Public Disclosure Authorized

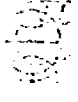
[illegible] Implications for Rural Development

[illegible]

[illegible]

Working Paper

[illegible]



THE WORLD BANK

GLOBAL ENVIRONMENT FACILITY

Environmental Indicators for Global Cooperation

Eric Rodenburg
Dan Tunstall
Frederik van Bolhuis

Working Paper
Number 11

UNEP

THE WORLD BANK

The Global Environment Facility
1818 H Street NW
Washington DC 20433 USA

Manufactured in the United States of America
First printing March 1995

ISBN 1-884122-12-4
ISSN 1020-0894

The prominence given to countries in global fora has traditionally been based on economic and political considerations. This paper examines a broader approach that includes two important environmental factors—a country's contribution to global pollution, and the global environmental benefits derived from its natural areas and biodiversity.

Eric Rodenburg and Dan Tunstall are Senior Associates at the World Resources Institute (WRI), and Frederik van Bolhuis is Senior Environmental Economist at the Secretariat of the Global Environment Facility (GEF). The authors gratefully acknowledge the valuable input of Allen Hammond (WRI), and other WRI and GEF colleagues, including Parul Subramanian who edited the paper. They are particularly indebted to the World Conservation Monitoring Centre in Cambridge, England, for permission to use their work on biodiversity indicators. They also wish to thank participants at the January 1993 workshop on global environmental indicators, who provided thoughtful suggestions on ways to improve the paper—Karan Capoor, Willy Cruz, Herman Daly, Hillary French, Lee Kimball, Walter Lusigi, Gareth Porter, and Philip Warburg.

Contents

EEZ	Exclusive economic zone
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GNP	Gross national product
OECD	Organization for Economic Cooperation and Development
WCMC	World Conservation Monitoring Centre
WRI	World Resources Institute

Introduction

The increasing recognition of the transboundary nature of environmental and natural resource problems has led to calls for new institutional structures and mechanisms to effectively address these concerns. Several global initiatives have been launched over the last five years to manage and protect resources for the benefit of current and future generations. These include legal agreements such as the Convention on Biological Diversity, the Framework Convention on Climate Change, and the Montreal Protocol on Substances that Deplete the Ozone Layer, as well as organizational structures such as the Commission on Sustainable Development and the Global Environment Facility (GEF). Memberships of these bodies differ, as do their rules for policy- and decision-making. Nevertheless, all attempt to develop governance arrangements that are equitable, effective, and transparent.

This paper originated in the search for a basis for forming new country groupings, or constituencies, for representation in the Council of the GEF. Countries participating in the GEF decided, at the time of its restructuring in 1994, that the GEF would have a 32-member Council to represent all its member countries. Fourteen of these seats were to be allocated to developed countries, sixteen to developing countries, and two to economies in transition. Among the developed countries, seats were to be assigned on the basis of each country's financial contribution to the Trust Fund of the GEF. For the developing countries and the economies in transition, it was agreed that several other factors, including each country's natural resources, would be taken into account.[1] But no weights were assigned to any of these criteria.

This paper is based on the research undertaken to develop yardsticks for the contribution to the global environment by some of these factors, namely the positive contribution of a country's natural habitat and the negative contribution of its polluting activities. This work is clearly only a first step, and further work remains to be done. But it may help to move us closer to an index that could lead to environmental resources being taken into account in traditional forms of national economic accounting.

Country shares

Any efforts aimed at achieving international cooperation must sooner or later address the question of how weights should be assigned to individual countries. These weights, or country shares, can be calculated as a country's percentage share of a global or regional aggregate. This aggregate could be based on any chosen criterion, such as size of economy,

[1] The six criteria mentioned were: (a) equitable and balanced representation from within the geographic region; (b) commonality of global, regional, and subregional environmental concerns; (c) policies and efforts toward sustainable development; (d) natural resource endowment and environmental vulnerability; (e) contributions to the GEF as defined in paragraph 25 (c)(iii) of the Instrument; and (f) all other relevant and environment-related factors (Global Environment Facility, *Instrument for the Establishment of the Restructured Global Environment Facility* (Washington, D.C., 1994) Annex E, paragraph 3).

population, or area, depending on its intended use. Country shares have many potential applications, including:

- International governance
- Intercountry comparisons and country ranking
- Policy formulation
- Determination of financial contributions for burden-sharing
- Decision-making mechanisms such as voting.

Environmental indicators and country shares

Historically, country shares tended to be based on economic yardsticks, usually derived from the country's gross national product (GNP). In recent years, it has been recognized that this measure fails to take into account important non-monetized services for sustaining natural resources and ecosystems, both at the country and global levels. This is a significant failing since economic production is not based on economic capital alone, but also on human and natural capital. While the return on economic and human capital is at least partly reflected in a country's conventional economic performance statistics (a better educated, healthier population has higher economic productivity), that on natural capital is usually disregarded. "Natural capital" is here narrowly defined as the non-commercialized part of the natural environment that provides environmental services not captured in standard GNP accounts. Returns on the commercialized natural environment (such as agricultural lands, and reserves of hydrocarbons and minerals) are reflected in GNP statistics and therefore counted as part of a country's economic production and wealth.

Industrialized donor countries gain recognition for contributing funds to help mitigate environmental damage. It could be argued that countries should also be recognized for the non-monetized environmental services to the global ecosystem that emanate from their natural capital, as well as for any negative environmental services in the form of their contribution to global environmental pollution.[2]

To use a terminology derived from natural resource accounting, the industrialized countries have, over the past 200 years, converted a large part of their natural environment into human and human-made capital. The return on the resulting monetary economy permits a high per capita monetary income, a small part of which is provided to fund environmental rehabilitation. Developing countries, by and large, have advanced less along this route of converting their natural environment into human and human-made capital. While this constrains their ability to contribute funding services, they contribute more (non-monetized) ecosystem services. This paper examines how these ecosystem services could be taken into account in a calculation of their country shares. Likewise, it examines how the shares of countries that emit large amounts of environmental pollutants could reflect both their use of scarce global sinks to the detriment of current and future generations, and the spillover damage to the global commons.

In its early stages of development, a country typically brings into use large tracts of natural habitat. In the traditional scheme of allocating country shares based on economic size, such a transition translates into a share gain. However, under an environmentally-adjusted scheme for country shares this effect would be reduced, because each country would not only gain shares due to its growing economy, but also lose shares due to its shrinking natural capital and increasing pollution.

Tracking these environmental indicators could provide useful guidance for the sound management of natural assets, both at the national and global levels. This is especially so in the absence of a full-fledged system of environmental accounting, which could still take many years to establish.[3]

[2] Other non-monetized services include household work, subsistence agriculture, and so on.

[3] See Yusuf J. Ahmad, Salah El Serafy and Ernst Lutz, eds., *Environmental Accounting for Sustainable Development* (UNEP-World Bank symposium, Washington, D.C.: World Bank, 1989); Robert Repetto, William Magrath, Michael Wells, Christine Beer and Fabrizio Rossini, *Wasting Assets: Natural Resources in the National Income Accounts* (Washington, D.C.: World Resources Institute, 1989); and *Handbook of National Accounting: Integrated Environmental and Economic Accounting* (New York: United Nations, 1993).

1 Developing Global Environmental Indicators

The environmental dimension can be included in global cooperation mechanisms in many ways.[4] This paper proposes a way to take into account both certain negative and positive environmental services that emanate from a country:

- The traditional measure of economic production may be modified to take into account the extent to which a country is providing non-monetized negative environmental services (in terms of pollution of the global commons). This we term the country's Pollution-Adjusted Economy Indicator.
- An estimate of a country's wealth in terms of its natural capital may be used as a proxy for its positive environmental services, thus providing the country's Natural Capital Indicator.

Despite the lack of comprehensive environmental data, approximations can be made as a first step toward developing these indicators. This paper presents calculations of both the indicators, along with an example of how they might be used in combination with a classical measure of economic weight for determining environmentally-adjusted country shares. Our simulation accords equal weight to a country's Pollution-Adjusted Economy Indicator, Natural Capital Indicator, and GNP. Clearly, the chosen weighting of 1:1:1 is only one of many possible options.

The results of these calculations for 172 countries are provided in tables in Appendixes I and II. Countries are ranked on the basis of Pollution-Adjusted Economy shares, Natural Capital shares, and shares that take into account both these indicators. Appendix I presents a global ranking; Appendix II shows rankings among the industrialized countries (members of the Organization for Economic Cooperation and Development (OECD)), as well as rankings among developing countries and economies in transition (non-OECD countries).[5] Tables 1A and 2A present country rankings based on Pollution-Adjusted Economy shares—table 1A for all countries, and table 2A for rankings among OECD and non-OECD countries. Tables 1B and 2B show rankings in the same country categories based on Natural Capital shares. Tables 1C and 2C present a ranking based on country shares that have taken into account all three elements: the Pollution-Adjusted Economy Indicator, the Natural Capital Indicator, and GNP; the first column in these tables provides GNP shares for comparison.[6]

[4] There exist examples of international governance that, to some degree, set a precedent for basing voting shares on a multi-dimensional equation to include natural resources. One is the voting allocation formula of the International Tropical Timber Agreement (1983). Article 10 of this agreement may be summarized as follows: I. Producing members have 1000 votes—400 votes distributed equally among Africa, Asia-Pacific, and Latin America; 300 votes based on shares of total tropical forest resources; and 300 votes in proportion to timber exports. II. Consuming members have 1000 votes—10 initial votes for each, and the remainder distributed in proportion to timber imports.

[5] For this study, Mexico, a recent member of the OECD, is still included in the list of developing countries.

[6] Data used in the tables are derived from *World Resources 1994–95* (Washington, D.C.: World Resources Institute, 1994), unless otherwise indicated.

Pollution-Adjusted Economy Indicator

GNP has long proved a useful yardstick for economic production. It measures the value of goods and services produced by a country during a given year. However, it does not take into account the value of environmental services that were used in the process, nor the actual and potential damage resulting from the production process.

Individual countries emit pollutants or degrade natural resources, thus reducing the environmental services that emanate from their natural capital. Among the important pollutants that degrade the global commons are carbon dioxide, methane, carbon monoxide, and other greenhouse gases; chlorofluorocarbons; toxic pollutants; and excessive nutrients and acids. It could be argued that countries that are high emitters of carbon dioxide use more than their share of the limited capacity of the atmosphere as a sink for their wastes, without paying for this use.

To develop a Pollution-Adjusted Economy Indicator, we have chosen to apply a per capita carbon dioxide pollutant factor to GNP. In this first attempt, a country's carbon dioxide emissions have thus been used as a proxy indicator for the whole range of pollutants that degrade the environment of other countries and the global commons. The proposed Pollution-Adjusted Economy Indicator for a country is based on the following relationships and variables:

> Pollution-Adjusted Economy Indicator = GNP x Average/Actual per capita carbon dioxide emissions
>
> Average per capita emissions = World median, or 2.1984 tonnes per annum
>
> Actual per capita emissions = Estimated carbon dioxide emissions/Total population.

For any country, current GNP (in this case, 1991 GNP) is multiplied by the ratio of average per capita carbon emissions divided by the actual per capita emissions for roughly the same year (see table 1A).[7] Average per capita carbon dioxide emissions are calculated as the world median, which was 2.1984 tonnes in 1991. Actual per capita carbon dioxide emission figures are based on estimated releases from the burning of fossil fuels and the production of cement, divided by the total population of the country. These data are reasonably accurate and can be estimated for most countries annually, based on recent population censuses and projections, and the type of fuels consumed in the economy.[8]

In the example of Brazil, 1991 estimates of actual per capita carbon dioxide emissions are 1.43 tonnes. The ratio of average to actual is calculated by dividing average emissions (2.20 tonnes) by actual emissions (1.43 tonnes), giving a ratio of 1.54. This boosts Brazil's Pollution-Adjusted Economy Indicator and gives it an adjusted country share of 6.56 percent of the global total. In the case of the United States, on the other hand, the country share drops from 25.9 percent to an adjusted country share of 6.06 percent on the basis of a similar calculation: actual per capita carbon dioxide is estimated at 19.53 tonnes per annum; the ratio of average (2.20 tonnes) over actual (19.53 tonnes) equals 0.11, reducing its Pollution-Adjusted Economy Indicator and therefore its adjusted country share.

Those countries that emit a large amount of carbon dioxide on a per capita basis, irrespective of how efficiently they manage their energy production and consumption sectors, are penalized by this approach. They are in effect being made to pay for using too large a share of scarce global resources. Even Japan, a very energy-efficient country, has a relatively low Pollution-Adjusted Economy

[7] The ratio of average to actual is only one of many ways to modify indicators of economic production. The purpose here is to broadly account for all current and future damage to the global environment. Alternatively, one could develop an environmental indicator based on the cost of controlling carbon dioxide emissions. Using data from the Intergovernmental Panel on Climate Change (IPCC) and other sources, the average cost of controlling carbon dioxide emissions is estimated at US$215 per ton. It turns out that when this figure is applied, the ranking of countries remains essentially the same as when the unmodified GNP is used.

[8] Each ton of natural gas contains a certain amount of carbon. (In methane, the primary component of natural gas, carbon makes up about 75 percent by weight.) This carbon, when burned with oxygen, forms carbon dioxide. The burning of fossil fuels for energy inevitably results in emissions of carbon dioxide regardless of the efficiency of the combustion process. For example, while a gas turbine might extract more energy from a ton of natural gas than would burning that same ton of gas to heat water to run a steam turbine, both processes would produce exactly the same amount of carbon dioxide.

Indicator because its per capita carbon dioxide emissions are 8.79 tonnes per year, far above the world median. Large, densely populated, less developed countries such as Bangladesh, India, and Indonesia emit carbon dioxide on a per capita basis at rates below the world median and so have a higher Pollution-Adjusted Economy Indicator. China, with emissions at the world median level, has a ratio of 1.00, while its adjusted GNP is equal to its regular GNP, thereby representing a share of 4.06 percent of the gross world product (GWP).

Table 2A highlights differences between the industrialized and developing countries. The former emit carbon dioxide at rates that are higher than the world median and therefore have a lower Pollution-Adjusted Economy Indicator. Their country shares are therefore reduced. Many of the economically poorer countries, such as Burundi, Cambodia, Chad, Mali, Nepal, and Uganda use fossil fuels sparingly, which raises their Pollution-Adjusted Economy Indicator and so also their country shares.

Adjusting for negative environmental services due to pollution is the first proposed modification. The second involves bringing into the equation a measure of the positive environmental services that emanate from a country's natural capital.[9]

Natural Capital Indicator

The natural assets of a country include all the mineral and biological resources under its sovereignty: land, water, air, coastal zones (including the exclusive economic zone (EEZ) as defined by the United Nations Convention on the Law of the Sea), soils and subsoil minerals, and all living resources. A Natural Capital Indicator, as we have chosen to define it, refers to the non-commercial portion of these assets.

The rationale for this definition is that we are aiming to include that part of natural resources—and its derived ecosystemic return—which is not already captured in conventional economic indicators for the country. Our definition of natural capital therefore excludes: fossil fuels, metals and valuable minerals, agricultural lands, forest plantations, aquaculture areas, and cities and metropolitan areas. In other words, this indicator excludes any lands and waters that are domesticated and reserved primarily for economic output. Groundwater aquifers are also excluded because their contents are only withdrawn for essentially economic purposes such as irrigation, electric power cooling, and domestic use.

What natural assets will then be captured by a country's Natural Capital Indicator? We have included: forests (both closed and open), coastal zones, natural wetlands, relatively unmanaged rangelands, protected areas, protected watersheds, and any other areas that are left in or managed in a natural (non-domesticated) state. We also include marginal lands that may no longer be natural, but whose ecosystemic services (derived from cultivation and harvesting) are rarely counted in national economic figures. Obviously, the distinction between what is domesticated and what is natural can sometimes be blurred.[10]

A country's natural capital could be measured in terms of its extent (area) and diversity (type or classification). It could also be measured in terms of its quality or condition (degradation). However, degradation has been omitted in order to keep the Natural Capital Indicator simple. Degradation is very difficult to measure in any manner that might allow a fair comparison between ecosystems and nations. In any case, as degradation increases, agricultural productivity tends to decline, so that GNP figures already incorporate some measure of this component.

In this first attempt at computing the Natural Capital Indicator, we are basing it solely on a country's remaining natural areas (measured in hectares), as adjusted by the ratio of actual biodiversity and average biodiversity. If a country's territory constituted 5 percent of the sovereign territory of the world, its average (or "expected") biodiversity

[9] This constitutes a first approximation of one of the corrections required in the traditional system of national accounting as we move toward establishing a future system of environmental accounting.

[10] While commercialized natural resources tend to have a lower level of biodiversity than would be found in natural areas, the choice of cropping systems is important for functional diversity and for both domestic, and to a lesser degree, wild species richness.

share would also be 5 percent. The Natural Capital Indicator is thus calculated as each country's part of the world's total of remaining natural areas, adjusted for its biodiversity richness.

The Natural Capital Indicator (NCI) is based on the following variables and relationships:

NCI = Remaining natural areas (RNA) x Biodiversity indicator (BDI)

RNA = National territory (NT) - Commercial lands (CL)

NT = Land and freshwater + Marine resources area

CL = Cropland (temporary and permanent) + Permanent pasture + Cities and metropolitan areas

BDI = Actual/Average biodiversity

Actual biodiversity = Number of species (mammal, bird, reptile, amphibian, and vascular plant) per area + Number of endemic species (mammal, bird, reptile, amphibian, and vascular plant) per area

Average biodiversity = Average number of species for a country with a given territory.

The assumptions and judgments made in defining these terms are summarized below.

1. National territory includes all land and freshwater areas within national boundaries. Water is measured in area, not volume. The available statistics on national territory are usually quite accurate.
2. National territory, as defined here, also includes that part of the oceans that is under the sovereign jurisdiction of a country. This is an important resource for many countries, being home to most of the world's marine biodiversity. The area of these marine territories can be measured using statistics for the EEZ, or the shelf up to 200 meters in depth. In this paper we have used the EEZ area, defined as a country's marine territory up to 200 miles offshore. Note that EEZ estimates for some countries, especially small islands states, are greater than the land areas of these countries. Neither estimates of EEZ nor continental shelf area are available for some small coastal countries.
3. Natural areas are defined as areas that are not domesticated and are left, therefore, in a relatively undisturbed natural state. There are no generally accepted international classifications for this concept. While treated in the above equation as a residual, natural areas include: forest and woodland (including lands logged but expected to grow back), protected areas and areas used for subsistence living, wetlands, undeveloped coastal zones, grasslands (that are not permanent pasture), desert, rock and ice, lakes and rivers, and any other categories of land that could reasonably be deemed "other natural lands." Statistics from the Food and Agriculture Organization of the United Nations (FAO) and data from other international sources can be used to develop crude estimates of each type of natural area, although many such measurements are still in dispute. Cropland and permanent pasture statistics used in this paper are taken from FAO.[11]
4. We have no accurate or comparable measure for cities. No independent variable has therefore been developed, and we are for now unable to exclude cities and metropolitan areas from "other natural lands." While this poses a conceptual problem, statistically it rarely makes a significant difference except in the case of small island states such as Singapore. The Digital Chart of the World, developed by the U.S. Defense Mapping Agency, provides estimates of the areas of cities and towns in cartographic form, but

[11] Two other possibilities for defining natural areas could be explored. Any non-vegetative land (perhaps derived from satellite imagery of vegetation) could be excluded from a country's measure of natural lands, or current estimates of the extent of natural habitat could be taken from *World Resources 1990-91* (Washington, D.C.: World Resources Institute). WRI is currently updating these estimates and hopes to have habitat estimates for most countries within two years.

area has not yet been calculated or compiled for all countries.

5. Biological diversity can be measured using many different indicators, depending on whether the purpose is to assess genetic, species, or ecosystem diversity.[12] This paper uses one of the few indicators of broad coverage currently available—the species richness and species endemism indicators developed by the World Conservation Monitoring Centre (WCMC).[13] The biodiversity indicator gives equal weight to both the total species richness and endemic species richness of a country. For each country, actual species diversity per unit area is based on the number of species—mammal, bird, reptile, amphibian, and vascular plant—per 10,000 square kilometers (km^2), plus the number of endemic species per 10,000 km^2. As a result, endemic species are double counted in this indicator. Average or expected biodiversity is calculated for all countries as the average number of species per 10,000 km^2. Invertebrates, non-flowering plants, and marine and freshwater fish have had to be left out due to a lack of data.[14] Very small countries are not included because the relationship between species and area breaks down.
6. The term "biodiversity," as used in this paper, represents either diversity within ecosystems or the diversity of ecosystems within a country. It does not, however, reflect the uniqueness of the ecosystem or the species. Certain ecosystems with fewer species, such as those at the higher latitudes, thus tend to be undervalued.
7. Including biodiversity admittedly increases the complexity of the Natural Capital Indicator, but it achieves the objective of giving those countries that have a large number of species, and endemic species in particular, added weight. Because biodiversity is measured in different units (number of species) than natural areas, a judgment needs to be made concerning the relative weight to accord to the two factors. In this paper, equal weight is given by *multiplying* the natural area by the ratio of actual biodiversity and expected biodiversity.
8. The number of species of mammals, birds, and vascular plants is well known for most countries around the world. The numbers of reptiles and amphibians are less well known.

It should be pointed out that country share rankings could vary considerably depending on how the land's ecosystemic wealth is brought into the equation, or on the weights given to each phylum within the biodiversity indicator, or on the relative weight given to endemic species versus total species within a country. In the case of the biodiversity indicator, much depends on how accurately the WCMC indicator that is used here reflects the relative diversity of life within each country—which in turn depends upon the accuracy of the underlying data.

Although the quality and availability of data affect this indicator, they do not pose too serious a constraint. Missing data such as EEZ area can be calculated quite accurately. Relative measures of built-up areas can easily be derived from the Digital Chart of the World. Information on the number of species (both total and endemic) and land use will improve as ongoing research yields more results. The use of a Natural Capital Indicator could even provide an impetus to accelerate such research. As data improve, they can be incorporated into the

[12] See, for example, *Biodiversity Indicators for Policy-Makers* by Walter V. Reid, Jeffrey A. McNeely, Daniel B. Tunstall, Dirk A. Bryant and Manuel Winograd (Washington, D.C.: World Resources Institute, 1993).

[13] *Development of a National Biodiversity Indicator* (Cambridge, U.K.: World Conservation Monitoring Centre, in press). WCMC's biodiversity indicator provides some measure of endemism, which is important when considering a country's natural capital. However, data is only available for species unique to a given country (national endemism) rather than species with limited ranges (biological endemism). This tends to favor the larger countries.

[14] This paper weighs both natural land and marine resource area by terrestrial diversity, as no country-specific estimates are available for marine species richness (with the exception of near-shore fish species, available for a few countries). The indicator assumes that terrestrial and marine diversity are closely correlated. This is clearly an oversimplification. Terrestrial diversity is highest in tropical forests, while coral reefs are centers of high marine biodiversity. Both ecosystems are found in the tropics, but not necessarily close together. For example, coral reefs are found off the shores of countries bordering the Red Sea. The vegetation found on inland areas in these countries is low in diversity, consisting mainly of desert and shrub vegetation. The use of this indicator thus undervalues the coastal biodiversity of this region.

calculation of country shares without requiring changes in the methodology of the calculation.

The results of the calculations for the Natural Capital Indicator are shown in table 1B. First, a figure for all remaining natural areas is calculated for each country (this includes the EEZ area). This figure is multiplied by the biodiversity indicator (actual biodiversity divided by average biodiversity) to create a biodiversity-adjusted area score, or Natural Capital Indicator. This indicator is then used to calculate the country's share of the global total.

The results indicate that large countries, with substantial areas of natural habitat and extensive biodiversity, tend to score high. Brazil has a country share of 12.25 percent, and Indonesia one of 10.50 percent. The next highest scores are for the United States (7.94 percent), Australia (7.09 percent), the Russian Federation (5.35 percent), China (5.31 percent), Mexico (4.39 percent), Papua New Guinea (2.91 percent), India (2.41 percent), South Africa (2.37 percent), and Peru (2.19 percent).

Cold countries in the northern latitudes such as Canada, Finland, Iceland, Mongolia, Norway, and Sweden have relatively little biodiversity and therefore lower country shares. Large semi-arid countries such as Algeria, Egypt, Libya, and Mauritania have low biodiversity scores because the number of species is less than expected for the size of the country. Canada, with large remaining natural areas, but a low biodiversity score (0.28 percent), has a country share of 1.03 percent.

2 Using Global Environmental Indicators

Country shares reflecting the Pollution-Adjusted Economy Indicator and the Natural Capital Indicator could be used in many ways, for example, in governance arrangements, in intercountry comparisons and ranking, in the formulation of policy, in the determination of financial contributions for burden-sharing, and in decision-making mechanisms such as voting. The example presented in this paper uses a combined measure of economic and environmental weight to rank countries. Such a ranking can provide pointers for the role and contribution of countries in environmental cooperation. Our simulation accords equal weight to a country's Pollution-Adjusted Economy Indicator, Natural Capital Indicator, and GNP. As mentioned before, this weighting of 1:1:1 is merely one of many possible combinations.

Table 1C presents a global ranking based on percentage shares for 172 countries. The United States has the largest share (13.44 percent), followed by Japan (8.44 percent), Brazil (6.96 percent), Indonesia (4.53 percent), Germany (4.07 percent), China (3.78 percent), India (3.71 percent), and France (3.28 percent). Although the United States still ranks first, its share is halved in comparison to its GNP share. A similar reduction is experienced by most industrialized countries. Australia and New Zealand are exceptions—both countries more than double their shares. Developing countries that are rich in biodiversity and have low per capita energy consumption gain most from this approach. These countries include Ecuador, Indonesia, Madagascar, Nepal, Papua New Guinea, Peru, Sudan, and Zaire. Small island states with large marine territories also score high.

The first 10 countries have a combined percentage share of half, while the first 20 have a combined share of more than two-thirds. Of the top 30 countries, 19 are developing countries (with the Republic of Korea being counted as a developing country), and 10 are industrialized countries. The Russian Federation is included in the top 30 countries.

As a group, the share of industrialized countries is nearly halved, going from an 80 percent GNP share to 45 percent. The share of developing countries, meanwhile, has nearly tripled from 20 percent to 54 percent (see table 2C). The economies in transition in Eastern and Central Europe show a decline in country shares similar to that of most industrialized countries. The Gulf states too, being low in biodiversity, show a halving of their GNP share.

3 Conclusion

Any formula for calculating country shares on the basis of economic and environmental indicators will be controversial. However, the examples presented in this paper—the Pollution-Adjusted Economy Indicator and the Natural Capital Indicator—could prove useful in global environmental cooperation by incorporating an environmental dimension into the usual economic comparators.

This study uses the two indicators together, but experts working on issues related to climate change and biodiversity may wish to pursue their development and application separately.

One of the benefits of using environmental indicators to modify more traditional economic country rankings is that some tradeoffs become clearer. If a country pursues a sustainable development path, its share will rise. But if its growth leads to an increase in global pollution, or comes at the expense of its remaining natural areas and biodiversity, the country's share is likely to decline. The challenge for every country is to seek economic growth in ways that can be sustained without drawing down natural capital or excessively polluting the rest of the world.

Many developing countries have indicated a desire for alternatives to schemes for weighting votes. This may be partly because weights have traditionally been based on economic, political, or military factors, which tend to favor the industrialized countries. The approach suggested in this paper may help to address concerns about weighting, and contribute to more effective global environmental action. Global environmental management, with its intricate links to global economic management, is a newly recognized challenge requiring fresh approaches to international cooperation. The environmentally-adjusted country shares proposed here may mark a first step in this direction.

Appendix I

Country Shares—Global Ranking

Table 1A Country shares based on Pollution-Adjusted Economy Indicator (PEI)

	Country	*1991 GNP ($ millions) (1)*	*Per capita CO_2 emissions (tonnes) (2)*	*Ratio of world median/ Actual per capita CO_2 emissions (3)*	*Pollution-Adjusted GNP Indicator (4) = (1) x (3)*	*Pollution-Adjusted GNP share (percent) (5) = (4)/Total of (4)*
1	Japan	3,336,960	8.79	0.25	834,240	8.00
2	India	282,681	0.81	2.73	770,948	7.39
3	Brazil	444,781	1.43	1.54	684,278	6.56
4	United States	5,620,400	19.53	0.11	632,690	6.06
5	China	424,036	2.20	1.00	424,036	4.06
6	France	1,162,840	6.56	0.34	389,779	3.74
7	Bangladesh	23,814	0.15	15.00	357,207	3.42
8	Germany	1,895,051	12.13	0.18	343,514	3.29
9	Italy	1,069,670	6.96	0.32	337,791	3.24
10	Indonesia	111,057	0.92	2.40	266,537	2.55
11	United Kingdom	952,914	10.00	0.22	209,432	2.01
12	Nepal	3,453	0.04	60.00	207,193	1.99
13	Spain	485,990	5.64	0.39	189,347	1.81
14	Ethiopia	6,257	0.07	30.00	187,714	1.80
15	Pakistan	46,207	0.55	4.00	184,826	1.77
16	Uganda	2,949	0.04	60.00	176,928	1.70
17	Zaire	8,123	0.11	20.00	162,460	1.56
18	Cameroon	10,146	0.15	15.00	152,192	1.46
19	Sudan	10,107	0.15	15.00	151,605	1.45
20	Philippines	46,138	0.70	3.16	145,698	1.40
21	Mali	2,412	0.04	60.00	144,708	1.39
22	Mexico	252,635	3.92	0.56	141,664	1.36
23	Thailand	89,548	1.83	1.20	107,458	1.03
24	Cambodia	1,725	0.04	60.00	103,500	0.99
25	Kenya	8,505	0.18	12.00	102,066	0.98
26	Korea, Rep.	274,056	6.05	0.36	99,657	0.96
27	Turkey	101,967	2.49	0.88	89,971	0.86
28	Peru	35,007	0.88	2.59	87,518	0.84
29	Nigeria	31,884	0.81	2.73	86,957	0.83
30	Russian Federation	479,546	12.31	0.18	85,633	0.82
31	Switzerland	228,219	6.16	0.36	81,507	0.78
32	Canada	558,014	15.21	0.14	80,677	0.77
33	Burkina Faso	2,675	0.07	30.00	80,244	0.77
34	Madagascar	2,584	0.07	30.00	77,514	0.74
35	Tanzania	2,561	0.07	30.00	76,821	0.74
36	Sweden	216,801	6.23	0.35	76,518	0.73
37	Iran, Islamic Rep.	125,375	3.70	0.59	74,480	0.71
38	Sri Lanka	8,665	0.26	8.57	74,271	0.71
39	Chad	1,212	0.04	60.00	72,699	0.70
40	Burundi	1,201	0.04	60.00	72,037	0.69
41	Netherlands	282,941	9.23	0.24	67,367	0.65
42	Ghana	6,176	0.22	10.00	61,759	0.59
43	Morocco	26,451	0.95	2.31	61,041	0.59
44	Malawi	1,991	0.07	30.00	59,729	0.57

(continued on next page)

(Tabel 1A continued)

	Country	1991 GNP ($ millions) (1)	Per capita CO_2 emissions (tonnes) (2)	Ratio of world median/ Actual per capita CO_2 emissions (3)	Pollution-Adjusted GNP Indicator (4) = (1) x (3)	Pollution-Adjusted GNP share (percent) (5) = (4)/Total of (4)
45	Rwanda	1,930	0.07	30.00	57,909	0.56
46	Argentina	91,211	3.55	0.62	56,419	0.54
47	Algeria	50,818	2.16	1.02	51,679	0.50
48	Colombia	41,267	1.76	1.25	51,584	0.49
49	Haiti	2,471	0.11	20.00	49,429	0.47
50	Egypt	32,691	1.54	1.43	46,701	0.45
51	Austria	157,568	7.80	0.28	44,385	0.43
52	Guatemala	8,839	0.44	5.00	44,194	0.42
53	Australia	294,856	15.10	0.15	42,940	0.41
54	Yugoslavia	70,038	3.66	0.60	42,023	0.40
55	Belgium	189,562	10.22	0.22	40,766	0.39
56	Benin	1,838	0.11	20.00	36,767	0.35
57	Central African Rep.	1,218	0.07	30.00	36,550	0.35
58	Mozambique	1,212	0.07	30.00	36,359	0.35
59	Cote d'Ivoire	8,482	0.51	4.29	36,353	0.35
60	Niger	2,361	0.15	15.00	35,416	0.34
61	Senegal	5,527	0.37	6.00	33,162	0.32
62	Guinea	2,691	0.18	12.00	32,296	0.31
63	South Africa	99,366	7.18	0.31	30,418	0.29
64	Paraguay	5,566	0.40	5.45	30,361	0.29
65	Portugal	58,451	4.25	0.52	30,233	0.29
66	Malaysia	45,787	3.33	0.66	30,189	0.29
67	Lao Peo.'s Dem. R.	939	0.07	30.00	28,183	0.27
68	El Salvador	5,723	0.48	4.62	26,412	0.25
69	Chile	28,945	2.42	0.91	26,313	0.25
70	Finland	120,584	10.41	0.21	25,475	0.24
71	Zambia	3,394	0.29	7.50	25,455	0.24
72	Denmark	122,141	12.24	0.18	21,941	0.21
73	Ukraine	121,458	12.31	0.18	21,689	0.21
74	Greece	65,504	7.18	0.31	20,052	0.19
75	Venezuela	53,957	6.16	0.36	19,270	0.18
76	Saudi Arabia	120,286	13.96	0.16	18,943	0.18
77	Poland	68,427	8.06	0.27	18,662	0.18
78	Togo	1,553	0.18	12.00	18,639	0.18
79	Honduras	3,072	0.37	6.00	18,429	0.18
80	Israel	59,129	7.29	0.30	17,828	0.17
81	Yemen	6,523	0.81	2.73	17,790	0.17
82	Dominican Rep.	6,743	0.84	2.61	17,590	0.17
83	Norway	103,207	13.74	0.16	16,513	0.16
84	Tunisia	12,333	1.80	1.22	15,101	0.14
85	Ecuador	10,768	1.65	1.33	14,358	0.14
86	Syrian Arab Rep.	14,562	2.31	0.95	13,868	0.13
87	Uruguay	8,823	1.43	1.54	13,573	0.13
88	Sierra Leone	903	0.15	15.00	13,552	0.13
89	New Zealand	42,074	6.96	0.32	13,287	0.13

(Table 1A continued)

Country	1991 GNP ($ millions) (1)	Per capita CO_2 emissions (tonnes) (2)	Ratio of world median/ Actual per capita CO_2 emissions (3)	Pollution-Adjusted GNP Indicator (4) = (1) x (3)	Pollution-Adjusted GNP share (percent) (5) = (4)/Total of (4)
90 Bolivia	4,793	0.81	2.73	13,073	0.13
91 Papua New Guinea	3,307	0.59	3.75	12,401	0.12
92 Romania	32,034	5.94	0.37	11,864	0.11
93 Costa Rica	5,662	1.06	2.07	11,715	0.11
94 Hungary	28,142	6.05	0.36	10,233	0.10
95 Ireland	39,162	9.23	0.24	9,324	0.09
96 Zimbabwe	6,577	1.65	1.33	8,769	0.08
97 Bhutan	259	0.07	30.00	7,761	0.07
98 Kazakhstan	41,691	12.31	0.18	7,445	0.07
99 Czechoslovakia	38,707	12.20	0.18	6,974	0.07
100 Nicaragua	1,735	0.55	4.00	6,941	0.07
101 Congo	2,623	0.88	2.50	6,558	0.06
102 Belarus	32,131	12.31	0.18	5,738	0.05
103 Singapore	39,249	15.06	0.15	5,730	0.05
104 Bulgaria	16,316	6.30	0.35	5,692	0.05
105 Mauritius	2,623	1.14	1.94	5,077	0.05
106 Uzbekistan	28,255	12.31	0.18	5,046	0.05
107 Comoros	245	0.11	20.00	4,898	0.05
108 Swaziland	872	0.44	5.00	4,362	0.04
109 Botswana	3,335	1.69	1.30	4,350	0.04
110 Jordan	3,835	2.42	0.91	3,486	0.03
111 Fiji	1,431	0.95	2.31	3,302	0.03
112 Gambia, The	322	0.22	10.00	3,218	0.03
113 Panama	2,130	1.47	1.50	3,195	0.03
114 Jamaica	2,759	1.91	1.15	3,183	0.03
115 Oman	9,685	7.40	0.30	2,877	0.03
116 Cape Verde	285	0.22	10.00	2,851	0.03
117 Namibia	2,166	X	X	2,166	0.02
118 Azerbaijan	12,065	12.31	0.18	2,154	0.02
119 Cyprus	6,135	6.34	0.35	2,128	0.02
120 United Arab Emir.	32,809	36.49	0.06	1,976	0.02
121 Gabon	4,419	5.02	0.44	1,935	0.02
122 Iceland	5,979	7.00	0.31	1,878	0.02
123 Guinea-Bissau	184	0.22	10.00	1,838	0.02
124 Lithuania	10,220	12.31	0.18	1,825	0.02
125 Mauritania	1,026	1.28	1.71	1,759	0.02
126 Moldova	9,529	12.31	0.18	1,702	0.02
127 Latvia	9,193	12.31	0.18	1,642	0.02
128 Georgia	9,000	12.31	0.18	1,607	0.02
129 Armenia	7,233	12.31	0.18	1,292	0.01
130 Kyrgyzstan	6,900	12.31	0.18	1,232	0.01
131 Malta	2,598	4.65	0.47	1,228	0.01
132 Turkmenistan	6,387	12.31	0.18	1,141	0.01
133 Estonia	6,088	12.31	0.18	1,087	0.01
134 Lesotho	1,050	X	X	1,050	0.01

(continued on next page)

(Tabel 1A continued)

Country	*1991 GNP ($ millions)* *(1)*	*Per capita CO_2 emissions (tonnes)* *(2)*	*Ratio of world median/ Actual per capita CO_2 emissions* *(3)*	*Pollution-Adjusted GNP Indicator* *(4) = (1) x (3)*	*Pollution-Adjusted GNP share (percent)* *(5) = (4)/Total of (4)*
135 Solomon Islands	226	0.48	4.62	1,041	0.01
136 Tajikistan	5,669	12.31	0.18	1,012	0.01
137 Luxembourg	12,238	27.48	0.08	979	0.01
138 Barbados	1,711	3.92	0.56	959	0.01
139 Equatorial Guinea	142	0.33	6.67	949	0.01
140 Bahamas, The	3,044	7.47	0.29	895	0.01
141 Vanuatu	174	0.44	5.00	870	0.01
142 Suriname	1,661	4.69	0.47	778	0.01
143 Guyana	346	1.06	2.07	717	0.01
144 St. Lucia	380	1.21	1.82	692	0.01
145 Trinidad and Tob.	4,602	14.73	0.15	687	0.01
146 Belize	389	1.36	1.62	631	0.01
147 Maldives	101	0.44	5.00	504	0.00
148 Dominica	175	0.81	2.73	478	0.00
149 Western Samoa	154	0.81	2.73	421	0.00
150 Bahrain	3,679	19.38	0.11	417	0.00
151 Seychelles	350	1.87	1.18	412	0.00
152 Kiribati	53	0.29	7.50	394	0.00
153 Qatar	7,473	44.66	0.05	368	0.00
154 Tonga	128	0.77	2.86	366	0.00
155 Grenada	198	1.32	1.67	330	0.00
156 St. Kitts and Nevis	156	1.76	1.25	195	0.00
157 Antigua and Barbuda	355	4.36	0.50	179	0.00
158 Korea, DPR	X	10.96	0.20	X	X
159 Viet Nam	X	0.29	7.50	X	X
160 Kuwait	X	5.68	0.39	X	X
161 Iraq	X	2.27	0.97	X	X
162 Angola	X	0.51	4.29	X	X
163 Libya	X	9.12	0.24	X	X
164 Somalia	X	0.07	30.00	X	X
165 Myanmar	X	0.11	20.00	X	X
166 Mongolia	X	4.36	0.50	X	X
167 Lebanon	X	3.00	0.73	X	X
168 Djibouti	X	0.81	2.73	X	X
169 Afghanistan	X	0.29	7.50	X	X
170 Cuba	X	3.22	0.68	X	X
171 Liberia	X	0.11	20.00	X	X
172 Albania	X	1.91	1.15	X	X

Source: World Resources 1994–95 *(Washington, D.C.: World Resources Institute, 1994).*

Notes:

i NA = not applicable.

ii X = no information available.

iii World median per capita CO_2 emissions = 2.1984 tonnes (1991).

Table 1B Country shares based on Natural Capital Indicator (NCI)

	Country	*Total area (ha) (1)*	*EEZ (ha) (2)*	*Cropland (ha) (3)*	*Permanent pasture (ha) (4)*	*Natural area (ha) (5) = (1)+(2)-(3)-(4)*	*Ratio of actual/ Average biodiversity score (6)*	*Natural Capital Indicator (7) = (6) x (5)*	*Natural Capital share (percent) (8) = (7)/ Total of (7)*
1	Brazil	851,197	316,840	58,450	182,900	926,687	4.35	4030380	12.25
2	Indonesia	190,457	540,860	21,700	11,800	697,817	4.95	3456310	10.50
3	United States	937,261	971,140	189,915	241,467	1,477,019	1.77	2611764	7.94
4	Australia	771,336	449,630	48,934	417,992	754,040	3.10	2334249	7.09
5	Russian Fed.	1,707,520	395,243	132,100	81,000	1,889,663	0.93	1761910	5.35
6	China	959,696	135,580	96,455	400,000	598,821	2.92	1745790	5.31
7	Mexico	195,820	285,120	24,710	74,499	381,731	3.78	1443341	4.39
8	Papua New Guin.	46,284	236,660	388	84	282,472	3.39	956786	2.91
9	India	328,759	201,490	168,990	12,038	349,221	2.27	792906	2.41
10	South Africa	122,104	155,340	13,174	81,378	182,892	4.26	779690	2.37
11	Peru	128,522	102,690	3,730	27,120	200,362	3.60	720630	2.19
12	Philippines	30,000	178,600	7,970	1,240	199,390	3.13	623446	1.89
13	Ecuador	28,356	115,900	2,720	5,100	136,436	4.26	581642	1.77
14	Japan	37,780	386,110	4,637	642	418,611	1.35	565066	1.72
15	Colombia	113,891	60,320	5,380	40,300	128,531	3.97	510898	1.55
16	New Zealand	27,099	483,320	425	13,677	496,317	1.01	501305	1.52
17	Madagascar	58,704	129,200	3,092	34,000	150,812	3.22	485915	1.48
18	Zaire	234,541	100	7,850	15,000	211,791	2.25	476087	1.45
19	Venezuela	91,205	36,380	3,895	17,650	106,040	3.97	421499	1.28
20	Kiribati	71	355,000	37	X	355,034	X	355034	1.08
21	Chile	75,695	228,820	4,525	13,450	286,540	1.20	343051	1.04
22	Canada	997,614	293,940	45,960	28,200	1,217,394	0.28	338481	1.03
23	Argentina	276,689	116,450	27,200	142,300	223,639	1.45	323770	0.98
24	Viet Nam	33,169	72,210	6,600	335	98,444	2.72	267599	0.81
25	Angola	124,670	60,570	3,400	29,000	152,840	1.63	249483	0.76
26	France	55,150	349,310	19,105	11,581	373,774	0.59	220005	0.67
27	Malaysia	32,975	47,560	4,880	27	75,628	2.69	203533	0.62
28	Solomon Islands	2,890	134,000	57	39	136,794	1.43	196071	0.60
29	Myanmar	67,655	50,950	10,034	361	108,210	1.63	176633	0.54
30	Bolivia	109,858	NA	2,296	26,650	80,912	2.03	164574	0.50
31	Sudan	250,581	9,160	12,900	110,000	136,841	1.11	151233	0.46
32	Tanzania	94,509	22,320	3,365	35,000	78,464	1.88	147325	0.45
33	Seychelles	28	134,930	6	X	134,952	X	134952	0.41
34	Tajikistan	143,100	NA	800	3,315	138,985	0.93	129589	0.39
35	Panama	7,708	30,650	654	1,560	36,144	3.53	127423	0.39
36	Ethiopia	122,190	7,580	13,930	44,950	70,890	1.79	126612	0.38
37	Portugal	9,239	177,420	3,171	849	182,639	0.68	124900	0.38
38	Costa Rica	5,110	25,890	528	2,320	28,152	4.35	122440	0.37
39	Spain	50,478	121,940	20,345	10,210	141,863	0.79	112715	0.34
40	Fiji	1,827	113,530	240	60	115,057	0.95	109446	0.33
41	Mauritius	186	118,300	106	7	118,373	0.90	107108	0.33
42	Iran, Islamic Rep.	164,800	15,570	15,050	44,000	121,320	0.87	105471	0.32

(continued on next page)

(Table 1B continued)

	Country	Total area (ha) (1)	EEZ (ha) (2)	Cropland (ha) (3)	Permanent pasture (ha) (4)	Natural area (ha) (5) = (1)+(2)-(3)-(4)	Ratio of actual/ Average biodiversity score (6)	Natural Capital Indicator (7) = (6) x (5)	Natural Capital share (percent) (8) = (7)/ Total of (7)
43	Somalia	63,766	78,280	1,039	43,000	98,007	1.07	105113	0.32
44	Sri Lanka	6,561	51,740	1,901	439	55,961	1.77	98954	0.30
45	Maldives	30	95,910	3	1	95,936	X	95936	0.29
46	Mozambique	80,159	56,200	3,100	44,000	89,259	1.05	93835	0.29
47	Cuba	11,086	36,280	3,329	2,971	41,066	2.23	91394	0.28
48	Algeria	238,174	13,720	7,605	31,175	213,114	0.41	86646	0.26
49	Gabon	26,767	21,360	452	4,700	42,975	1.86	79887	0.24
50	Cameroon	47,544	1,540	7,008	8,300	33,776	2.34	79024	0.24
51	Equatorial Guinea	2,805	28,320	230	104	30,791	2.56	78824	0.24
52	Turkey	77,945	23,660	27,885	8,600	65,120	1.16	75659	0.23
53	Norway	32,390	202,480	882	109	233,879	0 32	75551	0.23
54	Thailand	51,312	8,580	22,126	770	36,996	2.03	75250	0.23
55	Central Afr. Rep.	62,298	NA	2,006	3,000	57,292	1.31	75050	0.23
56	Niger	126,700	NA	3,605	8,900	114,195	0.66	75031	0.23
57	Denmark	4,309	146,420	2,555	219	147,955	0.50	73472	0.22
58	Pakistan	79,610	31,850	20,730	5,000	85,730	0.84	71608	0.22
59	Ghana	23,854	21,810	2,720	5,000	37,944	1.86	70535	0.21
60	Tonga	75	70,000	48	4	70,023	X	70023	0.21
61	Kazakhstan	271,730	NA	35,600	161,800	74,330	0.93	69305	0.21
62	Guyana	21,497	13,030	495	1,230	32,802	1.97	64747	0.20
63	United Kingdom	24,488	178,530	6,736	11,197	185,085	0.34	62854	0.19
64	Italy	30,127	55,210	12,033	4,877	68,427	0.90	61915	0.19
65	Jamaica	1,099	29,760	269	190	30,400	2.01	61218	0.19
66	Greece	13,199	50,510	3,933	5,255	54,521	1.08	59062	0.18
67	Libya	175,954	33,810	2,150	13,300	194,314	0.29	56231	0.17
68	Chad	128,400	NA	3,205	45,000	80,195	0.68	54842	0.17
69	Mali	124,019	NA	2,093	30,000	91,926	0.58	53037	0.16
70	Suriname	16,327	10,120	68	20	26,359	1.95	51512	0.16
71	Senegal	19,672	20,570	2,350	3,100	34,792	1.48	51387	0.16
72	Kenya	58,037	11,800	2,428	38,100	29,309	1.62	47366	0.14
73	Yemen	52,797	58,420	1,480	16,065	93,672	0.50	46984	0.14
74	Zambia	75,261	NA	5,268	30,000	39,993	1.17	46932	0.14
75	Bahamas, The	1,388	75,920	10	2	77,296	0.60	46416	0.14
76	Ukraine	60,370	29,203	34,807	6,900	47,866	0.93	44630	0.14
77	Cote d'Ivoire	32,246	10,460	3,660	13,000	26,046	1.68	43810	0.13
78	Nigeria	92,377	21,090	32,050	40,000	41,417	1.04	43107	0.13
79	Honduras	11,209	20,090	1,810	2,550	26,939	1.57	42249	0.13
80	Guatemala	10,889	9,910	1,875	1,390	17,534	2.39	41852	0.13
81	Egypt	100,145	17,350	2,585	X	114,910	0.36	41024	0.12
82	Zimbabwe	39,058	NA	2,810	4,856	31,392	1.25	39117	0.12
83	Sierra Leone	7,174	15,570	643	2,204	19,897	1.95	38883	0.12

(Table 1B continued)

Country	Total area (ha) (1)	EEZ (ha) (2)	Cropland (ha) (3)	Permanent pasture (ha) (4)	Natural area (ha) (5) = (1)+(2)-(3)-(4)	Ratio of actuall Average biodiversity score (6)	Natural Capital Indicator (7) = (6) x (5)	Natural Capital share (percent) (8) = (7)/ Total of (7)
84 Namibia	82,429	NA	662	38,000	43,767	0.89	38818	0.12
85 Congo	34,200	2,470	168	10,000	26,502	1.46	38753	0.12
86 Cape Verde	403	78,940	39	25	79,279	0.48	38205	0.12
87 Dominican Rep.	4,873	26,880	1,446	2,092	28,215	1.32	37332	0.11
88 Guinea	24,586	7,100	728	6,150	24,808	1.49	37009	0.11
89 Morocco	44,655	27,810	9,087	20,900	42,478	0.84	35481	0.11
90 Vanuatu	1,219	68,000	144	25	69,050	0.50	34634	0.11
91 Liberia	9,775	22,970	373	5,700	26,672	1.28	34248	0.10
92 Oman	21,246	56,170	58	1,000	76,358	0.43	32965	0.10
93 Lao PDR	23,680	NA	901	800	21,979	1.48	32463	0.10
94 Botswana	58,173	NA	1,380	33,000	23,793	1.30	30858	0.09
95 Saudi Arabia	214,969	18,620	2,335	85,000	146,254	0.21	30427	0.09
96 Nicaragua	13,000	15,980	1,273	5,350	22,357	1.32	29581	0.09
97 Comoros	223	24,900	100	15	25,008	1.08	27091	0.08
98 Guinea-Bissau	3,612	15,050	335	1,080	17,247	1.55	26780	0.08
99 Uganda	23,588	NA	6,705	1,800	15,083	1.72	25883	0.08
100 Paraguay	40,675	NA	2,216	20,800	17,659	1.32	23365	0.07
101 Cambodia	18,104	5,560	3,056	580	20,028	1.16	23269	0.07
102 Benin	11,262	2,710	1,860	442	11,670	1.97	23035	0.07
103 Afghanistan	65,209	NA	8,054	30,000	27,155	0.81	22011	0.07
104 Trinidad & Tob.	513	7,680	120	11	8,062	2.72	21915	0.07
105 Uruguay	17,741	11,930	1,304	13,517	14,850	1.28	19068	0.06
106 Mauritania	102,552	15,430	205	39,250	78,527	0.23	18420	0.06
107 Sweden	44,996	15,530	2,853	558	57,115	0.32	18266	0.06
108 Estonia	4,510	14,622	X	X	19,132	0.93	17839	0.05
109 Uzbekistan	44,740	NA	4,500	21,600	18,640	0.93	17380	0.05
110 Iraq	43,832	70	5,450	4,000	34,452	0.49	16770	0.05
111 El Salvador	2,104	9,190	733	610	9,951	1.68	16738	0.05
112 Barbados	43	16,730	33	4	16,736	X	16736	0.05
113 Burkina Faso	27,420	NA	3,564	10,000	13,856	1.11	15313	0.05
114 Nepal	14,080	NA	2,641	2,000	9,439	1.58	14952	0.05
115 Haiti	2,775	16,050	905	498	17,422	0.83	14407	0.04
116 Turkmenistan	48,810	NA	1,200	33,460	14,150	0.93	13193	0.04
117 Bangladesh	14,400	7,680	9,189	600	12,291	1.07	13182	0.04
118 Yugoslavia	25,580	5,250	7,766	6,352	16,712	0.78	13015	0.04
119 Malawi	11,848	NA	2,409	1,840	7,599	1.65	12529	0.04
120 Tunisia	16,361	8,570	4,576	3,360	16,995	0.71	12097	0.04
121 Finland	33,813	9,810	2,453	123	41,047	0.29	11760	0.04
122 Germany	35,695	5,040	12,391	5,704	22,640	0.49	11131	0.03
123 Ireland	7,028	38,030	953	4,690	39,415	0.28	10850	0.03
124 Belarus	20,760	NA	6,100	3,100	11,560	0.93	10778	0.03
125 Iceland	10,300	86,690	8	2,274	94,708	0.11	10599	0.03
126 Kyrgyzstan	19,850	NA	1,400	8,650	9,800	0.93	9137	0.03

(continued on next page)

(Table 1B continued)

Country	Total area (ha) (1)	EEZ (ha) (2)	Cropland (ha) (3)	Permanent pasture (ha) (4)	Natural area (ha) (5) = (1)+(2)-(3)-(4)	Ratio of actual/ Average biodiversity score (6)	Natural Capital Indicator (7) = (6) x (5)	Natural Capital share (percent) (8) = (7)/ Total of (7)
127 Korea, DPR	12,054	12,960	2,000	50	22,964	0.39	8970	0.03
128 Latvia	6,410	5,574	1,687	845	9,452	0.93	8813	0.03
129 Togo	5,679	210	664	1,790	3,435	2.48	8534	0.03
130 Cyprus	925	9,940	156	5	10,704	0.68	7320	0.02
131 Gambia, The	1,130	1,950	178	90	2,812	2.53	7127	0.02
132 Romania	23,750	3,190	10,053	4,705	12,182	0.58	7028	0.02
133 Lithuania	6,520	1,134	NA	245	7,409	0.93	6908	0.02
134 Georgia	6,970	3,254	800	2,050	7,374	0.93	6876	0.02
135 Mongolia	156,650	NA	1,375	124,157	31,118	0.22	6874	0.02
136 Bulgaria	11,091	3,290	4,146	2,022	8,213	0.83	6792	0.02
137 Poland	31,268	2,850	14,759	4,048	15,311	0.44	6743	0.02
138 Malta	32	6,620	13	X	6,639	X	6639	0.02
139 Bhutan	4,700	NA	131	270	4,299	1.46	6286	0.02
140 Netherlands	3,733	8,470	930	1,099	10,174	0.54	5528	0.02
141 Belize	2,296	NA	56	48	2,192	2.20	4830	0.01
142 Israel	2,077	2,330	436	147	3,824	1.19	4533	0.01
143 Azerbaijan	8,660	NA	1,600	2,200	4,860	0.93	4531	0.01
144 Jordan	8,921	70	391	791	7,809	0.57	4461	0.01
145 United Arab Emir.	8,360	5,930	39	200	14,051	0.31	4318	0.01
146 Korea, Rep.	9,902	NA	2,127	80	7,695	0.56	4308	0.01
147 Djibouti	2,320	620	NA	200	2,740	1.46	4007	0.01
148 Lebanon	1,040	2,260	301	10	2,989	1.30	3877	0.01
149 Czechoslovakia	12,787	NA	5,108	1,641	6,038	0.61	3662	0.01
150 Austria	8,385	NA	1,533	2,015	4,837	0.74	3583	0.01
151 Syrian Arab Rep.	18,518	1,030	5,503	7,989	6,056	0.58	3494	0.01
152 Albania	2,875	1,230	707	401	2,997	0.97	2908	0.01
153 Rwanda	2,634	NA	1,153	471	1,010	2.80	2829	0.01
154 Grenada	34	2,700	13	1	2,720	X	2720	0.01
155 Dominica	75	2,000	17	2	2,056	X	2056	0.01
156 Switzerland	4,129	NA	412	1,609	2,108	0.84	1778	0.01
157 Hungary	9,303	NA	5,287	1,197	2,819	0.59	1676	0.01
158 Armenia	2,980	NA	500	750	1,730	0.93	1613	0.00
159 Burundi	2,783	NA	1,336	914	533	2.44	1298	0.00
160 Moldova	3,370	NA	1,700	300	1,370	0.93	1277	0.00
161 Belgium	3,051	270	763	610	1,948	0.63	1230	0.00
162 Qatar	1,100	2,400	5	50	3,445	0.26	893	0.00
163 Lesotho	3,035	NA	320	2,000	715	1.02	729	0.00
164 Bahrain	68	510	2	4	572	X	572	0.00
165 Swaziland	1,736	NA	204	1,180	352	1.51	530	0.00
166 Kuwait	1,782	1,200	4	134	2,844	0.18	514	0.00
167 Luxembourg	259	NA	65	52	142	1.16	165	0.00
168 Singapore	62	30	1	0	91	X	91	0.00

(Table 1B continued)

Country	Total area (ha) (1)	EEZ (ha) (2)	Cropland (ha) (3)	Permanent pasture (ha) (4)	Natural area (ha) (5) = (1)+(2)-(3)-(4)	Ratio of actual/ Average biodiversity score (6)	Natural Capital Indicator (7) = (6) x (5)	Natural Capital share (percent) (8) = (7)/ Total of (7)
169 Western Samoa	284	X	122	1	161	0.47	76	0.00
170 St. Lucia	62	X	18	3	41	X	41	0.00
171 Antigua & Barb.	44	X	8	4	32	X	32	0.00
172 St. Kitts and Nevis	36	X	14	1	21	X	21	0.00

Source: World Resources 1994–95 *(Washington, D.C.: World Resources Institute, 1994).*

Notes:

i ha = hectares.

ii NA = not applicable.

iii X = no information available.

iv Area estimates for land, water, and commercial land are drawn mainly from FAO's AGROSTAT Database.

v EEZ areas are taken from World Resources 1994-95, *table 22.1. The areas of landlocked countries have not been modified in any way.*

vi Average biodiversity is assumed for those countries where no biodiversity estimate is available.

Table 1C Country shares based on Pollution-Adjusted Economy Indicator, Natural Capital Indicator, and GNP

	Country	*National share of Gross World Product (percent)*	*GNP share amended by Pollution-Adjusted GNP and Natural Capital share in the ratio 1:1:1 (percent)*
1	United States	26.31	13.44
2	Japan	15.62	8.44
3	Brazil	2.08	6.96
4	Indonesia	0.52	4.53
5	Germany	8.87	4.07
6	China	1.98	3.78
7	India	1.32	3.71
8	France	5.44	3.28
9	Australia	1.38	2.96
10	Italy	5.01	2.81
11	Russian Federation	2.24	2.81
12	Mexico	1.18	2.31
13	United Kingdom	4.46	2.22
14	Spain	2.27	1.48
15	Canada	2.61	1.47
16	Bangladesh	0.11	1.19
17	Philippines	0.22	1.17
18	Peru	0.16	1.06
19	South Africa	0.47	1.04
20	Papua New Guinea	0.02	1.01
21	Zaire	0.04	1.01
22	Korea, Rep.	1.28	0.75
23	Colombia	0.19	0.75
24	Madagascar	0.01	0.74
25	Ethiopia	0.03	0.74
26	Pakistan	0.22	0.74
27	Nepal	0.02	0.68
28	Netherlands	1.32	0.66
29	Sudan	0.05	0.65
30	Ecuador	0.05	0.65
31	Argentina	0.43	0.65
32	Switzerland	1.07	0.62
33	New Zealand	0.20	0.62
34	Sweden	1.01	0.60
35	Uganda	0.01	0.60
36	Cameroon	0.05	0.58
37	Venezuela	0.25	0.57
38	Thailand	0.42	0.56
39	Iran, Islamic Rep.	0.59	0.54
40	Turkey	0.48	0.52
41	Mali	0.01	0.52
42	Chile	0.14	0.48
43	Belgium	0.89	0.43

(Table 1C continued)

	Country	National share of Gross World Product (percent)	GNP share amended by Pollution-Adjusted GNP and Natural Capital share in the ratio 1:1:1 (percent)
44	Tanzania	0.01	0.40
45	Austria	0.74	0.39
46	Kenya	0.04	0.39
47	Malaysia	0.21	0.37
48	Nigeria	0.15	0.37
49	Kiribati	0.00	0.36
50	Cambodia	0.01	0.36
51	Sri Lanka	0.04	0.35
52	Denmark	0.57	0.34
53	Algeria	0.24	0.33
54	Portugal	0.27	0.31
55	Ukraine	0.57	0.30
56	Norway	0.48	0.29
57	Chad	0.01	0.29
58	Finland	0.56	0.28
59	Saudi Arabia	0.56	0.28
60	Ghana	0.03	0.28
61	Burkina Faso	0.01	0.28
62	Morocco	0.12	0.27
63	Viet Nam	0.00	0.27
64	Yugoslavia	0.33	0.26
65	Angola	0.00	0.25
66	Egypt	0.15	0.24
67	Burundi	0.01	0.23
68	Greece	0.31	0.23
69	Bolivia	0.02	0.22
70	Mozambique	0.01	0.21
71	Malawi	0.01	0.21
72	Solomon Islands	0.00	0.20
73	Guatemala	0.04	0.20
74	Central African Rep.	0.01	0.19
75	Niger	0.01	0.19
76	Rwanda	0.01	0.19
77	Myanmar	0.00	0.18
78	Haiti	0.01	0.18
79	Cote d'Ivoire	0.04	0.17
80	Poland	0.32	0.17
81	Costa Rica	0.03	0.17
82	Senegal	0.03	0.17
83	Kazakhstan	0.20	0.16
84	Israel	0.28	0.15
85	Guinea	0.01	0.14
86	Benin	0.01	0.14
87	Tajikistan	0.03	0.14

(continued on next page)

(Table 1C continued)

	Country	National share of Gross World Product (percent)	GNP shares amended by Pollution-Adjusted GNP and Natural Capital shares in the ratio 1:1:1 (percent)
88	Panama	0.01	0.14
89	Seychelles	0.00	0.14
90	Zambia	0.02	0.13
91	Paraguay	0.03	0.13
92	Mauritius	0.01	0.13
93	Lao People's Dem. Rep.	0.00	0.12
94	Fiji	0.01	0.12
95	Yemen	0.03	0.11
96	El Salvador	0.03	0.11
97	Somalia	0.00	0.11
98	Honduras	0.01	0.11
99	Dominican Rep.	0.03	0.10
100	Ireland	0.18	0.10
101	Maldives	0.00	0.10
102	Romania	0.15	0.10
103	Gabon	0.02	0.09
104	Cuba	0.00	0.09
105	Czechoslovakia	0.18	0.09
106	Sierra Leone	0.00	0.08
107	Equatorial Guinea	0.00	0.08
108	Tunisia	0.06	0.08
109	Singapore	0.18	0.08
110	Belarus	0.15	0.08
111	Hungary	0.13	0.08
112	Zimbabwe	0.03	0.08
113	Uzbekistan	0.13	0.08
114	Jamaica	0.01	0.08
115	Uruguay	0.04	0.08
116	Tonga	0.00	0.07
117	Togo	0.01	0.07
118	Syrian Arab Rep.	0.07	0.07
119	Guyana	0.00	0.07
120	Congo	0.01	0.06
121	United Arab Emirates	0.15	0.06
122	Oman	0.05	0.06
123	Suriname	0.01	0.06
124	Libya	0.00	0.06
125	Nicaragua	0.01	0.05
126	Bahamas, The	0.01	0.05
127	Bulgaria	0.08	0.05
128	Botswana	0.02	0.05
129	Namibia	0.01	0.05
130	Cape Verde	0.00	0.05
131	Comoros	0.00	0.04

(Table 1C continued)

Country	*National share of Gross World Product (percent)*	*GNP share amended by Pollution-Adjusted GNP and Natural Capital share in the ratio 1:1:1 (percent)*
132 Vanuatu	0.00	0.04
133 Liberia	0.00	0.03
134 Guinea-Bissau	0.00	0.03
135 Trinidad and Tobago	0.02	0.03
136 Bhutan	0.00	0.03
137 Estonia	0.03	0.03
138 Azerbaijan	0.06	0.03
139 Lithuania	0.05	0.03
140 Latvia	0.04	0.03
141 Turkmenistan	0.03	0.03
142 Georgia	0.04	0.03
143 Iceland	0.03	0.03
144 Mauritania	0.00	0.03
145 Kyrgyzstan	0.03	0.02
146 Cyprus	0.03	0.02
147 Barbados	0.01	0.02
148 Luxembourg	0.06	0.02
149 Afghanistan	0.00	0.02
150 Jordan	0.02	0.02
151 Moldova	0.04	0.02
152 Gambia, The	0.00	0.02
153 Armenia	0.03	0.02
154 Iraq	0.00	0.02
155 Swaziland	0.00	0.02
156 Malta	0.01	0.01
157 Qatar	0.03	0.01
158 Korea, DPR	0.00	0.01
159 Bahrain	0.02	0.01
160 Belize	0.00	0.01
161 Mongolia	0.00	0.01
162 Lesotho	0.00	0.01
163 Grenada	0.00	0.00
164 Djibouti	0.00	0.00
165 Lebanon	0.00	0.00
166 Dominica	0.00	0.00
167 Albania	0.00	0.00
168 St. Lucia	0.00	0.00
169 Western Samoa	0.00	0.00
170 Antigua and Barbuda	0.00	0.00
171 St. Kitts and Nevis	0.00	0.00
172 Kuwait	0.00	0.00

Source: World Resources 1994–95 *(Washington, D.C.: World Resources Institute, 1994).*

Appendix II

Country Shares—OECD and Non-OECD Rankings

Table 2A Country shares based on Pollution-Adjusted Economy Indicator (PEI)

	Country	*1991 GNP ($ millions)* (1)	*Per capita CO_2 emissions (tonnes)* (2)	*Ratio of world median/ Actual per capita CO_2 emissions* (3)	*Pollution-Adjusted GNP Indicator* (4) = (1) x (3)	*Pollution-Adjusted GNP share (percent)* (5) = (4)/Total of (4)
OECD						
1	Japan	3,336,960	8.79	0.25	834,240	8.00
2	United States	5,620,400	19.53	0.11	632,690	6.06
3	France	1,162,840	6.56	0.34	389,779	3.74
4	Germany	1,895,051	12.13	0.18	343,514	3.29
5	Italy	1,069,670	6.96	0.32	337,791	3.24
6	United Kingdom	952,914	10.00	0.22	209,432	2.01
7	Spain	485,990	5.64	0.39	189,347	1.81
8	Turkey	101,967	2.49	0.88	89,971	0.86
9	Switzerland	228,219	6.16	0.36	81,507	0.78
10	Canada	558,014	15.21	0.14	80,677	0.77
11	Sweden	216,801	6.23	0.35	76,518	0.73
12	Netherlands	282,941	9.23	0.24	67,367	0.65
13	Austria	157,568	7.80	0.28	44,385	0.43
14	Australia	294,856	15.10	0.15	42,940	0.41
15	Belgium	189,562	10.22	0.22	40,766	0.39
16	Portugal	58,451	4.25	0.52	30,233	0.29
17	Finland	120,584	10.41	0.21	25,475	0.24
18	Denmark	122,141	12.24	0.18	21,941	0.21
19	Greece	65,504	7.18	0.31	20,052	0.19
20	Norway	103,207	13.74	0.16	16,513	0.16
21	New Zealand	42,074	6.96	0.32	13,287	0.13
22	Ireland	39,162	9.23	0.24	9,324	0.09
23	Iceland	5,979	7.00	0.31	1,878	0.02
24	Luxembourg	12,238	27.48	0.08	979	0.01
Non-OECD						
1	India	282,681	0.81	2.73	770,948	7.39
2	Brazil	444,781	1.43	1.54	684,278	6.56
3	China	424,036	2.20	1.00	424,036	4.06
4	Bangladesh	23,814	0.15	15.00	357,207	3.42
5	Indonesia	111,057	0.92	2.40	266,537	2.55
6	Nepal	3,453	0.04	60.00	207,193	1.99
7	Ethiopia	6,257	0.07	30.00	187,714	1.80
8	Pakistan	46,207	0.55	4.00	184,826	1.77
9	Uganda	2,949	0.04	60.00	176,928	1.70
10	Zaire	8,123	0.11	20.00	162,460	1.56
11	Cameroon	10,146	0.15	15.00	152,192	1.46
12	Sudan	10,107	0.15	15.00	151,605	1.45
13	Philippines	46,138	0.70	3.16	145,698	1.40
14	Mali	2,412	0.04	60.00	144,708	1.39
15	Mexico	252,635	3.92	0.56	141,664	1.36
16	Thailand	89,548	1.83	1.20	107,458	1.03
17	Cambodia	1,725	0.04	60.00	103,500	0.99
18	Kenya	8,505	0.18	12.00	102,066	0.98

(Table 2A continued)

	Country	1991 GNP ($ millions) (1)	Per capita CO_2 emissions (tonnes) (2)	Ratio of world median/ Actual per capita CO_2 emissions (3)	Pollution-Adjusted GNP Indicator (4) = (1) x (3)	Pollution-Adjusted GNP share (percent) (5) = (4)/Total of (4)
19	Korea, Rep.	274,056	6.05	0.36	99,657	0.96
20	Peru	35,007	0.88	2.50	87,518	0.84
21	Nigeria	31,884	0.81	2.73	86,957	0.83
22	Russian Federation	479,546	12.31	0.18	85,633	0.82
23	Burkina Faso	2,675	0.07	30.00	80,244	0.77
24	Madagascar	2,584	0.07	30.00	77,514	0.74
25	Tanzania	2,561	0.07	30.00	76,821	0.74
26	Iran, Islamic Rep.	125,375	3.70	0.59	74,480	0.71
27	Sri Lanka	8,665	0.26	8.57	74,271	0.71
28	Chad	1,212	0.04	60.00	72,699	0.70
29	Burundi	1,201	0.04	60.00	72,037	0.69
30	Ghana	6,176	0.22	10.00	61,759	0.59
31	Morocco	26,451	0.95	2.31	61,041	0.59
32	Malawi	1,991	0.07	30.00	59,729	0.57
33	Rwanda	1,930	0.07	30.00	57,909	0.56
34	Argentina	91,211	3.55	0.62	56,419	0.54
35	Algeria	50,818	2.16	1.02	51,679	0.50
36	Colombia	41,267	1.76	1.25	51,584	0.49
37	Haiti	2,471	0.11	20.00	49,429	0.47
38	Egypt	32,691	1.54	1.43	46,701	0.45
39	Guatemala	8,839	0.44	5.00	44,194	0.42
40	Yugoslavia	70,038	3.66	0.60	42,023	0.40
41	Benin	1,838	0.11	20.00	36,767	0.35
42	Central African Rep.	1,218	0.07	30.00	36,550	0.35
43	Mozambique	1,212	0.07	30.00	36,359	0.35
44	Cote d'Ivoire	8,482	0.51	4.29	36,353	0.35
45	Niger	2,361	0.15	15.00	35,416	0.34
46	Senegal	5,527	0.37	6.00	33,162	0.32
47	Guinea	2,691	0.18	12.00	32,296	0.31
48	South Africa	99,366	7.18	0.31	30,418	0.29
49	Paraguay	5,566	0.40	5.45	30,361	0.29
50	Malaysia	45,787	3.33	0.66	30,189	0.29
51	Lao Peo.'s Dem. R.	939	0.07	30.00	28,183	0.27
52	El Salvador	5,723	0.48	4.62	26,412	0.25
53	Chile	28,945	2.42	0.91	26,313	0.25
54	Zambia	3,394	0.29	7.50	25,455	0.24
55	Ukraine	121,458	12.31	0.18	21,689	0.21
56	Venezuela	53,957	6.16	0.36	19,270	0.18
57	Saudi Arabia	120,286	13.96	0.16	18,943	0.18
58	Poland	68,427	8.06	0.27	18,662	0.18
59	Togo	1,553	0.18	12.00	18,639	0.18
60	Honduras	3,072	0.37	6.00	18,429	0.18
61	Israel	59,129	7.29	0.30	17,828	0.17
62	Yemen	6,523	0.81	2.73	17,790	0.17

(continued on next page)

(Table 2A continued)

	Country	1991 GNP ($ millions) (1)	Per capita CO_2 emissions (tonnes) (2)	Ratio of world median/ Actual per capita CO_2 emissions (3)	Pollution-Adjusted GNP Indicator (4) = (1) x (3)	Pollution-Adjusted GNP share (percent) (5) = (4)/Total of (4)
63	Dominican Rep.	6,743	0.84	2.61	17,590	0.17
64	Tunisia	12,333	1.80	1.22	15,101	0.14
65	Ecuador	10,768	1.65	1.33	14,358	0.14
66	Syrian Arab Rep.	14,562	2.31	0.95	13,868	0.13
67	Uruguay	8,823	1.43	1.54	13,573	0.13
68	Sierra Leone	903	0.15	15.00	13,552	0.13
69	Bolivia	4,793	0.81	2.73	13,073	0.13
70	Papua New Guinea	3,307	0.59	3.75	12,401	0.12
71	Romania	32,034	5.94	0.37	11,864	0.11
72	Costa Rica	5,662	1.06	2.07	11,715	0.11
73	Hungary	28,142	6.05	0.36	10,233	0.10
74	Zimbabwe	6,577	1.65	1.33	8,769	0.08
75	Bhutan	259	0.07	30.00	7,761	0.07
76	Kazakhstan	41,691	12.31	0.18	7,445	0.07
77	Czechoslovakia	38,707	12.20	0.18	6,974	0.07
78	Nicaragua	1,735	0.55	4.00	6,941	0.07
79	Congo	2,623	0.88	2.50	6,558	0.06
80	Belarus	32,131	12.31	0.18	5,738	0.05
81	Singapore	39,249	15.06	0.15	5,730	0.05
82	Bulgaria	16,316	6.30	0.35	5,692	0.05
83	Mauritius	2,623	1.14	1.94	5,077	0.05
84	Uzbekistan	28,255	12.31	0.18	5,046	0.05
85	Comoros	245	0.11	20.00	4,898	0.05
86	Swaziland	872	0.44	5.00	4,362	0.04
87	Botswana	3,335	1.69	1.30	4,350	0.04
88	Jordan	3,835	2.42	0.91	3,486	0.03
89	Fiji	1,431	0.95	2.31	3,302	0.03
90	Gambia, The	322	0.22	10.00	3,218	0.03
91	Panama	2,130	1.47	1.50	3,195	0.03
92	Jamaica	2,759	1.91	1.15	3,183	0.03
93	Oman	9,685	7.40	0.30	2,877	0.03
94	Cape Verde	285	0.22	10.00	2,851	0.03
95	Namibia	2,166	X	X	2,166	0.02
96	Azerbaijan	12,065	12.31	0.18	2,154	0.02
97	Cyprus	6,135	6.34	0.35	2,128	0.02
98	United Arab Emir.	32,809	36.49	0.06	1,976	0.02
99	Gabon	4,419	5.02	0.44	1,935	0.02
100	Guinea-Bissau	184	0.22	10.00	1,838	0.02
101	Lithuania	10,220	12.31	0.18	1,825	0.02
102	Mauritania	1,026	1.28	1.71	1,759	0.02
103	Moldova	9,529	12.31	0.18	1,702	0.02
104	Latvia	9,193	12.31	0.18	1,642	0.02
105	Georgia	9,000	12.31	0.18	1,607	0.02
106	Armenia	7,233	12.31	0.18	1,292	0.01
107	Kyrgyzstan	6,900	12.31	0.18	1,232	0.01

(Table 2A continued)

Country	*1991 GNP ($ millions)* *(1)*	*Per capita CO_2 emissions (tonnes)* *(2)*	*Ratio of world median/ Actual per capita CO_2 emissions* *(3)*	*Pollution-Adjusted GNP Indicator* *(4) = (1) x (3)*	*Pollution-Adjusted GNP share (percent)* *(5) = (4)/Total of (4)*
108 Malta	2,598	4.65	0.47	1,228	0.01
109 Turkmenistan	6,387	12.31	0.18	1,141	0.01
110 Estonia	6,088	12.31	0.18	1,087	0.01
111 Lesotho	1,050	X	X	1,050	0.01
112 Solomon Islands	226	0.48	4.62	1,041	0.01
113 Tajikistan	5,669	12.31	0.18	1,012	0.01
114 Barbados	1,711	3.92	0.56	959	0.01
115 Equatorial Guinea	142	0.33	6.67	949	0.01
116 Bahamas, The	3,044	7.47	0.29	895	0.01
117 Vanuatu	174	0.44	5.00	870	0.01
118 Suriname	1,661	4.69	0.47	778	0.01
119 Guyana	346	1.06	2.07	717	0.01
120 St. Lucia	380	1.21	1.82	692	0.01
121 Trinidad and Tob.	4,602	14.73	0.15	687	0.01
122 Belize	389	1.36	1.62	631	0.01
123 Maldives	101	0.44	5.00	504	0.00
124 Dominica	175	0.81	2.73	478	0.00
125 Western Samoa	154	0.81	2.73	421	0.00
126 Bahrain	3,679	19.38	0.11	417	0.00
127 Seychelles	350	1.87	1.18	412	0.00
128 Kiribati	53	0.29	7.50	394	0.00
129 Qatar	7,473	44.66	0.05	368	0.00
130 Tonga	128	0.77	2.86	366	0.00
131 Grenada	198	1.32	1.67	330	0.00
132 St. Kitts and Nevis	156	1.76	1.25	195	0.00
133 Antigua and Barbuda	355	4.36	0.50	179	0.00
134 Angola	X	0.51	4.29	X	X
135 Myanmar	X	0.11	20.00	X	X
136 Somalia	X	0.07	30.00	X	X
137 Afghanistan	X	0.29	7.50	X	X
138 Iraq	X	2.27	0.97	X	X
139 Viet Nam	X	0.29	7.50	X	X
140 Korea, DPR	X	10.96	0.20	X	X
141 Cuba	X	3.22	0.68	X	X
142 Libya	X	9.12	0.24	X	X
143 Lebanon	X	3.00	0.73	X	X
144 Djibouti	X	0.81	2.73	X	X
145 Kuwait	X	5.68	0.39	X	X
146 Liberia	X	0.11	20.00	X	X
147 Mongolia	X	4.36	0.50	X	X
148 Albania	X	1.91	1.15	X	X

Source: World Resources 1994–95 *(Washington, D.C.: World Resources Institute, 1994).*

Notes:

i NA = not applicable.

ii X = no information available.

iii World median per capita CO_2 emissions = 2.1934 tonnes (1991).

Table 2B Country shares based on Natural Capital Indicator (NCI)

	Country	*Total area (ha) (1)*	*EEZ (ha) (2)*	*Cropland (ha) (3)*	*Permanent pasture (ha) (4)*	*Natural area (ha) (5) = (1)+(2)-(3)-(4)*	*Ratio of actual/ Average biodiversity score (6)*	*Natural Capital Indicator (7) = (6) x (5)*	*Natural Capital share (percent) (8) = (7)/ Total of (7)*
OECD									
1	United States	937,261	971,140	189,915	241,467	1,477,019	1.77	2611764	7.94
2	Australia	771,336	449,630	48,934	417,992	754,040	3.10	2334249	7.09
3	Japan	37,780	386,110	4,637	642	418,611	1.35	565066	1.72
4	New Zealand	27,099	483,320	425	13,677	496,317	1.01	501305	1.52
5	Canada	997,614	293,940	45,960	28,200	1,217,394	0.28	338481	1.03
6	France	55,150	349,310	19,105	11,581	373,774	0.59	220005	0.67
7	Portugal	9,239	177,420	3,171	849	182,639	0.68	124900	0.38
8	Spain	50,478	121,940	20,345	10,210	141,863	0.79	112715	0.34
9	Turkey	77,945	23,660	27,885	8,600	65,120	1.16	75659	0.23
10	Norway	32,390	202,480	882	109	233,879	0.32	75551	0.23
11	Denmark	4,309	146,420	2,555	219	147,955	0.50	73472	0.22
12	United Kingdom	24,488	178,530	6,736	11,197	185,085	0.34	62854	0.19
13	Italy	30,127	55,210	12,033	4,877	68,427	0.90	61915	0.19
14	Greece	13,199	50,510	3,933	5,255	54,521	1.08	59062	0.18
15	Sweden	44,996	15,530	2,853	558	57,115	0.32	18266	0.06
16	Finland	33,813	9,810	2,453	123	41,047	0.29	11760	0.04
17	Germany	35,695	5,040	12,391	5,704	22,640	0.49	11131	0.03
18	Ireland	7,028	38,030	953	4,690	39,415	0.28	10850	0.03
19	Iceland	10,300	86,690	8	2,274	94,708	0.11	10599	0.03
20	Netherlands	3,733	8,470	930	1,099	10,174	0.54	5528	0.02
21	Austria	8,385	X	1,533	2,015	4,837	0.74	3583	0.01
22	Switzerland	4,129	X	412	1,609	2,108	0.84	1778	0.01
23	Belgium	3,051	270	763	610	1,948	0.63	1230	0.00
24	Luxembourg	259	X	65	52	142	1.16	165	0.00
Non-OECD									
1	Brazil	851,197	316,840	58,450	182,900	926,687	4.35	4030380	12.25
2	Indonesia	190,457	540,860	21,700	11,800	697,817	4.95	3456310	10.50
3	Russian Fed.	1,707,520	395,243	132,100	81,000	1,889,663	0.93	1761910	5.35
4	China	959,696	135,580	96,455	400,000	598,821	2.92	1745790	5.31
5	Mexico	195,820	285,120	24,710	74,499	381,731	3.78	1443341	4.39
6	Papua New Guin.	46,284	236,660	388	84	282,472	3.39	956786	2.91
7	India	328,759	201,490	168,990	12,038	349,221	2.27	792906	2.41
8	South Africa	122,104	155,340	13,174	81,378	182,892	4.26	779690	2.37
9	Peru	128,522	102,690	3,730	27,120	200,362	3.60	720630	2.19
10	Philippines	30,000	178,600	7,970	1,240	199,390	3.13	623446	1.89
11	Ecuador	28,356	115,900	2,720	5,100	136,436	4.26	581642	1.77
12	Colombia	113,891	60,320	5,380	40,300	128,531	3.97	510898	1.55
13	Madagascar	58,704	129,200	3,092	34,000	150,812	3.22	485915	1.48
14	Zaire	234,541	100	7,850	15,000	211,791	2.25	476087	1.45
15	Venezuela	91,205	36,380	3,895	17,650	106,040	3.97	421499	1.28
16	Kiribati	71	355,000	37	X	355,034	X	355034	1.08

(Table 2B continued)

	Country	Total area (ha) (1)	EEZ (ha) (2)	Cropland (ha) (3)	Permanent pasture (ha) (4)	Natural area (ha) (5) = (1)+(2)-(3)-(4)	Ratio of actual/ Average biodiversity score (6)	Natural Capital Indicator (7) = (6) x (5)	Natural Capital share (percent) (8) = (7)/ Total of (7)
17	Chile	75,695	228,820	4,525	13,450	286,540	1.20	343051	1.04
18	Argentina	276,689	116,450	27,200	142,300	223,639	1.45	323770	0.98
19	Viet Nam	33,169	72,210	6,600	335	98,444	2.72	267599	0.81
20	Angola	124,670	60,570	3,400	29,000	152,840	1.63	249483	0.76
21	Malaysia	32,975	47,560	4,880	27	75,628	2.69	203533	0.62
22	Solomon Islands	2,890	134,000	57	39	136,794	1.43	196071	0.60
23	Myanmar	67,655	50,950	10,034	361	108,210	1.63	176633	0.54
24	Bolivia	109,858	X	2,296	26,650	80,912	2.03	164574	0.50
25	Sudan	250,581	9,160	12,900	110,000	136,841	1.11	151233	0.46
26	Tanzania	94,509	22,320	3,365	35,000	78,464	1.88	147325	0.45
27	Seychelles	28	134,930	6	X	134,952	X	134952	0.41
28	Tajikistan	143,100	X	800	3,315	138,985	0.93	129589	0.39
29	Panama	7,708	30,650	654	1,560	36,144	3.53	127423	0.39
30	Ethiopia	122,190	7,580	13,930	44,950	70,890	1.79	126612	0.38
31	Costa Rica	5,110	25,890	528	2,320	28,152	4.35	122440	0.37
32	Fiji	1,827	113,530	240	60	115,057	0.95	109446	0.33
33	Mauritius	186	118,300	106	7	118,373	0.90	107108	0.33
34	Iran, Islamic Rep.	164,800	15,570	15,050	44,000	121,320	0.87	105471	0.32
35	Somalia	63,766	78,280	1,039	43,000	98,007	1.07	105113	0.32
36	Sri Lanka	6,561	51,740	1,901	439	55,961	1.77	98954	0.30
37	Maldives	30	95,910	3	1	95,936	X	95936	0.29
38	Mozambique	80,159	56,200	3,100	44,000	89,259	1.05	93835	0.29
39	Cuba	11,086	36,280	3,329	2,971	41,066	2.23	91394	0.28
40	Algeria	238,174	13,720	7,605	31,175	213,114	0.41	86646	0.26
41	Gabon	26,767	21,360	452	4,700	42,975	1.86	79887	0.24
42	Cameroon	47,544	1,540	7,008	8,300	33,776	2.34	79024	0.24
43	Equatorial Guin.	2,805	28,320	230	104	30,791	2.56	78824	0.24
44	Thailand	51,312	8,580	22,126	770	36,996	2.03	75250	0.23
45	Central African R.	62,298	X	2,006	3,000	57,292	1.31	75050	0.23
46	Niger	126,700	X	3,605	8,900	114,195	0.66	75031	0.23
47	Pakistan	79,610	31,850	20,730	5,000	85,730	0.84	71608	0.22
48	Ghana	23,854	21,810	2,720	5,000	37,944	1.86	70535	0.21
49	Tonga	75	70,000	48	4	70,023	X	70023	0.21
50	Kazakhstan	271,730	X	35,600	161,800	74,330	0.93	69305	0.21
51	Guyana	21,497	13,030	495	1,230	32,802	1.97	64747	0.20
52	Jamaica	1,099	29,760	269	190	30,400	2.01	61218	0.19
53	Libya	175,954	33,810	2,150	13,300	194,314	0.29	56231	0.17
54	Chad	128,400	X	3,205	45,000	80,195	0.68	54842	0.17
55	Mali	124,019	X	2,093	30,000	91,926	0.58	53037	0.16
56	Suriname	16,327	10,120	68	20	26,359	1.95	51512	0.16
57	Senegal	19,672	20,570	2,350	3,100	34,792	1.48	51387	0.16
58	Kenya	58,037	11,800	2,428	38,100	29,309	1.62	47366	0.14
59	Yemen	52,797	58,420	1,480	16,065	93,672	0.50	46984	0.14

(continued on next page)

(Table 2B continued)

	Country	Total area (ha) (1)	EEZ (ha) (2)	Cropland (ha) (3)	Permanent pasture (ha) (4)	Natural area (ha) (5) = (1)+(2)-(3)-(4)	Ratio of actual/ Average biodiversity score (6)	Natural Capital Indicator (7) = (6) x (5)	Natural Capital share (percent) (8) = (7)/ Total of (7)
60	Zambia	75,261	X	5,268	30,000	39,993	1.17	46932	0.14
61	Bahamas, The	1,388	75,920	10	2	77,296	0.60	46416	0.14
62	Ukraine	60,370	29,203	34,807	6,900	47,866	0.93	44630	0.14
63	Cote d'Ivoire	32,246	10,460	3,660	13,000	26,046	1.68	43810	0.13
64	Nigeria	92,377	21,090	32,050	40,000	41,417	1.04	43107	0.13
65	Honduras	11,209	20,090	1,810	2,550	26,939	1.57	42249	0.13
66	Guatemala	10,889	9,910	1,875	1,390	17,534	2.39	41852	0.13
67	Egypt	100,145	17,350	2,585	X	114,910	0.36	41024	0.12
68	Zimbabwe	39,058	X	2,810	4,856	31,392	1.25	39117	0.12
69	Sierra Leone	7,174	15,570	643	2,204	19,897	1.95	38883	0.12
70	Namibia	82,429	X	662	38,000	43,767	0.89	38818	0.12
71	Congo	34,200	2,470	168	10,000	26,502	1.46	38753	0.12
72	Cape Verde	403	78,940	39	25	79,279	0.48	38205	0.12
73	Dominican Rep.	4,873	26,880	1,446	2,092	28,215	1.32	37332	0.11
74	Guinea	24,586	7,100	728	6,150	24,808	1.49	37009	0.11
75	Morocco	44,655	27,810	9,087	20,900	42,478	0.84	35481	0.11
76	Vanuatu	1,219	68,000	144	25	69,050	0.50	34634	0.11
77	Liberia	9,775	22,970	373	5,700	26,672	1.28	34248	0.10
78	Oman	21,246	56,170	58	1,000	76,358	0.43	32965	0.10
79	Lao PDR	23,680	X	901	800	21,979	1.48	32463	0.10
80	Botswana	58,173	X	1,380	33,000	23,793	1.30	30858	0.09
81	Saudi Arabia	214,969	18,620	2,335	85,000	146,254	0.21	30427	0.09
82	Nicaragua	13,000	15,980	1,273	5,350	22,357	1.32	29581	0.09
83	Comoros	223	24,900	100	15	25,008	1.08	27091	0.08
84	Guinea-Bissau	3,612	15,050	335	1,080	17,247	1.55	26780	0.08
85	Uganda	23,588	X	6,705	1,800	15,083	1.72	25883	0.08
86	Paraguay	40,675	X	2,216	20,800	17,659	1.32	23365	0.07
87	Cambodia	18,104	5,560	3,056	580	20,028	1.16	23269	0.07
88	Benin	11,262	2,710	1,860	442	11,670	1.97	23035	0.07
89	Afghanistan	65,209	X	8,054	30,000	27,155	0.81	22011	0.07
90	Trinidad and Tob.	513	7,680	120	11	8,062	2.72	21915	0.07
91	Uruguay	17,741	11,930	1,304	13,517	14,850	1.28	19068	0.06
92	Mauritania	102,552	15,430	205	39,250	78,527	0.23	18420	0.06
93	Estonia	4,510	14,622	X	X	19,132	0.93	17839	0.05
94	Uzbekistan	44,740	X	4,500	21,600	18,640	0.93	17380	0.05
95	Iraq	43,832	70	5,450	4,000	34,452	0.49	16770	0.05
96	El Salvador	2,104	9,190	733	610	9,951	1.68	16738	0.05
97	Barbados	43	16,730	33	4	16,736	NA	NA	0.05
98	Burkina Faso	27,420	X	3,564	10,000	13,856	1.11	15313	0.05
99	Nepal	14,080	X	2,641	2,000	9,439	1.58	14952	0.05
100	Haiti	2,775	16,050	905	498	17,422	0.83	14407	0.04
101	Turkmenistan	48,810	X	1,200	33,460	14,150	0.93	13193	0.04
102	Bangladesh	14,400	7,680	9,189	600	12,291	1.07	13182	0.04
103	Yugoslavia	25,580	5,250	7,766	6,352	16,712	0.78	13015	0.04

(Table 2B continued)

Country	*Total area (ha)* (1)	*EEZ (ha)* (2)	*Cropland (ha)* (3)	*Permanent pasture (ha)* (4)	*Natural area (ha)* (5) = (1)+(2)-(3)-(4)	*Ratio of actual/ Average biodiversity score* (6)	*Natural Capital Indicator* (7) = (6) x (5)	*Natural Capital share (percent)* (8) = (7)/ Total of (7)
104 Malawi	11,848	X	2,409	1,840	7,599	1.65	12529	0.04
105 Tunisia	16,361	8,570	4,576	3,360	16,995	0.71	12097	0.04
106 Belarus	20,760	X	6,100	3,100	11,560	0.93	10778	0.03
107 Kyrgyzstan	19,850	X	1,400	8,650	9,800	0.93	9137	0.03
108 Korea, DPR	12,054	12,960	2,000	50	22,964	0.39	8970	0.03
109 Latvia	6,410	5,574	1,687	845	9,452	0.93	8813	0.03
110 Togo	5,679	210	664	1,790	3,435	2.48	8534	0.03
111 Cyprus	925	9,940	156	5	10,704	0.68	7320	0.02
112 Gambia, The	1,130	1,950	178	90	2,812	2.53	7127	0.02
113 Romania	23,750	3,190	10,053	4,705	12,182	0.58	7028	0.02
114 Lithuania	6,520	1,134	X	245	7,409	0.93	6908	0.02
115 Georgia	6,970	3,254	800	2,050	7,374	0.93	6876	0.02
116 Mongolia	156,650	X	1,375	124,157	31,118	0.22	6874	0.02
117 Bulgaria	11,091	3,290	4,146	2,022	8,213	0.83	6792	0.02
118 Poland	31,268	2,850	14,759	4,048	15,311	0.44	6743	0.02
119 Malta	32	6,620	13	X	6,639	X	6639	0.02
120 Bhutan	4,700	X	131	270	4,299	1.46	6286	0.02
121 Belize	2,296	X	56	48	2,192	2.20	4830	0.01
122 Israel	2,077	2,330	436	147	3,824	1.19	4533	0.01
123 Azerbaijan	8,660	X	1,600	2,200	4,860	0.93	4531	0.01
124 Jordan	8,921	70	391	791	7,809	0.57	4461	0.01
125 United Arab Emir.	8,360	5,930	39	200	14,051	0.31	4318	0.01
126 Korea, Rep.	9,902	X	2,127	80	7,695	0.56	4308	0.01
127 Djibouti	2,320	620	X	200	2,740	1.46	4007	0.01
128 Lebanon	1,040	2,260	301	10	2,989	1.30	3877	0.01
129 Czechoslovakia	12,787	X	5,108	1,641	6,038	0.61	3662	0.01
130 Syrian Arab Rep.	18,518	1,030	5,503	7,989	6,056	0.58	3494	0.01
131 Albania	2,875	1,230	707	401	2,997	0.97	2908	0.01
132 Rwanda	2,634	X	1,153	471	1,010	2.80	2829	0.01
133 Grenada	34	2,700	13	1	2,720	X	2720	0.01
134 Dominica	75	2,000	17	2	2,056	X	2056	0.01
135 Hungary	9,303	X	5,287	1,197	2,819	0.59	1676	0.01
136 Armenia	2,980	X	500	750	1,730	0.93	1613	0.00
137 Burundi	2,783	X	1,336	914	533	2.44	1298	0.00
138 Moldova	3,370	X	1,700	300	1,370	0.93	1277	0.00
139 Qatar	1,100	2,400	5	50	3,445	0.26	893	0.00
140 Lesotho	3,035	X	320	2,000	715	1.02	729	0.00
141 Bahrain	68	510	2	4	572	X	572	0.00
142 Swaziland	1,736	NA	204	1,180	352	1.51	530	0.00
143 Kuwait	1,782	1,200	4	134	2,844	0.18	514	0.00
144 Singapore	62	30	1	X	91	X	91	0.00
145 Western Samoa	284	X	122	1	161	0.47	76	0.00
146 St. Lucia	62	X	18	3	41	X	41	0.00

(continued on next page)

(Table 2B continued)

Country	Total area (ha) (1)	EEZ (ha) (2)	Cropland (ha) (3)	Permanent pasture (ha) (4)	Natural area (ha) (5) = (1)+(2)-(3)-(4)	Ratio of actual/ Average biodiversity score (6)	Natural Capital Indicator (7) = (6) x (5)	Natural Capital share (percent) (8) = (7)/ Total of (7)
147 Antigua and Barb.	44	X	8	4	32	X	31	0.00
148 St. Kitts and Nev.	36	X	14	1	21	X	21	0.00

Source: World Resources 1994–95 *(Washington, D.C.: World Resources Institute, 1994).*

Notes:

i ha = hectares.

ii NA = not applicable.

iii X = no information available.

iv Area estimates for land, water, and commerical land are drawn mainly from FAO's AGROSTAT Database.

v EEZ areas are taken from World Resources 1994-95, *table 22.1. The areas of landlocked countries have not been modified in any way.*

vi Average biodiversity is assumed for those countries where no biodiversity estimate is available.

Table 2C Country shares based on Pollution-Adjusted Economy Indicator, Natural Capital Indicator, and GNP

	Country	*National share of Gross World Product (percent)*	*GNP share amended by Pollution-Adjusted GNP and Natural Capital share in the ratio 1:1:1 (percent)*
OECD		**80.15**	**45.61**
1	United States	26.31	13.44
2	Japan	15.62	8.44
3	Germany	8.87	4.07
4	France	5.44	3.28
5	Australia	1.38	2.96
6	Italy	5.01	2.81
7	United Kingdom	4.46	2.22
8	Spain	2.27	1.48
9	Canada	2.61	1.47
10	Netherlands	1.32	0.66
11	Switzerland	1.07	0.62
12	New Zealand	0.20	0.62
13	Sweden	1.01	0.60
14	Turkey	0.48	0.52
15	Belgium	0.89	0.43
16	Austria	0.74	0.39
17	Denmark	0.57	0.34
18	Portugal	0.27	0.31
19	Norway	0.48	0.29
20	Finland	0.56	0.28
21	Greece	0.31	0.23
22	Ireland	0.18	0.10
23	Iceland	0.03	0.03
24	Luxembourg	0.06	0.02
Non-OECD		**19.85**	**54.39**
1	Brazil	2.08	6.96
2	Indonesia	0.52	4.53
3	China	1.98	3.78
4	India	1.32	3.71
5	Russian Federation	2.24	2.81
6	Mexico	1.18	2.31
7	Bangladesh	0.11	1.19
8	Philippines	0.22	1.17
9	Peru	0.16	1.06
10	South Africa	0.47	1.04
11	Papua New Guinea	0.02	1.01
12	Zaire	0.04	1.01
13	Korea, Rep.	1.28	0.75
14	Colombia	0.19	0.75
15	Madagascar	0.01	0.74
16	Ethiopia	0.03	0.74

(continued on next page)

(Table 2C continued)

	Country	National share of Gross World Product (percent)	GNP share amended by Pollution-Adjusted GNP and Natural Capital share in the ratio 1:1:1 (percent)
17	Pakistan	0.22	0.74
18	Nepal	0.02	0.68
19	Sudan	0.05	0.65
20	Ecuador	0.05	0.65
21	Argentina	0.43	0.65
22	Uganda	0.01	0.60
23	Cameroon	0.05	0.58
24	Venezuela	0.25	0.57
25	Thailand	0.42	0.56
26	Iran, Islamic Rep.	0.59	0.54
27	Mali	0.01	0.52
28	Chile	0.14	0.48
29	Tanzania	0.01	0.40
30	Kenya	0.04	0.39
31	Malaysia	0.21	0.37
32	Nigeria	0.15	0.37
33	Kiribati	0.00	0.36
34	Cambodia	0.01	0.36
35	Sri Lanka	0.04	0.35
36	Algeria	0.24	0.33
37	Ukraine	0.57	0.30
38	Chad	0.01	0.29
39	Saudi Arabia	0.56	0.28
40	Ghana	0.03	0.28
41	Burkina Faso	0.01	0.28
42	Morocco	0.12	0.27
43	Viet Nam	0.00	0.27
44	Yugoslavia	0.33	0.26
45	Angola	0.00	0.25
46	Egypt	0.15	0.24
47	Burundi	0.01	0.23
48	Bolivia	0.02	0.22
49	Mozambique	0.01	0.21
50	Malawi	0.01	0.21
51	Solomon Islands	0.00	0.20
52	Guatemala	0.04	0.20
53	Central African Rep.	0.01	0.19
54	Niger	0.01	0.19
55	Rwanda	0.01	0.19
56	Myanmar	0.00	0.18
57	Haiti	0.01	0.18
58	Cote d'Ivoire	0.04	0.17
59	Poland	0.32	0.17

(Table 2C continued)

	Country	National share of Gross World Product (percent)	GNP share amended by Pollution-Adjusted GNP and Natural Capital share in the ratio 1:1:1 (percent)
60	Costa Rica	0.03	0.17
61	Senegal	0.03	0.17
62	Kazakhstan	0.20	0.16
63	Israel	0.28	0.15
64	Guinea	0.01	0.14
65	Benin	0.01	0.14
66	Tajikistan	0.03	0.14
67	Panama	0.01	0.14
68	Seychelles	0.00	0.14
69	Zambia	0.02	0.13
70	Paraguay	0.03	0.13
71	Mauritius	0.01	0.13
72	Lao Peo.'s Dem. Rep.	0.00	0.12
73	Fiji	0.01	0.12
74	Yemen	0.03	0.11
75	El Salvador	0.03	0.11
76	Somalia	0.00	0.11
77	Honduras	0.01	0.11
78	Dominican Rep.	0.03	0.10
79	Maldives	0.00	0.10
80	Romania	0.15	0.10
81	Gabon	0.02	0.09
82	Cuba	0.00	0.09
83	Czechoslovakia	0.18	0.09
84	Sierra Leone	0.00	0.08
85	Equatorial Guinea	0.00	0.08
86	Tunisia	0.06	0.08
87	Singapore	0.18	0.08
88	Belarus	0.15	0.08
89	Hungary	0.13	0.08
90	Zimbabwe	0.03	0.08
91	Uzbekistan	0.13	0.08
92	Jamaica	0.01	0.08
93	Uruguay	0.04	0.08
94	Tonga	0.00	0.07
95	Togo	0.01	0.07
96	Syrian Arab Rep.	0.07	0.07
97	Guyana	0.00	0.07
98	Congo	0.01	0.06
99	United Arab Emirates	0.15	0.06
100	Oman	0.05	0.06
101	Suriname	0.01	0.06
102	Libya	0.00	0.06
103	Nicaragua	0.01	0.05

(continued on next page)

(Table 2C continued)

Country	*National share of Gross World Product (percent)*	*GNP share amended by Pollution-Adjusted GNP and Natural Capital share in the ratio 1:1:1 (percent)*
104 Bahamas, The	0.01	0.05
105 Bulgaria	0.08	0.05
106 Botswana	0.02	0.05
107 Namibia	0.01	0.05
108 Cape Verde	0.00	0.05
109 Comoros	0.00	0.04
110 Vanuatu	0.00	0.04
111 Liberia	0.00	0.03
112 Guinea-Bissau	0.00	0.03
113 Trinidad and Tobago	0.02	0.03
114 Bhutan	0.00	0.03
115 Estonia	0.03	0.03
116 Azerbaijan	0.06	0.03
117 Lithuania	0.05	0.03
118 Latvia	0.04	0.03
119 Turkmenistan	0.03	0.03
120 Georgia	0.04	0.03
121 Mauritania	0.00	0.03
122 Kyrgyzstan	0.03	0.02
123 Cyprus	0.03	0.02
124 Barbados	0.01	0.02
125 Afghanistan	0.00	0.02
126 Jordan	0.02	0.02
127 Moldova	0.04	0.02
128 Gambia, The	0.00	0.02
129 Armenia	0.03	0.02
130 Iraq	0.00	0.02
131 Swaziland	0.00	0.02
132 Malta	0.01	0.01
133 Qatar	0.03	0.01
134 Korea, DPR	0.00	0.01
135 Bahrain	0.02	0.01
136 Belize	0.00	0.01
137 Mongolia	0.00	0.01
138 Lesotho	0.00	0.01
139 Grenada	0.00	0.00
140 Djibouti	0.00	0.00
141 Lebanon	0.00	0.00
142 Dominica	0.00	0.00
143 Albania	0.00	0.00
144 St. Lucia	0.00	0.00
145 Western Samoa	0.00	0.00
146 Antigua and Barbuda	0.00	0.00
147 St. Kitts and Nevis	0.00	0.00
148 Kuwait	0.00	0.00

Source: World Resources 1994–95 *(Washington, D.C.: World Resources Institute, 1994).*

Distributors of World Bank Publications

ARGENTINA
Carlos Hirsch, SRL
Galeria Guemes
Florida 165, 4th Floor-Ofc. 453/465
1333 Buenos Aires

AUSTRALIA, PAPUA NEW GUINEA, FIJI, SOLOMON ISLANDS, VANUATU, AND WESTERN SAMOA
D.A. Information Services
648 Whitehorse Road
Mitcham 3132
Victoria

AUSTRIA
Gerold and Co.
Graben 31
A-1011 Wien

BANGLADESH
Micro Industries Development Assistance Society (MIDAS)
House 5, Road 16
Dhanmondi R/Area
Dhaka 1209

Branch offices:
Pine View, 1st Floor
100 Agrabad Commercial Area
Chittagong 4100

BELGIUM
Jean De Lannoy
Av. du Roi 202
1060 Brussels

CANADA
Le Diffuseur
151A Boul. de Mortagne
Boucherville, Québec
J4B 5E6

Renouf Publishing Co.
1294 Algoma Road
Ottawa, Ontario
K1B 3W8

CHILE
Invertec IGT S.A.
Av. Santa Maria 6400
Edificio INTEC, Of. 201
Santiago

CHINA
China Financial & Economic Publishing House
8, Da Fo Si Dong Jie
Beijing

COLOMBIA
Infoenlace Ltda.
Apartado Aereo 34270
Bogota D.E.

COTE D'IVOIRE
Centre d'Edition et de Diffusion Africaines (CEDA)
04 B.P. 541
Abidjan 04 Plateau

CYPRUS
Center of Applied Research
Cyprus College
6, Diogenes Street, Engomi
P.O. Box 2006
Nicosia

DENMARK
SamfundsLitteratur
Rosenoerns Allé 11
DK-1970 Frederiksberg C

DOMINICAN REPUBLIC
Editora Taller, C. por A.
Restauración e Isabel la Católica 309
Apartado de Correos 2190 Z-1
Santo Domingo

EGYPT, ARAB REPUBLIC OF
Al Ahram
Al Galaa Street
Cairo

The Middle East Observer
41, Sherif Street
Cairo

FINLAND
Akateeminen Kirjakauppa
P.O. Box 128
SF-00101 Helsinki 10

FRANCE
World Bank Publications
66, avenue d'Iéna
75116 Paris

GERMANY
UNO-Verlag
Poppelsdorfer Allee 55
53115 Bonn

HONG KONG, MACAO
Asia 2000 Ltd.
46-48 Wyndham Street
Winning Centre
7th Floor
Central Hong Kong

HUNGARY
Foundation for Market Economy
Dombovari Ut 17-19
H-1117 Budapest

INDIA
Allied Publishers Private Ltd.
751 Mount Road
Madras - 600 002

Branch offices:
15 J.N. Heredia Marg
Ballard Estate
Bombay - 400 038

13/14 Asaf Ali Road
New Delhi - 110 002

17 Chittaranjan Avenue
Calcutta - 700 072

Jayadeva Hostel Building
5th Main Road, Gandhinagar
Bangalore - 560 009

3-5-1129 Kachiguda Cross Road
Hyderabad - 500 027

Prarthana Flats, 2nd Floor
Near Thakore Baug, Navrangpura
Ahmedabad - 380 009

Patiala House
16-A Ashok Marg
Lucknow - 226 001

Central Bazaar Road
60 Bajaj Nagar
Nagpur 440 010

INDONESIA
Pt. Indira Limited
Jalan Borobudur 20
P.O. Box 181
Jakarta 10320

IRAN
Kowkab Publishers
P.O. Box 19575-511
Tehran

IRELAND
Government Supplies Agency
4-5 Harcourt Road
Dublin 2

ISRAEL
Yozmot Literature Ltd.
P.O. Box 56055
Tel Aviv 61560

ITALY
Licosa Commissionaria Sansoni SPA
Via Duca Di Calabria, 1/1
Casella Postale 552
50125 Firenze

JAPAN
Eastern Book Service
Hongo 3-Chome, Bunkyo-ku 113
Tokyo

KENYA
Africa Book Service (E.A.) Ltd.
Quaran House, Mfangano Street
P.O. Box 45245
Nairobi

KOREA, REPUBLIC OF
Pan Korea Book Corporation
P.O. Box 101, Kwangwhamun
Seoul

Korean Stock Book Centre
P.O. Box 34
Yeoeido
Seoul

MALAYSIA
University of Malaya Cooperative Bookshop, Limited
P.O. Box 1127, Jalan Pantai Baru
59700 Kuala Lumpur

MEXICO
INFOTEC
Apartado Postal 22-860
14060 Tlalpan, Mexico D.F.

NETHERLANDS
De Lindeboom/InOr-Publikaties
P.O. Box 202
7480 AE Haaksbergen

NEW ZEALAND
EBSCO NZ Ltd.
Private Mail Bag 99914
New Market
Auckland

NIGERIA
University Press Limited
Three Crowns Building Jericho
Private Mail Bag 5095
Ibadan

NORWAY
Narvesen Information Center
Book Department
P.O. Box 6125 Etterstad
N-0602 Oslo 6

PAKISTAN
Mirza Book Agency
65, Shahrah-e-Quaid-e-Azam
P.O. Box No. 729
Lahore 54000

PERU
Editorial Desarrollo SA
Apartado 3824
Lima 1

PHILIPPINES
International Book Center
Suite 1703, Cityland 10
Condominium Tower 1
Ayala Avenue, H.V. dela Costa Extension
Makati, Metro Manila

POLAND
International Publishing Service
UL Piekna 31/37
00-677 Warzawa

For subscription orders:
IPS Journals
Ul. Okrezna 3
02-916 Warszawa

PORTUGAL
Livraria Portugal
Rua Do Carmo 70-74
1200 Lisbon

SAUDI ARABIA, QATAR
Jarir Book Store
P.O. Box 3196
Riyadh 11471

SINGAPORE, TAIWAN, MYANMAR, BRUNEI
Gower Asia Pacific Pte Ltd.
Golden Wheel Building
41, Kallang Pudding, #04-03
Singapore 1334

SOUTH AFRICA, BOTSWANA
For single titles:
Oxford University Press Southern Africa
P.O. Box 1141
Cape Town 8000

For subscription orders:
International Subscription Service
P.O. Box 41095
Craighall
Johannesburg 2024

SPAIN
Mundi-Prensa Libros, S.A.
Castello 37
28001 Madrid

Librería Internacional AEDOS
Consell de Cent, 391
08009 Barcelona

SRI LANKA AND THE MALDIVES
Lake House Bookshop
P.O. Box 244
100, Sir Chittampalam A. Gardiner Mawatha
Colombo 2

SWEDEN
For single titles:
Fritzes Fackboksforetaget
Regeringsgatan 12, Box 16356
S-103 27 Stockholm

For subscription orders:
Wennergren-Williams AB
P. O. Box 1305
S-171 25 Solna

SWITZERLAND
For single titles:
Librairie Payot
Case postale 3212
CH 1002 Lausanne

For subscription orders:
Librairie Payot
Service des Abonnements
Case postale 3312
CH 1002 Lausanne

THAILAND
Central Department Store
306 Silom Road
Bangkok

TRINIDAD & TOBAGO, ANTIGUA BARBUDA, BARBADOS, DOMINICA, GRENADA, GUYANA, JAMAICA, MONTSERRAT, ST. KITTS & NEVIS, ST. LUCIA, ST. VINCENT & GRENADINES
Systematics Studies Unit
#9 Watts Street
Curepe
Trinidad, West Indies

UNITED KINGDOM
Microinfo Ltd.
P.O. Box 3
Alton, Hampshire GU34 2PG
England

*UNDP Field Offices**

P.O. Box 5
Kabul Afghanistan

Deshmorat E4
Shkurrit Street
Villa No. 35
Tirana, Albania

Boîte postale 823
Alger Gare,
Algiers 16000,
Algeria

Caixa Postal 910
Luanda, People's
Republic of Angola

Casilla de Correo
2257
1000 Capital
Federal
Buenos Aires,
Argentina

United Nations
Unified Interim
Office
Hrazdan Hotel
2nd floor
Pionerskaia St. 2
Yerevan, Armenia

United Nations
Interim Office
3 Istiglaliyyat Street
Baku 1, Azerbaijan

P. O. Box 26814
Manama, Bahrain

G.P.O. Box 224
Dhaka 1000
People's Republic
of Bangladesh

P.O. Box 625 C
Bridgetown,
Barbados

G.P.O Box 103
220000 Minsk
Belarus

Boîte postale 506
Cotonou, Republic
of Benin

B P . 5 7 5
Ouagadougou 01
Ouagadougou,
Burkina Faso

G. P. O. Box 162
Thimphu, Bhutan

Casilla 9072
La Paz, Bolivia

P.O. Box 54
Gaborone,
Botswana

Caixa Postal 0285
70359-970 Brasilia,
DF
Brazil

P.O. Box 8
1184 Sofia
Bulgaria

Boîte postale 1490
Bujumbura,
Burundi

Boîte Postale 872
Bangui, Central
African Republic

P.O. Box 877
Phnom Penh
Cambodia

Boîte postale 816
Yaounde, Republic
of Cameroon

P.O. Box 2077
Douala
Cameroon

Caixa Postal 62
Praia, Republica de
Cabo Verde

Boîte postale 906
N'Djamena
Republique du
Tchad

Casilla 197-D
Santiago, Chile

2 Dongqijie
Sanlitun
Beijing, People's
Republic of China

Apartado Aereo,
No. 091369
Bogota, Colombia

Boîte postale 648
Moroni, Federal
Islamic Republic
of Comoros

Boîte postale 465
Brazzaville,
People's Republic
of
the Congo

Apartado Postal
4540
San Jose, Costa
Rica

01 Boîte postale
1747
Abidjan 01,
Republique de Cote
d'Ivoire

UNDP Cuba
1 United Nations
Plaza
New York, N.Y.
10017, U.S.A.

P. O. Box 5603
Nicosia, Cyprus

P.O. Box 2530
DK-2100
Copenhagen
Denmark

Boîte postale 2001
Djibouti,
République de
Djibouti

Apartado 1424
Santo Domingo,
DominicanRepublic

P.O. Box 27
Pyongyang,
Democratic
People's
Republic of Korea

P. O. Box
1703-4731
Quito, Ecuador

P. O. Box 982
Postal Code No.
11511
Cairo, Arab
Republic of Egypt

P. O. Box 1114
San Salvador, El
Salvador

P.O. Box 5366
Asmara
Eritrea

UNDP Malabo,
Equatorial Guinea
c/o UNDP, P.O.
Box 1603
Grand Central
Station
New York, N.Y.
10163-1608

P.O. Box 446
EE-0090 Tallinn
Estonia

P. O. Box 5580
Addis Ababa,
Ethiopia

Private Mail Bag
Suva, Fiji

Boîte postale 2183
Libreville, Gabon

P. O. Box 553
Banjul, The Gambia

P. O. Box 1423
Accra, Ghana

Apartado Postal 23
'A'
01909 Guatemala
City, C.A
Guatemala

Boîte postale 222
Conakry, Republic
of Guinea

C. P. 179
P.O. Box 1011
Bissau Codex
Republic of
Guinea-Bissau

P. O. Box 10960
Georgetown,
Guyana

Boîte postale 557
Port-au-Prince,
Haiti

Apartado Postal 975
Tegucigalpa D.C.,
Honduras

P.O. Box 3059
New Delhi 110003,
India

Ravindra Mansion
(2nd floor)
Dinsha Vachha
Road
Bombay 400020,
India

P.O. Box 2331
Jakarta 10310,
Indonesia

P . O . B o x
15875-4557
Tehran, Islamic
Republic of Iran

P.O. Box 2048
(Alwiyah)
Baghdad, Iraq

P. O. Box 280
Kingston, Jamaica

P.O. Box 51359
Jerusalem 91513
Israel

P. O. Box 35286
Amman, Jordan

Hotel Kazakhstan
Room: 1312
Lenin Prospect
Almaty, Kazakhstan

P. O. Box 30218
Nairobi, Kenya

P. O. Box 2993
Safat
13030 Kuwait
State of Kuwait

9 Tentra Street
Second floor
Riga
Latvia

P. O. Box 11-3216
Beirut, Lebanon

P. O. Box 301
Maseru 100,
Lesotho

P. O. Box 10-0274
1000 Monrovia 10
Liberia, West
Africa

Central Post Office
Box 62
LT-2000
Vilnius, Lithuania

P. O. Box 358
Tripoli, Great
Socialist People's
Libyan
Arab Jamahiriya

P. O. Box 1348

**GEF Working Papers are available at UNDP Field Offices and through World Bank Distributors.*

Antananarivo 101,
Republic of
Madagascar

P.O. Box 30135
Lilongwe 3, Malawi

P. O. Box 12544
50782 Kuala
Lumpur, Malaysia

P.O. Box 2058
Male, Republic of
Maldives

Boite postale 120
Bamako, Mali

Boite postale 620
Nouakchott,
Mauritania

P.O. Box 253
Port Louis,
Mauritius

Apartado Postal
105-39
11581 Mexico,
D.F., Mexico

Room 222/224,
Hotel Codru
277012 Chisinau
Republic of
Moldova

P.O. Box 49/207
Ulaanbaatar,
Mongolia

Casier ONU,
Rabat-Chellah
Rabat, Morocco

P. O. Box 4595
Maputo
Republic of
Mozambique

P.O. Box 650
Yangon, Myanmar

Private Bag 13329
Windhoek, Namibia

P. O. Box 107
Kathmandu, Nepal

Apartado Postal
3260
Managua,
Nicaragua

Boite postale 11207
Niamey, Niger

P. O. Box 2351
Garki, Abuja

P. O. Box 2075
Lagos, Nigeria

GPO Box 403
Karachi 3, Pakistan

P. O. Box 1051
Islamabad, Pakistan

Apartado 6314
Panama 5, Panama

Casilla de Correo
1107
Asuncion, Paraguay

Apartado 4480
Naciones Unidas
Lima, Peru

P.O. Box 7225
Domestic Airport
Post Office Lock
Box
Pasay City, Metro
Manila
Philippines
&
P.O. Box 2865
1068 Manila
Philippines

P. O. Box 1041
Port Moresby,
Papua New Guinea

P.O. Box I
Warsaw 12, Poland

Box 3233
Doha, State of
Qatar

P.O. Box 551
Sana'a
Republic of Yemen

Central Post Office
Box 143
Seoul, Area Code
100-601
Republic of Korea

Strada Aurel Vlaicu
nr. 16
Sectorul 2, P. O.
Box 1-701
79362 Bucharest,
Romania

Boite Postale 445
Kigali, Rwanda

P. O. Box 1146
Jeddah 21431,
Saudi Arabia

P.O. Box 558
Riyadh 11421,
Saudi Arabia

P. O Box 1011
Freetown, Sierra
Leone

Private Mail Bag
Apia, Samoa

Caixa Postal 109
São Tomé, São
Tomé and Principe

c/o Ministry of
Environment,
Economic,
Planning and
External Relations
Mont Fleuri
P.O. Box 656
Victoria, Mahé
Seychelles

Boite postale 154
Dakar, Senegal

P.O. Box 24
Mogadiscio, Somali
Democratic
Republic

UNDP Mogadiscio
c/o UNDP Nairobi
Kenyatta
International
Conference
Centre
P.O. Box 30218
Nairobi, Kenya

P. O. Box 1505
Colombo, Sri
Lanka

P.O. Box 913
Khartoum, Republic
of Sudan

Private Bag
Mbabane,
Swaziland

Palais des Nations
CH-1211 Geneva
10
Switzerland

P. O. Box 2317
Damascus, Syrian
Arab Republic

P. O. Box 812
Port-of-Spain,
Trinidad and
Tobago

G.P.O. Box 618
Bangkok 10501,
Thailand

Boite Postale 911
Lome, Togo

Boite postale 863
1035 Tunis, Tunisia

P. K. 407
06043 Ulus
Ankara, Turkey

5 Sichnevogo
Povstannya
Street
Kaiv 262010,
Ukraine

P. O. Box 3490
Abu Dhabi, United
Arab Emirates

P.O. Box 9182
Dar-es-Salaam,
United Republic of
Tanzania

P. O. Box 7184
Kampala, Republic
of Uganda

Casilla de Correo
1207
11200 Montevideo,
Uruguay

4 Taras Shevchenko
Street
Tashkent 700029
Uzbekistan

Apartado 69005
Caracas 1063A, Venezuela

2 Phung Khac
Khoan
Ho Chi Minh
Socialist Republic
of Viet Nam

1889 F Street,
N.W.
(Gr. floor)
Washington D.C.
20006

Federal Republic of
Yugoslavia
(Serbia,
Montenegro)
Szetozara
Markovica
581100 Belgrade

Bosnia,
Herzegovina,
Croatia,
Slovenia,
Macedonia
c/o Vienna
International Centre
Room: C0217
P.O. Box 500
A-1400 Vienna

Boite postale 7248
Kinshasa, Republic
of Zaire

P. O. Box 31966
Lusaka, Republic of
Zambia

P.O. Box 4775
Harare, Zimbabwe

Printed on recycled paper

ISBN 1-884122-12-4
STOCK # 72212