UNEP

industry and environment

ISSN 0378-9993
Industry and Environment
Volume 25 No. 1
January – March 2002

A publication of the United Nations Environment Programme
Division of Technology, Industry and Economics

Une publication du Programme des Nations Unies pour l'environnement
Division Technologie, Industrie et Economie

Una publicación del Programa de las Naciones Unidas para el Medio Ambiente
División de Tecnología, Industria y Economía

Regional challenges for sustainability

- Conservation of resources
- Mining and minerals

- Corporate environmental reporting
- Sustainable consumption

Industry and Environment is a quarterly review published by the United Nations Environment Programme Division of Technology, Industry and Economics (UNEP DTIE), Tour Mirabeau, 39-43 quai André-Citroën, 75739 Paris Cedex 15, France. Tel: +33 1 44 37 14 50; Fax: +33 1 44 37 14 74; E-mail: unep.tie@unep.fr; http://www.uneptie.org

Director

Jacqueline Aloisi de Larderel

Editorial Board

Tore Brevik
Michael Chadwick
Claude Fussler
Nay Htun
Ashok Khosla
William H. Mansfield III
Haroldo Mattos de Lemos
Walter Retzsch
Léon de Rosen
Sergio C. Trindade

Editorial Staff

Françoise Ruffe
Rebecca Brite
John Smith
Thalia Stanley

Editorial Policy

The contents of this review do not necessarily reflect the views or policies of UNEP, nor are they an official record. The designations employed and the presentation do not imply the expression of any opinion whatsoever on the part of UNEP concerning the legal status of any country, territory or city or its authority, or concerning the delimitation of its frontiers or boundaries.

The non-copyrighted contents of this review may be reprinted without charge provided that **Industry and Environment** and the author or photographer concerned are credited as the source and the editors are notified in writing and sent a voucher copy.

Industry and Environment welcomes for possible publication feedback from readers, news on their sectors of activity, or articles. The editors cannot guarantee publication or return of unsolicited manuscripts, photographs and artwork. Manuscripts which do not conform to the conventions and standards of the review may be returned for revision.

Subscriptions

Industry and Environment is subject to an annual subscription fee of US$ 60.00. See back cover for order form. Upon application to the Director, submitted on letterhead, the annual subscription charge may be waived for government, educational and non-profit organizations in developing countries which are unable to remit payment.

Industry and Environment is printed on 100% chlorine free paper.

Contents

Regional industry issues

3 Editorial

4 Regional challenges for sustainability: facts and figures

14 The mining and minerals sector: factors weakening its contribution to African development – *by Thomson Sinkala*

17 Riverbed mining at Filabusi, Insiza District, Zimbabwe: a model for sustainable development in small-scale artisanal mining – *by David E.H. Murangari*

18 South Africa's BoTT model: an innovative solution for delivering sustainable water services to the rural poor – *by Patrick Ayoub, Thuso Ramaema and Oliver Ive*

21 Environmental reporting by companies in Japan – *by Toshihiko Goto*

25 Sustainable consumption: an insurmountable challenge? – *by Elaine Geyer-Allély*

30 Changing consumption patterns in Central and Eastern Europe – *by Eva Charkiewicz*

32 La restricción de financiamiento como una de las principales barreras en la implementación de la Producción más Limpia en Latinoamérica y Caribe (LAC) – *by Marco A. González*

37 Cleaner Production: a key to sustainability in the Caribbean? – *by Sharon Laurent*

39 Reducing industrial pollution and improving energy efficiency in West Asia – *by A.F. Alhajji*

43 Alternative water resource management policies in West Asia – *by Waleed K. Al-Zubari*

48 Recommendations from UNEP regional industry consultations

Other topics ◆ Autres sujets ◆ Otros tópicos

53 Mining finance providers reassert their green credentials – *by Andrew P. Zemek*

News ◆ Actualités ◆ Actualidades

56 World News

58 Industry Updates

59 UNEP Focus

62 Books and Reports

66 Web Site Highlights

66 Feedback

Meeting regional challenges for sustainability

Ten years ago Agenda 21 (the 1992 Rio Earth Summit's global action plan for environment and development) recognized that the policies and operations of business and industry have a decisive role to play in bringing about a sustainable future.

With the increasing interest in new public-private partnerships, the upcoming World Summit on Sustainable Development in Johannesburg is expected to address relationships between industry and the environment and innovative ways to deal with complicated socio-economic issues.

As one contribution to the Johannesburg summit, UNEP has worked with business and industry to produce sectoral reports concerning Agenda 21 implementation. The reports cover 22 sectors – from advertising to waste management.

These sectoral reports reflect increased awareness of environmental issues and improvements in the application of environmental management tools. They also reflect strengthened regulatory frameworks that have resulted in reduced emissions, better resource efficiency, and the introduction of Cleaner Production in many countries.

However, as the articles in this issue of *Industry and Environment* make clear, we still confront basic challenges such as the need for more rapid adoption of sustainable consumption patterns and Cleaner Production processes. These challenges have global significance, but some are particularly urgent in certain regions. Providing the world's poor with access to sustainable energy and clean water is of fundamental importance.

Despite progress in business and industry during the past decade, the worldwide problem of "overshoot" still exists – i.e. the degree to which consumption exceeds the Earth's carrying capacity. While unsustainable consumption patterns make it possible for some people to live better lives in the short run, it jeopardizes our natural capital in the long run.

As the articles in this issue also make clear, regional challenges for sustainability can be highly complex. The environmental and sustainability indicators in the following "Facts and Figures" section focus on the considerable – and growing – gaps between regions.

Stark regional differences (e.g. in energy use or foreign direct investment) suggest the magnitude of the task ahead. Africa, with 14% of the world's population, produces less than 3.5% of global CO_2 emissions. Yet it is one of the regions that will suffer most from the consequences of climate change.

As another example, lead pollution is often perceived as one environmental problem that has largely been solved. Leaded gasoline has been phased out in much of the world, owing to awareness of environmental health issues and concerns about sustainability. But unleaded gasoline, which is common in Western Europe and North America, is not available in all regions. Millions of people in dozens of countries are still exposed to unacceptable levels of lead exposure, mainly from vehicle exhaust emissions.

Far from being eliminated, lead pollution is an example of a regional challenge for sustainability. As a challenge that can nevertheless be met, it demonstrates the opportunities available to us. UNEP supports the development of regional action plans to phase out leaded gasoline. If implementation is to take place in all regions, agreement and actions are needed at the highest level – from political and business leaders alike.

The private sector increasingly recognizes the need to bridge the gap between rich and poor. It has also begun to understand that sustainable development makes good business sense. The World Summit on Sustainable Development should make 2002 a landmark year for environmental protection and poverty alleviation.

The sectoral reporting process supported by UNEP has identified five key challenges that cut across sectors and regions:

- addressing problems resulting from past practices (e.g. "orphan" mining sites);
- changing production processes and products, in line with life-cycle approaches;
- assuring greater sectoral integration with respect to the economic, environmental and social dimensions of decision-making;
- developing innovative private financing; and
- promoting public-private partnerships.

All of the sector reports emphasize that there is a crucial role for government in providing an appropriate framework in which industry can operate.

One important outcome to be expected from the Johannesburg summit is accelerated development of partnerships and similar initiatives by private business and others. There is no substitute for the creativity of the private sector; there is every indication that Johannesburg, by embracing the contributions of industry and the wider private sector, will be a summit of actions, not just words.

Johannesburg may prove to be humanity's last chance to make the shift from environmental destruction to a sustainable future. Today, more than ever, the consumption patterns of the rich are a burden on developing countries. We must reverse this trend. Responses are needed to regional challenges for sustainability. We cannot have long-lasting development, of benefit to all, without a sound and healthy environment. ◆

Regional challenges for sustainability: facts and figures

This "Facts and Figures" focuses on the state of the environment and sustainability in UNEP regions, especially with respect to industry. The main source of the data presented here is UNEP's *Global Environment Outlook 3* (*GEO-3*). This new publication covers the 30 years since the UN Conference on the Human Environment in Stockholm. Detailed references for most of the information below will be found in *GEO-3*. Exceptions are indicated with an asterisk (*). The latest drafts of *GEO-3* available during the preparation of this issue of *Industry and Environment* have been used.

Despite the value of indicators such as those in **Table 1**, they inevitably tend to give an overgeneralized picture. The enormous diversity within each region should not be forgotten. For example, Asia-Pacific, the largest region, covers over one-fifth of the planet's land area and contains virtually every known type of soil, climate and landscape.

Africa

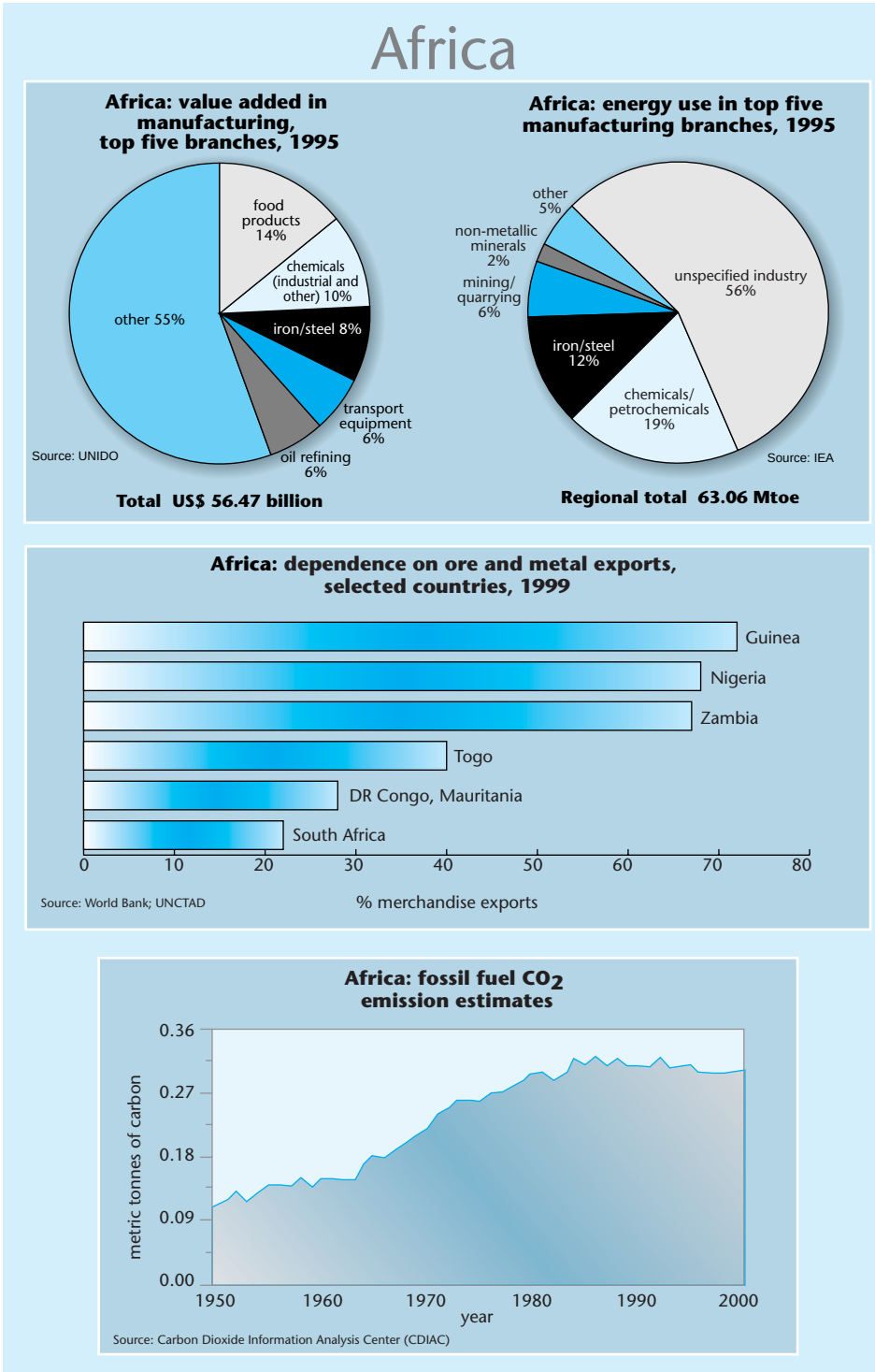
Africa is richly endowed with mineral resources, including 22% of non-Middle Eastern oil reserves. It relies on primary commodities for some 80% of its export earnings (EIA 2000, UN 2001*). Outside the Northern Africa sub-region and South Africa, this region has relatively little formal manufacturing (and that sub-sector is largely characterized by low technology use and low capacity). Africa's overall environmental impact so far has been fairly low. The informal sector plays a large role.

Minerals (such as bauxite, chromite, cobalt, diamonds, gold, manganese, platinum group metals, titanium and zirconium) and hydrocarbons (oil and gas) contribute large shares of many African countries' GDP. Their exploitation puts considerable pressure on the environment through, for example, resource depletion, pollutant emissions, acid drainage, heavy metal contamination and salinity.

Land

Africa is the second largest region after Asia-Pacific. Two-thirds of its land area is arid or semi-arid. The main issues related to land are degradation and desertification. Others include soil contamination and loss of natural habitats to farming or settlement.

There are increasing demands on the land to produce cash crops for export. By 1999 about 32% of suitable land in Africa was cultivated. Cereal production almost doubled between 1975 and 1999. However, the number of undernourished people in Africa has doubled since 1970.



About 25% of Africa's land is vulnerable to water erosion and about 22% to wind erosion. Erosion has increased siltation rates in reservoirs and rivers. It has also increased flood risks in rivers and estuaries. In Sudan, siltation of the Blue Nile has reduced the capacity of the Roseires reservoir (which generates 80% of the country's electricity) by 40% in 30 years.

Urban areas

While African cities account for only 10% of the world's total urban population, Africa's urban

Table 1
UNEP regions: selected environmental and sustainability indicators

	Africa[a]	Asia-Pacific[b]	Europe[c]	North America[d]	Latin America and Caribbean[e]	West Asia[f]
A. Land area (million km²)	29.63	34.63	23.59	18.38	20.18	3.72
B. Population, 2000						
total (million)	793.63	3513.85	817.74	314.00	518.87	97.69
% change 1972-2000[g]	111.52	61.67	13.84	32.79	116.15	153.80
density (inhabitants/km²)	27	102	35	17	26	26
% urban	37.9	35.1	74.6	77.2	75.3	67.1
C. GDP, 1999						
total (PPP,[h] billion current US$[i])	1462.27	13,955.71	11,530.72	9668.09	3388.40	301.41[j]
per capita (PPP,[h] current US$)	1886	4023	14,108	31,094	6629	n.a.[k]
% change, 1987-1999 (constant 1995 US$)	38.00	51.93	66.03	43.55	30.66	n.a.[k]
D. GDP, 1997, by sector (%)[l]						
agriculture	25	15	6	2	7	10
industry	29	34	31	27	30	38
services	46	51	58	72	63	48
E. Foreign investment, aid and debt, 1998 (current US$)						
foreign direct investment (net inflows, balance of payments % of total)[m]	1.2	12.9	43	31.8	11	0.1
official development assistance and other official aid (% of total)[n]	36	33	16	0	10	4
ratio of external debt to GDP	64	36	49	n.a.[k]	39	71
F. Freshwater resources use (km³/year, average of various years)						
available resources	3994	12,774	6856	5200	14,040	57
withdrawals	156	1852	465	514	271	84
consumption, by sector (%)[l]						
industry	6	8	48	46	9	4
domestic	8	6	17	11	18	6
agriculture	86	86	33	37	74	90
G. Energy supply, 1999						
TPES (Mtoe)[o]	437.69	3212.00	2667.81	2511.76	588.98	221.06
of which (%)						
coal & coal products	20.13	33.88	18.97	22.58	4.67	0.06
oil[p]	20.76	31.38	34.63	38.53	36 [q]	52.17
natural gas	11.22	10.85	30.14	23.58	19.34	47.00
H. Energy use, 1999						
TFC[r] (Mtoe)	316.76	2269.15	1857.41	1661.64	437.49	152.46
toe per capita	0.5	0.7	2.3	5.3	0.9	1.6
I. Energy intensity						
toe/US$ 1000 of GDP	0.22	0.16	0.16	0.17	0.13	0.43[s]
J. Electricity production, 1997 (TWh)	33.51	338.20	366.85	365.12	73.60	20.23
K. Automobiles, 1996 (per 1000 people)	26.6	41.4	304.4	745.6	90.9	91.8
L. Greenhouse gases, 1996						
Industrial emissions of CO_2 per capita (tonnes)	1.13	12.39	7.93	19.07	2.53	7.30

Source: Except as noted (*), variables compiled by UNEP/DEWA/GRID-Geneva from data provided by:
A. UN Food and Agriculture Organization (FAO)
B. UN Population Division
C. and D. World Bank
E. World Bank*
F. World Resources Institute (WRI)
G-I. International Energy Agency (IEA)
J. WRI
K. International Road Federation via World Bank
L. UNEP/DEWA/GRID-Geneva

Notes
a) Includes La Réunion (France)
b) Includes Central Asia, Iran and the South Asian subcontinent, as well as French Polynesia, New Caledonia, and Wallis and Futuna (France); American Samoa, Guam and the Northern Marianas (US); Pitcairn Island (UK); and Tokelau (New Zealand)
c) Includes Turkey and Israel
d) Canada and the United States
e) Includes Anguilla, the British Virgin Islands, the Caymans, Montserrat and the Turks and Caicos (UK); Puerto Rico and the Virgin Islands (US); Guadeloupe, Martinique and French Guyana (France); and Aruba and the Netherlands Antilles (Netherlands)
f) Arabian Peninsula and Arab Middle East
g) Trend periods used in this table vary according to data availability
h) Purchasing power parity
i) International US$
j) 1995, WRI, 1987 US$; excludes Yemen and West Bank/Gaza*
k) Not available
l) Totals may not equal 100% due to rounding or estimation methods
m) Total (world) 1998 FDI: US$ 655 billion
n) Total (world) 1998 official aid: US$ 44.3 billion
o) Total primary energy supply in million tonnes of oil equivalent
p) Crude oil supply plus oil product trade
q) Revised by IEA Energy Statistics Division*
r) Total final consumption
s) Based on 1995 TFC*
t) One terawatt hour (TWh) equals a billion kilowatt hours

growth rate is among the world's highest. At the forecast annual rate of 3.5% a year, the region's share in total urban population will exceed 17% by 2015.

The amount of solid waste generated in urban areas is outstripping the capacity to collect, treat and dispose of it. In the Comoros, domestic waste is dumped directly on beaches. Much of Kampala's solid waste is dumped in wetlands. Hazardous waste is often similarly disposed of. About 2% of the waste generated in Africa is recovered or recycled. The most commonly recycled materials are paper, textiles, glass, plastic and metal. Composting is carried out to some extent in Egypt, Morocco and Tunisia.

Freshwater resources

Africa's average annual renewable water resources amount to 5720 m³ per capita (the world average is 7600 m³). Distribution of surface and groundwater resources is extremely uneven. The Democratic Republic of Congo is the wettest country, with average annual internal renewable resources of 935 km³. The driest country, Mauritania, has 0.4 km³.

Groundwater contributes 15% of Africa's water resources. Areas heavily dependent on groundwater, such as Northern and Southern Africa, risk water shortages, as water is extracted far more rapidly than it is recharged.

Africa is the home of 28% of the people in the world who do not have access to improved water supply. Coverage in rural areas is 45%, compared to 85% in urban areas; 62% of the region's population had access to improved water supply in 2000, a slight improvement on 57% in 1990.

The share of the population with access to improved sanitation was 60% in 2000, down

slightly from 61% in 1990. There was an average 84% coverage of urban populations, compared to 45% in rural areas.

Coastal and marine areas

Africa's 40,000 km of coastline is characterized by diverse ecosystems and abundant natural resources, which provide both ecological benefits and economic opportunities. The coral reefs of the Red Sea and Western Indian Ocean support a large and growing tourism industry. Population pressure is causing widespread degradation and pollution of such resources. Another cause for concern is the possibility of sea level rise.

Direct threats include unsustainable commercial fishing, mining of sand dunes and clearing of mangroves. Indirect impacts include dams, increased fertilizer use and clearing of vegetation.

Some 470 million tonnes of oil is shipped via the Western Indian Ocean annually. Over 100 million tonnes passes through the Red Sea alone. Port activities also pose threats. Effluents from fish processing, abattoirs and chemical and manufacturing industries are frequently discharged to the sea.

Atmosphere

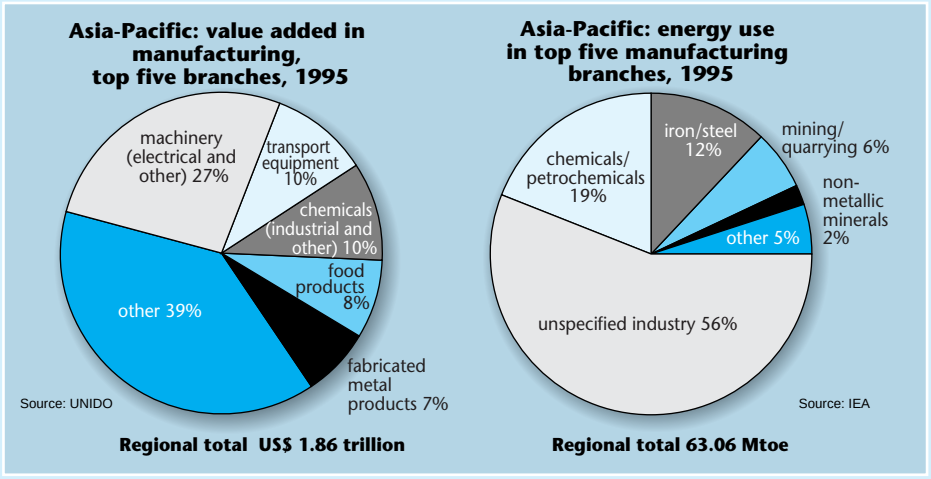
Climate variability is the single most significant atmospheric phenomenon in Africa. Anthropogenic air pollution is a problem in Northern and Southern Africa and in selected large cities.

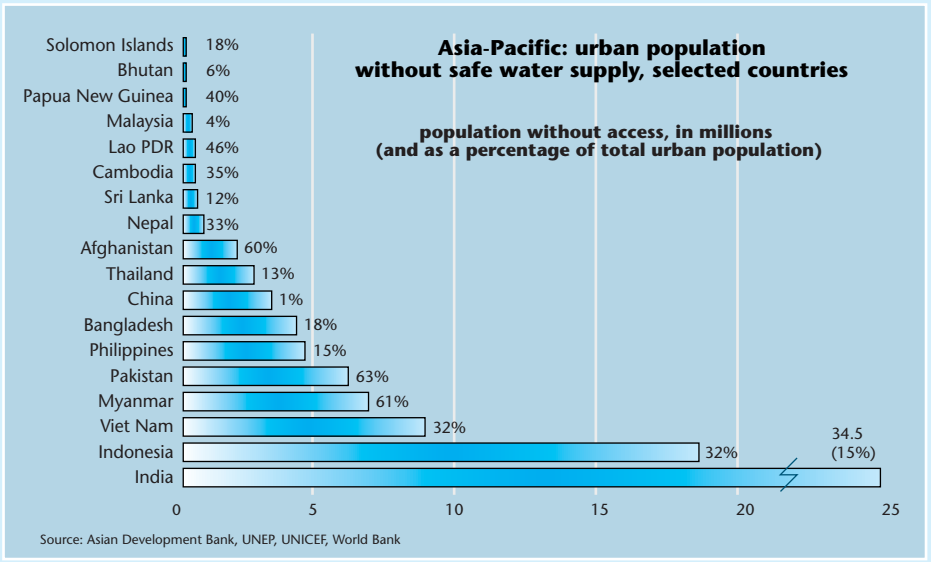
Compared with other regions, Africa emits negligible amounts of anthropogenic air pollutants and greenhouse gases. It contributes less than 3.5% of global CO_2 emissions, with South Africa accounting for almost 47% of the regional total. Some countries in Northern Africa (where energy consumption increased by 44% between 1980 and 1998) also contribute significantly.

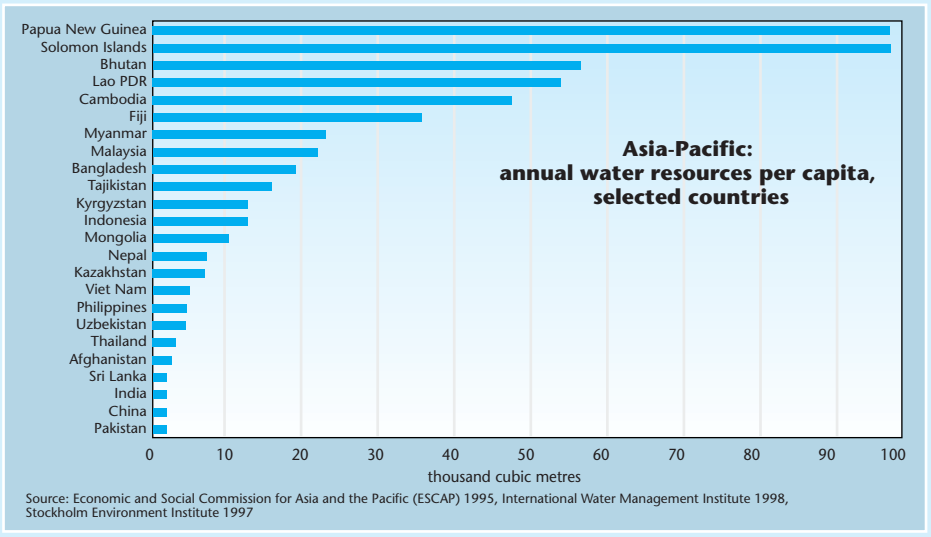
In Northern Africa, the Western Indian Ocean islands, Southern Africa and some large cities deterioration of air quality is mainly linked to burning of household fuel, plus vehicular and industrial emissions. Northern Africa's industrial growth averaged 0.6% a year in the period 1980-98.

Asia-Pacific

The wide range of natural resources in the Asia-Pacific region includes fossil fuels, uranium, metals, minerals such as mica and asbestos, and hardwoods. The region has the tropics' highest rate of commercial logging and – with heavy dependence on wood for fuel, as well – its highest annual rate of deforestation (1.2%) (ESCAP and ADB 2000*). Manufacturing is well developed, with a significant high-technology element.







Land

The key land issues in the Asia-Pacific region are degradation (especially desertification, but also erosion, compaction, acidification and nutrient depletion, among others), land use change and soil contamination. Overgrazing, overcropping and overuse of inorganic fertilizers are contributing factors in Australia and Asia, while problems in the Pacific islands relate more to mining, logging, monocropping and alien species. Some 88% of the region's degraded land is in Asia (including Central Asia).

Water erosion particularly affects the Himalayas, Central Asia, China and the South Pacific, above all Australia, while wind erosion is of special concern in South Asia, above all Iran, India, Pakistan and Afghanistan. Northern Asia, Australia and New Zealand suffer serious soil contamination; the chemical and electroplating industries in Japan and Korea are important sources of such contamination.

Desertification affects over half the drylands in Asia. The worst problems are in Central Asia (over 60% affected), followed by South Asia (over 50%) and Northeast Asia (about 30%).

The strongest land use change pressures come from agricultural expansion and intensity. In the Philippines between 1980 and 1990, forest cover and grasslands decreased by 67%, farmland

Asia-Pacific

Asia-Pacific: water resources and use, selected countries

Country	Population (million, mid 1999)	Area (km²)	Resources (km³/yr)	Consumption (km³/yr)	Consumption (% of resources)
Afghanistan	21.92	652,090	60	26	43
Australia	18.90	7,682,640	398	24	6
Bangladesh	126.94	144,000	115	23	20
Cambodia	11.93	181,035	88	1	1
China	1266.83	9,600,000	2 812	500	18
Fiji	.80	18,270	29	<1	3
India	998.05	3,287,260	1 142	552	48
Indonesia	209.25	1,811,570	2 986	49	2
Iran	64.96	1,636,000	130	75	58
Japan	126.69	377,800	435	90	21
Malaysia	22.70	32,850	556	12	2
Mongolia	2.62	1,566,500	25	<1	4
Nepal	22.40	147,181	207	12	6
New Zealand	3.82	270,530	397	2	<1
Pakistan	138.72	796,000	247	180	73
Philippines	74.45	298,170	356	105	30
Korea	46.85	99,390	70	30	42
Solomon Islands	43	27,990	45	<1	2
Sri Lanka	18.63	65,610	47	10	21
Thailand	61.80	511,000	210	33	16
Viet Nam	78.70	330,000	318	65	20

Source: ESCAP 1996, 1999

Asia-Pacific: desertification, selected countries

Country	Area (million ha)	Degraded area (%)	Population (million)	Population density (inhabitants/km²)	Cultivated area per capita (ha)
China	960	27	1 150	123	0.08
Mongolia	156	41	2.3	1.5	0.16
Azerbaijan	8.6	—	7.3	84.2	0.19
Kazakhstan	271.7	60	16.9	6.2	2.13
Kyrgyzstan	19.8	60	4.5	22.6	0.30
Tajikistan	14.3	—	5.5	38.4	0.15
Turkmenistan	48.8	66.5	4.2	8.6	0.35
Uzbekistan	44.7	59.2	1.7	48.5	0.21
India	328	53	944.6	295	0.18
Pakistan	79.6	52	131.6	165	0.16
Afghanistan	65.2	85	23.2	35	0.17
Iran	163.6	43	67.2	41	0.27

Source: Secretariat of UN Convention to Combat Desertification 1998

almost doubled and urban area increased by 16%. In Thailand between 1965 and 1997, the share of forested land fell from 56% to 24%.

Urban areas

Asia-Pacific is urbanizing at an annual rate of 2.4% (2001-2015 estimate); the expected annual rate for the South Pacific and Australasia, now the most urbanized sub-region at 70.2%, is 1.2%. The level of urbanization ranges from 7.1% in Bhutan to 100% in Singapore and Nauru.

Much solid waste in the region's urban centres is either dumped or burned by the waste generators. Even collected waste is mainly disposed of in open dumps, many of which are not properly operated. Cities with adequate solid waste disposal (e.g. Singapore, Tokyo and most cities in Australia and New Zealand) are having difficulty handling the increasing volumes of waste. Disposal and treatment of industrial, toxic and hazardous waste also causes serious problems in the region.

Despite significant investment during the last two decades, most countries in the region have urban water supply and sanitation deficits. One in five urban residents in the developing countries does not have access to improved water. Afghanistan has the lowest urban water supply coverage at 19%, while India has the largest number of people without such access. Sanitation provision varies among populations; the least well served are the urban populations in Afghanistan, Myanmar, Viet Nam and Bhutan, with less than 50% access.

Freshwater resources

The Asia-Pacific region accounts for about 36% of global runoff. The highest absolute amounts of water resources are in China, Indonesia and Bangladesh. China (along with India and Pakistan) also ranks among the lowest countries in annual water resources per capita. Water scarcity and pollution are the key water issues facing the region.

Asia-Pacific has the world's lowest per capita availability of freshwater resources. India has a water deficit of 100 billion cubic metres (bcm) per year. Deficiency of freshwater resources in Central Asia, especially for drinking, presents a risk of reduced living standards and increased risk of morbidity.

Water bodies in most cities of the region's developing countries receive domestic sewage, industrial effluents, chemicals and solid waste. Recent data covering 94% of the Asian population suggest that only 48% have sanitation coverage, which would be the lowest share among all world regions. In rural areas this figure is 31%, compared with 78% in urban areas. However, 81% of the region's population is provided with drinking water (75% in rural and 93% in urban areas). Almost two-thirds of the world's people without access to improved water supply live in Asia.

There are a number of success stories regarding water reuse and recycling in the region's industrialized countries, making use of approaches such as Cleaner Production, environmental management systems, ISO 14000, environmental auditing and reporting, and industrial eco-zoning.

Coastal and marine areas

In the last 30 years depletion of coastal resources such as fisheries, mangroves and coral reefs has been a subject of acute concern in the Asia-Pacific region. Mangrove clearance for shrimp culture has emerged as a major issue; the Chakaria Sundarbans in eastern Bangladesh, for instance, have been almost completely cleared. Aquaculture has also led to releases of nutrients, pathogens and potentially hazardous chemicals.

In the Pacific islands the causes of degradation of coastal resources include mineral extraction, trade in coral and live fish, aquaculture, overfishing and industrial pollution.

Governments have initiated fishery management by reducing subsidies and regulating access rights. The South Pacific tuna fishery may prove

to be the world's first sustainable, multinational ocean fishery.

Over half the world's coral reefs are in the Pacific islands; large areas are degraded due to factors ranging from changes in the ocean environment to tourism, population density and economic development in coastal areas. Destruction of one kilometre of coral reef represents a cost of up to US$ 1.2 million over 25 years in fishery, tourism and protection values.

Atmosphere

Air quality in the Asia-Pacific region has seriously worsened during 30 years of rapid urbanization and industrial growth. Air pollution levels in the region's largest cities are among the world's highest. Transport is a significant source of urban air pollution. Other sources include industry, power generation, and domestic burning of biomass and fuels such as charcoal.

Of the 15 cities in the world with the highest levels of particulate matter, 12 are in Asia; of these cities, six also have the highest levels of atmospheric SO_2. New Delhi has recorded 420 µg/m^3 for particulates. Tehran has recorded SO_2 levels four times the WHO guidelines.

Australia, China, India, Iran, New Zealand, Thailand, the Philippines and Sri Lanka are among the countries of the region pursuing initiatives such as introduction of unleaded gasoline and low-sulphur fuels.

High dependence on coal in China and India has made haze and acid rain critical regional issues in the past decade. At least two-thirds of acid deposition in the region is attributed to coal-fired power plants with marginal or outdated pollution control equipment.

Depletion of the stratospheric ozone layer has also emerged as a serious concern in the region. Data from Australia and New Zealand show that UV levels are still rising. India and China are the largest regional producers and users of CFCs. India is the world's second largest CFC producer and fourth largest CFC consumer.

CO_2 is the main anthropogenic greenhouse gas emitted in the Asia-Pacific region. Most comes from industry. A majority of countries in the Northwest Pacific and East Asia sub-region, along with the Pacific islands, may be particularly vulnerable to climate change phenomena such as sea level rise since most of their settlements and industries are in coastal or lowland areas.

Europe

Western Europe, the birthplace of industrialization, now has a post-industrial economic structure. The resource base has been drawn upon for centuries, yet it still makes a significant contribution to GDP (including through such primary industries as forestry and fishery). In comparison, much of the potential of Central and Eastern Europe remains untapped, particularly in regard to minerals such as coal, iron and hydrocarbons. (These minerals are also found in Western Europe. The European region as a whole accounts for nearly 23% of non-Middle Eastern oil reserves [EIA 2000*]). The West's highly developed manufacturing sector is dependent on imports of raw materials, while Eastern and Central Europe rely more on basic industries.

Land

Since the 1950s Europe has experienced continual urbanization and sprawling of urban settlements, resulting in significant expansion of urban areas at the cost of natural, semi-natural and agricultural land.

Pressures on land resources in much of Central and Eastern Europe began to decrease during the 1990s, following the collapse of centrally planned economies and the end of state subsidies to large collective farms. Economic collapse also led to a sharp decline in use of agrochemicals, abandonment of huge irrigation projects and less livestock. Much land is now being reforested.

Damage to soil from human activities, which is on the rise, includes surface sealing (often leading to flooding, mudflows and landslides), local and diffuse contamination and erosion. Soil acidification is no longer a major problem, having decreased by 50% since the 1980s.

Huge irrigation and hydroelectric projects and poor water management in the east have resulted in salinization and waterlogging of large areas, especially in Russia, Ukraine, Azerbaijan and Belarus.

Urban areas

Europe's urban population increased steadily during the 1960s and 1970s. Since then the main phenomenon has been urban sprawl linked to expanding infrastructure, higher incomes, and the diminishing size and increasing number of households. In Western Europe between 1980 and 1995, the urban population increased by 5% while the number of households rose by 19%.

With nearly three-quarters of the population living in urban areas and an expected annual urbanization rate of just 0.3% between 2000-2015, urbanization in Europe is expected to stabilize at 82%. Half the population lives in towns of 1000 to 50,000 people, one-quarter in towns of 50,000 to 250,000 and one-quarter in cities of over 250,000; these shares are not expected to change.

In the EU countries annual waste generation per capita from household and commercial activities, which constitutes only part of municipal waste, exceeds by one-third the target of 300 kg set in the fifth EU environmental action plan. Most European countries have recycling programmes, and there is a special EU packaging directive. In the 18 countries of the European Environment Agency, 13% of municipal waste is collected separately by type. There are large variations per country, from 38% in the Netherlands to an average of 5% in southern Europe.

Acceptance of the concept of producer responsibility for environmentally sound disposal of packaging and products is fairly widespread in Western Europe. In France, for instance, municipalities are responsible for waste collection while industry is responsible for recycling certain materials. In the UK, all companies in a packaging chain share the responsibility (retailers 47%, packers 36%, converters 11%, raw material manufacturers 6%).

Freshwater resources

Water resources range from 3000 mm (annual average runoff) in western Norway to 100-400 mm in much of Central Europe and less than 25 mm in central and southern Spain. Some countries depend heavily on water from beyond their borders. Water pollution is a serious issue; some progress has been made in Western Europe, but less in Central and Eastern Europe.

Europe uses relatively little of its renewable water resources: some 20%, on average, in Western Europe (ranging from less than 5% in the north to more than 25% in Belgium, Germany, Spain and Italy) and 2% in Russia.

In the central part of Western Europe most of the water supply is used for cooling in energy production and is returned to the source more or less unchanged. In the southern part of the sub-region, where water is generally less abundant, agriculture consumes around 75% of supply, compared to 20% for urban and industrial use and 5% for cooling. Some 80% of the irrigation water evaporates.

Industry and households in Western Europe have increased their water use efficiency: the amount withdrawn for public supply fell by 8 to 10% in the period 1985-95. Use for agriculture rose significantly in the south of the sub-region, however, as the amount of irrigated farmland has increased by nearly 20% since the mid 1980s.

In Central and Eastern Europe, industrial water use fell considerably with economic restructuring. Urban demand has grown steadily. Irrigation demand is also increasing (e.g. from 5% to 21% between 1970 and 1994 in Romania).

Coastal and marine areas

Much of Europe is surrounded by semi-closed and closed seas such as the Adriatic, Mediterranean, Black, Caspian and Baltic. Their limited water exchange with the open sea makes them particularly sensitive to pollution. The open coasts of the Atlantic also show the effects of land-based pollution, offshore oil and gas operations, shipping and accidental oil spills.

Some 85% of European coasts are believed to be at high or moderate risk from development (e.g. tourism, transport, intensive agriculture and industry, fishing and urbanization).

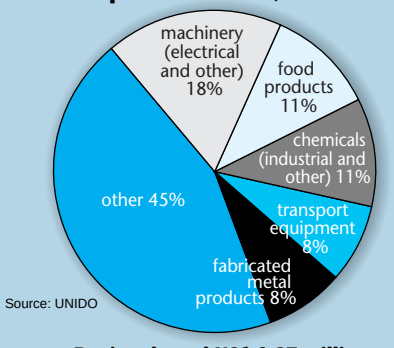
Europe's coastal areas host two-thirds of its tourism (the region attracts 60% of all international tourism). The European tourism industry is growing by 3.7% per year. Among other impacts, water consumption by this sector is three to seven times higher than that by the local population.

Maritime transport of goods increased in the EU by 35% between 1975 and 1985, then levelled off. It is estimated that 30% of world merchant shipping and 20% of world oil shipping crosses the Mediterranean.

Despite great improvements in industry, pollution from land-based sources remains serious in many areas.

Europe

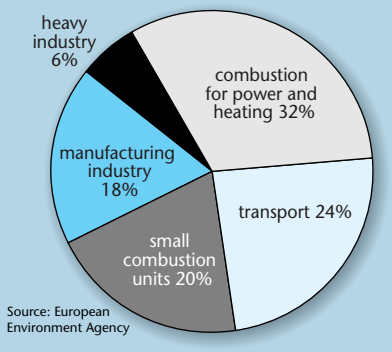
Europe: value added in manufacturing, top five branches, 1995



Source: UNIDO

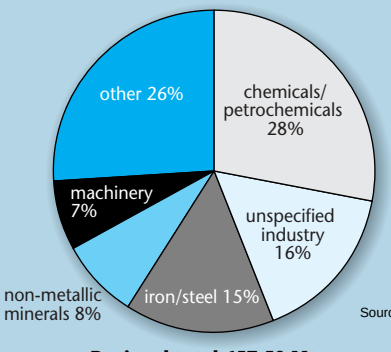
Regional total US$ 1.27 trillion

European Union: sources of CO_2 emissions from fossil fuel burning



Source: European Environment Agency

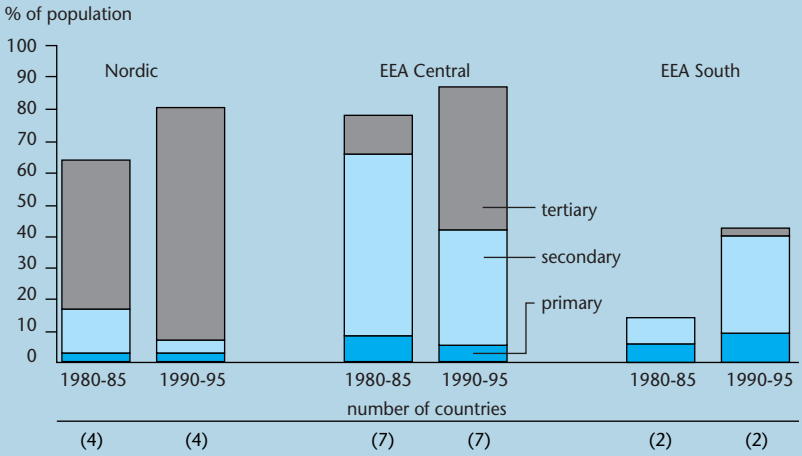
Europe: energy use in top five manufacturing branches, 1995



Source: IEA

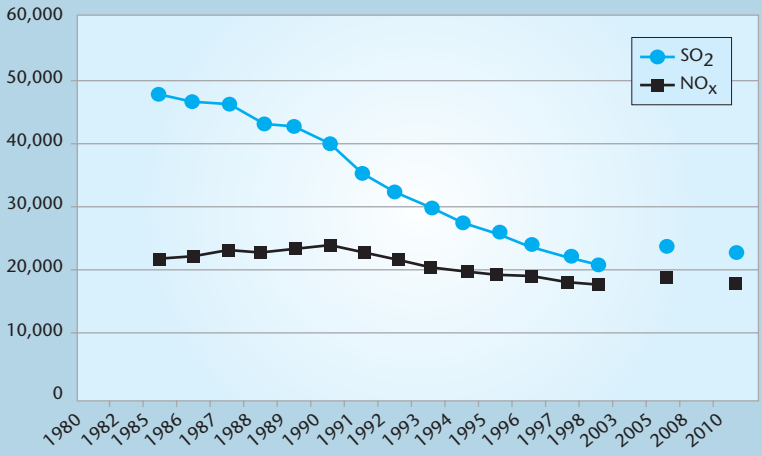
Regional total 657.50 Mtoe

Western Europe: development of wastewater treatment



Nordic: Finland, Iceland, Norway, Sweden.
EEA Central: Austria, Denmark, Germany, Ireland, Luxembourg, Netherlands, UK.
EEA South: Greece, Spain.
Source: Eurostat and national statistics

Europe: anthropogenic SO_2 and NO_x emissions, 1980-2010 (kilotonnes)



Source: Norwegian Meteorological Institute

Atmosphere

The main contributors to air pollution in Western Europe over the last three decades have been transport, solvent use, storage and distribution of fossil fuels, industry and agriculture. In Central and Eastern Europe, where the power sector and heavy industry were long the major polluters (with transport of significance in major cities), recession helped reduce air pollution in the early 1990s. However, private vehicle use rose sharply even during the worst recession years.

Overall, European emissions of most key air pollutants have declined since the early 1980s. By late 2000, sulphur compounds had been reduced by more than two-thirds from 1980 levels in Western Europe and by one-third in Central and Eastern Europe. In 1990-96, SO_2 emissions increased in Greece (7%) and Portugal (3%) while reductions of 71% and 60% were observed in Germany and Finland, respectively. Particulate matter and tropospheric ozone precursors remain serious problems.

In Western Europe SO_2, NO_x and NH_3 emissions show a clear decoupling from GDP growth, indicating that the measures taken have had some effectiveness. Some of the Central and Eastern European countries likely to accede to the EU soon also appear to have achieved such decoupling. Yet many air pollution reduction targets remain unmet.

The thickness of the ozone layer over Europe has measurably decreased since the 1980s. An increase in UV radiation was observed in Europe between 1980 and 1997, especially in the northeast. The transition in Central and Eastern Europe has delayed the phase-out of ODS production and consumption, but there has been some progress.

Many European countries are key proponents of a global climate change treaty, though the region remains one of the main contributors to global greenhouse gas emissions.

North America

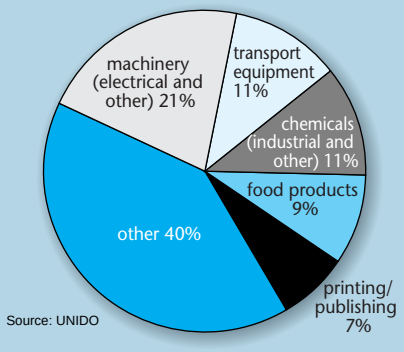
Vast mineral wealth, forests, fertile fields and other resources helped the third largest continent achieve its high level of development. Today industry is its main source of wealth. Much manufacturing (including textiles, leather goods, petrochemical products, iron and steel, ships and machines, books, clothes, wood products and foods) is concentrated in coastal areas, including the shores of the Great Lakes.

Land

About 11% of the world's agricultural cropland is in North America. Almost 20% of the United

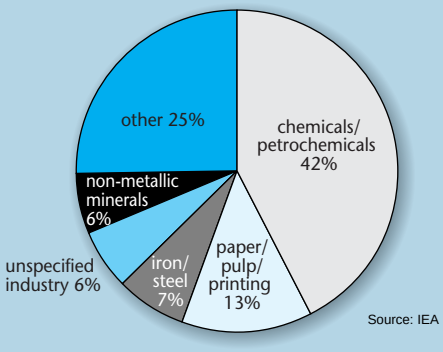
North America

North America: value added in manufacturing, top five branches, 1995



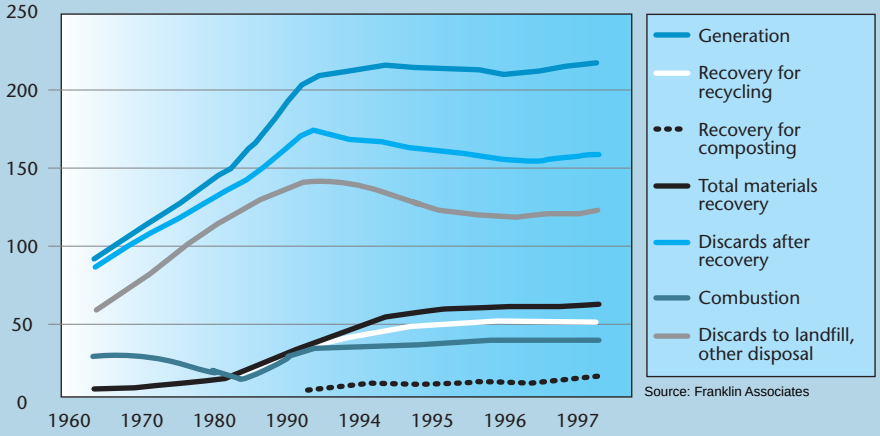
Regional total US$ 1.82 trillion

North America: energy use in top five manufacturing branches, 1995



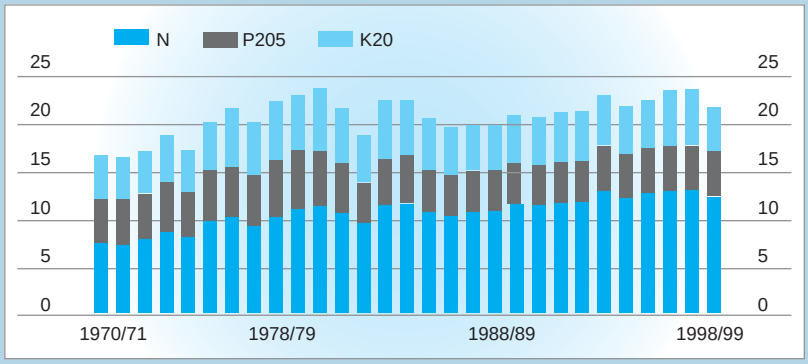
Regional total 412.87 Mtoe

Unites States: municipal solid waste generation and disposal, 1960-97



Source: Franklin Associates

North America: fertilizer composition (million tonnes nutrients)



Source: IFA 2000

States is arable and permanent cropland and 26% permanent grassland or pasture. In Canada virtually all undeveloped land that is amenable to cultivation is devoted to agriculture, though its share of the country's total territory is only about 7%.

A key issue is land degradation, especially that associated with use of chemical herbicides, insecticides, algicides and fungicides. Other direct pressures include the shift to fewer but larger farms and overgrazing on arid land.

In the 1980s both countries adopted strategies that took fragile land out of agricultural production. These and other conservation measures have led to significant declines in erosion. Yet soil loss continues to threaten productivity on about one-third of US cropland and a large share of Canadian cropland remains at risk of loss by water erosion.

North America leads the world in pesticide use, accounting for 36% of the total. The pesticide market has grown by about 6% a year since 1990. The area treated with chemical pesticides has also increased rapidly – more than tripling in Canada, for instance, in the period 1970-95. Homeowners use 5-10% of the pesticides sold in North America.

Urban areas

North America is highly urbanized: in the past 30 years the percentage of the population living in cities has risen from 72% to 77.2%. The typical settlement pattern in the region, commonly called "urban sprawl," is characterized by low-density, non-contiguous, automobile-dependent suburbs surrounding urban cores. Abetted by a vocal grassroots movement, federal, regional and city governments are increasingly attempting to address the environmental and social impacts of sprawl.

Between 1981 and 1991, the number of kilometres travelled by car increased by 23% in the United States and 33.7% in Canada. From 1990 to 1998 the US suburban population grew by 11.9% while central city populations grew 4.7%.

North America produces more municipal solid waste than any other region. Since 1970 the rate of increase in US municipal solid waste generation has slowed considerably, as waste recovery has increased and disposal to landfill has decreased. Volumes are growing, however, with lightweight but high-volume materials such as paper and plastic replacing dense and heavy materials in the waste stream.

Freshwater resources

North America has about 13% of the world's renewable freshwater (excluding water frozen in glaciers and ice caps). While supplies are abundant, it also has a growing population, extensive irrigated agriculture and increasing municipal and industrial demands. In the late 1990s North America used 1693 cubic metres of water per capita per year, more than any other region.

Recent US conservation measures have led to declines in both per capita and total water consumption; in the period 1980-95 total withdrawals declined by nearly 10% while the population grew by 16%. In Canada overall water withdrawal over 1972-91 increased by 80% while the population grew by just 3%.

By the mid 1990s groundwater supplied 30-50% of North Americans and over 90% of rural dwellers. Hazardous compounds used in industry and agriculture are threatening groundwater quality, with agriculture being the dominant factor – particularly fertilizer use, though the effects of pesticide contamination are increasingly being examined. Underground tanks for storing oil products, acids, chemicals, industrial solvents and other chemical products are leading sources of groundwater contamination by known or suspected carcinogens.

Groundwater levels have generally stopped declining since the 1980s, but aquifer depletion still accounted for about 10% of all US freshwater withdrawals in the mid 1990s. In 1990, 62% of irrigated farmland relied on groundwater projects.

Coastal and marine areas

Almost 25% of Canada's population and about 55% of the population of the United States live in coastal areas. The US coastal population is growing at four times the national average, with small coastal cities showing some of the highest levels of growth. An issue of increasing gravity is the excessive input of nitrogen from land-based activities. Another high priority issue is the precipitous decline of North American fisheries.

By 1999, 24 subspecies of West Coast salmon had been listed under the US Endangered Species Act and Canada had closed or curtailed salmon harvests for some species. The key causes of salmon declines, aside from overharvesting, are habitat destruction or degradation from dams, hatcheries, logging, mining, overgrazing, urbanization, agricultural runoff, industrial pollution and water project development, though the role of natural cycles such as El Niño has recently come under examination.

Atmosphere

North America's considerable industrial, transport and energy activities have major effects on the atmosphere. The past 30 years have seen notable regional and local air quality improvements. The Clean Air Acts in Canada (1969) and the United States (1970) resulted in gradual reductions in urban levels of most conventional air pollutants.

Acid rain control programmes have helped cut sulphur compound emissions dramatically (by up to 25% in some areas) since 1995, though evidence suggests many sensitive areas still receive acid deposition exceeding their assimilation capacity, and that damage from acid deposition may be more fundamental and long-lasting than had been believed. New concerns have arisen over ground level ozone and fine particulate matter.

As regards ozone precursors, fossil fuel combustion by power plants, industry and motor vehicles is the major source of NO_x (transport alone accounts for 60% of NO_x emissions in Canada and 53% in the United States). Industry is responsible for 30% of atmospheric emissions of VOCs in Canada and 49% of those in the United States; mobile sources account for 26% of those in Canada and 37% of those in the United States.

The northern parts of the region have been subject to serious stratospheric ozone deficits. Under the Montreal Protocol, Canada reduced its use of ozone depleting substances more rapidly than required and cut production from a high of 27.8 kilotonnes in 1987 to 1.0 kilotonne in 1996. The United States (which had been the largest CFC producer) also acted to phase them out. Both countries eliminated non-essential CFC use.

North America emits more greenhouse gases, both in all and per capita, than any other region. In 1996, with about 5% of the world's population, it accounted for about 25% of all anthropogenic emissions of CO_2. Most of these emissions are from fossil fuel combustion.

Latin America and the Caribbean

Development in the LAC region was long built on exports of commodities. Argentina, Brazil, Chile, Mexico, Uruguay and Costa Rica are among the countries with the most significant industrial growth. Poorer countries have traditionally tended to rely more on single-product exports. Venezuela alone has more than one-fifth of non-Mideast oil reserves (EIA 2000*), and the region holds a wealth of other raw-material resources including renewable resources: to name just a few, metals (including precious metals), gemstones, phosphates, nitrates, marble, limestone, graphite, exotic woods, rubber and other botanicals. Small and medium-sized enterprises dominate manufacturing.

Land

The LAC region has the world's largest reserves of arable land: some 576 million hectares, or almost 30% of the region's total 1.99 billion hectares. Land degradation (associated with compaction, leaching of nutrients and pollution) is a priority issue. In the past 30 years arable land and grassland have increased at the expense of forests.

Land tenure issues in this region (e.g. concentration of ownership, lack of land titles, a split between large farms and smallholdings) entail pressures on the land, particularly in the case of small Caribbean islands. About 38% of the rural population is made up of smallholders, 31% of landless peasants and 27.1% of minority ethnic groups.

Urban areas

LAC is the most urbanized region in the developing world. Urbanization in the region is closely linked to the economic development models of the past 30 years. The resulting dissociation of urbanization from economic progress has led to deficiencies in basic services and public health.

Between 1970 and 2000 the urban share of total population in the region increased from 57% to 75.3%. The urbanization level is 78% in South America, 67% in Central America and 55% in the Caribbean.

Solid waste generation per inhabitant has risen from 0.2-0.5 kg per day in 1970 to 0.92 kg on average today. Although an average of almost 90% of households are covered by collection services in the largest cities, disposal is inadequate for 43% of the waste collected. About 3% of the urban waste is recycled. Waste generation is significantly higher in the more affluent parts of cities.

Overall, 99% of urban LAC households have access to improved water services and 87% have improved sanitation, the shares for the latter ranging from 50% in Haiti to 100% in the British Virgin Islands, Montserrat and Suriname. Less than 5% of municipal wastewater in the region as a whole is treated.

Freshwater resources

The LAC region has over 30% of the world total of renewable water resources. The Gulf of Mexico Basin, South Atlantic Basin and La Plata Basin, which cover 25% of the region's territory, have 40% of its population and only 10% of its regional water resources.

LAC water-related challenges, which often transcend national boundaries, fall largely into three broad groups: decreasing available water per capita per year (related to population growth, urban expansion, deforestation and climate change); loss of quality (linked to untreated sewage, excessive fertilizer and pesticide use, and pollution from industry, mining and the energy sector); and outdated institutional and legal frameworks.

Annual industrial withdrawal in South America is estimated at 15 km^3, with 80% of demand coming from Argentina and Brazil. Demand is constantly increasing in the mining sector, especially in Chile and Peru; some parts of the Andes may need to import water in the near future as a result. In Venezuela and in Trinidad and Tobago, the oil sector is a major user. Demand from the tourism industry is rising, especially in the Caribbean.

Irrigation is a rapidly expanding use. In 1998 over 18 million hectares in the region was irrigated, up from just over 10 million in 1970.

Domestic access to water supply and sanitation is generally high on average, though inequity among users is widespread, especially between rural and urban areas. The latter have 93% water and 87% sanitation coverage, compared to 62% and 49% for the former.

Coastal and marine areas

Key environmental issues for the coastal and marine areas of LAC relate to overfishing, habitat conversion and destruction, and pollution from settlements, tourism, shipping (especially of hazardous substances) and the energy sector. Climate change and sea level rise would likely exacerbate these problems significantly, particularly in the Caribbean.

LAC marine and coastal areas include major hydrocarbon producing areas. The main pressure on the marine and coastal environment in certain areas is the risk of spills from oil and gas exploration, production and distribution.

Tourism (some 12% of the LAC economy) is chiefly concentrated along coasts. Tourists contribute 43% of the Caribbean's GDP and one-third of its export revenue. Environmental effects include habitat conversion, increased demand for ports and roads, salinization of coastal aquifers, and discharges of sewage, garbage and hazardous waste from cruise ships.

Atmosphere

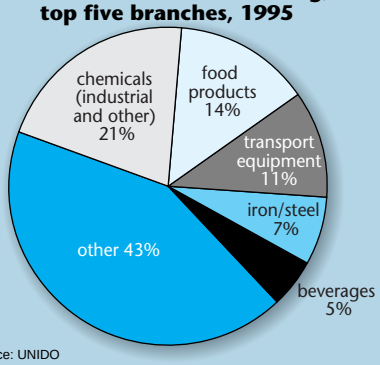
Air pollution is a critical issue in this region. Rapid urbanization, industrialization and growth of the motor vehicle fleet are the main causes. The region also is affected by ozone layer depletion and is vulnerable to effects of global climate change.

Pollution, long evident in big cities, increasingly affects medium-sized cities and small islands. Transport is a major source; Mexico City and Buenos Aires attribute over 70% of emissions to transport. In cities including Santiago (Chile), an additional source is small and medium-sized enterprises.

In Mexico City almost 60% of SO_2 emissions are from industry, including oil refining. Mining

Latin America and the Caribbean

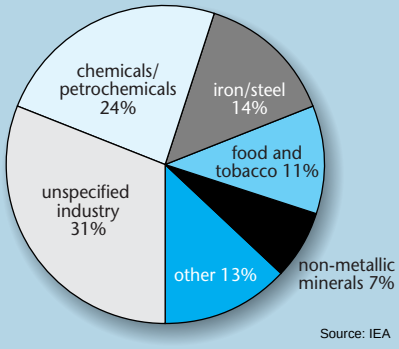
Latin America and the Caribbean: value added in manufacturing, top five branches, 1995



Source: UNIDO

Regional total US$ 283.52 billion

Latin America and the Caribbean: energy use in top five manufacturing branches, 1995



Source: IEA

Regional total 152.55 Mtoe

Latin America and the Caribbean: solid waste collection and disposal, selected cities

City (year)	Population (millions)	Garbage (T/day)	Collection (%)	Disposal in landfills[b] (%) Good	Regular	Bad
South America						
Buenos Aires[a] (96)	12.0	10500	91	100	-	-
Sao Paulo[a] (96)	16.4	22100	95	100	-	-
Río de Janeiro (96)	9.9	9900	95	-	100	-
Santiago (95)	5.3	4600	100	100	-	-
Guayaquil (96)	2.3	1400	100	100	-	-
Caracas (95)	3.0	3500	95	-	100	-
Salvador (96)	2.8	2800	93	-	100	-
Curitiba (95)	2.1	1300	100	100	-	-
Brasilia (96)	1.8	1600	95	-	75	25
Belo Horizonte (96)	3.9	3200	90	100	-	-
Mesoamericai						
Mexico[a] (94)	15.6	18,700	80	50	25	25
Monterrey[a] (96)	2.8	3000	81	-	100	-
Guatemala (92)	1.3	1200	80	-	-	100
San Salvador (92)	1.3	700	60	-	-	-
Caribbean						
Havana (91)	2.0	1400	100	-	100	-
Santo Domingo (94)	2.8	1700	65	-	-	100

a) Metropolitan area
b) Good = sanitary landfill; Regular = controlled landfill; Bad = open landfill

Source: Pan-American Health Organization; Inter-American Development Bank

Latin America and the Caribbean: irrigated surface by sub-region (thousands of hectares)

	1970	1985	1998
Mesoamerica	3812	5718	6986
Caribbean	705	1204	1282
South America	5673	8296	10,043

Source: FAO

is responsible for deterioration of local air quality in Bolivia, Brazil, Chile, Colombia, the Dominican Republic, Jamaica, Peru, Suriname and Venezuela.

Annual average losses of stratospheric ozone at latitudes 25-60° were about 5% in 1979-97. Ozone layer depletion is of particular concern in Argentina, Chile and southern Brazil. LAC signatories of the Montreal Protocol, supported by the Multilateral Fund, have taken measures aimed at phasing out ODS. Mexico, Venezuela and Argentina still produce CFCs. Brazil halted production of ODS in 2000.

CO_2 emissions in LAC have increased steadily in the past 30 years. In 1991-92 the region was estimated to account for 11.22% of global anthropogenic CO_2 emissions, 4.51% of global industrial CO_2 emissions and 48.5% of emissions from land-use change. Deforestation, especially in the Amazon basin, is thought to be a key source of greenhouse gases; another source is methane from livestock breeding.

West Asia

From the mid 20th century, oil and gas development has worked a socio-economic transformation in the West Asia region, until then dependent on farming and trade. Nine of the region's 12 countries produce and export hydrocarbons. Governments have invested heavily in major infrastructure and heavy industry (e.g. cement, iron and steel, fertilizers, chemicals and petrochemicals).

The Gulf Cooperation Council (GCC) countries – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates – depend almost entirely on oil and gas while Yemen and the Mashriq sub-region – Iraq, Jordan, Lebanon, Syria, and the West Bank and Gaza – have more diversified economies. Manufacturing in the region as a whole includes foods, textiles, chemicals, tools and light equipment, basic metals, and transport equipment.

Land

Desertification is a key issue in this region. Most land in West Asia is either desertified (shares range from 10% in Syria to nearly 100% in Bahrain, Kuwait, Qatar and the United Arab Emirates) or vulnerable to desertification.

Underlying causes include climate, socio-economic factors such as high population growth rates, intensive agriculture replacing traditional farming practices, poverty, and government policies aimed at achieving food security, usually entailing subsidies for agrochemicals, incentives to acquire farm machinery, and free or low-price energy and irrigation water.

Non-agricultural land changes have been driven by population growth and other demographic shifts leading notably to increased urbanization and to industrialization (e.g. electricity generation, chemicals, fertilizers, oil refining, mining and printing in the Arabian Peninsula sub-region, electricity generation, fertilizers, smelting and cement in the Mashriq).

Urban areas

West Asian countries range from highly urbanized (e.g. Kuwait) to mainly rural (Yemen). Three main factors have shaped the region's urban landscapes: the 1970s oil boom and sharp fluctuations in oil revenue in the following two decades; movements of people within the region due to armed conflicts and civil strife; and globalization, which is generating greater economic integration of West Asian countries into the global economy

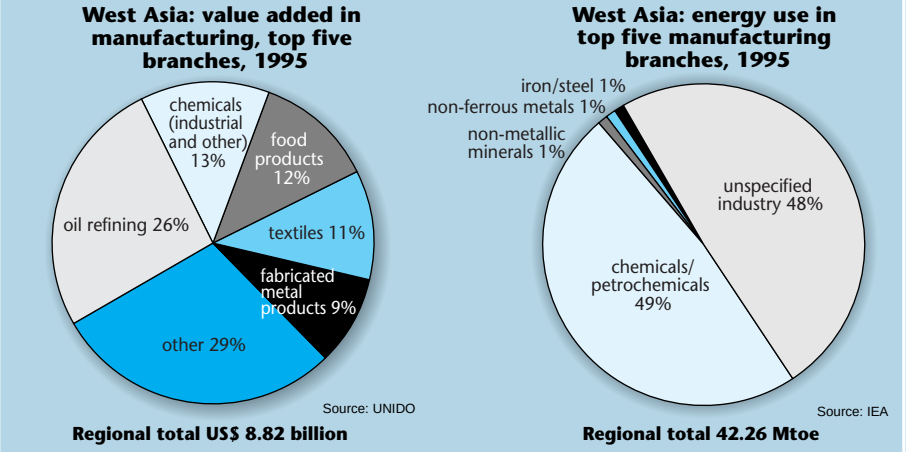
and increasing the role of information technology.

Not only is the region's population growth rate the world's highest (it averaged 3.7% a year in 1980-2000), but the urbanization rate is even higher, with migration from rural to urban areas as well as arrivals of foreign workers, especially in the GCC countries. The urbanization rate has been much higher in the Arabian Peninsula than in the Mashriq.

Municipal waste generation in the region is estimated to have increased from 4.5 million tonnes in 1970 to 25 million tonnes in 1995. The effectiveness of municipal waste management is generally higher in the GCC countries than in the Mashriq. The highest levels of resource use and waste generation also occur in the wealthy cities of the GCC countries.

Industry in most countries of the Arabian Peninsula is resource-intensive and produces a lot of hazardous and toxic waste. Not all countries in the region have facilities to handle such waste, which may be dumped on fallow or public land, in rivers or coastal waters, or in facilities intended for municipal waste.

West Asia



Freshwater resources

The Arabian Peninsula sub-region receives less than 100 mm of rain a year and has no reliable surface water supplies. It depends entirely on groundwater and desalination plants. About 70% of the Mashriq sub-region has average annual precipitation of less than 250 mm and variation by season and district is very high. The Mashriq is richer in surface water resources than the Arabian Peninsula.

High population growth in the region is among the factors pushing demand for water up and resources per capita down. Other factors include urban migration and living standard improvement. Many countries of the region impose water rationing.

Food self-sufficiency policies have encouraged agricultural expansion, boosting water demand and requiring the mining of deep aquifers. Unregulated pumping, inadequate or nonexistent irrigation water tariffs, lack of enforcement against unlawful drilling, poor irrigation practices and lack of farmer awareness have resulted in excessive water use.

Water quantity and quality are major issues in the Mashriq. Effluent, agrochemicals and industrial discharges into rivers and other water bodies have seriously affected aquatic life. Discharges from tanneries into Syria's Barada River, for example, can boost BOD levels to 23 times the usual level.

The overall value of the water stress index for West Asia is 84.4%, which is considered very critical. Countries in the region have nevertheless made significant strides in ensuring that a majority of people have access to safe water and sanitation coverage. The percentage of the population with water supply coverage in 2000 ranged from 39% in Oman to 100% in Lebanon; sanitation coverage in 2000 ranged from 45% in Yemen to 100% in Lebanon and Saudi Arabia.

Coastal and marine areas

West Asia borders the Mediterranean, the Red Sea, the Gulf and the Arabian Sea. The coastal zones – mainly interactive marine, brackish and terrestrial systems – are under various degrees of stress from migration, urbanization, dumping of untreated waste, and regional and internal conflicts. Key environmental issues include physical alteration, marine pollution and overexploitation of marine resources.

The Mashriq and the Arabian Peninsula have different coastal pressures to contend with. In the GCC countries the challenges are from oil-related industries and desalination plants; in the Mashriq the challenge is primarily the pollution of rivers flowing into the sea, laden with waste, agrochemical residues and hazardous substances from industry.

With its heavy oil traffic, the Gulf could become the world's most polluted marine area unless strict measures are taken. Pollution from land-based sources, particularly from industry, is recognized in most of the region as another serious threat. Sewage is also an important issue. Most coastal cities of the Mashriq have outdated sewers and discharge untreated sewage into the sea, as do parts of some GCC countries. In Bahrain, Kuwait and the UAE, among other places, all sewage is treated before discharge, however, and some is recycled.

Major discharges from desalination plants, including brine, chlorine and heat, pose a serious threat. Nearly 43% of the world's desalinated water is produced in the GCC countries and the trend is increasing.

Atmosphere

Population growth, urbanization, oil-related industries and other industrial activities are the main factors behind the increase in air pollution hot spots in West Asia. Some major cities and industrial compounds have concentrations that may exceed WHO guidelines by a factor of two to five.

Burning of fossil fuel (the main cause of air pollution and main source of anthropogenic CO_2 emissions in the region) accounts for 100% of West Asia's commercial energy production. Low-quality fuel is used in many factories and power plants, particularly in the Mashriq.

The cement industry is the main industrial source of CO_2 emissions in the Mashriq. It also emits large amounts of dust in a region where sand and dust storms are already seasonal problems. Dust storms in particular can carry pollutants long distances.

Many vehicles in the region are in poor condition, and about 30% of the fleet is more than 15 years old. Leaded gasoline is still a major motor fuel in many countries. Unleaded gasoline has been introduced in GCC countries and Lebanon. It has been the only gasoline available in Bahrain since July 2000.

All countries in West Asia except Iraq are parties to the Montreal Protocol under Article 5, and all are users but not producers of ODS. Most countries have already frozen ODS consumption as required by the protocol, though methyl bromide is still consumed in Jordan, Lebanon and Syria, and other ODS are consumed in Bahrain and Oman.

The mining and minerals sector: factors weakening its contribution to African development

Thomson Sinkala, Professor, School of Mines, University of Zambia, Box 32379, Lusaka, Zambia (tsinkala@santren-elearning.com; tsinkala@mines.unza.zm)

Summary
Africa's great mineral wealth has the potential to contribute significantly to its development. In this article some factors responsible for poor realization of this wealth are outlined. Proposals are made for ensuring that the mining sector contributes to regional, national and local sustainable development. Conflict minimization would make it possible to redirect resources to civil development.

Résumé
L'Afrique possède des ressources minières considérables qui pourraient contribuer de façon non négligeable à son développement. L'article met l'accent sur quelques facteurs responsables du faible degré de conscience de cette richesse et fait des propositions pour mettre le secteur minier au service du développement durable à l'échelle régionale, nationale et locale. L'apaisement des conflits permettrait de réorienter les ressources vers le développement de la société civile.

Resumen
La gran riqueza mineral de Africa presenta el potencial de contribuir considerablemente a su desarrollo. Este artículo destaca algunos factores responsables de la comprensión deficiente de esta riqueza. Se elaboran propuestas tendientes a que el sector minero contribuya al desarrollo sustentable regional, nacional y local. La minimización de conflictos posibilitaría redirigir los recursos hacia el desarrollo civil.

Africa is blessed with abundant mineral resources. Minerals of high value include petroleum, diamonds, gold, the platinum group metals (PGMs) and gemstones. About 20 of approximately 50 African countries can be considered to be minerals-based economies, emerging minerals-based economies, or economies in which minerals can (or could) play a significant economic role. The Southern Africa Development Community (SADC) region alone accounts for a significant proportion of world mineral reserves.

The long-term and sustainable benefits of Africa's mineral wealth are barely felt. **Figure 1** indicates the continent's extreme underdevelopment and endemic poverty. Africa has the highest net per capita ODA flow of any region. Sub-Saharan Africa is the world's least developed and most poverty stricken region. Its countries have the highest external debt levels as a percentage of GDP. To alleviate poverty and raise the standard of living, this region's mineral wealth needs to be developed and managed.

Some factors responsible for poor realization of mineral wealth

Poor mineral industry development policies

Some regions of Africa have (on average) world class geological prospectivity (**Table 1**). Efforts are being made to have these regions prospected. In the SADC region, for example, Tanzania, Zambia and South Africa are among the top 15 countries in the world terms of their mineral potential.[1]

Mineral development policies in Africa tend to give more weight to mineral exploration and extraction than to downstream processing beyond extraction. The continent's mineral industry has therefore evolved largely as a producer for foreign markets. While the industry has thrived under this export orientation, it has experienced a number of persistent marketing difficulties associated with commodity marketing.

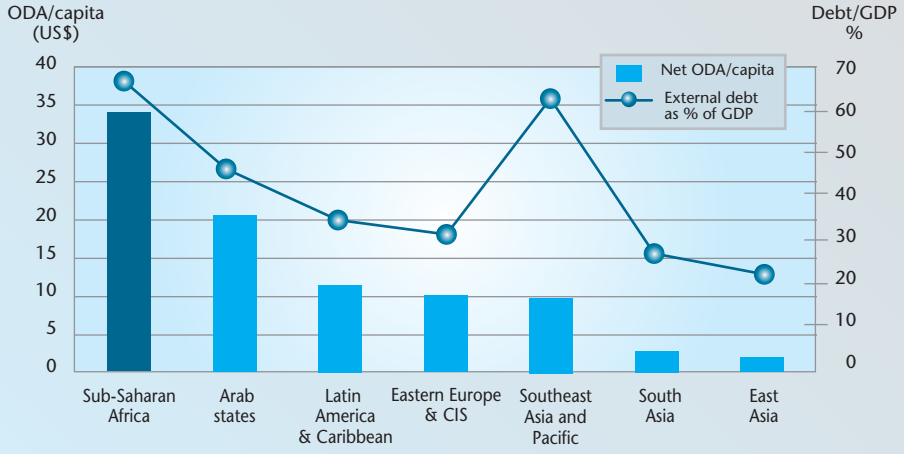
Mineral exploration is an unavoidable first step in the mining sequence, but it is largely a "non-profit" undertaking aimed at establishing the presence and economic potential of mineral deposits. Extraction will generally take place when a mineral is valued as an ore, meaning it can be mined at a profit. Revenues realized at the raw material extraction level are generally far less than those from downstream processing.

Poor physical infrastructure in relation to scale of mining

In mineral development and economic diversification a good infrastructure base promotes socio-economic development and attracts investment.

Although some regions in Africa have good geological potential, most countries have poor infrastructure and communications systems. At the same time, minerals are often located in remote areas of these countries. Large-scale mining companies generally have built-in capacity to develop infrastructure (roads, electricity, water, communication). It is economically difficult for more isolated small-scale mining activities to do

Figure 1
Net overseas development assistance per capita and external debt to GDP ratios (1997 data)



Source: J.M. Stewart, Policy Requirements for Successful Mining in Africa (2000)(www.natural-resources.org/minerals/development/docs/stewart.htm)

Table 1
Proportion of selected world mineral reserves in Southern Africa

Commodity	SADC[1] country	Global reserves (%)	Total
Gold	South Africa	35.0	35.0
PGMs	South Africa	55.7	
	Zimbabwe	8.9	64.6
Coal	South Africa	10.9	10.9
Uranium	Namibia	6.7	
	South Africa	9.4	16.1
Cobalt	Zambia	5.6	
	DRC[2]	26.0	
	South Africa	0.2	31.8
Copper	Zambia	5.2	
	South Africa	2.0	
	DRC	4.6	11.8
Nickel	South Africa	8.4	
	Botswana	0.6	
	Zimbabwe	0.2	9.2
Titanium	South Africa	20.4	20.4
Chromium	South Africa	68.3	
	Zimbabwe	20.5	88.8
Iron ore	South Africa	0.9	0.9
Manganese	South Africa	80.0	80.0
Vanadium	South Africa	44.5	44.5

1. Southern Africa Development Community
2. Democratic Republic of Congo
Source: MMSD Stakeholders Workshop, 2001

the same thing; economic gains made from small-scale mines would not produce significant and sustainable diversification impacts, nor would they pay for infrastructure development in their areas of operation.

Unfair administration of mineral resources

The current arrangement by which mineral licences are issued and supervised by the central government, often with little or no involvement of "local" communities (and with the communities seeing no direct benefits), has resulted in these communities being worse off. This is especially true of small-scale mining operations. While the area's miners ultimately leave with the wealth generated from minerals, communities are left with unrehabilitated pits, cleared bush and, in the worst cases, social disorders and HIV/AIDS.

Conflicts

Mineral-rich countries and regions are frequently the location of internal and/or cross-border conflicts, such that the wealth generated from minerals exploitation largely goes to pay for arms rather than for socio-economic development. These conflicts occur in countries associated with high value minerals such as Angola (oil and diamonds), Democratic Republic of Congo (diamonds), Sierra Leone (diamonds), Nigeria (oil), Algeria (gas and oil) and Sudan (oil).

Corruption

Corruption is a developmentally retrogressive phenomenon whenever it surfaces. It repels genuine investment. Investment that finds it way to recipient countries becomes expensive as the costs of inputs become inflated. There is a strong link between high levels of corruption and low levels of human development, since revenue that should be used for development is often diverted to non-development activities. Many countries in Africa are rated as highly corrupt (Table 2).

Loss of socio-economic security (SEC) due to resettlements

Certain levels of exploration and/or mining require that people in the affected area are resettled. The question is whether the socio-economic security in their new settlements is equal to or better than their original. It is a well known fact that such developments lead to landlessness, joblessness, homelessness, marginalization, food insecurity, increased morbidity and mortality, loss of access to common property resources, and social disarticulation.[2]

This large number of areas affected by ressettlement requires considerable attention to ensure that those affected do not suffer a net loss of their socio-economic security. Historically, such quantification has hardly been done. Even with the current involvment of communities in environmental impact assessments, quantification of SEC net benefits/loss to the community is scarcely carried out.

Possibilities for ensuring that the mining sector contributes to sustainable development

Many governments and regions are taking measures to ensure that the mining sector contributes to sustainable development.[3] Countries such as South Africa are cited as examples in various documents and articles. In addition to conducive investment and industry development policies, the following are suggested to add value to economic diversification efforts:

Natural resource accounting and exploitation

Non-mineral resources (e.g. agriculture, fishing and tourism) in a given area may be a better basis for development than mineral exploitation. It is therefore suggested that "resource accounting" (for lack of a better term) and economic simulations be performed before decisions are made on development directions and resources to exploit.

Resource ownership, management and distribution

In the past, management of traditional resources in Africa gave more responsibilities to authorities/communities living next to the resources. Such communities also directly benefited from the resources while contributing to the central "barn" managed by chiefs or their appointees. This gave greater sense of ownership, and therefore security, with respect to the resource.

Mineral licensing and management should involve local communities through their administrative structures. Mineral royalties should be such that a percentage goes directly to development of infrastructure, diversification of economic activities, and construction of schools and health centres in local communities. This not only contributes to the socio-economic sustainability of such communities, but will also improve the security of mineral and other natural resources in the area.

Such an approach to development, sometimes referred to as Administrative Management Design (ADMADE), has been used successfully.[4] If it were applied to the minerals sector, we might see a reduction in current national and regional mineral-based conflicts.

Downstream processing and economic diversification

The mining industry has strong backward and forward linkages with all other economic sectors.

Table 2
Corruption perceptions index, 2001

Rank	Country or entity	Corruption rating	Minerals
1	Finland	9.9	
2	Denmark	9.5	
3	New Zealand	9.4	
4	Iceland	9.2	
	Singapore	9.2	
6	Sweden	9.0	
7	Canada	8.9	
8	Netherlands	8.8	
9	Luxemborg	8.7	
10	Norway	8.6	
11	Australia	8.5	
12	Switzerland	8.4	
13	United Kingdom	8.3	
14	Hong Kong	7.9	
15	Austria	7.8	
16	Israel	7.6	
	United States	7.6	
18	Chile	7.5	
	Ireland	7.5	
20	Germany	7.4	
21	Japan	7.1	
22	Spain	7.0	
23	France	6.7	
24	Belgium	6.6	
25	Portugal	6.3	
26	Botswana	6.0	diamonds, salt
29	Italy	5.5	
30	Namibia	5.4	diamonds, uranium
31	Tunisia	5.3	
38	South Africa	4.8	gold, PGMs
40	Mauritius	4.5	
54	Egypt	3.6	
59	Ghana	3.4	chromium, gold
61	Malawi	3.2	gemstones
65	Senegal	2.9	
	Zimbabwe	2.9	gold, chromium
75	Zambia	2.6	copper, gemstones
82	Tanzania	2.2	gold, gemstones
84	Cameroon	2.0	oil
	Kenya	2.0	
88	Uganda	1.9	
90	Nigeria	1.0	oil

Perceptions of the degree of corruption by business people, risk analysts and the general public, ranging from 10 (highly clean) to 0 (highly corrupt)

Source: Transparency International

These linkages can be further enhanced through increased downstream processing of mineral products. Policies that target downstream processing would make it possible to extract minerals even at break-even prices, but with a view to feeding into the in-country downstream processing industry and other economic sectors where larger profit margins could be realized.

One notable example of economic diversification is Botswana, where mineral wealth has been managed carefully over an extended period since independence and the subsequent establishment of the diamond mining industry. Botswana has used taxes, royalties and dividend revenues to fund structural change within its economy, infrastructure and society.[5]

Fighting corruption

Corruption undermines a country's social fabric, distorts the government's priorities, undermines overall efficiency, and ultimately slows down economic growth. Measures to minimize these effects should include separation of powers within government structures, making information on government decisions and activities increasingly accessible to the public, strengthening corruption-fighting NGOs, and decentralizing governance structures.

Minimizing impacts of resettlement

The starting point should be to handle the whole process of resettlement as a business. Each affected individual and community should as a minimum break even, i.e. their socio-economic security (SEC) should as a minimum be equal to their original state. The individual and community should gain from mine development if this minimum is exceeded, directly or indirectly.

For this to happen, resettlement policies need to be adjusted where wanting, and environmental impact assessments and auditing need further development to adequately address this aspect. Measures towards meeting SEC include direct appropriate compensation, community development multiplier projects and programmes, community located mine service industries, and training of labour within the community.

Conclusion

It is clear that Africa has significant mineral resources. In many cases they are world class. Earnings from the mining industry are vital to the diversification of the continent's economy. However, despite the importance of national and regional economies, there is a historic lack of serious national strategies for developing downstream processing industries. Earnings from the industry need to be further invested in diversified mining and non-mining industries, with the aim of ensuring sustainability as well as increasing revenues and jobs.

In their bid to achieve progress, countries in the region need to take care not to neglect proper planning: many "development partners" may be willing to take short cuts, dump outdated technology and impose ill-considered projects on their unsuspecting hosts.

Other areas to which it is important to give attention include natural resource accounting, governance and management of mineral wealth, and the reduction of corruption.

Notes

1. See, for example, recent issues of *Mining Journal.*
2. MMSD (Mining, Minerals and Sustainable Development) Stakeholders Workshop, Johannesburg, South Africa, 18-19 September 2001.
3. Shackleton, S. and B. Campbell (eds.) (2000) *Empowering Communities to Manage Natural Resources: Case Studies from Southern Africa.* SADC (Southern Africa Development Community) Wildlife Sector, Natural Resources Management Programme. Lilongwe, Malawi.
4. Chanda, J. (2000) *Growth and Diversification in Mineral Economies: Mining investment promotion in the SADC region (www.natural-resources.org/minerlas/development/docs/chanda.htm).*
5. Solomon, M.H. (2000) *Growth and Diversification in Mineral Economies: Planning and incentives for diversification. (www.natural-resources.org/minerals/development/docs/solomon.htm).*

For information about minerals, metals and sustainable development, also see the Mineral resources Forum-Environment web site: //www. uneptie.org/pc/mining/mrfvision.htm ◆

Riverbed mining at Filabusi, Insiza District, Zimbabwe: a model for sustainable development in small-scale artisanal mining

David E.H. Murangari, Chief Executive Officer, Chamber of Mines of Zimbabwe, PO Box 712, Harare, Zimbabwe

The Riverbed Mining Project is located near the village town of Filabusi in the Insiza District, about 100 km southeast of Bulawayo in southwest Zimbabwe. This pilot project was launched in the mid 1990s by the late Professor Jurgen G. Voss and his staff from the University of Zimbabwe's Department of Mining Engineering and Metallurgy. Financial support was provided by GTZ, the German Technical Assistance Group.

Several rivers in Zimbabwe have been heavily damaged by illegal gold panning activities, usually by people acting individually or in small groups.[1] This project illustrates the concept of group mining, in which individuals engaged in mineral exploitation agree to cooperate to achieve proper mining methods and individual miners are bound by common mining interests and standards.

Group mining enables pooling of resources to allow some systems technology to be applied. It also creates a certain level of labour organization (task distribution) and diversification within the system. By these means it is hoped to increase overall efficiency, while at the same time allowing conservation and rehabilitation to be integrated into the mining process.

The level of cooperation may vary (and different organizational structures may exist) as long as the overall effect is that the levels of cooperation bring the operation of the groups of miners into a state which may be regarded as "proper mining". Group mining is a viable vehicle for sustainable development on the pilot project.

Project dynamics

This pilot project is the first of its kind worldwide. At least we know that it is the first in Sub-Saharan Africa, and certainly in Zimbabwe. It was aimed at transforming the individual, informal illegal activity of gold panning into a formal, legal activity in which rehabilitation of the riverbed and riverbanks is an integral part of the actual mining process rather than an activity following extraction of the metal. In addition, the project was geared to other activities complementary to mining in the rural district area concerned. Experience so far has shown that this approach is technologically feasible, and that both economic and social viability can be achieved.

The pilot project was centered on a public stream (the Mtshabezi River) where several gold panners had been at work, with the result that a local reservoir and weir were silted up and the water disappeared. Riverbanks upstream and downstream of the weir were extensively damaged, so that soil erosion extended beyond the previous banks in a haphazard manner. The project involved using shovels and wheelbarrows to remove loads of sand and silt from the riverbed in the reservoir and next to the weir to a site beyond the riverbanks, where gold was extracted using an array of sleuce boxes and other gravity methods.

All the "washed" sand was then conveyed to backfill holes, trenches and gullies created along the riverbanks. The idea was to rehabilitate the banks to approximately their approximate original level to avoid steep gradients. In addition, alluvial cobbles from the riverbed were used to stabilize the repaired banks, onto which some local grass types were planted. Any excess sand and silt was stockpiled about 30 metres away from the banks.

The weir and reservoir were consequently desilted and water accumulated in the reservoir. Water from the reservoir was pumped to continue with the gold extraction process downstream of the weir. Some of the water was used to develop a vegetable market garden about 100 metres from the site. Excess sand and silt, which had been stockpiled away from the riverbanks, were mixed with cement to make concrete blocks. These were sold to the local community for use in construction.

The project's most important benefits

Environmental benefits

Environmental benefits include:

- Gold panning and extraction activities conform to environmental conservation and rehabilitation requirements for "proper mining";
- Neither mercury nor cyanide is used in the gold extraction process;
- Desiltation of the weir and reservoir was achieved;
- All mined-out areas have been rehabilitated to a better state than before gold extraction or group mining began;
- Riverbanks previously damaged by the activities of individual illegal panners have been rehabilitated;
- It is hoped that this type of alluvial mining will be used for entire exploitation of the gold in the mined area, rendering the area unattractive to any future mining activity and thereby protecting the rehabilitated riverbanks in a sustainable manner.

Economic and social benefits

Economic and social benefits include:

- Availability of water from the desilted weir and reservoir will be improved;
- Capabilities of the rural district council will be enhanced;
- Standards of living in the poor rural community will rise. People may now earn a living from other resultant activities, enabling them to invest their income in education, improved nutrition, good health and sanitation, and long-term general well-being;
- Some of the skills learned in the process by panners are transferable to other development projects in the community.

Women make up over 51% of the rural population. They also constitute a large proportion of the economically disadvantaged rural population that resorts to alluvial gold panning in order to make a living. Over 60% of people employed on this project are women.

The pilot project has demonstrated that collective stakeholder efforts to put into effect the recognized criteria for combating the adverse effects of rampant small-scale artisanal gold panning activities have achieved success as a model project. Promulgation of an appropriate legal framework, and organization of previous illegal panners into group mining, resulted in a pilot project that has rehabilitated a previously silted reservoir and provided water needed to continue the gold mining project downstream, as well as to create a paying vegetable garden and make concrete blocks for building. It is hoped that this project will act as a useful model for the sustainable development of small-scale artisanal mining, which can be replicated elsewhere either in Zimbabwe or in Sub-Saharan Africa.

The author was formerly Secretary for Mines, Zimbabwe Government. The views expressed in this article those of the author and do not represent those of the Chamber of Mines of Zimbabwe.

---

1. See, for example, John Holloway, "Small-scale mining: how to combine development and low environmental impact," *Industry and Environment*, Vol. 20, No. 4 (1997). The theme of this issue was "Mining and Sustainable Development".

South Africa's BoTT model: an innovative solution for delivering sustainable water services to the rural poor

Patrick Ayoub, Chief Executive Officer, Water and Sanitation Services South Africa (Ondeo Services),
Thuso Ramaema, Commercial Director, Water and Sanitation Services South Africa, P.O. Box 320, Rivonia 2128, South Africa, and
Oliver Ive, Managing Director, Amanz'abantu, and Chief Executive Officer, Metsico, P.O. Box 19442, Tecona 5214, South Africa

Summary
The South African government recently adopted a policy of providing free basic water services to consumers, especially the poor. It has been providing rural water infrastructure using an innovative Public-Private Partnership programme called "Build Operate Train Transfer" (BoTT). BoTT has helped ensure that the process of delivering water supply and sanitation proceeds on a fast-track basis while taking public expenditure, sustainability and social objectives into account.

Résumé
Le gouvernement sud-africain a récemment décidé de fournir gratuitement aux consommateurs, en particulier aux plus pauvres d'entre eux, des services élémentaires d'approvisionnement en eau. A cet effet, il a mis en place des infrastructures rurales dans le cadre d'un programme innovant de partenariat public-privé, baptisé " Build Operate Train Transfer " (BoTT), qui a pour but d'accélérer le processus d'approvisionnement en eau et de construction d'installations d'assainissement, sans perdre de vue les objectifs visés en matière de dépenses publiques, de développement durable et d'intérêts de la collectivité.

Resumen
El gobierno sudafricano adoptó recientemente la política de suministrar gratuitamente agua potable a los consumidores, especialmente a los pobres. Ha provisto infraestructura rural para agua potable mediante un innovador programa público-privado denominado "Transferencia Ferroviaria Construir Operar" (BoTT). BoTT ha ayudado a asegurar que el proceso de entrega del agua potable y de las medidas sanitarias se realice en forma rápida a la vez que considera el gasto público, la sustentabilidad y los objetivos sociales.

In July 1997, South Africa's Department of Water Affairs and Forestry (DWAF) launched a national programme to provide sustainable water supply and sanitation to rural people in the country's four poorest provinces (the Eastern Cape, Northern Province, Mpumalanga and KwaZuluNatal). Following a tender, two-year contracts were signed with four consortia. In 1999 the contracts were extended for two more years.

The Programme Implementation Agents (PIAs) for the projects in Amanz'abantu (Eastern Cape) and Metscio (Northern Province) (**Figure 1**) are led by Water and Sanitation Services South Africa (WSSA).[1,2]

While these provincially defined projects are government funded, they have been formulated as innovative partnerships between public, private and non-governmental stakeholders. These partnerships are collectively referred to as the BoTT (Build Operate Train Transfer) programme.[3]

During the first four years of the BoTT programme, some 2.5 million people have obtained access to safe water supply at a cost of South African Rand (ZAR) 1.3 billion. On 13 October 2001 the government announced that it had provided water service to the seven millionth person since the inception of its "Reconstruction and Development Programme" in 1994.

Ondeo Services (Suez) is actively involved in implementing South Africa's BoTT programme as part of "Water for All", its programme for serving low-income communities worldwide.

Figure 1
Rural population provided with water services in Amanz'abantu and Metsico provinces

Amanz'abantu (Eastern Cape)	July 1997	January 2001
Population served by rehabilitated system	0	400,000
Additional population served	0	300,000
Total	0	700,000
Metsico (Northern Province)	July 1997	January 2001
Population served by rehabilitated system	500,000	600,000
Additional population served	0	1,000,000
Total	500,000	1,600,000

Water services provided through Water and Sanitation Services South Africa (WSSA), a subsidiary of Ondeo Services (Suez) and Group5, in partnership with the South African Department of Water Affairs and Forestry (DWAF).

Source: Ondeo Services

The BoTT programme

The BoTT programme is a public-private partnership designed and initiated by DWAF. Funding is furnished by the public sector (DWAF) and private partners are responsible for project implementation. The purpose of the BOTT programme is to provide a comprehensive infrastructure and service delivery mechanism suitable for an environment in which rapid and sustainable socio-economic transformation is paramount (and in which there is the associated requirement of flexibility during the planning and implementation process).

This programme is primarily targeted at poor communities and small, poorer municipalities. One of its basic principles is that the only way to achieve sustainability is to actively involve communities and local governments at all stages of the project life cycle. The BoTT programme therefore attempts to build up capacity within institutions, communities and councils in order to pursue an integrated and participatory approach.

The BoTT approach requires the private sector and NGO service providers to form a company, the Programme Implementation Agent (PIA), capable of undertaking the full project implementation life cycle on a "turnkey" basis and in an integrated manner.

Activities undertaken during project implementation include:

- project conceptualization;
- environmental assessment;
- project planning, design and construction;
- community consultation and social empowerment;
- institutional development to ensure long-term sustainability;
- operation and maintenance throughout a defined O&M phase in which community-based operators receive training;
- transfer of the scheme to the local municipality as "a going concern";

◆ mentorship during an agreed period following transfer.

The BoTT approach is only possible in the context of a public-private partnership (PPP), with government (at both the local and national levels) and the Programme Implementing Agent (PIA) working together closely within a defined contract and partnership framework to achieve agreed objectives. As conceptualization and planning of projects requires approval in a multi-stakeholder environment, implementation can only succeed where agreement is achieved by the "partnering" stakeholders.

One of the key principles built into the BoTT approach is that project sustainability cannot be achieved without active involvement of communities and local governments at all stages of the project's life cycle. Thus, in parallel with the "hard" activities of technical design, construction, commissioning and operation, there is a "soft" process of consultation, education and training, with institutional development within the community and local government structures.

The PIA companies created four years ago have developed a "one-stop shop" capacity to carry out implementation. Two of the PIAs have been formed under the leadership of Water and Sanitation Services South Africa (WSSA), a subsidiary of Ondeo Services (Suez) and Group5.

Metsico operates in the Northern Province and Amanz'abantu in the Eastern Cape. The shareholding structure of these two PIA companies comprises corporate entities, in addition to WSSA, drawn from well established nationally based consultants and contractors with expertise in different areas (e.g. design, construction, operation and maintenance, on-site sanitation, and institutional and social development). Emerging black economic empowerment companies operating locally in these provinces are 40% shareholders.

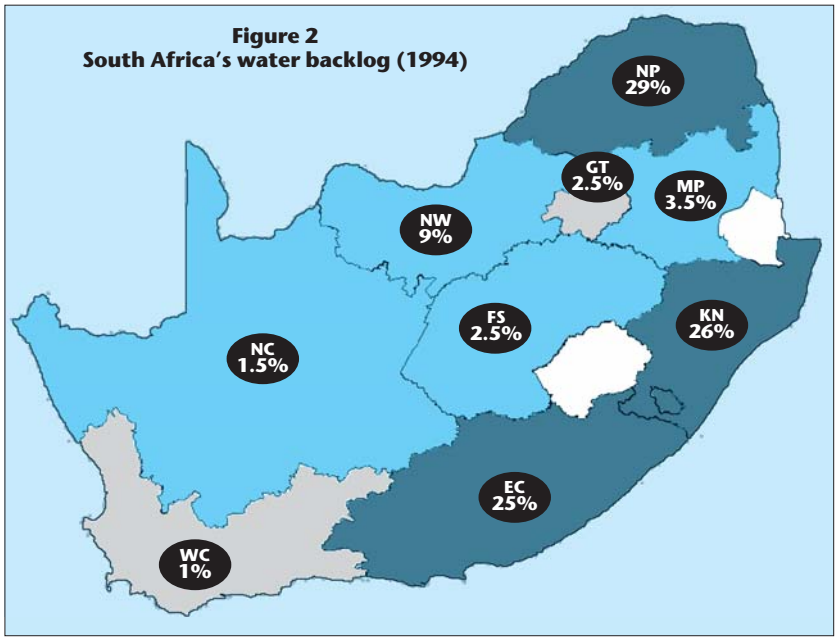
A number of NGOs participate as service providers to the PIAs, especially in the programme's "community buy-in and education and awareness" elements.

The institutional and social development (ISD) component must be regarded as an indispensable part of the project. Its actions guarantee that the project matches the real local situation and remains viable through:

◆ increasing stakeholder commitment;
◆ raising awareness of hygiene issues;
◆ informing the community of its responsibilities;
◆ training and empowering local labour;
◆ involving the community in network design, construction, O&M and customer management;
◆ setting up and training Village Water Committees.[4]

The more community participation there is, the more likely it is that the project will match the community's expectations – and that consumers will feel responsible for its operation and maintenance. Even in situations where it may be inappropriate to entrust the system to the community, it is important to create or re-establish a balance between community responsibility and water service quality.

Figure 2
South Africa's water backlog (1994)



Community-based operators

Evaluations and future application

The BoTT approach to development of rural water supply and sanitation for poor communities has proven successful. Independent evaluations undertaken by the World Bank (in 1998) and the European Union (in 1999, 2000 and 2001) all reported that the BoTT mechanism was generally succeeding.[5,6]

These reports, together with interim audits and consultations undertaken by DWAF, have highlighted some areas that need attention in future BoTT programmes. DWAF has taken these lessons and experience and built them into its new improved BoTT 2 model, which it now advocates for use by local governments.

As the BoTT programme has moved beyond the period in which new projects can be begun, the government is in the process of launching new delivery mechanisms to fill the implementation void that BoTT will leave as it completes its mission.

Policy and legal environment

Legislative reforms are being developed to assist municipalities during the transition period, as responsibility for water services is transferred from mainly DWAF to local governments.

Despite the government's clearly stated desire to increase private sector participation in the long-term water service delivery framework, the changing institutional and legal environment has created uncertainty in both the public and private sectors.

The government recently adopted a policy of providing free basic water services to consumers, especially the poor. In turn, this will assist those responsible for operating the schemes by providing access to a subsidy to cover the first 6 m^3 of consumption per household per month. Some time will be required before new municipalities are in a position to implement this policy in rural and underdeveloped areas, where cross-subsidization is not feasible. However, it should be noted that this investment would be limited to Delegated Management Frameworks (public-private partnerships), as the South African Constitution prohibits water privatization.

The BoTT programme has helped the government ensure that the delivery process could proceed on a fast-track basis while diligently accounting for public expenditure and achieving social objectives.

When to apply the BoTT model

The "one-stop shop" BoTT model offers an attractive contractual alternative for environments considered by the private sector to be at high risk. This model is particularly well suited to situations in which one or more of the following factors make longer-term contracts (with greater risk-sharing) unfeasible:

- The private sector is unwilling to provide capital investment or to accept significant commercial and financial risk;
- The government requires substantial public investment for social improvement;
- The scope of the work required of the private partner is not defined at the outset, but it is clear that it will include more than one project, involve a large annual turnover, and require expertise in multiple disciplines;
- The public sector is wary of private participation and unwilling to commit to long-term agreements due to uncertainties in legal protection.

Social intervention session

BoTT model success factors

So far, the BoTT model has succeeded as a fast-track delivery mechanism thanks to a cocktail of prerequisites:

- strong government will to deploy and regulate such an infrastructure programme delivery (DWAF input);
- availability of ring-fenced funding and follow-up on delivery by donors (EU input);
- programme management and implementation by the private sector (efficiency and accountability);
- "on the ground" partnership between the private sector (consultant engineers, contractors and water services operators) and NGOs;
- extensive institutional and social development input (local government and communities buy-in);
- strong involvement in the ownership, management and service delivery of emerging affirmative local private companies.

Conclusion

The water service backlog was identified by the South African Government in 1994 as 18 million people without water and 21 million without sanitation (**Figure 2**). Despite efforts since that time, there is still a long way to go. The government remains committed to pro-actively and progressively eliminating this backlog in partnership with the private sector.

Thanks to an innovative public-private partnership programme, Build Operate Train Transfer (BoTT), South Africa is building its rural water infrastructure in a sustainable way.

Through WSSA, Ondeo Services (Suez) is now providing sustainable water services to over 2,200,000 low-income rural people in the Eastern Cape and the Northern Province in partnership with South Africa's Department of Water Affairs and Local Government. Over 1,000,000 rural poor people in those two provinces currently benefit from rehabilitated infrastructure and 1,100,000 have access to potable water (Figure 1).

Such a "one-stop shop" approach, based on achieving sustainability in water services delivery, can be transposed to other areas needing access to basic quality water services – provided there is no unnecessary red tape.

As Gérard Mestrallet, Chairman and CEO of Suez, recently demanded in "The Water Truce", his open letter to governments, members of parliaments and international institutions throughout the world: "Water for all, quickly."[7]

Electronic prepayment standpipe

Notes

1. Water and Sanitation Services South Africa (WSSA) is a joint venture between Ondeo Services UK and Group5. WSSA provides water and wastewater services to over 2 million people (of which 80% low income population) in the provinces of Kwazulu-Natal, Eastern Cape, Western Cape, Northern Province and Gauteng. In 2001 WSSA was the first water services company in South Africa to receive dual ISO 9002 (quality management system) and ISO 14001 (environmental management system) certification from the South African Bureau of Standards (SABS).
2. Ondeo Services is a world leader in water management services. It currently supplies over 115 million people with drinking water and wastewater services. Large cities served by Ondeo Services include Buenos Aires, Santiago, Atlanta, Manila, Jakarta, Amman, Johannesburg and Casablanca. Ondeo Services addresses the entire water cycle (water resources management, drinking water treatment, wastewater treatment and sludge treatment). It is a subsidiary of Ondeo, the water division of Suez. A global services group active in promoting sustainable development, Suez provides global energy, water and waste services solutions worldwide to businesses, individuals and municipalities.
3. South Africa's BoTT programme has evolved from the BoT (Build Operate Transfer) concept developed during the 1970s. See, for example, Steve Waddell, *Emerging Models for Developing Water Systems for the Rural Poor: From Contracts to Co-Production, Business Partners for Development Water and Sanitation Cluster,* 1999 *(www.bpd-waterandsanitation.org/english/docs/waddel-leng. pdf).*
4. BoTT programmes emphasize the importance of community leadership. See Waddell, *Emerging Models for Developing Water Systems for the Rural Poor.*
5. *Final Evaluation of the EC Contribution to the Sector Support Programme for Community Water Supply and Sanitation (SSPCWSS).* Symonds Group Ltd, Pretoria, May 2001.
6. *External Review of BoTT Programme.* Department of Water Affairs and Forestry Chief Directorate Water Services, The World Bank, Danida, UNICEF, DFID Southern Africa, Resource Development Consultants, November 1998.
7. From the Suez "Bridging the water Divide" brochure (*bridgingthewaterdivide @suez.com*).

For more information on the "free basic water debate" in South Africa, as well as the evolution of the BoTT programme, see, for example, the Business Partners for Development Water and Sanitation Cluster web site *(www.bpd-waterandsanitation.org/english/prj_ bott.htm).*

Environmental reporting by companies in Japan

Toshihiko Goto, Chair, Environmental Auditing Research Group (EARG), 5-6-5 Koganehara Matsudo City, 270-0021 Japan (pxd04322@nifty.ne.jp)

Summary
Japan is a leader in corporate reporting in the Asia-Pacific region. The development of Japanese environmental reporting initiatives during the past decade is reviewed. Survey responses concerning environmental reporting by Japanese companies are also described. Ways to ensure the reliability of environmental reports are beginning to be addressed in Japan. In environmentally advanced companies environmental reporting is moving in the direction of sustainability reports.

Résumé
Dans la région Asie-Pacifique, le Japon fait figure de leader en ce qui concerne la publication d'informations sur les activités des entreprises. L'article fait le point sur les initiatives prises ces dix dernières années par les entreprises japonaises pour produire des rapports sur l'environnement ; il présente les résultats de l'enquête menée à ce sujet auprès d'un échantillon d'entreprises. Le Japon commence à s'intéresser aux moyens de garantir la fiabilité des rapports sur l'environnement. Dans les entreprises très en avance dans ce domaine, on assiste à une évolution vers des formes élargies de rapports qui couvrent le développement durable en général.

Resumen
Japón es líder en la realización de informes societarios en la región del Pacífico Asiático. Este artículo contiene una revisión del desarrollo de las iniciativas relacionadas con los informes ambientales durante la última década. Describe las respuestas a los informes ambientales de compañías japonesas. En Japón se están comenzando a contemplar los distintos métodos para asegurar la confiabilidad de los informes ambientales. En las empresas ambientalmente avanzadas los informes ambientales apuntan a la sustentabilidad.

Efforts to promote corporate openness on sustainability, environmental performance and social responsibility have gained momentum in industrialized economies in recent years. In the Asia-Pacific region these efforts are probably most advanced in Japan, Taiwan, Australia and New Zealand.

Guidelines such as those of the Global Reporting Initiative (GRI) are gradually being disseminated in much of the rest of this region. For example, Excellent Industries of India began using the GRI guidelines in 2000 to collect and report company-wide information on performance. Companies in Southeast Asia are experimenting with and commenting on the GRI guidelines.[1]

Such openness can seem threatening to many Asian companies. They may feel the type of information elicited by reporting guidelines is proprietary; their home countries may also have a weak history or tradition of public reporting on corporate matters. The importance of small and medium-sized enterprises in many Asian economies is seen as another barrier to more widespread use of corporate reporting.

However, corporate openness is increasing. In Korea several leading corporations have adopted environmental philosophy charters and practices. In the Philippines the San Miguel Corporation (a beverage, food and agribusiness company) began to publish annual and semi-annual corporate environmental reports before any industry disclosure projects had got off the ground in that country.

Background

Public presentation of corporate environmental information has progressed rapidly. It takes various forms, referred to generically as "environmental reporting". This phenomenon developed globally in the 1990s.[2] Environmental reporting in Japan began in the 1980s, when companies started to include information about environmental issues in their annual reports.

Independent environmental reports began to be issued a little later in Japan than in the West. The EARG (Environmental Auditing Research Group) formed a study group in the autumn of 1992. Although we were able to collect environmental reports from 16 companies at that time, only three were Japanese reports and they resembled pamphlets, brochures or employee training material.

In 1994 we started a term-limited joint project with the Valdez Society in Japan, a study group on environmental reporting benchmarks (BER). Among over 100 documents collected, more than 50 were from Japanese companies. Thus the publication of independent environmental reports appears to have begun at that time. Although this occurred against a background of growing concern about global environmental problems, it can be assumed that several documents in particular had a significant influence on the increase in environmental reporting, such as *Eco-Friendly Corporate Activity Indicators,* produced by what is now the Ministry of the Environment (MoE), and MITI's *The Voluntary Plan.*[3]

A draft version of *Eco-Friendly Corporate Activity Indicators* was released in the autumn of 1992. It was aimed at bringing about changes in corporate environmental activities. With respect to the MITI voluntary plan, at a symposium on environmental management a participant representing a large corporation made a telling statement to the effect that the word "voluntary" when used by MITI sounded like "compulsion". Administrative guidance had evidently been quite severe in several types of industry. Nevertheless, in 1993 more than 300 companies had gained experience with the production of environmental reports. These reports varied widely from company to company.

When we asked companies to send us their "voluntary plans", most complied. I assumed the voluntary plan summarized a company's environmental efforts and that it would see no reason not to disclose this information. Of course, some companies denied our request.

Administrative guidance by MoE and MITI had a tremendous influence not only on corporate environmental reporting, but also on companies' voluntary information provision practices.

Types of reports

There is not necessarily a fixed definition of an environmental report. These reports can take various forms. Currently three types of environmental reports are used in Japan.

Environmental reports

As a result of MoE's "Eco-Friendly Corporate Activity Investigation", the proportion of listed companies increased from 27% in 1997 to 46% in 2000, demonstrating that these companies provide environmental information to the public. In 2000 an investigative questionnaire was sent to 2556 listed companies and 3827 unlisted ones that employed more than 500 people. The rate of response was 46% for listed companies and 40% for unlisted ones. Based on this investigation, over 430 companies had issued independent environmental reports. This figure does not include site reports published by companies at the local factory level.

Moreover, according to a 1999 investigation by

the National Institute for Environmental Studies (NIES), 460 companies planned to issue environmental reports in the near future. Altogether, it was expected that over 600 companies would issue environmental reports during the 2001 fiscal year.

Other data also support this trend. In 1999 a METI-affiliated organization, the Japan Environmental Management Association for Industry (JEMAI), disseminated a questionnaire on corporate environmental information presentation practices. The responses indicated that 99 companies already issued environmental reports, 47% had issued their first report within the last two years, and 39% had issued reports during the previous three to six years. Altogether, 86% of the companies had begun to issue environmental reports within the last six years.

Looking at the above figures as a whole, it is clear that the number of environmental reports is growing rapidly. Increased interest in acquiring ISO14001 certification is one reason for the publication of greater numbers of environmental reports. As of October 2001, Japan accounted for about 23% of some 32,000 ISO14001 certifications worldwide. Implementation of an effective Environmental Management System (EMS) appears to contribute significantly to environmental reporting and communication. Collection of accurate information is essential for environmental reporting. An effective EMS greatly simplifies this task.

Figure 1
Respondent profile

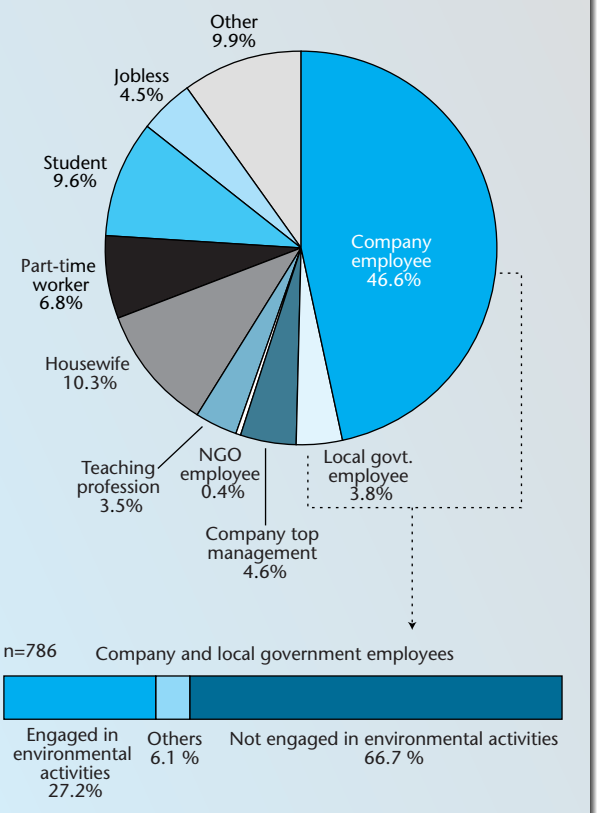


Table 1
Percentage of respondents by gender and age

		10-19	20-29	30-39	40-49	50-59	Over 60
Male	1028	21 (2.0)	158 (15.4)	282 (27.4)	328 (31.9)	165 (16.1)	74 (7.2)
Female	531	8 (1.5)	152 (28.6)	223 (42.0)	108 (20.3)	31 (5.8)	9 (1.7)
Total	1559	29 (1.9)	310 (19.9)	505 (32.4)	436 (28.0)	196 (12.6)	83 (5.3)

Eco-Action Plans

The Environmental Activity Evaluation Programme is MoE's 1996 guidance document on environmental management programmes for SMEs. The revised version, published in connection with ISO14031 in 1999, is called *Eco-Action 21*. While participation is voluntary, public presentation of an Eco-Action Plan is recommended. Eco-Action Plans can be submitted for the Environmental Report Grand-Prix (see below). An Eco-Action Plan contains information on companies' business activities, their environmental load, targets for reducing this load, and concrete measures taken to protect the environment. There is no investigative data on the number of Eco-Action Plans issued, but reports from about 25 companies have been submitted for the Environmental Report Grand-Prix.

Local government environmental reports

Local governments are beginning to issue environmental reports, as distinct from environmental White Papers. Interest in obtaining ISO14001 certification is growing among some 3300 local governments. As of October 2001, 247 local governments were ISO14001 certified. In the future it is expected that these ISO14001 certifications will lead to the issuance of environmental reports by the local governments.

The official commendation system

The official commendation system for environmental reports is considered a good way to increase the quality as well as the quantity of environmental reports. Two systems exist in Japan: *environmental awards programmes*, and the *Network for Environmental Planning (NEP)*.

Environmental Action Plan Awards were established in 1997 with MoE support. The purpose of this programme (renamed the Environmental Report Grand-Prix in 1999) is to encourage companies to initiate and develop quality environmental reports or environmental activity programmes. The programme is sponsored by the Japan Global Environmental Forum and the Japan Environment Preservation Alliance, both of which are non-profit organizations supervised by MoE. Support is provided by MoE, the Mainichi Newspaper Corporation and the Nihonkeizai Newspaper Corporation, in collaboration with the Environmental Auditing Research Group. In November 2001, winners of the fifth Environmental Report Grand-Prix were announced.

The Toyo Keizai Green Reporting Awards began in 1998. These awards were established jointly by the Green Reporting Forum (GRF) and Toyo Keizai Shinpo-Sha, one of the most prominent publishers in the economic and industrial field. The Green Reporting Forum was established in 1996 by some members of the study group on environmental reporting benchmarks (BER).

The Network for Environmental Reporting

In 1998 the Network for Environmental Reporting (NER) was created to promote environmental reports and environmental reporting. With MoE support, representatives of companies, administrations, NGOs and academic circles gathered to study and encourage the issuance of environmental communications.

Work towards the following objectives has been taken place steadily over the last three years:

◆ As part of cooperation among companies, civil society organizations and citizens, information and opinions have been exchanged on measures that need to be taken to produce the type of environmental report that is desirable. In this way environmental efforts and research are advanced. Regular meetings for all members are held, focusing on corporate environmental report case studies. Study group meetings organized by volunteer members address more specific themes. Other symposia also take place, in collaboration with several related bodies.

◆ With the aim of making information related to environmental reports available, NER disseminates general information concerning the meaning of an environmental report or the specific situation with respect to a company's environmental efforts. As NER uses various media, it contributes to the company's own dissemination efforts.[4]

Environmental reporting guidelines

A growing number of ideas on environmental reporting formats have been introduced, reflecting the increasing number of Japanese companies issuing environmental reports. *Benchmarks for Environmental Reports* (published by BER in 1966) was followed by *Benchmark for Environmental Reports 1999* (published jointly by EARG and GRF). MoE published environmental reporting guidelines in February 2001. At the same time it published an explanation of environmental performance indicators.[5]

METI also published environmental reporting guidelines in June 2001. These guidelines address the characteristics of specific industries.[6]

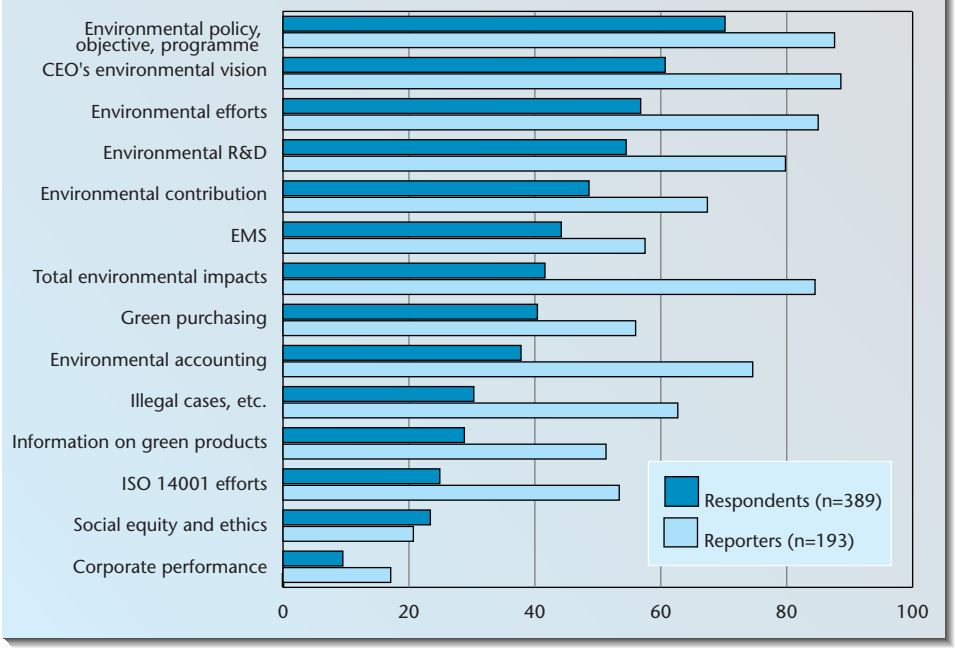
Ensuring reliability

With the growing importance of environmental reports, the importance of ensuring reliability has been highlighted. This theme is being discussed internationally using various terms including "assurance" and "verification". MoE's environmental reporting guidelines, mentioned above, devote several pages to this theme.

In 1998 Toyota was the first company to include a third party opinion in its environmental report. Today dozens of environmental reports include third-party opinions. NEC issues its corporate environmental report in conjunction with a NGO.

Perhaps in response to activities of the International Federation of Accountants (IFAC), a Japanese Institute of Certified Public Accountants (JICPA) study group has examined this subject since 1998. In July 2000 the study group published a draft report. Feedback was taken into account, and in 2001 the study group produced an interim report.[7]

Figure 2
Respondents' needs as perceived by themselves and information needs perceived by reporters (2001 total)



Environmental report surveys

Several investigations have been undertaken in order to solicit information related to the production of environmental reports by Japanese companies. Below is a small sample of the results of two investigations in which the author took some part.

National Institute for Environmental Studies

The National Institute for Environmental Studies (NIES) first carried out an environmental opinion poll of Japanese consumers in the 1995 fiscal year.[8] A corporate environmental opinion poll was conducted in the 1996 fiscal year. In the 1997 and 1998 fiscal years, NIES compared the environmental opinions of Japanese and German consumers.

Japan's second corporate environmental opinion poll took place in the 1999 fiscal year. An investigation during the 2000 fiscal year focused specifically on environmental communication: the 685 companies contacted had published environmental reports by 1999 or were considering issuing them in the near future. Of these companies, 475 responded. This 69% response rate can be considered very high.

In 2000, an investigation was carried out on "The Influence of Corporate Environmental Communication on the Creation of a Circulation Social System for Japanese Companies". It was undertaken by the NIES Global Environment and Lifestyle Study Group.[9]

Some study results are summarized below:[10]

Weighting environmental issues in corporate management

Where a company is regarded as having demonstrated a high environmental consciousness, the following analysis can be made: *There is overall recognition that environmental management means the issue is not at the level of the pursuit of profit, but at the level of a company's survival, influencing its life and death.*

Over 40% of respondents reacted positively to the proposal "to pursue environmental management for securing sustainability environmentally, economically and socially …"

Linking the achievement evaluation system and environmental efforts

In evaluating the achievements of sections or individuals, 36.8% of respondents said they used the creation of environmental efforts as an indicator. If the fact that these effects are under examination was included, the figure was over 60%. This percentage was especially high among global or export-oriented companies.

Reasons for environmental communication

The reason for environmental communication given most often (by 46.1% of companies) was "to promote mutual understanding with a stakeholder". In addition, 52.1% of companies indicated that changes were produced by their environmental strategies and activities while 42.6% reported no changes after communicating with stakeholders. Overall, it can be concluded that companies recognized the importance of communication.

Reasons for public presentation of information

The most frequent response was "to ensure the reliability of our company and aim at image improvement". The second most frequent was that "the company consumes resources from the natural environment and is responsible for explaining its activity in regard to environment". Third was "in order to raise environmental consciousness within the company".

Means of environmental communication

The most common means of environmental communication were in-house newsletter (72.6%), corporate guidance, a pamphlet, etc. (69.5%), company home page (60.0%), public presentation of sites (50.3%) and environmental reporting (45.5%). The most important tools were environmental reporting and the company homepage. It is thought that the issuance of environmental reports will increase in the future.

Reaction from stakeholders

Those stakeholders whose response to environmental reports were the most pronounced were the company's employees, managers and trade unions. Other stakeholders such as contractors, suppliers and customers also responded.

40.2% of companies indicated that there were consumer reactions. The figure for reactions from NGOs was 34.7%, as communication with these organizations was not as active. The figure for reactions from investors, stockholders, etc. was 50% if mild reactions were included. Reactions from financial institutions remained at the 40% level.

Stakeholders considered most important

The stakeholders companies considered most important were from the community, related companies and the company itself, in that order. Only 2.7% of companies responded that they considered NGOs as important stakeholders. This low figure expresses the reality of Japanese society: until recently NGOs have played only a small role.

Training environmental communication specialists

Over 50% of companies responded that they had "already trained" or were "now engaged in training" specialists in environmental communication.

Table 2
Responding companies and persons responsible for their environmental reporting

	2001 total		2000 total		2001 total		2000 total
	Number (n=321)	(%)	(%) (n=321)		Number (n=321)	(%)	(%) (n=321)
Fishery/forestry	1	0.3	-	Electrical appliances	49	15.3	9.0
Mining	1	0.3	0.3	Transport machinery	19	5.9	5.9
Construction	28	8.7	9.7	Precision machinery	14	4.4	5.3
Food	18	5.6	5.9	Distribution	14	4.4	9.0
Fibre	4	1.2	3.1	Financial	3	0.9	4.4
Pulp and paper	4	1.2	0.3	Insurance	4	1.2	0.9
Chemistry	34	10.6	7.5	Real estate	1	0.3	0.9
Pharmaceutical	9	2.8	3.4	Transportation	9	2.8	2.2
Petroleum/coal	3	0.9	0.3	Communication	5	1.6	-
Gum	2	0.6	0.9	Electricity	8	2.5	0.9
Glass	1	0.3	0.3	Gas	2	0.6	1.2
Metal	10	3.1	5.0	Service	16	5.0	4.0
Machinery	13	4.0	5.9	Other	30	9.3	10.3

Training such a specialist was under consideration in 30% of companies. Virtually all environmentally advanced companies recognized the importance of specialist training.

NTT X

NTTX, a subsidiary of NTT (Nippon Telephone & Telegram), manages a web site dealing with environmental issues called "Environmental *goo*". In 2000 it carried out "Environmental *goo* environmental report research", a first trial in Japan of a web site user-based investigation of environmental reports. NTT X repeated this investigation in 2001.

This new investigation was aimed not only at Environmental *goo* members but also at other targets using the general reference portal *goo*. The Environmental *goo* membership could be considered an "environmental concern layer".

It is thought that this investigation was the first to measure how well environmental reports would function as a tool to be used by the general public. For the first time the question of the audience for environmental communication was studied, with a comparison of results. This proved to be a very interesting investigation. The communication gap has been clearly revealed.

Environmental *goo* and *goo* research members were contacted based on the mailing list. Replies were received via the Internet. The questionnaire was sent to a total of 2000 companies, most listed on the stock exchange. Also included were 100 unlisted companies with high sales revenues.

An Environmental *goo* member's environmental report producer was contacted from the mailing list and the reply was obtained via the Internet.

46.6% of respondents were company employees. 27.2% of respondents working for companies or local governments were engaged in activities related to the environment (**Figure 1**). The largest share of respondents were in their thirties or forties. Some 66% of respondents were men (**Table 1**). Profiles of responding companies and their perceived environmental information needs are presented in **Figure 2** and **Table 2**.[11]

Future trends

The institutionalization of environmental reporting

The Prime Minister's Consultative Council published a report in July 2001 concerned with promoting a sustainably circulation society. This Council's name is "the Council for Promoting 21st century *Wa no Kuni*" (the literal meaning of *Wa no Kuni* is "the country of a ring or circle"). The Chinese character for a ring is the same as that for "environment". In Japanese *Wa* also means "harmony".

The Council was convened by the Prime Minister on 16 February 2001. Since the 21st century is the Century of Globalization, the Council's purpose is to change the social system from mass production, mass consumption and mass dumping to a sustainable society in which simplicity and quality are understood to be important. It aims to work on the fundamental *Wa no Kuni* way of living together with the Earth.

The Council also aims to work on measures for realizing *Wa no Kuni*. In this regard, a reference to environmental reports is included: "The institutionalization of environmental reports should be considered". It should be examined whether a duty of environmental reporting is imposed. This is a controversial theme, but in-depth discussion is likely to begin shortly.

Sustainability reports

In environmentally advanced companies, environmental reporting is moving in the direction of sustainability reports. Presumably influenced by the GRI Guidelines, several of these companies have obtained experience with such reports in the last two years.

In December 2001, CBCC (the Council for Better Corporate Citizenship) launched a crash study meeting on Corporate Social Responsibility (CSR). It will produce a report in March 2002. CBCC is a subsidiary of Keidanren (the Japan Federation of Economic Organizations), Japan's biggest industry organization.

One reason for initiating this study group is that many companies receive a large number of questionnaires about CSR from rating organizations in Europe and America. Since the necessity of reporting on social matters has begun to be recognized, it is likely that environmental reports will evolve into sustainability reports among global companies in the near future.

Strengthening reliability

The concept of ensuring reliability was introduced above. A recent development will serve to further strengthen reliability. In December 2001 the General Regulation Reform Meeting in the Cabinet Office published *The First Reply in Regard to Promoting Regulation Reform*. It states that there is a need "to promote a comprehensive policy which utilizes economic measures and the pubic presentation of information measures." More precisely, this document states both the need for many more companies to issue environmental reports and the need to examine measures that strengthen the reliability of environmental reports. Intense discussion will likely take place in 2002.

Notes

1. Japan and India are the two Asian countries represented on the GRI Steering Committee. The author has been a member of the Steering Committee.
2. See UNCTAD (UN Conference on Trade and Development), *Environmental Financial Accounting and Reporting at the Corporate Level*, December 1997.
3. In 2001, the name of the Japanese Environmental Agency was officially changed to the Ministry of the Environment, Japan Government (MoE). The name of the Ministry of International Trade and Industry (MITI) has recently changed to the Ministry of Economy, Trade and Industry (METI).
4. For more information about this organization, contact the Network for Environmental Report-

ing, c/o Global Environmental Forum, 1-9-7 Azabudai, Minato-ku Tokyo 106-0041, Japan (Tel: +81 3 5561 9735, Fax: +81 3 5561 9737). NER activities are reported in the magazine *Global-net*, published by the Global Environmental Forum. Information about NER can be downloaded from the Internet, but in Japanese only *(http://eco.goo.ne.jp/ner/)*. The author is one of four NER co-chairs.

5. English versions of these reports can be downloaded from the Internet (*www.env.go.jp/en/eco/o-epi2000.pdf, www.env.go.jp/en/eco/epi2000.pdf* and *www.env.go.jp/en/eco/erg2000.pdf*). The author took part in this work as an NGO representative.

6. English versions of the guidelines can be downloaded from the Internet (*www.meti.go.jp/english/special/EnvironmentalProtection/index. html*).

7. Environmental Auditing Special Sectional Meeting, Management Research Board of Enquiry, Japanese Institute of Certified Public Accountants (JICPA) *(www.jicpa.or.jp)*.

8. The author participated in this research group from its inception in 1995.

9. The study group met at the Sumitomo Life Research institute, Inc. (SLRI). The chairman was Saburo Kato, an SLRI associate member and chief research worker. Mr. Kato also chairs the Japan Association of Environment and Society for the 21st Century (JAES21).

10. NIES Social and Environmental System Department, Environmental Economy Laboratory (Dr. Midori Aoyagi, Chief Research Worker) (*www.nies.go.jp*).

11. The sources for these figures are: *http://eco.goo.ne.jp/env_report/index.html, http://eco.goo.ne.jp/env_report/index.html, http://eco.goo.ne.jp/env_report/index.html and http://research.goo.ne.jp/Result/0110op24/01.html.* ◆

Sustainable consumption: an insurmountable challenge?

Elaine Geyer-Allély, consultant, s/c SCAC, BP 84, Bamako, Mali; formerly Administrator, Programme on Sustainable Consumption, Environment Directorate, Organisation for Economic Co-operation and Development (OECD), Paris, France

Summary

Several conditions need to be met if more sustainable consumption patterns are to be promoted effectively. Some have already been met, including widespread consumer concern about the environment, increasing technology- and behaviour-induced decoupling of resource use and consumption, greater government commitment, and evolving forms of decision-making. This article focuses on the dynamics of household consumption in North America and Europe.

Résumé

Plusieurs conditions doivent être remplies si l'on veut promouvoir efficacement des modes de consommation durables. Certaines le sont déjà, notamment la sensibilisation de nombreux consommateurs aux problèmes d'environnement, le découplage (induit par la technologie et les comportements) entre l'usage des ressources et la consommation, un plus grand engagement des gouvernements et l'évolution des formes de processus décisionnel. L'article s'intéresse à la dynamique de la consommation des ménages en Amérique du Nord et en Europe.

Resumen

Se requieren varias condiciones para que los modelos de consumo sustentable puedan ser promovidos de manera eficiente. Algunas de estas condiciones ya están dadas, como ser la preocupación generalizada por el medio ambiente, el mayor desacople entre el uso y el consumo de recursos derivado de la tecnología y las conductas, un mayor compromiso por parte del gobierno y formas más modernas de toma de decisiones. Este artículo se centra en la dinámica del consumo domiciliario en Estados Unidos y en Europa.

OECD countries[1] in North America and Europe have made progress in improving the quality of the environment in many areas over the last 20 years. Emissions of some air pollutants have decreased, deforestation trends have been reversed, and point source pollution from industry has been reduced. However, during the same period only moderate progress has been made in addressing problems linked to, for example, water and energy consumption. Other environmental pressures have intensified, especially those related to climate change, biodiversity loss, marine resources and groundwater contamination. Despite sometimes important improvements in resource efficiency, overall environmental degradation has persisted in most areas due to the volume effects of total increases in production and consumption (OECD, 2001).

"Consumption" can be broadly defined to include public consumption, private sector consumption of raw materials and intermediate products, and final consumption of goods and services at the household level. In this sense, achieving sustainable consumption concerns the entire production-consumption-waste chain and requires a wide range of environmental protection strategies to optimize material flows, increase resource efficiency, minimize waste and pollution, and dispose of waste in environmentally sound ways.

This article focuses on the dynamics of household consumption in North America and Europe, drawing on a two and a half year programme of research and analysis carried out in the Environment Directorate of the Organisation for Economic Co-operation and Development (OECD, 2002).[2] It describes the nature and magnitude of the challenge of reducing the environmental impacts of current and projected household consumption patterns.

While the close link to progress in sustainable production and waste management practices is recognized, particular attention is given to strategies needed to engage North American and European consumers more fully in sustainable lifestyles. Can the challenge of sustainable con-

sumption be met? What will it take to make greater progress?

The nature of the challenge

Environmental pressures from consumption will rise

Most North American and European countries have policies to reduce the environmental impacts of household activities, including encouraging energy conservation or waste recycling, imposing standards to improve the choice of environmentally benign goods on the market, and using taxes or fees to increase the relative prices of products with greater negative environmental impacts. Private sector innovations have sometimes brought about important changes in product design and technology which have helped reduce the environmental impacts of consumption patterns, particularly in the areas of energy and waste. Environmental and consumer NGOs have been instrumental in translating abstract debates about "sustainable consumption" into practical action areas for households.

Many of these initiatives have had the effect of reducing the environmental intensity of consumption patterns or changing consumer behaviour. In general, however, the results so far appear to have been modest. Environmental impacts of household consumption are expected to increase over the next 20 years, and important aspects of the social dimension of sustainability (e.g. equity and distributional considerations) have yet to be addressed.

Per capita private consumption has increased steadily in these countries during the last two decades. It is expected to continue to follow GDP growth in the period to 2020. Households as a group are not the largest contributor to most environmental pressures, but their impact is not negligible and will intensify over the next two decades (OECD, 2001):

Consumption is:

- household consumption of goods and services
- a series of activities from the selection and use of a product or service through to its disposal
- market expenditure but also consumption of non-marketed goods and services

Sustainable consumption is:

- consumption of goods and services that meet basic needs and quality of life without jeopardizing the needs of future generations
- site- and problem-specific
- a dynamic concept that indicates the direction and sometimes magnitude of environmental change

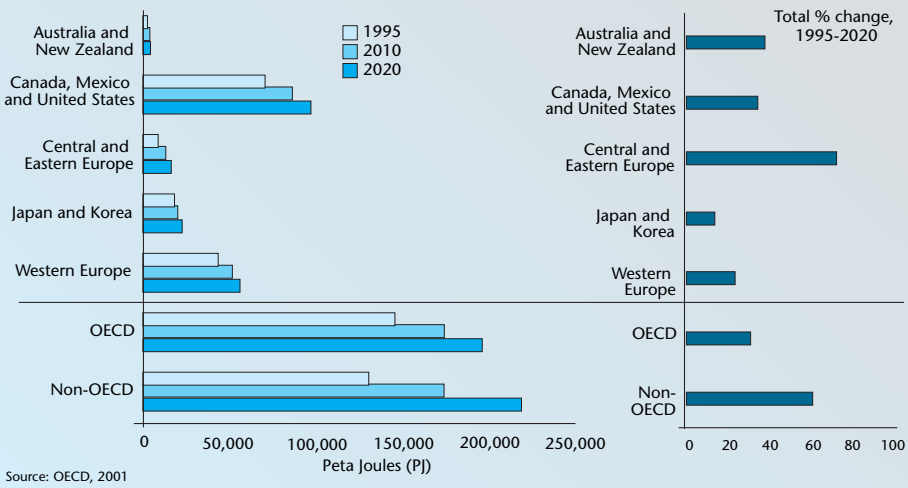
Energy

Energy use in OECD countries grew 36% between 1973 and 1998 and is expected to grow another 35% by 2020. Along with transport, commercial and residential energy uses (which together represent approximately 30% of current final energy consumption) represent the most rapidly growing areas of global energy use. Gains in energy efficiency are slowing the rate of growth of energy demand in North America (1.1% per year) and Europe (0.9% per year), but the total amount of energy demanded continues to increase (**Figure 1**).

Transport

Strong growth in demand for transport is continuing, with road transport (passenger and freight) and aviation showing the highest growth rates. By 2020, the current total motor vehicle stock in OECD countries (550 million, of which 75% personal vehicles) will increase 32% while motor vehicle kilometres are projected to increase 40% (**Figure 2**). Tourism travel is an important and growing source of transport and energy use and CO_2 emissions (**Figure 3**), although not as great as other forms of travel. Current trends in tourism travel point to an increase in the number of departures, greater use of air travel, and a growing preference for far-off destinations. Global air travel is projected to triple in the period 1995-2020. The environmental impacts of tourism travel currently range from moderate (with respect to climate change) to locally acute (with respect to more classic vehicle pollutants). However, projected growth in tourism-related travel – especially longer distance travel by air – will increase household environmental impacts.

Figure 1
Total final energy consumption (TFC), 1995-2020



Source: OECD, 2001

Waste

In 1997, OECD households generated 67% of municipal waste loads on average.[3] Municipal waste, one of the fastest growing waste streams, constitutes approximately 14% of total waste generated. Municipal waste generation is projected to increase approximately 40% between 1995 and 2020 in Western Europe and over 50% in North America (**Figure 4**). The type of waste generated by households has greatly diversified. While recycling rates have increased for different waste streams, they have not influenced the absolute volume of waste generated. Priority areas of concern are packaging and organic waste. Waste often represents a loss of material and energy resources. It can be a source of greenhouse gas emissions, air and water pollution, and soil contamination where inadequately managed.

Water

Water consumption is one area where trends in some OECD countries show a clear decoupling of economic growth and consumption trends. Households are relatively low consumers of water compared to other economic sectors, and household demand for fresh water has stabilized and even declined in nine – primarily European – countries. However, in many other countries more efficient water technologies and behavioural changes have been offset by population growth and expanded use of water services for bathing, dish and clothes washing, gardening, etc.

Food

North American and European households consume more meat, vegetables, fish, and processed and imported foods than in the past. (The market for organic food products is also growing.) The most significant environmental impacts related to food occur early in the production chain. However, households influence these impacts through choice of diet and demand for food-related services. Households also directly affect the environment through food-related energy consumption, waste generation, transportation and greenhouse gas emissions.

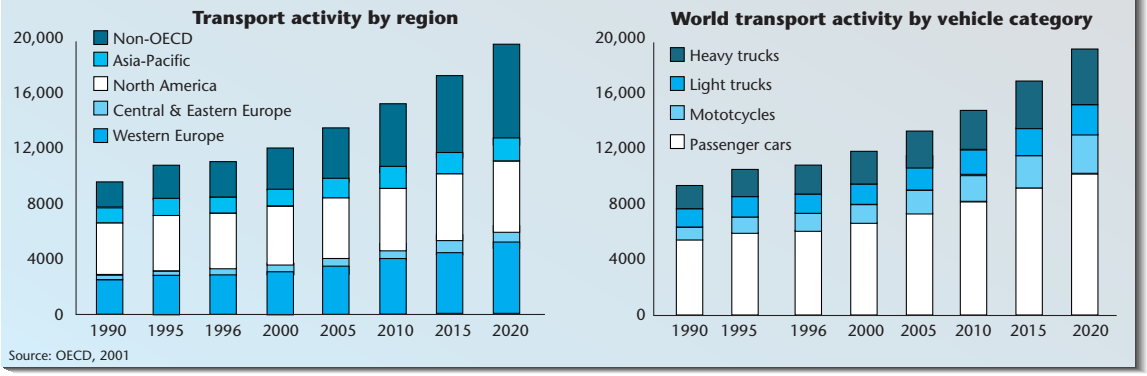
Scale increases outweigh efficiency gains

In many countries there are signs of a potential decoupling of economic growth from environmental degradation in some areas. Use of energy and other resources (such as agricultural raw materials, water and metals) now appears to be increasing at a slower rate than GDP, and the pollution intensity of output is increasing even more slowly. Product and technological innovations have reduced the energy and material intensity of a large number of consumer goods.

However, the increasing volumes of goods used and discarded and the *structure* of consumer

demand have outweighed many of these gains, including in key areas of household consumption. Energy consumption trends provide a clear example. Higher energy prices, stricter building codes, subsidies for conversion from oil to other energy sources, and programmes to encourage home insulation have significantly reduced the energy intensity[4] of household space (**Figure 5**) and water heating. Energy intensities of electric appliances have also fallen, although more modestly. Despite these achievements, households continue to increase their energy consumption due to greater home floor space per capita, higher comfort levels for cooling and heating, and greater use of electrical appliances (**Table 1**). Although growth in demand has slowed, energy use by households is expected to continue to increase in OECD countries to 2020. Electricity demand by households is projected to increase substantially in all OECD regions.

Figure 2
Billions of motor vehicle kilometres travelled (VKT), 1990-2020



Source: OECD, 2001

The long-term boundaries of sustainability introduce significant uncertainty into the identification and planning of sustainable consumption patterns (as in other areas of environmental policy). This is because society's preferences change, while the preferences of future generations can never be adequately represented. Nor can the rate and nature of technological change be forecast with any degree of reliability. Technological progress can offer the possibility to augment consumption opportunities for a given stock of wealth, but may be insufficient in terms of environmental impact to keep up with an increase in the scale of pressures on natural resources. This is currently the case in the energy and transport sectors. Thus, achieving sustainable consumption will often require changes in consumer behaviour.

A diverse group with varying levels of commitment

Are consumers amenable to change? They are a large, dispersed and heterogeneous group whose behaviour affects the environment in different ways. It seems clear that consumers care about the environment. However, while several marketing studies suggest that the number of "green consumers" is increasing, results at the retail level suggest that environmental criteria are often not reflected in actual consumer purchases.

Current and projected household consumption patterns are influenced by a number of driving forces. Rising per capita income, demographics (more working women, more single-person households, larger retirement population) and accompanying changes in lifestyle have led to more individualized buying patterns, a shift towards more processed and packaged products, greater levels of appliance ownership, and wider use of services and recreation. Higher incomes have also increased the number of objects households purchase. Technology, institutions and infrastructure play an important role, as they create the prevailing conditions faced by households in everyday life and can either expand or constrain the product options available.

Government policies, marketing strategies or NGO information campaigns intended to influence consumer decision-making directly can be more complicated to design than initiatives directed to more homogenous groups of actors, such as public procurement officers or private sector decision-makers. Initiatives to promote more sustainable household consumption need to be well targeted and, in many cases, to include a combination of instruments and strategies that provide a consistent signal to consumers.

Weak policy signals

The rationale for affecting consumer choices and consumption as a whole lies in the existence of environmental externalities linked to the production and consumption of key consumer goods and services. In a world where prices or information will never be absolutely "perfect", intervention by governments is needed. This also holds true where the time frame implied by sustainable development means the market may take too long to signal socially efficient solutions. Well designed policy instruments have a role to play in making the market work for environmental protection and sustainable development.

Because of the range of economic, socio-demographic, technological and other influences that shape consumption patterns, promoting more sustainable patterns requires integrated, cross-sectoral policies that give consistent messages to consumers. While a growing number of governments recognize this, household consumption today remains a peripheral issue in most countries and is treated in an *ad hoc* fashion. Integration requires a clearer set of policies explicitly designed to increase the environmental sustainability of household consumption in the key areas of energy, transport and waste (and water in some countries), but also more routine consideration of the potential impact on consumption patterns and environmental impacts of policies in other areas (land-use planning, energy deregulation, institutional aspects of water management).

Governments could play a more active role in facilitating household action for sustainable consumption than they do currently. In particular, they need to clarify objectives for household action, reinforce existing policies, and improve the coordination and consistency of policies to help households develop less material- and pollution-intensive lifestyles.

Achieving more sustainable consumption patterns

Reducing impacts, not consumption

It is resource use and environmental pollution that have to be brought to sustainable levels, not the consumption of products and services as such. This means that private sector innovation and government policies are needed to promote a shift in the *structure* of consumption and production, so

Table 1
Electrical appliance ownership and energy use per household (hh) in the Netherlands

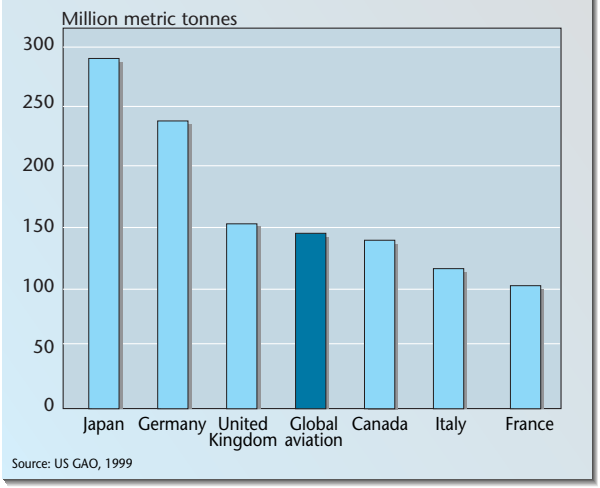
	1973			1996		
Appliance	**Penetration (% of the population)**	**Efficiency (kWh/app)**	**Energy use per hh (kWh)**	**Penetration (% of the population)**	**Efficiency (kWh/app)**	**Energy use per hh (kWh)**
Fridge	88	450	396	112	342	382
Freezer	17	800	136	56	380	212
Dishwasher	4	900	36	25	303	76
Clothes washer	85	450	83	98	231	225
Clothes dryer	5	700	35	52	542	279
Water boiler	16	1750	280	18	1352	238
CV system	30	500	150	77	283	216
Television	96	175	168	166	100	166

Source: ECN, 1998, in OECD, forthcoming 2002

as to reduce the environmental impacts of households with respect to energy, transport and waste.

What about the scale impacts of consumption? Even with a focus on the structure of consumption, it is important to identify the magnitude of change needed. Where ecological limits can be established, sustainable consumption can be linked to specific targets (e.g. for CO_2 levels, air and water quality, waste generation trends). These targets, along with an understanding of the factors driving consumption, should shed light not only on key areas where environmental protection efforts should be strengthened, but also on the relative contributions of technology and behavioural changes to the problem and to the solution.

Figure 3
Total carbon emissions from global aviation and selected countries



Source: US GAO, 1999

Five framework conditions for promoting sustainable household consumption

The examination of sectoral trends in household consumption, particularly the driving forces that shape consumer preferences, points to five framework conditions that are necessary if a critical mass of consumers – more than just the small market segment of highly motivated "green" consumers – is to make environmentally aware decisions. These are:

A price structure for consumer goods and services that internalizes environmental costs and benefits

Many of the environmental externalities of consumption result from inadequate reflection of environmental costs in the price of key consumer goods or services (energy, waste, water). In some cases price increases would not be sufficient on their own to shift consumption patterns significantly, but they are a necessary step. Moreover, there are still broad corrections to be made to the costs of natural resource use and pollution in North American and European economies, particularly through the removal of perverse subsidies (e.g. to the agricultural sector, to environmentally damaging energy sources) and the elimination of pollution tax exemptions for industry. Attempting to shift consumer demand to environmentally sound products and services will have little net environmental effect as long as broad signals concerning energy and natural resource use still point the wrong direction.

A policy and regulatory framework that makes clear the priorities and direction for change

North American and European countries in general have a strong base of environmental protection legislation. The polluter-pays and user-pays principles provide a clear foundation for policies to promote sustainable consumption. In contrast, governments still need to define the objectives for household participation in environmental protection more clearly, and to better communicate these objectives to the public. Consumers are concerned about the environment and believe they have a role to play, but few know how to prioritize their actions. Only democratic government (at national, state or municipal level) can establish and rank environmental protection objectives.

In the ten years since Rio, many activities have been inspired by the qualitative concept of sustainable consumption. Moving forward now will require a more quantitative approach. While in general it would not be operational to translate the contribution of consumers to a "factor 4" or "factor 10" overall target, sub-targets could be developed based on sector-specific analyses (food, energy, transport, waste) showing how much direct behavioural change is to be expected from consumers versus environmental progress embodied in products and services. An important step in this direction is improving environmental impact data and indicators related to consumption.

Availability of a range of environmentally friendly goods and services

The shift in North American and European economies towards greater reliance on services offers significant opportunities to create less environmentally intensive consumption options through new consumer goods and services (e.g. personal "mobility packages", leased carpets, reuse-of-water plumbing). Nevertheless, tremendous potential remains for applying design-for-the-environment principles, and for finding new ways to satisfy consumer needs at lower environmental costs. Governments can quicken the pace of product innovation through a variety of measures including taxes on pollution and waste, producer responsibility programmes, legislative standards for minimum product performance, and use of information and economic instruments to stimulate consumer demand for environmentally friendly goods and services.

Technology and infrastructure that include environmental quality criteria

Addressing environmental challenges related to consumption in the future will require adopting a wider "systems of provision" perspective that reveals the close and mutually reinforcing links between physical infrastructure and production and consumption patterns, and that underlines the importance of medium- and long-term development of technologies and infrastructure (energy, transport, waste) which will support sustainable household behaviour. In some areas (e.g. electricity generation) North American and European countries are already more or less locked into fixed provision systems for the next few decades, meaning that opportunities to increase the share of more sustainable technologies are many years away. This time lag underlines the importance of setting clear environmental protection objectives.

An educational, learning and information environment that motivates and enables consumer action

To make environmentally aware decisions, consumers must have both information and certain practical skills and knowledge (e.g. to be able to identify eco-labels, sort waste, consider the environmental characteristics of a product or service). They must also have a real role in public debate on environmental protection. Currently, although consumers have access to an abundance of information, much of it is not very useful for identifying environmentally sustainable actions. Governments and other stakeholders need to improve the targeting of environmental and consumption information and communicate it more effectively. Closely linked is the need to reinforce general environmental awareness and education. A major effort is still required to integrate environmental and sustainability education into school curricula, continuing education, and professional and workplace training. An important part of information and education strategies should be bringing consumers "up to date" on current environmental priorities, particularly regarding climate change.

A multi-stakeholder approach

A web of driving factors shape household consumption patterns. There are many options for influencing consumption patterns, with roles for public policy, market innovation, NGO mobilization of consumer groups, and voluntary initiatives by consumers themselves. In some cases the impetus to shift consumption patterns can come strongly from consumers; in others reducing environmental impacts will depend on shifts in the technological or infrastructure characteristics of supply patterns. For example, in the highly competitive food and tourism industries consumers have a central role in shaping the products offered on the market, but they have significantly less influence on energy and water supply systems or waste collection programmes. Shifting consumption patterns in these areas will require more emphasis on external driving factors. These realities argue for a strong multi-stakeholder approach to promoting more sustainable consumption patterns.

Sustainable consumption policy should also be seen as part of a wider life cycle strategy that addresses environmental impacts at different

points of the product chain of goods and services. A life cycle perspective brings into focus the many "decision points" that can be influenced by different stakeholders along the product chain.

Achieving stronger engagement by consumers

Even in a multi-stakeholder context, one of the greatest challenges remaining is to engage a wider group of consumers in environmentally aware decision-making. There is no one model for "sustainable citizenship" that will bring about the right mix of actions and attitudes. "Green consumerism" is not a continuum from "less green to more green"; environmental pressures are site- and context-specific, meaning there are often many different ways of acting in an environmentally conscious way. Still, certain practical steps can be taken by government, the private sector and NGOs to increase consumer awareness and action:

Respond to rising consumer scepticism and perceived information overload

Ensuring accurate information is an important part of enabling consumers to make more environmentally aware decisions. At a minimum, governments, the private sector and NGOs need to ensure that environmental information in the marketplace is accurate and credible. Many countries already have legislation on misleading advertising that has been, or could be, extended to cover "environmental claims". Governments, businesses and NGOs can also help support the implementation of ISO standards for environmental claims. Information on the environment should be better targeted to consumers.

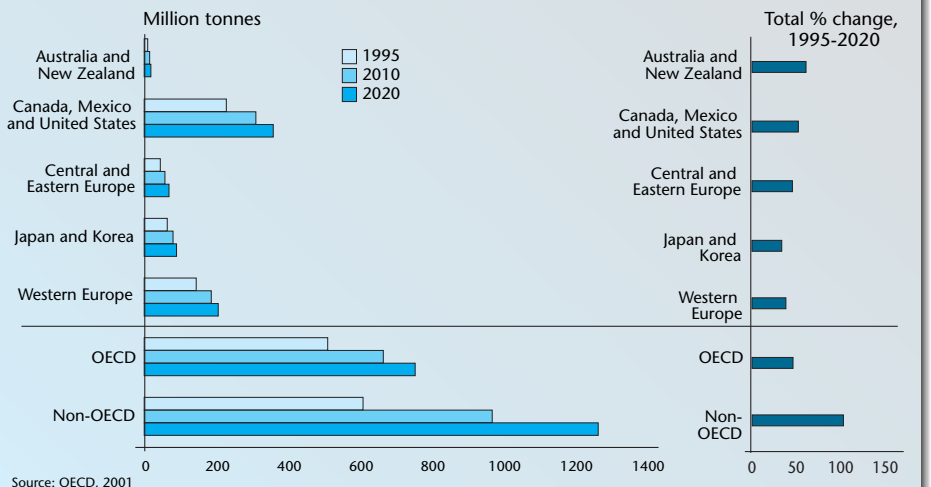
Put individual action in a wider context

Consumers also need information that puts environmental concerns in a social context. The public nature of many environmental amenities or services leads to the possibility for strategic decision-making on whether to cooperate or to "free-ride". Consumers need information about what is expected of them and what they can expect others to do.

Increase active citizen participation in sustainable consumption decision-making

Greater citizen participation in environmental decision-making (including that related to consumption patterns) is seen by many as a key way to help citizens not only recognize their responsibility for some environmental problems, but also help design effective solutions. Many countries have long-standing traditions of extensive citizen involvement and are looking for new (and complementary) ways to include citizens in policy-making. For the moment there are few examples of active citizen participation in the development of policies related to household consumption patterns. However, the body of empirical experience is growing. It is revealing a number of ways in which participatory decision-making can promote more sustainable household consumption. In many instances sustainable consumption may be one of the most appropriate areas for public input, as it directly concerns the activities that define everyday life and is therefore closest to many consumer interests and concerns.

Figure 4
Municipal waste generation, 1995-2020



Source: OECD, 2001
Note: 1995 data for Australia and New Zealand are educated guesses

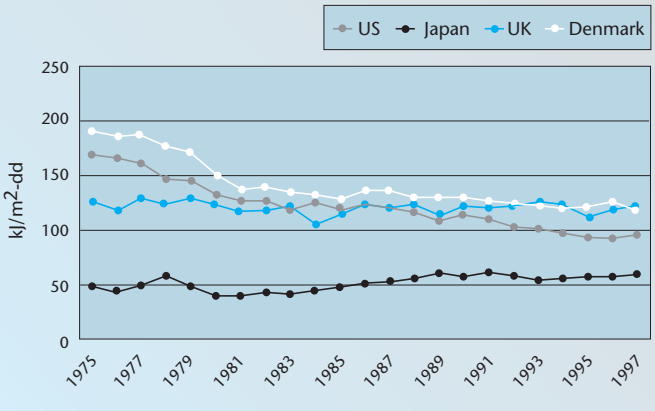
Moving forward

Looking ahead at the nature and size of the problem, the challenge of promoting more sustainable consumption patterns is daunting – and this without considering the even greater implications of a global community consuming in the style and on the scale of OECD countries.

Yet we can also recognize that the foundations for making greater progress already exist. Practical steps can be taken in the short term to improve the markets' ability to allocate resources, and to strengthen signals to the private sector and consumers to produce and consume in an environmentally sensitive manner. The expanding use of multi-stakeholder approaches to solving environmental problems is particularly good news with respect to the design and implementation of solutions that promote sustainable consumption.

Still, if North American and European governments have kept sustainable consumption on their agenda since the 1992 Earth Summit, it is fair to say that much of the last decade has been spent getting comfortable with the issue and exploring ways forward. Some promising approaches are emerging, but projections of environmental trends make it clear that more concrete action, reaching a broader group of consumers, is now needed.

Figure 5
Space heating intensity (adjusted to similar climate)



Source: US GAO, 1999

Notes

1. The OECD region can be roughly divided into four regions: North America (Canada, the United States, Mexico), Western Europe (Austria, Belgium, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the EC), Central and Eastern Europe (the Czech Republic, Hungary, Poland, the Slovak Republic), and Asia-Pacific (Australia, Korea, Japan, New Zealand).

2. Contributions to that publication have been drawn on for this article. The author thanks, in particular, Dan Biller, Philippe Crist, Bas de Leeuw and Adriana Zacarias-Farah.

3. Across OECD countries this percentage ranges from 41% to 96%, with differences sometimes linked to definitions of "municipal waste".

4. Energy intensity refers to the amount of electricity needed for a particular end-use, such as space and water heating or operation of household appliances.

References

OECD (2001) *OECD Environmental Outlook* (Organisation for Economic Co-operation and Development, Paris).

OECD (forthcoming, 2002) *Promoting Sustainable Consumption in OECD Countries: Trends and Policies* (Organisation for Economic Co-operation and Development, Paris).

Changing consumption patterns in Central and Eastern Europe

Eva Charkiewicz, Tools for Transition, c/o Institute of Social Studies, PO Box 29776,
2502 LT The Hague, The Netherlands (charkiew@iss.nl)

In Central and Eastern Europe relationships between people, goods, money and time have been rapidly transformed. Money flows faster, everyday life has become more intense, products and the people themselves look different than they did a decade ago. Old, domestically produced energy-gulping refrigerators have been replaced with new, more efficient (and more expensive) machines; old Soviet-made Ladas or Polish Fiats have been replaced by Opels and Hyundais; the streets and the media are cluttered with advertising; and menus feature less and less domestically produced food. New, previously unknown products such as dishwashers and clothes dryers, as well as the new culture of packaging, have replaced more frugal and resource-conserving consumption practices.

Not only products but also people, streets and politics have been repackaged in new ways. In countries like Poland, Soviet aesthetics have literally become a museum piece. Last summer the National Museum in Warsaw organized an exhibition of goods produced or used in Poland under communism. The comparison between the old and new aesthetics was intended to commemorate the achievements of the transition decade of the 1990s. Young two-income couples in their 30s and 40s are the first generation of consumers to spend more than they earn, buy consumer goods on credit and throw away, for instance, clothes, furniture, or radios and TV sets when they are still usable. Nevertheless, huge sections of the population are experiencing deprivation and exclusion from the consumer paradise.

While the new rich and the new poor live in worlds apart, consumption patterns have changed tremendously for both groups. The majority of the population are doing their best to become good global consumers, whether in the MTV, soap opera or counterfeit brand informal market format.

Contrary to popular wisdom, consumerism and status consumption predate political and economic changes by at least three decades. Already in the 1970s Poland and Hungary had reoriented their national economic plans to include production and import of consumer goods. Following the post-war period of communist austerity, new clothing and household or cosmetic products appeared on shop shelves and the practice of "hunting for goods", as shopping was called in Polish idiom, was established. At this time the worst environmental problems related to production.

In the transition from communism to consumerism, the acceleration of production and consumption and the new consumer aesthetics are among the most significant markers of changes – and the greatest cause of environmental concern. The increase in volumes consumed has not taken place against a background of cleaner production, lower transport intensity, and decoupling of production and consumption from environmental impacts. Neither green consumerism nor expectations that post-socialist decision-makers and consumers would learn from the environmental mistakes of the West have materialized as expected in Central and Eastern Europe.

The shift to consumerism is associated with the political and economic liberalization of the former Soviet block economies. In addition to domestic changes in demand, another factor behind the rapid exploitation of natural resources such as oil or forests is the opening up of national economies and the growth of international trade. Foreign-produced goods are more transport intensive. As these economies have opened up, local resource bases (e.g. vast forest and mineral resources in the Russian Far East, or Polish and Baltic forests) have been made available to high-impact consumers in the Pacific Rim or Western European economies.

Advertising and the new symbolic environments

Savvy Western consumers hardly ever take advertising into account. In the transition countries, however, advertising is an entirely new experience. While the typical success rate of direct marketing in the West averages 2%, in Russia or the Czech Republic most junk mail is opened and read by more than one person. Advertising is among the fastest growing economic sectors. To a large extent, this is due to the opening up of new markets to global companies, which are the leading clients of global advertising agencies. As a share of GDP, average advertising expenditure per capita is similar to that in the EU. But in Eastern Europe, where airtime and space in the print media are cheaper than in the West, the same amount of money buys more ads. Most advertising firms in the region are owned by US agencies, and advertisers convey "American dream" images of affluence, unproblematic prosperity, a world without limits, external beauty and youth. Environmental concerns do not fit with this vision of the world.

Advertising not only associates products with power and glamour, or achievement and security, but also provides a new cultural environment in which people learn about new role models and ways of being in the world. Its part in social learning, and the dependence of business (including the media) on advertising, accounts for the industry's importance in influencing or reformatting people's needs and business strategies. Advertisers promote role models and lifestyles associated with the pleasures of consumption and material achievement rather than thrift, frugality and conservation.

Consumers scarcely think about advertisements as something they pay for in the product price. In 1997, a statistical consumer spent $13 on advertising in Poland, $26 in Hungary and $32 in the Czech Republic. While this is far less than the $360 per capita spent in the Netherlands, income levels in that country and in the East are very different.

The disappearance of generic products from the market, under the pressure of new consumer aesthetics, also has implications for the poorest income groups.

Among the advertising industry's clients, credit providers play a special part in stimulating the growth of consumption. Since the mid 1990s, the debit and credit card system has developed rapidly. In only two years, between 1995 and 1997, the number of debit card holders in Poland increased by 320%. Car dealers were among the first companies to advertise consumer credit. Now consumers in Central Europe are moving from a cash to a plastic economy. As the experience of other countries shows, the availability of credit increases the propensity to consume.

Of course there is nothing wrong with consumption as such. The problem is with the environmental and social costs that are externalized to consumers and societies at large. Examples of the social costs of advertising are the way it perpetuates images of nature that justify the conquest and

exploitation of the environment, or images of women as mainly housewives or consumers of beauty products. These social costs also include perceptions of income deprivation and social exclusion among less affluent consumers.

The new rich and the new poor

The new aesthetics, the global city appearance of national capitals, and messages in international media describing Central and Eastern European countries as consumer paradises can also be very misleading in another sense. They do not show the steep increases in income disparities (among the highest in the world), the growing poverty, or the fact that the consumption patterns of the poor have also been transformed and now have more pronounced environmental impacts. As an example, the decline of public transport and the need to commute to jobs and markets have led many people to buy the cheapest available cars, frequently second-hand ones.

According to the World Bank, 120 million people live in absolute poverty in the region (at less than US$ 2.15 per day). Most are in countries that were part of the Soviet Union. As national statistics show, many more people (at least half the region's population) experience income poverty. Consumers in Central and Eastern Europe still spend a substantial part of their income on food and housing. In Hungary and Poland, 50% say they have nothing left after paying their monthly bills. Only 5% of Polish households indicate that their standard of living has substantially improved in comparison with the pre-transition period, while over 50% claim theirs has declined. It is not surprising that concerns about jobs and pensions override health and environmental concerns.

Given that populations in this region are well educated, poverty is often linked to lack of income-generating opportunities and the unavailability of credit. Many commentators blame red tape and the absence of an enabling environment for small and medium-sized businesses. In many countries these businesses generate the majority of jobs. For instance, in the United States close to 30% of jobs are created by small businesses owned by women. Governments in the East tend to focus on attracting foreign investors and offer them incentive packages. A French hypermarket chain, Auchon, enjoys tax privileges in Poland, where self-employed or small business owners must pay advances on social security contributions and taxes even before they start making any profit. In this context, examples of the survival or growth of businesses engaged in environmentally sound production certainly deserve more attention.

Opportunities for policy intervention

Producers of products such as organic and/or biodynamic[1] food, crop-based fuels, eco-friendly paints and varnishes, biodegradable packaging, food trays and cups, and organic cosmetics, as well as renewable forms of energy, have attempted to develop and grow their businesses with varying degree of success. The common storyline is a heroic struggle for survival in the context of red tape, lack of local and national government support, and competition from foreign investors.

In Poland, automotive fuel containing oil from the rape plant (colza) is now produced by several companies. Some are former state-owned chemical companies, such as the plant in Kedzierzyn. Others, like the margarine producer Kama, used to be food manufacturers. Now they are shifting to crop-based production and seeking a new market niche.

Producers of crop-based fuel in Poland's Czestochowa region have organized an alternative energy association. Marek Sztolcoman, one of the founders, has presented the case for this initiative resulting in cleaner air in cities and protection of rural livelihoods.[2] There are many more such initiatives in Poland. Several local authorities have entered into partnerships to resolve environmental problems, including through joint production of crop-based fuel. However, fuel is heavily taxed. The new environmental industry can survive only if the government decides, in the name of public and environmental interest, to apply lower tariffs on crop-based fuel.

In northeastern Poland in the late 1980s, several municipalities signed an agreement on sustainable development. This region is known as the "green lungs" of Poland. One local businessman, Jerzy Wysocki, has won a regional award for the production of plates, cups and trays made of bran, the waste material in the mills he operates. Plates and cups made of apple and orange peels have been produced in Sweden and Japan, but unlike other producers Wysocki does not use any synthetic binding substances. In contrast to plastic, which persists in the environment for generations, creating health and environmental risks, plates made of bran can be biodegraded within a month. Wysocki, who began production of bran plates in 2000, now exports to Germany and Canada.

In the context of increasing poverty, new crop-based industries that generate income and employment opportunities and protect the environment can bring about win-win situations with respect to social and environmental sustainability. Without such businesses, consumers will not have opportunities to make their consumption patterns more sustainable.

Despite the ten-year history of transition and the presence of various donors and international organizations pursuing social, environmental and business development agendas, none of the countries in the East has yet developed a comprehensive support programme that would stimulate the growth of green businesses.

Notes

1. Biodynamic farming is similar to organic farming, but uses techniques that rejuvenate the soil.
2. Interview with the Polish newspaper *Gazeta Wyborcza,* 19 July 2001. Internet searches and Polish daily newspapers on-line provided some of the information used in this article.

References

Charkiewicz, E., S.v. Bennekom and A. Young (2001) *Transitions to Sustainable Production and Consumption. Concepts, Policies, and Actions. Tools for Transition.* The Hague, The Netherlands.

CEECP (1998) *Impacts of Economic Globalization and Changes in Consumption Patterns in Central and Eastern Europe and Other Transition Countries.* Umanotera (The Slovenian Foundation for Sustainable Development). Llubljana, Slovenia.

CEECP (1999) *Lost in Transition. Local Markets and Sustainable Practices.* Umanotera (The Slovenian Foundation for Sustainable Development). Llubljana, Slovenia.

World Bank (2001) World Development Report: *Attacking Poverty 2000/ 2001.* Oxford University Press, New York.

La restricción de financiamiento como una de las principales barreras en la implementación de la Producción más Limpia en Latinoamérica y Caribe (LAC)

Marco A. González, Director Gerente, Finanzas Ambientales, Calle 1, Mz BH Lote 4, Santiago de Surco, Lima – Perú (mgonzalez@envirofinance.org)

Summary

Lack of financing remains one of the main obstacles to broad adoption of Cleaner Production by industry. The problem is especially severe for small and medium-sized enterprises, which are often perceived as more risky and less profitable than large companies. This situation adversely affects implementation of Cleaner Production in Latin America, as SMEs represent the vast majority (around 95%) of its industrial sector. A credit programme for Cleaner Production in Latin America, under the auspices of UNEP, would make use of the experience and expertise of Cleaner Production Centres, international green funds and financially robust local commercial banks.

Résumé

Le manque de fonds est l'un des principaux obstacles à l'adoption généralisée des procédés de production plus propres par l'industrie. Cette pénurie d'argent est particulièrement handicapante pour les petites et moyennes entreprises (PME) que les investisseurs considèrent généralement comme des opérations plus risquées et moins rentables que les grandes entreprises. C'est un inconvénient majeur pour l'application généralisée de la production plus propre puisque les PME constituent la grande majorité du secteur industriel en Amérique latine (pres de 95%). L'article propose un programme de financement de la production plus propre en Amérique latine sous les auspices du PNUE, tirant parti des retours d'expérience et du savoir faire des Centres de production plus propre, des Fonds d'investissement verts et des banques commerciales locales financièrement solides.

Resumen

La escasez de recursos financieros sigue siendo una de las mayores barreras para que la producción más limpia (PML) se difunda más ampliamente en la industria. Esta realidad es especialmente grave en el caso de las Pequeñas y Medianas Empresas (PYMEs), ya que normalmente los financieros las perciben comparativamente con más riesgo y menos rentables. Esta situación afecta negativamente a la implementación de la PML a nivel global, ya que las PYMEs representan la mayoría del sector industrial en América Latina (cerca de 95%). El artículo propone un Programa de Crédito para PML en América Latina, respaldado por el PNUMA, que aprovecharía la experiencia de los centros de PML, de fondos verdes internacionales y de bancos locales financieramente sólidos.

El concepto de Producción más Limpia (PML) está avanzando de forma interesante en LAC, aunque aún no está difundido adecuadamente entre quienes toman las decisiones en las empresas, gobiernos y entidades financieras. Hay algunos casos en los cuales esta definición conlleva todavía una confusión conceptual. Un ejemplo de ello es el que ocurrió recientemente en el lanzamiento de un nuevo Centro de Producción más Limpia (CMPL) en LAC, donde tuvo que cambiarse el nombre por Centro de Eficiencia Tecnológica, debido a que el primero evocaba más a empresas dedicadas a la limpieza y no a la PML.

Una vez explicado el concepto, este es bien recibido y casi siempre con interés por parte de los representantes empresariales. Sin embargo, en la mayoría de los casos en los cuales el empresario está interesado en PML, no logra concretar su inversión.

Una de las razones principales de este problema es la escasa disposición de financiamiento bancario para PYME en países en desarrollo, las cuales representan más del 95% del total de empresas, aunque sólo facturan menos del 45% del total del producto interior bruto (cifras aproximadas).

El 5% restante de las empresas está compuesto por empresas transnacionales y corporaciones locales (relativamente) grandes, las cuales no tienen mayores dificultades para conseguir financiamiento en mercados de capitales y en la banca comercial local e internacional.

Además, cabe resaltar que de este primer 5%, aproximadamente el 70% de las empresas están ligadas a la explotación de recursos naturales (principalmente del sector minero) y a empresas de infraestructura (mayoritariamente relacionadas con las mineras) (**Tabla 1**).

Por otra parte, en las PYMEs, ante la falta de mecanismos de financiamiento alternativos, las inversiones de capital son poco frecuentes y su financiación se hace a través de recursos internos (autofinanciación). Ante esta situación el empresario convencido en PML no tiene los medios necesarios para financiar su inversión.

El sector financiero

El mercado financiero local tiene preferencia de trabajo por el primer 5% de las empresas, que representan el 69% del portafolio total[1], mientras que el 95% restante representa sólo el 14%. Debe tenerse también en consideración que las PYME no tienen acceso a otros mercados financieros más desarrollados como los mercados de capitales o créditos internacionales (**Tabla 2**).

Las pocas PYMES que tienen acceso al sistema bancario local, logran tasas de interés entre 17% y 24%, mientras que en el mercado internacional las tasas fluctúan entre 3% y 5% más el costo del riesgo país.

Es interesante mencionar además, que mientras el concepto de largo plazo en países desarrollados es de aproximadamente 20 años, en LAC el criterio de largo plazo es entre 5 y 7 años (**Tabla 3**).

Las instituciones financieras (IF) por su parte no perciben de un modo claro la relación entre sus actividades y el medio ambiente, no existiendo compromiso con los efectos o perjuicios que sus clientes generan en el medio ambiente.

Tampoco se ha identificado al medio ambiente como variable de riesgo a analizar; de tal forma que no existe una discriminación en el portafolio entre aquellos proyectos que son respetuosos con el medioambiente y los que no.

Debido a esta falta de discriminación, todos los proyectos son tratados de forma similar y por el mismo patrón de análisis financiero. Más aún, en el portafolio de un banco, se pueden encontrar, empresas con alto riesgo para el medio ambiente, con una buena calificación crediticia debido a sus estados financieros históricos o por la proyección de precios de sus producto ("commodities", en la mayoría de los casos), sin que se haya siquiera eva-

luado su grado de riesgo con el medio ambiente.

Adicionalmente, los banqueros no consideran como colateral válido la prenda industrial de la maquinaria necesaria para PMLya que el valor de tasación estará en función del valor de reventa en el mercado local.

Toda esta situación; por lo tanto, genera que el rango de proyectos en los que los empresarios pueden invertir tengan un períodos de recuperación entre 1 y 3 como máximo, lo cual es mucho menor al promedio internacional 15 años. Además, obliga a que en la mayoría de casos, las inversiones sea autofinanciados por los ingresos marginales internos de la propia empresa y por aportes de los accionistas.

La banca local nacional, por su parte, superó una crisis "casi" sistémica, evidenciada por la quiebra, fusión o absorción de diferentes instituciones financieras locales.2 Esta crisis se ha debido, por una parte a factores exógenos como las crisis financieras internacionales, la recesión global, desastres naturales, cambios climáticos como el fenómeno del Niño el Huracán Mitch, entre otros; pero por el otro lado, a que la metodología de evaluación de los créditos no es tan profunda y no analiza adecuadamente los riesgos de las empresas y proyectos.

Estas metodologías se limitan a realizar proyecciones futuras sobre base estadística pasada, sin considerar las diferentes variables cualitativas que modifican el presente y futuro. Asimismo, las evaluaciones crediticias han sido más evaluaciones de garantías y colaterales que evaluaciones de proyectos y flujos.

Mientras tanto, PYME sólidas, quienes presentaron proyectos profesionalmente sustentados; sin embargo, la inercia de la metodología de evaluación no ha permitido contar con productos financieros adecuados, generando así que estas PYME vayan convirtiéndose cada vez más en empresas poco competitivas debido a la ausencia de capital financiero.

Mientras tanto, la banca internacional se viene constituyéndose simplemente como una fuente de intermediación entre el dinero que logra obtener en sus países de origen (mercados más desarrollados) y este pequeño 5% de empresas que la mayoría de las veces son las transnacionales o mineras.

Hoy en día el problema no radica tanto en la disponibilidad de recursos financieros de corto plazo; sino en el riesgo que implica el prestarle a las PYMEs a largo plazo, más aún en PML, tema que los bancs no dominan. El problema ya no es la capacidad del banco en captar recursos, sino en colocarlos, los bancos tienen fondos pero no saben a quien otorgárselos debido a la falta de información, sobre todo si se trata de un proyecto.

El estado en su función de promotor

El estado está siempre interesado en mejorar las condiciones de crédito para el sector privado para así mejorar la competitividad en un mercado globalizado. Los mecanismos planteados van desde fondos revolventes, reducciones tributarias, garantías de crédito, entre otras, las cuales han tenido un éxito limitado pero no sostenible en el tiempo; no habiendo generado un cambio o superado permanentemente barreras de financiamiento.

Tabla 1

Categoría	Número de empresas	Facturación respecto del PBI	Moda	Mercado
Gran empresa	5%	55%	• Minería, • Infraestructura, • Recursos naturales, • Transnacionales	• Exportación, • Gobierno, • Intercompañia 85% • Mercado local 15%
PYME	95%	45%	Varios	• Mercado local 85% • Exportación 15%

Fuente: Comisión Nacional Supervisora de Empresas y Valores-Perú 1999.
Elaboración: propia

Tabla 2

Categoría	% por número de empresa	Acceso a fuentes de financiamiento externo	Condiciones crediticias
Gran empresa	5%	• Banca local • Banca internacional • Mercados de capitales • Intercompany loans • Proveedores	**Condiciones internacionales:** • Tasas de interés promedio: LIBOR + riesgo país + 1.5% spread (entre 5.5% y 7%) • Corto, medio (5 y 10 años) y largo plazo (10 a 30 años)
PYME	95%	• Banca local comercial • Banca informal (mercado negro) • Mecanismos alternativos de promoción	**Condiciones no competitivas:** • Tasas de interés promedio: 17 a 24% capital a corto plazo, limitado • Mediano plazo: entre 3 y 5 años • Largo plazo: inexistente

Tabla 3

Categoría	Productos de financiamiento disponibles	Disponibilidad
Gran empresa	Préstamos locales e internacionales, leasing, hipotecas, emisión de bonos, acciones, derivados, securitizaciones, facilidades para el comercio de exportación-importación, otros	Amplia variedad de productos competitivos
PYME	Préstamos locales, leasing, hipotecas, facilidades para el comercio de exportación-importación.	Limitada variedad de productos no competitivos

Este éxito limitado y sin continuidad, se debe a diferentes factores, entre los cuales se puede mencionar, como uno de los más importantes, el que los mecanismos planteados no involucraron, en su concepción, a la banca local, ni al sector privado empresarial, constituyéndose más bien mecanismos adoptados por imposición gubernamental o como oportunidad efímera de negocio financiero (**Tabla 4**).

La propuesta de cambio

A fin de vencer eficazmente esta barrera de inversión en PML, se propone un "programa de financiamiento para producción más limpia", para intentar aunar en un mismo criterio a los principales actores.

Este programa de financiamiento (PF) debería contar con la participación de:

Tabla 4

Acceso a financiamiento	Situación actual
5% accede a productos financieros competitivos	Competencia de productos en el mercado financiero
95% acceso limitado o no accede al sector financiero	El estado, organismos multilaterales, ONG[3] y otros en búsqueda de mecanismos alternativos de financiamiento para PML.

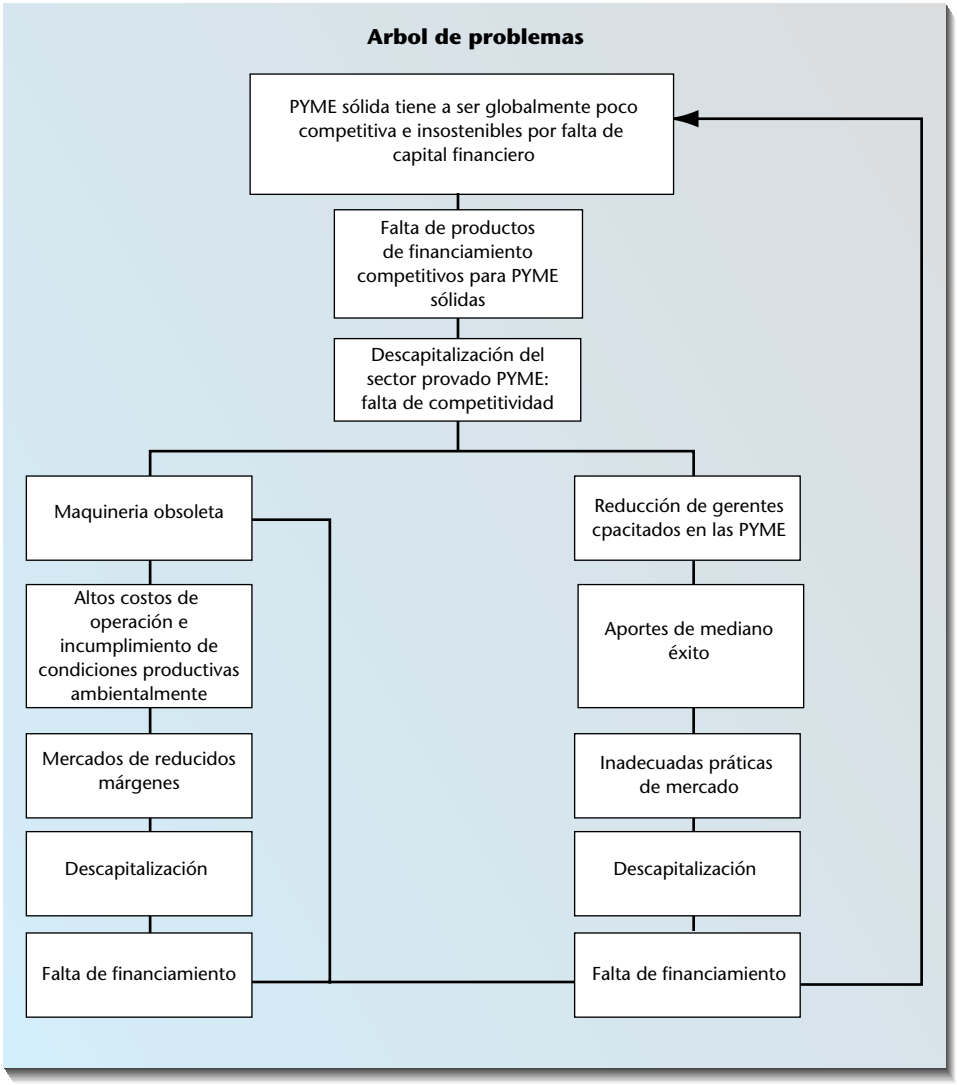
- El estado: a través de sus entes reguladores y promotores,
- El sector empresarial privado,
- Los fondos verdes o fondos de Organismos Multilaterales,
- La banca local comercial,
- Los CPML y su red.

La propuesta es que se inicie la organización del Programa, a través de una entidad autónoma y objetiva, con representatividad en cada uno de los actores, como por ejemplo el "Programa de Naciones Unidas para el Medio Ambiente" (en inglés, United Nations Environment Programme, UNEP).

El PNUMA es un actor válido que goza de credibilidad y poder de convocatoria demostrada entre los actores sugeridos. Es además, una entidad que promueve una nueva estrategia, desde un punto objetivo y mediador de los intereses de cada una de las partes, y es quien tiene la relación más cercana con las IF y los fondos verdes.

Además sería un interlocutor activo entre las partes mencionadas para el diseño del mecanismo, ya que comprende y promueve la relación entre las finanzas y el medio ambiente; de tal forma que tendría argumentos de negociación objetivos entre los actores sugeridos.

La finalidad es apoyar a la banca local comercial a intermediar recursos destinados a financiar PML, principalmente de fondos verdes, dispuestos a asumir parte del riesgo con la finalidad de



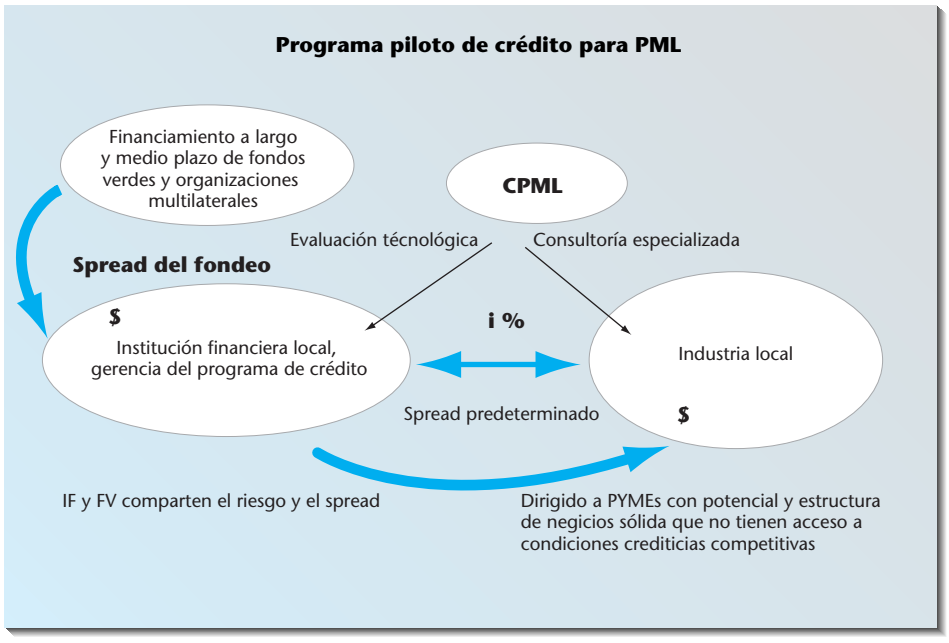
acelerar el proceso de aprendizaje de los agentes sobre cómo evaluar operaciones que respeten el medioambiente y sostenibles en el tiempo. De esta manera detendríamos en parte la contaminación, el uso indiscriminado de recursos naturales y generar oportunidades de negocios (de tal manera de hacer sostenible un mecanismo de financiamiento para PML).

El plazo de ejecución del Programa debe ser suficientemente largo como para generar estadísticas iniciales básicas, casos de estudios reales, crear la capacidad local de análisis y llegar a conclusiones sobre PML. De esta manera lograremos su continuidad.

Se podría iniciar con un sistema de riesgo y utilidades compartidas decrecientes en el tiempo y ser evaluado de forma continua a fin de mejorarlo con el tiempo y buscar su aplicación a países con similares características.

Un aspecto importante a resaltar es que para el éxito de este programa se necesitaría una capacitaciión dirigida a cada una de las partes. Así, los bancos comprenderían y seguirían la tendencia de "Banca Sostenible", los CPML comprenderían mejor los productos financieros existentes y los análisis mínimos necesarios para las evaluaciones crediticias, mientras que el estado comprenderá cómo incentivar la eco competitividad empresarial global.

Como objetivo secundario se lograría una dinámica de mecanismos similares entre los bancos, por competencia y liderazgo, a fin de promover la PML y replicabilidad. Esto generaría un efecto multiplicador del programa.



Las funciones de las partes involucradas

La banca local

Se debería trabajar con entidades sólidas y representativas a fin de ejecutar el programa de financiamiento. Para ello se iniciarían programas de capacitación (existentes en diferentes instituciones financieras como IFC, la CAF, entre otros) a fin de aprovechar su experiencia.

La finalidad de este programas será que los bancos comprendan, en un proceso de aprender-haciendo (*learning by doing*), cómo evaluar el riesgo y las oportunidades de la variable "medio ambiente" en los negocios.

La evaluación económica, financiera y técnica del riesgo deberá realizarse de manera conjunta con especialistas hasta que los oficiales de crédito logren realizar las evaluaciones ellos mismos.

La propuesta es que los bancos locales tengan los recursos "verdes" y el sistema de riesgo compartidos por la colocación crediticia. Para obtener la garantía de crédito, el banco local deberá demostrar ciertas cualidades y haber cumplido con la rigurosidad metodológica solicitada por los fondos verdes, como por ejemplo eco-clasificaciones de riesgo, monitoreos permanentes de la cartera, evaluación técnica y auditorías realizadas por entidades competentes, como los CPML, entre otros.

El PF deberá tener su propia clasificación así como diferentes mecanismos de clasificación crediticia. Las exigencias para la clasificación serán determinadas por las partes involucradas, así como las condiciones de crédito. Mientras que la selección del banco ejecutor deberá ser coordinada directamente con el fondo verde, teniendo en cuenta los resultados de la capacitación, la rigurosidad metodológica a seguir y la calidad financiera del mismo.

Las evaluaciones de crédito comprenderán siempre el análisis tradicional financiero, sin embargo, se complementarían con nuevas metodologías de evaluación, provenientes por ejemplo de los fondos especializados, como serían la eco-

Resumen del Programa de financiamiento para PML

Tópico	Propuesta	Riesgos	Mitigantes
Aliados estratégicos	• IF Local • CPML • Líneas y fondos verdes.	• Incomunicación, falta de entendimiento entre las partes • Procedimientos locales bancarios	• Organización intermedia objetiva que desarrolle el programa buscando la confluencia de objetivo • Formación diferenciada para las partes • Conocimiento de la metodología de evaluación crediticia por las partes
Administrador del programa	• Sólida institución local de prestigio	• Créditos no se asignen a PYMEs • Sobre utilización de "riesgo compartido" para corporaciones mineras, transnacionales u otras que no necesiten la garantía • Barreras administrativas e ineficacia en la identificación de candidatos y asignación de créditos • Falta de instrumentos de análisis de medio ambiental-financiero e impacto social	• Utilización de metodologías de análisis de fondos verdes especializados • Reportes semestrales de avances y metas • Grupo de expertos consultores revisores del portafolio del programa • Miembros del "UNEP FI Statement" • Definición del cliente objetivo a priori
Aprobación crediticia	• Riesgo compartido del programa renovable anualmente	• Riesgo crediticio del programa	• Metas predefinidas: ratios gerenciales predefinido • Mecanismos de salida y cancelación de programas predeterminados
Duración del programa, plazos, y procedimientos para aprobaciones crediticias	• Acordadas anualmente por las partes	• Fraude de fondos • Descoordinaciones entre las partes • Falta de "enforcement"	• Término máximo de programa crediticio • Plazos de créditos a ser evaluados por las partes • Disponibilidad de fondos
Aprobación crediticia	• Caso por caso. • IF local decision final	• Evaluación técnica	• Red CPML • Experiencia importante del banco local
Estrategia de Mercado	• IF lidera la evaluación crediticia y dirige clientes. • CPML evaluación técnica y sustenta el flujo de caja del proyecto	• Incomunicación	• Trabajo en equipo para determinar los criterios mínimos de aprobación crediticia • Publicación de los criterios de aceptación [1]
"Spread"	• "Spread" predefinido para el programa de crédito, basado en un criterio de riesgo compartido	• Interferencia con el sistema bancario local	• Programa piloto que busca replicabilidad privada entre los actores
Beneficios intangibles	• Los beneficios intangibles son para los actores del programa	• Propiedad económica de posibles beneficios intangibles	• El acuerdo es que ante esta eventualidad sea la empresa quien se beneficie
Colaterales	• Maquinaria	• Maquinaria "ad hoc" no es un buen colateral bancario	•Otras fuentes de cooperación * Red del CPML apoya en la evaluación y recolocación de la maquinaria.

1 RAAC Risk Acceptance Approval Criteria

clasificación de riesgo ambiental, análisis e informes de sostenibilidad, entre otros. Finalmente, la red de alianzas internacionales como la de UNEP DTIE, UNEP FI[4], los CPML, entre otros respaldarían y coordinarían los esfuerzos para el éxito del programa.

De esta forma, se pretende asegurar la continuidad al cabo de unos años de funcionamiento, ya que la banca tradicional local habría logrado comprender mejor cómo evaluar los proyectos de su propia cartera de PYME (ahora sostenible).

Los Centros de PML (CPML)

Los CPML se constituyen como aliados estratégicos del banco operador pues tendrían la responsabilidad de la evaluación técnica en PML. Estas organizaciones harían además monitoreos y auditorías técnicas y fundamentalmente apoyarían las proyecciones de los flujos de caja futuros. Además realizarían los análisis sobre la factibilidad de la operación, calidad de la maquinaria, valor secundario e importancia en el proceso productivo en la industria, a fin de que los bancos tengan una mejor evaluación de la garantía o colateral.

Con estos análisis e informes, los bancos tendrían una mayor confianza en las prestaciones realizadas y su percepción del riesgo se reduciría notablemente ya que ahora se contaría con la información necesaria para evaluar técnicamente los proyectos PYMEs.

La red de CPML se constituiría en alianza con los fondos verdes y la banca comercial, ya que generarían informes sobre el cumplimiento de las metas propuestas en el Programa para cada empresa y país.

El reto para el CPML es lograr credibilidad técnica e imagen de independencia de las empresas evaluadas ante la banca local. Asimismo, es importante para los CPML conocer los criterios financieros con que los bancos evalúan a las empresas y de esta manera lograr un mayor entendimiento entre las partes.

El Estado

La PML tiene como principal incentivo para el empresario la mayor rentabilidad para su empresa, la sostenibilidad en el tiempo, liderazgo, mejor acceso a mercados internacionales, entre otros. Sin embargo, este incentivo no siempre es claro.

Las principales fuerzas para la PML, la de mercado y la regulatoria, son fuerzas aún muy débiles en países en vías de desarrollo. A pesar de que la regulación sobre contaminación, depredación y utilización de recursos naturales, es a menudo adecuada, el problema estriba en que el estado no se ha preocupado lo suficiente, o no tiene la capacidad, para hacer cumplir las normas vigentes.

Esta situación genera desorden y competencia desleal entre las empresas. Por ello, se debería condicionar la continuidad de flujos de fondos verdes a metas concretas de reducción de contaminación y depredación siendo el Estado, de esta manera, un actor activo y responsable de que el programa funcionase.

Algunas lecciones aprendidas

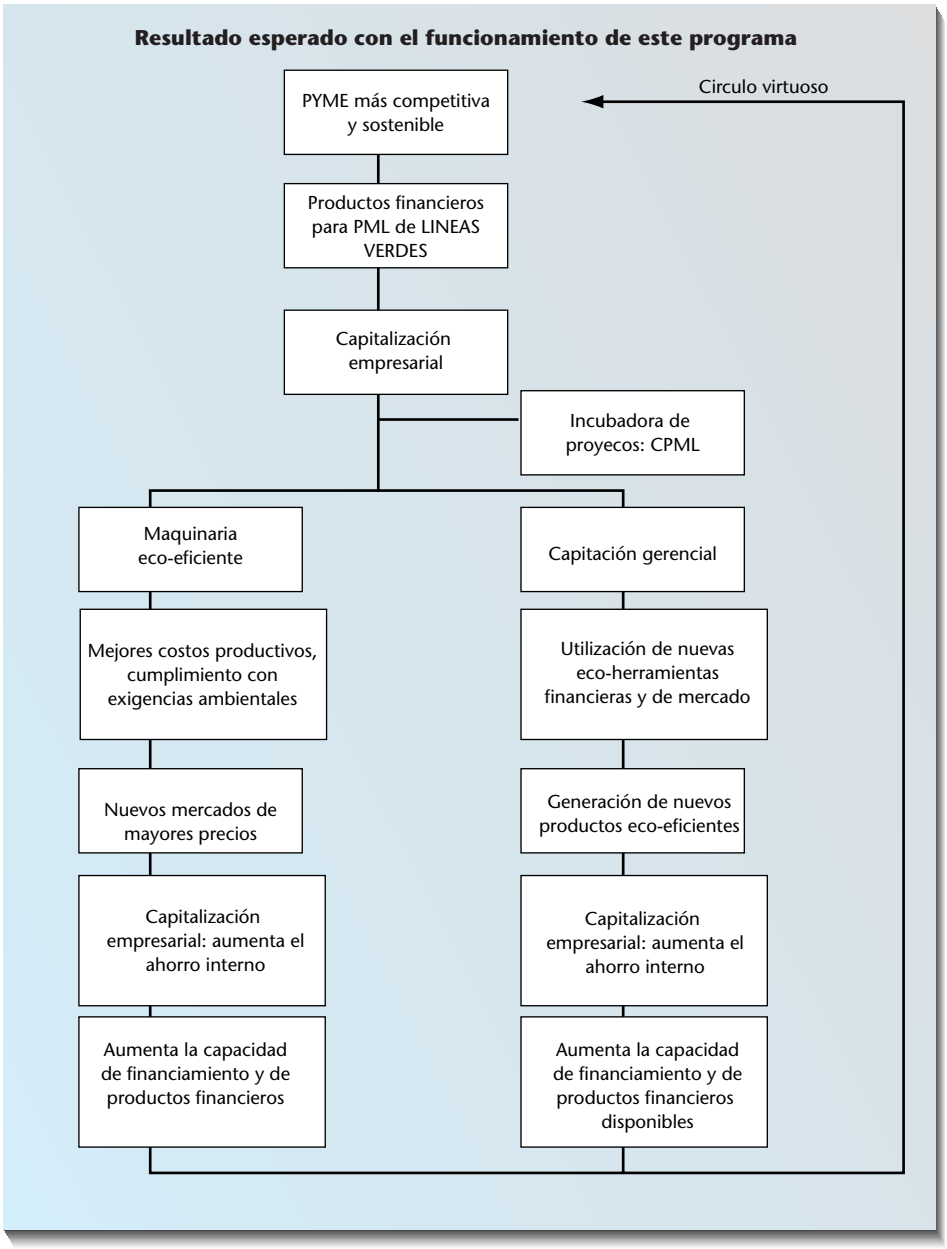
En años anteriores han existido innumerables fuentes de financiamiento que ofrecen dinero concesional a la banca local, pero habiendo definido al banco como el sujeto de crédito. Sin embargo estos mecanismos no han generado ningún incentivo para financiar PML a las PYME y se han preferido utilizar otras fuentes de financiamiento.

En ocasiones se utilizan estos fondos concesionales para las grandes empresas en donde existe competencia de productos financieros.

Se ha demostrado la existencia de fondos interesados en prestar a determinados proyectos, pero que al no conocer el funcionamiento del mercado local, el incumplimiento de pago ha sido muy elevado.

Elpago de un crédito es más exigible cuando un banco local es intermediario que cuando existe una entidad externa o una ONG de por medio.

Se deberá predefinir el "spread" máximo, condiciones crediticias generales y colaterales exigibles, a fin de asegurar el traslado del beneficio al cliente.



La capacitación paralela de las organizaciones involucradas es imperativa antes de iniciar el programa para facilitar la operatividad futura de las partes. De lo contrario sucedería, como se ha demostrado, la existencia de fondos de financiamiento en bancos comerciales para PML sin haberse utilizado debido a que los funcionarios bancarios no conocen el concepto.

La gestión del programa debe ser liderada por el banco local seleccionado. El resto de actores serían de apoyo, ya que es el banco local quien conoce la historia financiera de las empresas y administra información confidencial sobre la capacidad de repago del cliente potencial. Cabe destacar la existencia de proyectos de PML altamente rentables pero en empresas con calificación crediticia negativa, lo que impide su financiamiento. Debería ser el banco quien predetermine, *a priori,* las empresas potenciales y los rangos de financiamiento, para así lograr una mayor eficacia en las actividades.

Es importante definir el plazo del programa de financiamiento y sus metas a fin de asegurar colocaciones mínimas de los recursos asignados. Asimismo, se deberían predefinir las metas de colocación por categoría de clientes, a fin de asegurar que el mayor porcentaje de recursos sea para las PYMEs.

Las pautas del Programa se pueden elaborar dentro de un marco general, pero los detalles específicos y metas se deberían elaborar de manera conjunta entre los principales actores.

Notas

1. Superintendencia de Banca y Seguros Perú a Noviembre de 2001.
2. Entre 1997 y 2001: 11 IFI en Nicaragua, 8 en Guatemala, 11 en Perú que han pasado por alguno de estos procesos.
3. Organisación non Gubernamental
4. Iniciativa para el Sector financiero del Programa de Naciones Unidas para el Medio Ambiente (Ginebra).

Cleaner Production: a key to sustainability in the Caribbean?

Sharon Laurent, Head of Technology Information Service, Caribbean Industrial Research Institute (CARIRI), Tunapuna Post Office, Trinidad and Tobago (carriri@trinidad.net)

Though Cleaner Production has been discussed in the Caribbean since the early 1990s, there are as yet no National Cleaner Production Centres in the region. However, Cleaner Production technology (depending on how it is defined) may have wider applications in the Caribbean during the coming decade than had been previously thought.

This article addresses the range of activities that need to be considered to achieve sustainability in the Caribbean – while attaining goals of economic development and improved environmental and resource management.

The Caribbean region includes island states ranging in size from Cuba to Anguilla (91 sq km), as well as Guyana, Suriname and Belize on the mainland. All countries in the region have tropical climates. Some countries have dry and wet seasons, while others are quite arid. The coastal areas are usually very scenic. The inland ecosystems are lush with a variety of native and introduced flora. Only the larger islands and mainland countries support large and varied populations of fauna.

The size and nature of the industrial and service sectors in the region vary greatly, but it has long been clear that their effluents affect environmental quality and sustainability. Most countries prepared national statements for UNCED in 1992 identifying health, environmental and development issues. National development was seen to be based on exploitation of national physical resources as a basis for agriculture (e.g. sugar cane and banana crops), production processes (e.g. the oil industry in Trinidad and Tobago, the bauxite industry in Jamaica, Guyana and Suriname) or the hospitality industry (e.g. sun and sand and ecotourism products).

The end-products of the agricultural and mining sectors are exported to earn hard currency. The tourism industry also provides hard currency. Ecotourism has gained a larger market share in the last ten years.

Traditional production of agricultural commodities (sugar, citrus, coffee, cocoa, copra, rum and bananas) has continued, largely using technology and plant from the beginning of the 20th century. Agricultural pesticides are also used in very substantial quantities.

It has been expected that national human resource development would be enhanced through training at the secondary and tertiary levels to develop greater technological capabilities. Emphasis has also been given to information technology.

In most countries there has been a recognition that populations are increasing due to higher birth rates and lack of migration opportunities. Population growth has resulted in greater demand for housing, potable water supply, and general improvements in infrastructural services. It has also been recognized that solid waste and fecal waste disposal systems have not kept up with the production of effluents.

Thus the question arises: How can Cleaner Production technology assist in addressing the concerns of this region?

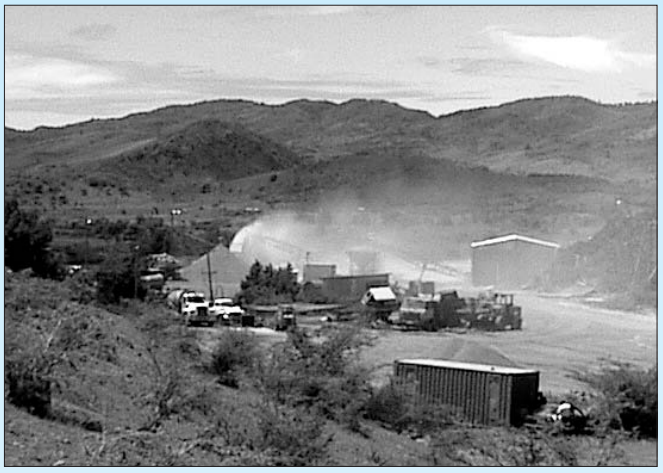
Cleaner Production opportunities

The definition of Cleaner Production provided by UNEP is as follows:

Cleaner Production is the continuous application of an integrated preventive environmental strategy to processes, products, and services to increase overall efficiency, and reduce risks to humans and the environment. Cleaner Production can be applied to the processes used in any industry, to products themselves and to various services provided in society.

◆ ***For production processes**, Cleaner Production results from one or a combination of conserving raw materials, water and energy; eliminating toxic and dangerous raw materials; and reducing the quantity and toxicity of all emissions and wastes at source during the production process.*

◆ ***For products**, Cleaner Production aims to reduce the environmental, health and safety impacts of products over their entire life cycles, from raw materials extraction, through manufacturing and use, to the "ultimate" disposal of the product.*



Dust emissions from aggregate processing

◆ ***For services,** Cleaner Production implies incorporating environmental concerns into designing and delivering services.*[1]

Regional concerns include effluents and resource utilization by traditional manufacturing and agricultural activities, in most cases on a much smaller scale than in larger countries. The extractive industries are substantial in scale and demand specific attention in the countries where they are located. The hospitality industry and human settlements are not usually considered to be "production processes" or "products", but they produce effluents that result in environmental degradation.

The food and beverage industries are major industrial sources of polluting effluents. They can be considered possible targets for improved practices. Though many sugar refining facilities employ outdated technology, limited options may be available for installing newer technology and improving management. Effluents from the rum and beer industries have very high BOD (biological oxygen demand). Discharges to watercourses have a devastating effect on water quality. These industries, as well as a range of food processing and dairy operations, could benefit from process optimization.

Since available potable water supplies have become more limited over the past ten years, and management practices are changing from supply enhancement to demand management (usually in the form of increased water rates), production methods optimizing water use are most appropriate in the food and beverage sector.

Industries based on the exploitation of non-renewable resources usually have international partners that promote implementation of the ISO 14001 standard on environmental management, leading to improved effluent management. These companies are now requesting that their subcontracting companies implement similar environmental management systems. ISO 14001 companies are required to demonstrate continuous improvement in managing effluent discharges. The American Chamber of Commerce of Trinidad and Tobago membership (which includes most of the large energy sector companies) has created a Safety Health and Environment Subcommittee that actively promotes environmental management.

Mining and processing of aggregates and clays could immediately benefit from improved processes. Substantial levels of air and water pollution result from these activities in many countries in the region. Restoration of mined areas also requires urgent attention.

The tourism sector, which not only earns hard currency but also creates employment, is very important in most Caribbean countries. Beautiful beaches and bright sunny days attract many visitors who want to enjoy a relaxing beach holiday. Other visitors are interested in the region's complex ecosystems, with their profusion of lush flora and large insect and bird ☞

☞ populations. The tourism industry has begun to implement quality systems for food preparation, solid and liquid waste management, and recreational waters, carried out through the Caribbean Alliance for Sustainable Tourism (CAST) and the Caribbean Epidemiology Centre with funding from the World Bank. While these approaches will address the management of some of the hospitality industry's activities, they need to be complemented by management of activities in other sectors. This initiative is an example of Cleaner Production technology applied to the service sector.

Since many countries in the Caribbean region have fishing industries, the quality of the marine environment is also of concern to seafood processors. As well as concerns with organic pollutants, it is recognized that if used oil from electric power plants and the transportation sector is improperly disposed of on land it will contaminate fresh water and, eventually, sea water. Initiatives are being developed concerning the identification of appropriate methods to dispose of used oil from land-based sources and from ships. The logistics of collection and disposal from the industrial and transportation sectors throughout the countries in the region are formidable. A number of technologies have been suggested. However, both environmental and economic criteria must be applied to determine whether any of these technologies is appropriate for use in specific national situations.

Disposal options appear to be either the use of technologies that degrade used oil into smaller molecules, through the application of biological processes, or recycling to produce another product that can be used as an energy source. In choosing between these options, there are questions to be answered regarding the cleanliness of the process, as by-products include wear metals (finely ground metal particles suspended in the used oil). Can Cleaner Production technology offer any solutions to these questions?

Improved management of effluents from urban settlements is an issue that urgently needs to be addressed. Urban development is expanding throughout the region, usually much more quickly than the infrastructure needed to support it. Debate is ongoing with respect to the possible benefits of using anaerobic sewerage treatment systems rather than traditional aerobic systems. Research has been undertaken in several countries in the region, but no definitive results are available.

The national marine institutes in Caribbean countries, as well as the international agencies led by UNEP, have collected a great deal of data on the quality of the marine and coastal zones. The results have been used by the Caribbean Environment Programme (CEP) to develop water quality standards for the marine environment. These standards are published as Protocols of the Cartagena Convention.[2] They await ratification by a majority of countries in the region. To meet the standards it will be necessary for countries to address management of waste disposal processes, as well as lowering the level of pesticide application in their agricultural activities. Can Cleaner Production offer assistance to these management problems?

The Caribbean Industrial Research Institute (CARIRI) in Trinidad and Tobago has been liaising with the Costa Rican Centre for Cleaner Production (CNP+L) to benefit from the Costa Rican approach to Cleaner Production. This approach was developed to assist industries in Costa Rica reduce their use of natural resources while enhancing production efficiency. CNP+L has targeted mainly the food and beverage sector in Costa Rica. It has produced a number of case studies demonstrating that improved management practices can result in lower effluent volume and reduced use of raw materials, and thus in cost saving for the processor. Collaboration between CNP+L and private sector institutions appears to be an effective mechanism for reaching processing industries.

CARIRI has also provided environmental auditing consultancy and testing services to companies in the Trinidad and Tobago energy and small business sectors, for use as a basis for beginning the process of implementing ISO 14001 or similar environmental management systems.

Hazardous waste management is a concern in the region due to limited disposal options

CARIRI hosts the Subregional Centre for implementation of the Basel Convention,[3] which seeks to provide training and technology transfer as well as access to information to assist Caribbean countries in dealing with issues related to hazardous waste management. A regional project on management of used lead-acid batteries is under way, with participation by countries from Central America, the Caribbean, and Venezuela and Colombia. It is expected that by mid 2002 recommendations will have been published for the operation of appropriate recovery and recycling operations in the countries in these regions to remove lead waste from the environment.

There are many regional examples of human health problems due to exposure to improperly disposed lead wastes. Lead-acid batteries are an example of consumer products that contribute to environmental pollution if appropriate disposal systems are not available. In countries where lead-acid batteries are produced, recycling by battery producers may be feasible if a lead smelting facility exists. However, smelting may produce other end-products that require environmentally sound disposal.

The disposal of vehicles is also part of the larger problem. Other consumer products of concern are white goods (household appliances), air conditioners, televisions and computing equipment, all of which pose disposal problems. Improper disposal may lead to soil pollution or immediate blockage of watercourses, resulting in flooding and subsequent decay and release of heavy metals and organic pollutants to the freshwater environment. All these products have life cycles. However, approaches to life cycle management being taken by producers are difficult to apply because of the distance between the consumer and the point of production. Innovative approaches are needed in small countries with limited options for disposal of such consumer products. These approaches must be capable of handling small volumes cost-effectively.

Conclusion

Sustainable economic development must be linked to resource management, as well as environmental management, if the overall objective of sustainable development is to be attained in the future. Providing tools and linkages will be a major problem, particularly in small states. Cleaner production can offer immediate solutions in sectors that process both renewable and non-renewable natural resources. UNEP's definition of Cleaner Production given above acknowledges the need to manage activities in the service sector. A wider definition of Cleaner Production might also address urban requirements for the creation of appropriate infrastructure and management of existing infrastructural services.

Notes

1. See *www.uneptie.org/pc/cp/home.htm.*

2. The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (the Cartagena Convention) was adopted in Cartagena, Colombia, in 1983 and entered into force in 1986. It is the only legally binding regional environmental treaty for the Wider Caribbean. The Cartagena Convention and its Protocols constitute a legal commitment by participating governments to protect, develop and manage their common waters jointly or individually. Currently there are two Protocols supporting the Convention. A third is nearing completion. For more information, see the UNEP – Caribbean Environment Programme web site (*www. cep.unep*).

3. The Basel Convention on Transboundary Movements of Hazardous Wastes and their Disposal was adopted in 1989 and entered into force in 1992. It strictly regulates transboundary movements of hazardous wastes and provides obligations to its Parties to ensure that such wastes are managed and disposed of in an environmentally sound manner. The Secretariat of the Basel Convention is administered by UNEP. For more information, see the Basel Convention web site (*unep.ch/basel*).

Reducing industrial pollution and improving energy efficiency in West Asia

A.F. Alhajji, Assistant Professor of Economics, Ohio Northern University, Huber Memorial 114, Ada, Ohio 45810, USA (a-alhajji@onu.edu)

Summary
Emission reduction, improved energy efficiency and regional environmental cooperation are prerequisites for sustainable development in West Asia. Industrial air pollution levels per capita and per GDP in this region are among the world's highest. Where natural gas projects are being carried out, CO_2 emissions are likely to be reduced along with natural gas flaring (an important source of these emissions).

Résumé
La réduction des émissions, une meilleure efficacité énergétique et l'instauration d'une coopération régionale dans le domaine de l'environnement sont des conditions préalables au développement durable en Asie de l'Ouest. Les niveaux de pollution de l'air par habitant (dus aux activités industrielles) et le produit intérieur brut sont parmi les plus élevés du monde. Les projets de récupération du gaz naturel en cours de réalisation dans la région devraient permettre de réduire les émissions de CO_2 et le brûlage du gaz naturel à la torche (source majeure d'émissions de CO_2).

Resumen
La reducción de emisiones, una mejor eficiencia energética y la cooperación ambiental entre regiones son requisitos indispensables para lograr un desarrollo sustentable en Asia Occidental. Los niveles per capita de contaminación ambiental en la industria y el PBI de esta región se encuentran en los valores más altos del mundo. En aquellos lugares en los que se están llevando a cabo proyectos de utilización de gas natural, las emisiones de dióxido de carbono probablemente se reducirán junto con el llameado del gas natural (una fuente importante de emisiones de dióxido de carbono).

Levels of industrial air pollution in West Asia, per capita and per GDP, are high and are increasing rapidly. Energy use by industry is predicted to continue to grow. Unless leaded gasoline and high-sulphur diesel are phased out, environmental conditions can be expected to deteriorate in the near future. National Environmental Protection Plan (NEAP) estimates of the annual cost of environmental damage in the region vary between 4% and 9% of GDP, compared with an estimated 5% in Eastern Europe and 2-3% in the OECD.

Government policies in this region emphasize industrialization, income diversification and economic development. Social and economic development takes precedence over environmental protection, which is not seen as an integral part of the development process. Often environmental laws exist but have not been integrated with industrial and development policies. Lack of such integration makes implementing environmental legislation difficult if not (in some cases) impossible.

Nevertheless, there are reasons for optimism. One of the most important is the initiation of new natural gas projects throughout the region. It is expected that utilities, factories, water desalination plants and petrochemical plants will increasingly use more environment-friendly natural gas instead of oil, reducing CO_2 emissions from these sources. Natural gas is cleaner than oil; moreover, its use as fuel may end the practice of flaring, a main source of CO_2 emissions in this region.

Several countries have begun phasing out leaded gasoline and high-sulphur diesel. There is genuine concern about the environmental effects of CO_2 emissions and their impact on human health, on the part of the public as well as officials.

Other drivers of change include multilateral environmental agreements (MEAs), access to the World Trade Organization (WTO), and the need for regional trade and investment.

The role of international bodies and NGOs is very restricted in much of West Asia, especially in the Gulf states. For example, efforts by the ESCWA to promote increased energy efficiency and emissions reduction are limited by a lack of funding, technical expertise and personnel.[1]

Industrial CO_2 emissions

Air pollution levels in West Asia are currently unsustainable. Data on industrial CO_2 emissions published by UNEP, the World Bank and the International Energy Agency (IEA), though not always consistent with each other, indicate severe problems, especially in oil-producing countries.

In 1999 CO_2 emissions in this region equalled those in Latin America, whose GDP is three times as great. It could be argued that in West Asia, with its oil-based economies, emissions are naturally higher than those in Latin America. But many Latin American countries have economically important oil and petrochemical industries.

West Asia has the world's second highest emissions of CO_2 relative to GDP, after the former Soviet republics (**Figure 1**). The average in this region is much higher than the world average, exceeding emissions per GDP in most developing countries. The seriousness of the situation is reflected in a number of ways – including widespread respiratory diseases in many parts of the region, especially during the last few years. Recent press reports indicate that respiratory problems among newborns in the Gulf region are at an all-time high.

Figure 2 shows CO_2 emissions per GDP in selected countries. CO_2 emissions in some countries in the region are around the world average, but those in oil-producing countries are generally much higher. UNEP and World Bank data indicate similar industrial CO2 emissions to those published by the IEA. In some cases, however, these data differ. For example, they show higher emissions in Yemen than those in Figure 2.

According to recent data on industrial CO2 emissions per capita, West Asia ranks third among world regions (**Figure 3**). While the world average was 3.88 tonnes per capita, the average in this region was 5.46 tonnes. This figure varies considerably among countries (e.g. 24.16 tonnes in Kuwait, compared with 2.82 tonnes in Jordan).

Qatar's CO_2 emissions per capita are the highest in the world (63.11 tonnes), followed by those of Kuwait (24.16 tonnes) and the United Arab Emirates (UAE) (23.83 tonnes). The United States ranks fourth (20.46 tonnes) and Bahrain fifth (19.74 tonnes). Other oil-producing countries, such as Saudi Arabia and Oman, produce roughly as much CO_2 per capita as the OECD countries (around 10 tonnes) (**Figure 4**). CO_2 emissions in most but not all countries in the region exceed the world average.

CO_2 emissions in the region increased from 1.1% of the world total in 1973 to 3.8% in 1999. During the same period the share of OECD and of non-OECD European countries, and that of the former USSR, declined by over 15% (IEA, 2001). CO_2 emissions per capita increased by 0.5 metric tonnes between 1990 and 1997, slightly below the world average increase of 0.6 metric tonnes. In the same period CO_2 emissions per capita increased by 8.2 metric tonnes in Kuwait and 44.5 metric tonnes in Qatar. Other countries in the region experienced moderate increases.

A rapid increase in industrial CO_2 emissions

began after the first oil shock in 1973, when the oil-producing countries launched massive development projects. **Figure 5** shows regional trends in industrial CO_2 emissions between 1960 and 1996. West Asia experienced the most rapid increases. Given recent trends, increases in CO_2 emissions in this region may have exceeded those in Europe during the last two years.

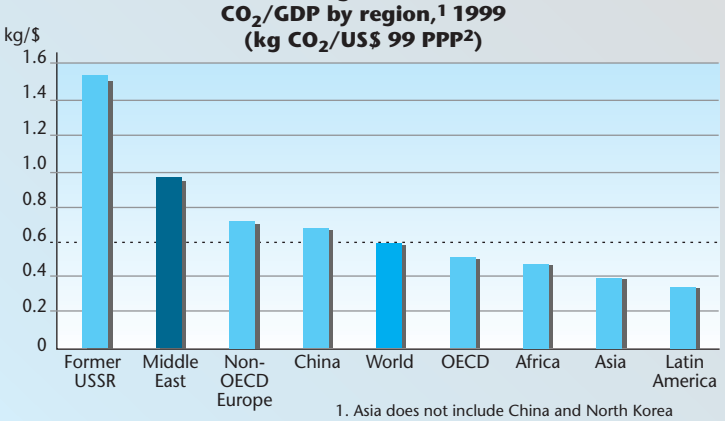
Sources of industrial emissions

Most industrial emissions are produced by petrochemical plants, cement factories, water desalination plants and utilities, and gas flaring. In 2000 in the ESCWA region, oil accounted for about 50% of total final energy consumption (TFC) by industry. This share was in reality much greater, as electricity (accounting for 11% of TFC) was mostly generated using oil.

Gas flaring in West Asia has been reduced significantly over the last 20 years. CO_2 emissions from gas flaring fell from 37% of the world total from this source in 1976 to 8% in 1998. **Figure 6** shows the declining trend in CO_2 emissions from gas flaring. This trend is expected to continue in the future as more natural gas projects are carried out, especially in Saudi Arabia, Iraq and Syria.

CO_2 emissions from cement production increased from 1% of the world total in 1976 to 2.4% in 1998. **Figure 7** shows the trend in CO_2 emissions from cement production. The invasion of Kuwait in 1991, when emissions from gas flaring increased, also resulted in decreased CO_2 emissions from cement production as factories ceased to operate. A decline in emissions between 1997 and 1998 may reflect an economic slowdown in the region related to lower oil prices.

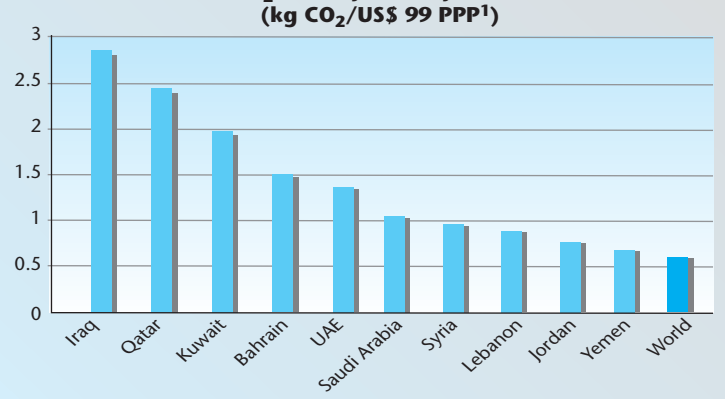
Figure 1
CO_2/GDP by region,[1] 1999
(kg CO_2/US$ 99 PPP[2])



Source: IEA, 2001

1. Asia does not include China and North Korea
2. PPP = adjusted for purchasing power parity

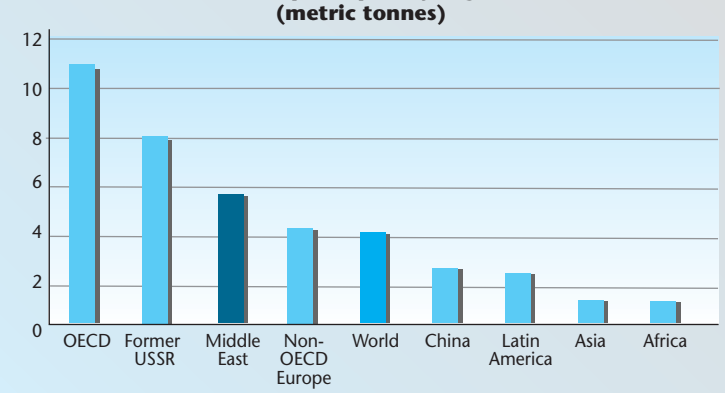
Figure 2
CO_2/GDP by country, 1999
(kg CO_2/US$ 99 PPP[1])



Source: IEA, 2001

1. PPP = adjusted for purchasing power parity

Figure 3
CO_2 emissions per capita by region,[1] 1999
(metric tonnes)



1. Asia does not include China and North Korea

Source: IEA, 2001

CO_2 emissions from electricity generation are also increasing, as the share of electricity generated by hydro power falls in Syria, Iraq and Egypt. Most electricity is produced using oil, especially in the Gulf region. World Bank data indicate that 67% of electricity in Kuwait, 63% in Saudi Arabia, 87% in Jordan, 98% in Iraq and 100% in Yemen is oil-generated. Per capita electricity consumption in West Asia is slightly above the world average, and is higher than that in Asia, Africa and Latin America. Per capita electricity consumption in the Gulf region, which is comparable to that in OECD countries, is increasing by 5% per year. Almost all new power plants are expected to use natural gas. Old power plants in several countries in the Gulf region are switching from oil to natural gas.

Industrial energy consumption and energy intensity

Industrial energy consumption in West Asia increased by 7% per year between 1995 and 2000 (ESCWA expects this trend to continue through 2010). Most of this increase was in consumption of natural gas (12.4% per year) and electricity (5.8% per year), with industrial oil consumption growing only 2.84%.

Figure 8 compares GDP per unit of energy use in countries in West Asia between 1990 and 1998. Recent UNEP data indicate improvements in energy intensity throughout the region. Compared with the rest of the world, however, energy intensity in many West Asian countries is high. Average energy intensity in West Asia and North Africa has increased only slightly since 1990, though some countries in the region have shown significant improvement.

ESCWA data based on industrial energy consumption per dollar of manufacturing value added (MVA) show energy intensity in the region falling from 1.61 kg of oil equivalent per dollar of MVA in 1995 to 1.4 kg in 1998. This figure was 1.49 kg in 1999, despite a large increase in MVA.

Government development policies

Environmental damage in West Asia is the result of government policies adopted on the basis of advice provided by international institutions and consultants. This is a classic example of market failure, in which government policies have not adjusted the market for externalities.

Petrochemical plants are the natural choice for oil-rich, export-oriented countries. Oil-based utilities are the most economical to run. To build a country from scratch, you need a number of cement factories operating around the clock. Changing energy sources to meet environmental standards (for example, switching to higher grade, low-sulphur diesel) would in many cases be very costly.

Managers of petrochemical plants and other government owned or publicly traded companies have no incentive to increase energy efficiency, reduce energy intensity or reduce emissions. Performance bonuses, salary increases and promotions are tied to output, revenues and profit.

In addition, governments set the prices of energy inputs below the market price. Such price setting, which does not reflect the true cost of energy inputs, increases energy intensity. Energy intensive industries were favoured in the early 1970s, when oil prices were very high and were expected to rise indefinitely. But with price fluctuations and low energy costs, there is no longer a need for price controls.

Governments have focused their environmental

efforts on areas other than industrial pollution and emissions of greenhouse gases. They have often limited the concept of environmental protection to very specific and narrow areas, such as designating wildlife refuges.

A petrochemical company in the Gulf region has claimed that it is important to show that "even while operating a sophisticated petrochemical complex, it is necessary to care for the environment." This company operates a "vegetable garden" producing 2000 kilograms of corn and cabbage a year. The same complex has one of the highest rates of CO_2 emissions per capita in the world. When the World Bank cited the efforts of countries in West Asia and North Africa to control industrial pollution, none of these countries were in the Gulf region.

Environmental protection measures are often based on economic principles. Countries in which afforestation is emphasized are combating desertification. Fish is an important part of people's diet in countries involved in oil spill prevention and response activities. Countries that concentrate on water resource issues often do not have enough water.

Figure 4
CO_2 emissions per capita by country, 1999 (metric tonnes)

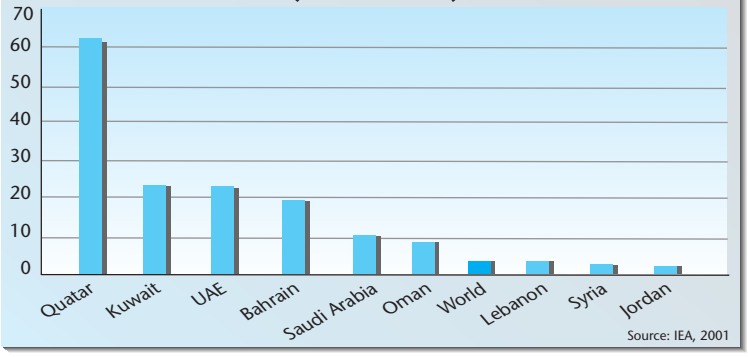
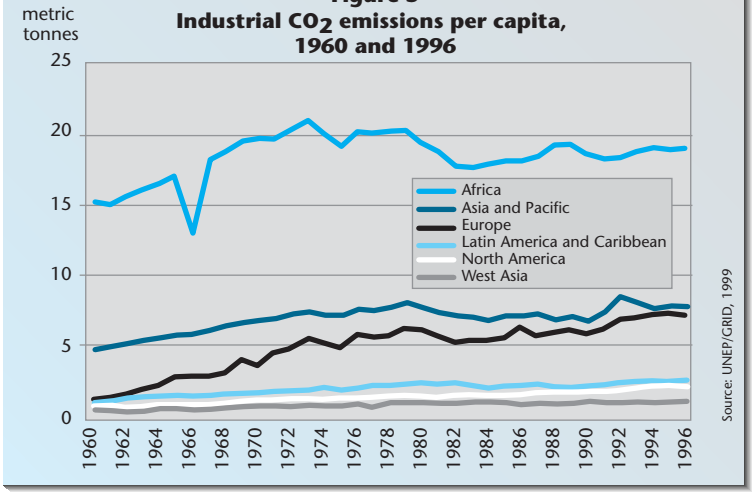


Figure 5
Industrial CO_2 emissions per capita, 1960 and 1996



Every country has developed its own concept of environmental protection, which may differ in some particulars from that of neighbouring countries. Such differences hinder environmental cooperation. Regional cooperation is most promising among the six Gulf Cooperation Council countries, owing to their many similarities.[2] Recent cooperation among oil-producing and consuming countries may furnish an opportunity for the Gulf region to adopt some of IEA-recommended efficiency standards.

Setting electricity prices below cost has hindered efforts by private industry, especially in the Gulf region, to increase energy efficiency and apply standards and labelling to, for example, imported equipment and tools. The private sector should benefit greatly from such standards and labelling. Companies in some countries in West Asia must house expatriate workers as well as, in some cases, their own nationals. These companies provide large housing complexes and pay for the electricity used. Recent increases in electricity prices in the Gulf region may help slow growth in electricity use. Even greater improvement could be expected if standards and labelling were in effect.

Weak institutional and legal frameworks

Environmental problems can be aggravated by weak institutional frameworks, inadequate enforcement mechanisms, and various forms of corruption. A weak institutional framework may result from lack of monetary and human resources, lack of political power, and weak linkages among different institutions.

All countries in the region have some environmental legislation in place, but this legislation needs to be implemented. Some laws are impossible to implement, as they conflict with other objectives such as increasing output in the petrochemical industry or delivering electricity to every village in the country.

Steps in the right direction

Almost every country in the region has at least one government agency, and sometimes a ministry, dealing with environmental issues. There are also many local not-for-profit organizations (a large proportion of such activities are carried out in Lebanon and Jordan). As indicated above, one of the most promising developments is the emphasis on natural gas. Once the first stage of the Dolphin project is completed, industries and utilities in Qatar, the UAE, Oman and possibly Kuwait will be using natural gas instead of oil.

Saudi Arabia, where natural gas has been used since the 1980s in the industrial cities of Al-Jubail and Yanbu, recently began to use it in power plants. An agreement will soon be signed with international oil companies hand-picked to build massive natural gas projects at a cost that could exceed $25 billion. Once these projects are operational, natural gas will be supplied to utilities and factories in the Riyadh region. Similar initiatives on a smaller scale are being taken in Syria and Lebanon. However, governments sometimes do not adequately appreciate the value of natural gas projects' environmental benefits. They perceive these benefits as a by-product, rather than as an integral part of the decision-making process used to determine such projects' economic value.

Adopting natural gas as the fuel of choice in oil-producing countries has other advantages. Natural gas use diverts oil from domestic consumption to exports: oil-producing countries can increase oil exports without additional investment in production capacity. When a power plant in Riyadh switched from oil to natural gas last year, Saudi Arabia was able to increase oil exports by 200,000 barrels per day.

Whether they have completed their National Environmental Action Plans or are still finalizing them, a number of countries in the region have made progress on many environmental issues. This section focuses on environmental planning in Lebanon, Kuwait and Saudi Arabia.

Lebanon

Lebanon's Ministry of Environment has recognized the importance of implementing legislation concerning the establishment of new factories, and of studies on industrial projects' environmental impacts. It has completed a study on industrial waste disposal, adopted a solution to the problem of dangerous industrial waste, and is working on classifying this type of waste and ways to recycle it.

While the Lebanese environmental plan is the most aggressive to date in West Asia, it needs to focus more on gaseous industrial emissions, especially as 24% of air pollution is produced by industry.

The Ministry of Environment has successfully encouraged the establishment of more than 20 grassroots environmental organizations throughout the country.

Kuwait

In Kuwait's environmental plan, sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) emissions from power plants are treated as a national environmental issue. Although oil with a 4-5% sulphur content has been used, Kuwait will use cleaner oil or switch to natural gas. An environmental court has been established, with judges receiving three months of training on environmental matters. Inspections have been organized in major industrial areas.

Kuwait produced a Biodiversity Strategy in

1997 and a National Environmental Strategy in 1998. An Environmental Assessment Law was passed in 1990.

Despite these activities, the issue of energy efficiency (especially in the electricity sector) has been ignored.

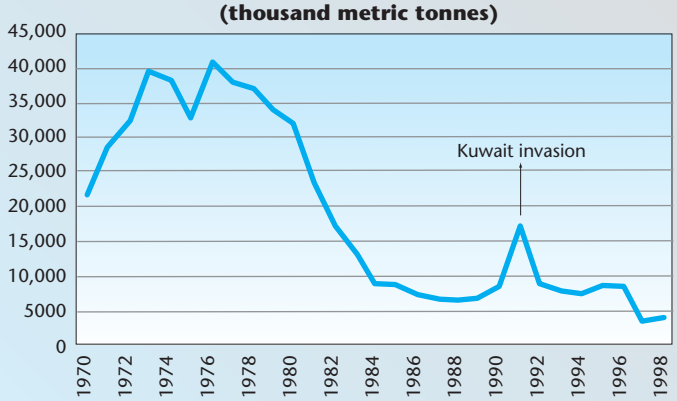
Saudi Arabia

In Saudi Arabia, Chapter 15 of the Seventh Five-Year Plan (2000-2005) is dedicated to environmental protection. A study on the environmental impact of petrochemical plants in the industrial city of Yanbu has been completed, and another study is being conducted on the environmental impact of power plants.

The Seventh Five-Year Plan acknowledges that despite the Kingdom's achievements, challenges remain. It emphasizes government incentives to build environment-friendly industries, as well as the implementation of standards for development projects. The policies proposed do not focus on industrial pollution, though the Plan indicates that Saudi Arabia will reduce all types of pollution according to international standards. Environment-friendly technology will be incorporated when new projects are evaluated. Recycling and treatment of industrial pollutants are also emphasized.

Compared with the Lebanese and Kuwaiti plans, however, the Saudi plan is too general and lacks concrete steps and specific targets.

Figure 6
CO_2 emissions from gas flaring in West Asia, 1970-1998 (thousand metric tonnes)



Source of Figures 6 and 7: Carbon Dioxide information Analysis Center (CDIAC), 2001

Figure 7
CO_2 emissions from cement production in West Asia, 1960-1998 (thousand metric tonnes)

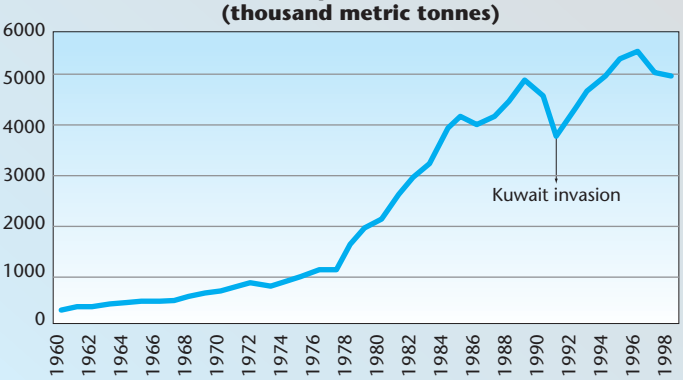
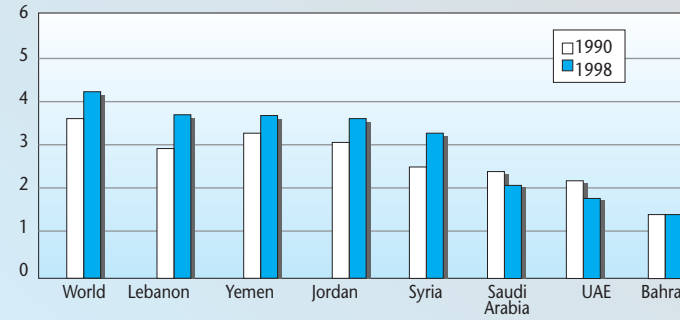


Figure 8
GDP per unit of energy use (PPP $ per kg oil equivalent[1])



1. PPP = adjusted for purchasing power parity

Source: UNEP, 2001

Conclusions and recommendations

Government policies favouring energy intensive industries have encouraged industrial pollution in West Asia. Environmental problems have been exacerbated by lack of environmental and energy policies, by price controls, and by fluctuating oil revenues.

Sustainable development cannot be effectively pursued until industrial emissions are reduced. This will require changes in government policies and, consequently, in public attitudes.

To curb industrial pollution and increase energy efficiency, countries in West Asia should:

- integrate environmental policies into economic and social development policies;
- encourage energy efficiency and the use of new energy efficient technology;
- institute energy conservation laws;
- institute the use of general guidelines, stand-by power reduction, efficiency standards and labelling for equipment and tools;
- establish energy intensity measures by industrial sector, by industry and by factory;
- establish policies to control greenhouse gases (this may include target-setting, taxation and trading permits);
- strengthen environmental institutions through higher budgets, publicity and political power;
- encourage public participation through environmental grassroots movements and other forms of participation;
- promote environmental cooperation among countries in West Asia in general, and the Gulf Cooperation Council in particular;
- avoid politicizing environmental issues in order to encourage regional cooperation;
- attract foreign investment that promotes energy efficient technology and renewable energy;
- encourage competition among privatized industries, as otherwise privatization may not improve energy efficiency;
- accompany environmental policies and regulations with anti-corruption measures.
- promote frequent testing and conduct detailed studies on industrial pollution;
- embrace natural gas as the fuel of choice for the industrial sector and utilities;
- implement the gradual phase-out of low quality diesel and leaded gasoline;
- eliminate price controls and establish an effective market structure;

Notes

1. The 13-member UN Economic and Social Commission for Western Asia (ESCWA) promotes economic and social development through regional and subregional cooperation and integration. It serves as the main general economic and social development forum for the ESCWA region within the UN system (see *www.escwa.org.lb*).

2. The members of the Gulf Cooperation Council are Bahrain, Kuwait, Oman, Quatar, South Africa and the United Arab Emirates (see *europa.en.int/comm/external_relations/gulf-cooperation/intro* and *http://xrules.com/quatar/gcc*).

Alternative water resource management policies in West Asia

Waleed K. Al-Zubari, Desert and Arid Zones Sciences Programme, College of Graduate Studies, Arabian Gulf University, PO Box 26671, Manama, Bahrain

Summary

Future water deficits are projected in West Asia, even under scenarios that include supply augmentation and policies aimed at demand management and conservation. While the region's water resources are extremely limited, long-term supply can be made more sustainable through a combination of planning, institutional reforms, economic tools, conservation measures and implementation of concrete projects.

Résumé

Des pénuries d'eau sont prévues en Asie de l'Ouest dans l'avenir,, même selon les scénarios basés sur une augmentation des approvisionnements et l'adoption de mesures pour gérer la demande et conserver les ressources. Si les ressources en eau de la région sont effectivement très limitées, l'approvisionnement à long terme pourrait toutefois devenir plus durable par la mise en œuvre combinée de plusieurs moyens comme la planification, les réformes institutionnelles, le recours à des instruments économiques, l'application de mesures de conservation et la réalisation de projets concrets.

Resumen

En Asia Occidental, se proyecta una escasez de agua para el futuro incluso en situaciones que contemplan el aumento del suministro y la introducción de políticas más acertadas relacionadas con la administración de la demanda del agua y su conservación. Si bien los recursos de agua de la región son muy limitados, el suministro a largo plazo puede hacerse más sustentable mediante la combinación de planificación, reformas constitucionales, herramientas económicas, medidas de conservación e implementación de proyectos concretos.

The population of West Asia more than quadrupled between 1950 and 2000, from about 20 million to 98 million. This increase, and the region's social, agricultural and industrial development, are associated with substantial increases in water demand, placing great pressures on limited water resources (**Figure 1**). In the Arabian Peninsula sub-region, spiraling water demand has been met mainly through intensive over-abstraction of groundwater, leading to its depletion and accelerated degradation of water quality. In the Mashreq sub-region, water resources have been reduced through conflicts over allocations from rivers and aquifers shared with neighbouring countries or through military occupation.

A clear imbalance between available water resources and water demand exists in most countries of the region. This imbalance is expected to continue. West Asia will experience major environmental problems during this century if the following issues are not resolved:

- conflicts over shared surface and groundwater resources;
- escalating water demands and lack of conservation measures;
- slowing rates of water resources augmentation;
- deterioration of water quality and reduction in the yield of heavily exploited aquifers;
- inadequacies in treatment of water and sewage from developing urban communities;
- inefficient methods of wastewater treatment and solid waste disposal;
- continuing rapid population growth.

Table 1
Available water resources in West Asia (1995)

Sub-region	Conventional water resources (Mcm)				Non-conventional water resources (Mcm)			
	Surface water	Groundwater			Desalinated water	Wastewater	Agricultural drainage	Total
		Reserve	Recharge	Used				
Arabian Peninsula	8310	130,500	7200	23,547	1645	937	30	2612
Mashreq	88,302	13,300	8515	8598	7	314	1210	1531
West Asia	96,612	143,800	15,715	32,145	1652	1251	1240	4143

Source: GEO 2000 (UNEP)

Table 1 shows estimated conventional (surface and groundwater) water resources as well as non-conventional ones (desalinated water, wastewater and agricultural drainage) in the region as of 1995. Many groundwater resources are in critical condition since volumes withdrawn far exceed natural recharge rates, resulting in deterioration of groundwater quality. In addition, excessive irrigation and surface dumping of raw and partially treated wastewater have generated large volumes of contaminated water, leading to pollution of shallow aquifers, and have caused deep concern over health impacts. It is reported that nitrate concentrations in some domestic wells in the Gaza Strip reached 40 mg/litre – four times the WHO limit (Zarzour et al., 1994).

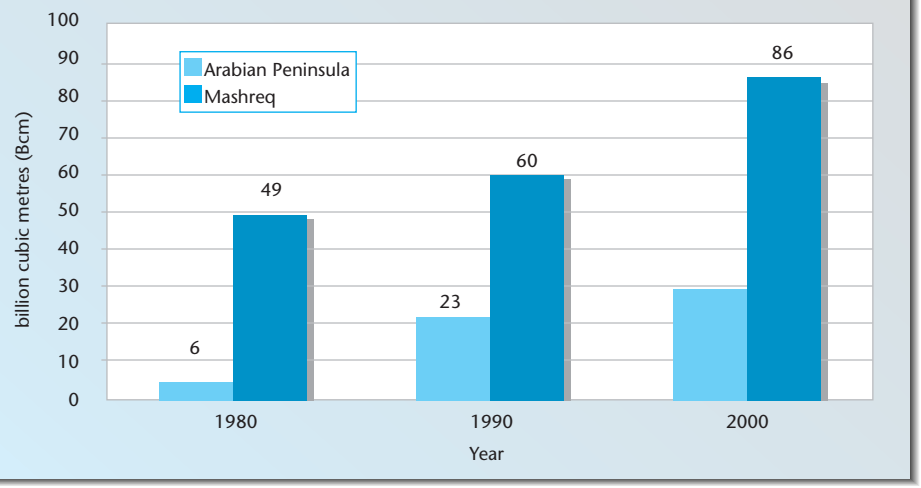
Desalination technology, introduced in the Arabian Peninsula in the mid 1950s, developed very rapidly to counteract the shortage of conventional water sources and to meet drinking water quality standards. In addition to their high cost (US$ 1-1.5/m^3; Bushnak, 1995), desalination plants have some negative impacts on the surrounding environment, including air pollution by emitted oxides and seawater, and marine life pollution by rejected hot brines that may contain residual treatment chemicals and trace elements picked up within the desalination plant.

Almost all Arabian Peninsula countries have tertiary wastewater treatment, though total capacity represents no more than 30% of supplied domestic water rates, posing problems of wastewater discharges (and associated pollution of shallow aquifers and coastlines) and rising urban water tables. Of the total treated wastewater volume of about 940 million cubic metres (Mcm)/year, some 392 Mcm/year is used to irrigate gardens, parks, roadside ornamentals and fodder crops and to landscape highways. (Al-Zubari, 1997). The rest is dumped to infiltrate shallow aquifers, or into the sea. Most Arabian Peninsula countries plan expanded use of reclaimed wastewater as a strategic alternative source of irrigation water and as a means of reducing groundwater abstraction.

Recycled irrigation water is not much used in the Arabian Peninsula. In the Mashreq sub-region only Syria exploits these water sources, with some 1210 Mcm being recycled annually. However, this source has potential if proper irrigation practices are used. Other non-conventional water sources, such as rainwater harvesting and weather modification, are still at the research stage.

Total water use for all purposes in West Asia in 1995 amounted to 96,286 Mcm, of which

Figure 1
Water demands in West Asia (1980-2000)



29,786 Mcm was used in the Arabian Peninsula and 66,500 Mcm in the Mashreq, with agricultural demands representing over 80% of the total (**Figure 2**). Water sources in each sub-region are shown in Figure 2. In the Arabian Peninsula the main source (91%) is groundwater, while in the Mashreq it is surface water (86%).

All the Arabian Peninsula countries except Oman have a per capita water share of less than 1000 m^3/yr, the threshold of chronic water scarcity. Resources per capita seem more plentiful in the Mashreq (except in Jordan and the Palestinian territories). However, there are serious conflicts concerning shared water resources in this sub-region. The overall value of the water stress index for West Asia is 84.4%, which is considered very critical.

Figure 3 shows projected total water demand in West Asia during the period 1995-2025 by sector (agricultural, municipal, industrial), based on consumption patterns in each sector in the period 1990-95. It appears that current water resources cannot satisfy future water demand much past 2005 unless steps are taken soon to manage and rationalize demand, increase and augment supply, and impose realistic controls on use.

Alternative policies aimed at sustainable development

The three scenarios described below are examples of different approaches to investigating the water balance required for sustainable development in West Asia during the period 1995-2025. The three scenarios accept the latest UN population projections and assume that current maximum-production agricultural policies will be continued.

Scenario 1 (business as usual)

The first scenario (**Table 2**) assumes:

- no further development of water resources;
- domestic and industrial water use secured as a first priority, with the consumption patterns observed in these two sectors during the last decade continuing;
- improvements in agricultural productivity per unit of water, resulting in a 20% saving in agricultural water demand by 2025 due to ongoing agricultural research and application of appropriate technologies, including biotechnology;
- settlement of shared water resources disputes.

This scenario appears pessimistic and represents the worst-case scenario. However, justifications for its consideration are as follows:

- 80% of the land in this region is classified as desert or semi-desert;
- Most of the easy and most promising water sources have been developed, whereas remaining locations require heavy investment, laborious investigations and intensive research programmes;
- Potential conflicts over shared water resources (which constitute a sizeable share of total resources) require lengthy and difficult negotiations before equitable reconciliation is attainable, which has resulted in the postponement of many water development schemes;
- The countries of West Asia have been strongly affected by regional wars and disputes inflamed over the last three decades with no permanent settlement, drastically affecting the region's economy and upsetting the socio-economic development plans of all its countries, again resulting in the postponement of many water development schemes.

Scenario 2 (supply augmentation)

This scenario (**Table 3**) takes into further consideration the outcome of the intensive investigations and research work in various fields foreseen for both conventional and non-conventional water sources, which would yield additional volumes of both conventional water resources (surface water) and non-conventional ones (desalinated water, recycled treated wastewater and irrigation water). Other assumptions concerning water consumption rates, the priority given to domestic and industrial water use, improvements in agricultural production research, and settlement of disputes over shared water resources are as in Scenario 1.

Scenario 3 (supply augmentation and policy remedies)

According to this scenario (**Table 4**), extensive research, investigation, development and reform programmes would be essential to develop the additional water resources foreseen in Scenario 2, as well as to bring about optimum rationalization of water use and minimization of water losses. Reform programmes are directed towards reducing water demands through formulated water policies that emphasize demand management, conservation and protection.

It should be noted that all scenarios are quantitative and do not take into account the impact of groundwater overdraft on the quality of the groundwater withdrawn, i.e. they assume that the water withdrawn will be usable. Mining and overexploitation of shallow and deep aquifers, particularly in the Arabian Peninsula, will be associated with an inevitable deterioration of water quality and loss of groundwater usefulness and readiness, in addition to salinization of agricultural lands, which will affect these projections in a dynamic manner.

Tables 2, 3, and 4 show the results of these scenarios. According to the baseline scenario (Scenario 1), the Arabian Peninsula will suffer from acute water shortages and fail to fulfil the set policy of maximum food production. A water balance deficit will be maintained. A total water deficit of some 40 Bcm in 2025 is foreseen. The Mashreq sub-region will be better off up to 2015; the major problem in this sub-region is that conflicts over shared water resources will strongly affect development plans if equitable resolution is not reached. In West Asia as a whole, this scenario suggests a deficit starting in 2005 and escalating to 55 Bcm in 2025.

Under the supply augmentation scenario (Scenario 2), the water deficit in the Arabian Peninsula will be slightly reduced. There should be a relatively smaller deficit in overall water resources in the Mashreq by 2025. In West Asia as a whole, there will be a deficit of 6.1 Bcm in 2010, reaching 40 Bcm in 2025 mainly due to the Arabian Peninsula deficit.

Even with supply augmentation and policy remedies (Scenario 3), the Arabian Peninsula will continue to experience an increasing water deficit. On the other hand, the Mashreq will continue to enjoy surplus water resources throughout the projection period. A water resources deficit of 1.4 Bcm will be experienced by the region as a whole in 2015, rising to 15.7 Bcm in 2025.

Scenario 3 is clearly an appropriate basis for an alternative strategy to secure sustainable development of water resources. Even so, the Arabian Peninsula will continue to experience a water deficit if it adheres to its food security targets and its population growth rates continue as projected. Thus this sub-region would either mine some 400 Bcm of shallow and deep groundwater resources during the projected period (a questionable approach given the expected deterioration of groundwater quality that would result) or undertake significant imports of agricultural produce. In the Mashreq, potential conflicts over shared water resources remain a fundamental pressing issue for early equitable settlements.

Policy implementation

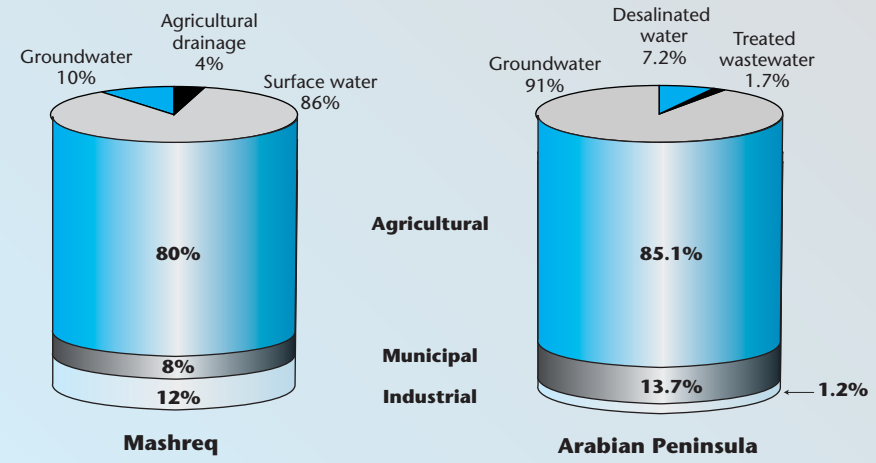
The overall objectives of these proposed alternative water policies for the countries of West Asia is to secure long-term water supply while meeting

strict criteria for socio-economic, financial and environmental sustainability and public health requirements. The actions set out below, based primarily on the lessons from Scenario 3 (supply augmentation and policy remedies), seem to offer the most promising alternative. Focused specifically on the acute problems of water supply and management in the West Asia region, they are aimed at encouraging:

- ♦ appropriate development of conventional and non-conventional water resources;
- ♦ resolution of conflicts over shared water resources;
- ♦ marked improvement in the efficiency of water use;
- ♦ substantial decrease in water demand.

Procedures to implement water resources policy can be classified in five categories:

Figure 2
Origin and uses of water in West Asia



Planning and analysis

Water policy formulation is very data intensive. Comprehensive hydrological data are required to complete the full inventory of the existing quantity and quality of water resources, along with time series for trend analysis and to calculate design parameters for waterworks. Data should be scrutinized to eliminate any exaggeration, and data collection should be well planned and continuous to provide information to assess the performance of the water schemes after implementation and the effect on downstream users. Scarcity of water resources is aggravated by the potential for conflicts between the countries of West Asia and their neighbours, which would seriously affect preparation of sustainable socio-economic development plans in the future if not reconciled.

The development of additional water resources in the region will require well planned, detailed and integrated studies of the potential for surface and groundwater and non-conventional water resources, together with cooperation among the countries of West Asia in these studies. Only then can the most appropriate and economically feasible options be selected from among the many recognized techniques, including rainwater harvesting, surface storage, groundwater recharge, wastewater reuse, weather modification, rational exploitation of groundwater aquifers, water importation, and desalination of brackish water and seawater.

Legal and institutional reforms

Water legislation is closely linked to development of other natural resources, especially in arid regions such as West Asia. Water legislation in West Asia is not keeping pace with demand for water resources. There is an urgent need for critical review of all existing legislation and how it relates to the policy options under review. The main areas of legislation that require amendment include water rights, water abstraction, water quality and environmental standards, water charges policy, water pollution and environmental protection, protection of groundwater from depletion and contamination, wastewater treatment, and solid waste disposal.

Amended legislation alone will not be effective in implementing new policies without significant reorganization of water administrations, especially decentralization of the power and influence of central governmental bodies responsible for water resources development and management. Indeed, institutional weakness is a major constraint on management of water resources in most countries of West Asia. This is a direct consequence of the ill-defined responsibilities of institutions dealing with water research, investigation and studies, planning and management, as well as the absence of updated powerful legislation to enforce coordination and collaboration among authorities at local, regional and national levels. Cross-sectorial coordination among water, agriculture, housing, industry and planning directorates is also required for efficient and successful policy formulation. Capacity building among the technical staff of research institutes and other water and agricultural administrations is badly needed so as to keep pace with the rapid progress of research in various fields of water, agricultural technologies and the socio-economic sciences, and to prepare a competent generation of scientists and professionals to manage limited water resources efficiently in arid environmental conditions.

Economic considerations and tools

There are strong links between the national economy and water resource management. National development strategies directly influence water allocation and use, as in the case of strategies for food self-sufficiency, while policies promoting exports and foreign exchange earnings from highly priced cash crops call for increased investments in irrigation schemes. Implementation of effective and efficient water resources policies is greatly hindered by shortage of financial resources; therefore future sustainable water policies must have positive impacts on central government financing from new tax revenues, prices and charges and reduction of subsidies.

Economic incentives can provide effective instruments to rationalize water use, provided that they do not act against other key economic factors. Possible incentives include water tariffs for

Figure 3
Projected water demands in West Asia

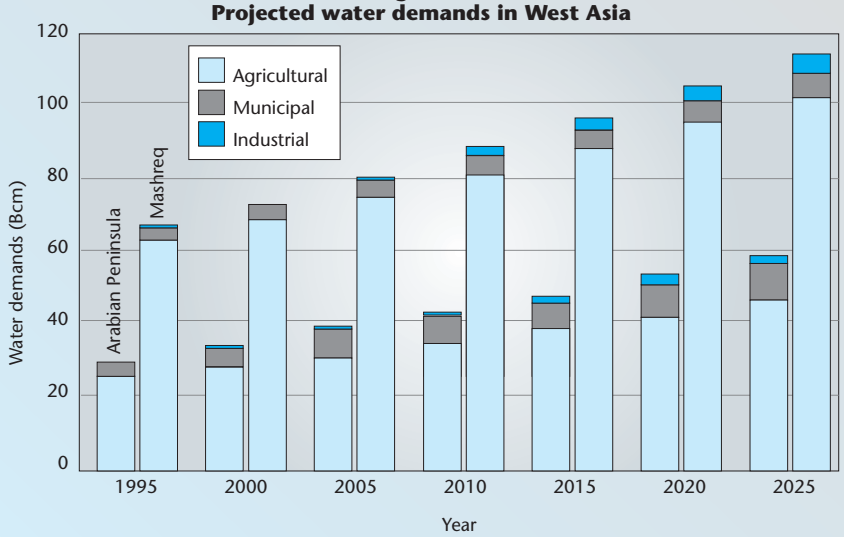


Table 2
Water balance in West Asia: Scenario 1 (business as usual)

Sub-region/year (Bcm)	1995	2000	2005	2010	2015	2020	2025
Arabian Peninsula							
Available water resources	18.64	18.64	18.64	18.64	18.64	18.64	18.64
Total water demand	29.79	33.70	37.70	42.19	47.18	52.95	58.68
Water balance	-11.15	-15.06	-19.06	-23.55	-28.54	-34.30	-40.04
Mashreq							
Available water resources	98.35	98.35	98.35	98.35	98.35	98.35	98.35
Total water demand	66.50	72.95	80.06	87.69	95.74	105.00	113.26
Water balance	31.85	25.40	18.29	10.66	2.61	-6.66	-14.91
West Asia							
Available water resources	116.99	116.99	116.99	116.99	116.99	116.99	116.99
Total water demand	96.29	106.65	117.76	129.88	142.92	157.95	171.93
Water balance	20.70	10.34	-0.77	-12.89	-25.93	-40.96	-54.94

Table 3
Water balance in West Asia: Scenario 2 (supply augmentation)

Sub-region/year (Bcm)	1995	2000	2005	2010	2015	2020	2025
Arabian Peninsula							
Available water resources	18.64	19.92	21.17	22.52	24.05	25.70	27.42
Total water demand	29.79	33.70	37.70	42.19	47.18	52.95	58.68
Water balance	-11.15	-13.78	-16.54	-19.67	-23.14	-27.24	-31.26
Mashreq							
Available water resources	98.35	99.10	100.16	101.23	102.30	103.37	104.45
Total water demand	66.50	72.95	80.06	87.69	95.74	105.00	113.26
Water balance	31.85	26.15	20.10	13.54	6.56	-1.64	-8.81
West Asia							
Available water resources	116.99	119.01	121.32	123.75	126.34	129.07	131.87
Total water demand	96.29	106.65	117.76	129.88	142.92	157.95	171.93
Water balance	20.70	12.36	3.56	-6.13	-16.58	-28.88	-40.07

domestic and industry water supply, charges for abstraction, irrigation, wastewater and pollution, and soft loans for modernization of equipment. While setting economic charges for water pollution may be the best way to discourage industrial water pollution, with pollution charges proportionate to the volume and the quality of effluent, implementation difficulties may be encountered through lack of enforcement procedures. The same caveat also applies to irrigation charges, based on metering consumption, area irrigated, type of crop, or length of irrigation time. Groundwater pricing should be based on quantity-based prices and charges, as it is both economically and administratively efficient to encourage conservation and efficient use.

Water conservation

Records and studies indicate that there is excessive and wasteful use of water in all sectors (agricultural, domestic and industrial) throughout West Asia. Huge water losses of at least 45% in agriculture arise from inefficient irrigation systems, while there is 20% leakage from water supply networks and a general 10% loss during industrial use. All countries of West Asia must incorporate conservation programmes to cut down water losses in their water resource management plans.

In the agricultural sector this objective can be approached by:

- reviewing the economics of irrigation and agricultural production, and reappraising agricultural policies;
- improving the efficiency of traditional irrigation systems, introducing appropriate modern irrigation technology (e.g. application of laser levelling for basin irrigation fields, lining field irrigation canals) as well as modern innovative agricultural techniques (e.g. soil-less agriculture), and promoting water conservation techniques among farmers and water users;
- reviewing current irrigation incentives and tariffs, implementing the necessary legislation to enforce and update regulations on water use, and strictly enforcing regulations;
- improving extension services and programmes to raise awareness among the public and farmers of the economic value of water as a precious, scarce and viable resource;
- providing subsidies/soft loans to encourage application of modern irrigation and agricultural systems.

In the domestic and industrial sectors this may require:

- restructuring water pricing to reflect its true costs, including environmental costs of maintenance and operation of water supply works and desalination and wastewater treatment plants. Water tariffs in most countries of the Arabian Peninsula are too low to encourage rational water use;
- reviewing water pricing mechanisms and applying escalating tariffs for increased water consumption;
- installing modern water-saving technology for distribution systems and households;
- improving leakage detection in water supply networks;
- modifying building codes to promote efficient use of wastewater (reuse and recycling);
- applying heavy pollution charges for industrial units violating regulations;
- making industry treat water before discharging it to water, lakes or the sea.

Projects and programmes

Water projects and programmes represent the final outcome of the process of water policy review. They are a component of the action plan, which should be consistent with overall water strategies. During detailed feasibility studies, any proposed projects and programmes must undergo comprehensive review and assessment before implementation, including cost-benefit analysis, cost-effectiveness analysis, environmental impact assessment (EIA), and economic and financial analysis.

Action programme for implementation

It is suggested that each country of West Asia appoint a national water council, whose members are ministers responsible for water resources development, management and utilization, to formulate and coordinate at the highest political level the country's overall water policy. A technical body (secretariat/committee) to be suggested by the council – composed of senior scientists, economists, engineers, lawyers from concerned ministries and authorities, university and research institutes, and public agencies and stakeholders including representatives of the water users – would help the council and ensure fair institutional and interministerial coordination at the national level.

The water strategy should consider development of the water sector, demand, protection, and sustainable use in the medium and long term (15-30 years). A great deal of data and information are needed to adequately form the base on which the strategy would be formulated with possible suitable options. The work plan would include several stages:

1) collection and review of existing data and information;
2) review and evaluation of previous development studies;
3) current conditions of water resources, population growth, socio-economic conditions, land use, and water utilization and related legislation in force;
4) evaluation of water resources potential;
5) water demand forecast;
6) water resources development planning framework;
7) water resources and facilities management and institutional reform;
8) estimate of total cost;
9) evaluation of strategy formulation: financial, economic, and social analyses.

According to the evaluation result, the selected options and alternative for strategy formulation could be decided and programmes, water projects, tariffs, new technologies and legal institutional reform recommended.

Water policies are usually projected over a longer period and have unforeseen impacts that

Table 4
Water balance in West Asia: Scenario 3 (supply augmentation and policy remedies)

Sub-region/year (Bcm)	1995	2000	2005	2010	2015	2020	2025
Arabian Peninsula							
Available water resources	18.64	19.92	21.17	22.52	24.05	25.70	27.42
Total water demand	29.79	32.10	34.45	37.20	40.38	44.25	48.00
Water balance	-11.15	-12.19	-13.28	-14.68	-16.33	-18.54	-20.57
Mashreq							
Available water resources	98.35	99.10	100.16	101.23	102.30	103.37	104.45
Total water demand	66.50	71.04	76.13	81.60	87.35	93.86	99.54
Water balance	31.85	28.05	24.03	19.63	14.94	9.51	4.90
West Asia							
Available water resources	116.99	119.01	121.32	123.75	126.34	129.07	131.87
Total water demand	96.29	103.15	110.57	118.80	127.73	138.10	147.54
Water balance	20.70	15.86	10.75	4.95	-1.39	-9.03	-15.67

are difficult to measure in detail and may not be implemented as proposed, but which respond to current need and priorities. Water policies may require continuous monitoring for progress, re-evaluation or even revision of priorities that meet obstacles. Monitoring of policy actions would therefore benefit policy management.

Successful implementation of the suggested policies would be the milestone for paving the long intricate path towards coping with water scarcity in this arid region. Failure to achieve the set targets for agricultural water demand would result in deterioration of both the quantity and quality of water supplies, increasing food deficits, deterioration of living standards, greater social unrest and possible regional conflicts. Furthermore, the assumptions built into the other scenarios will delay these problems (not solve them) unless stringent measures are taken and policy shifts, including population policies, are strictly implemented.

Acknowledgement

This study is the result of a joint effort by the Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD) and Arabian Gulf University (AGU). It was funded by UNEP through the Global Environment Outlook 3 project. The study was also used as a basis for preparing the West Asia contribution to the World Water Vision.

References

Al-Zubari, W.K. (1997) Towards the Establishment of a Total Water Cycle Management and Re-use Program in the GCC Countries. Proceedings of the 7th Regional Meeting of Arab IHP Committees. Rabat, Morocco, 8-12 September.

Bushnak, A.A. (1995) Desalination Technology and Economics. MEC Conference: Putting a Price on Water. Bahrain, 16-19 January.

Zarzour, H., I. Jad and Q. Violet (1994) Hydrochemical Indicators of the Severe Water Crisis in the Gaza Strip. In: *Final Report on the Project Water Resources in the West Bank and Gaza Strip*. Applied Research Institute, Jerusalem. ◆

Recommendations from UNEP regional industry consultations

As part of UNEP's contribution to the World Summit on Sustainable Development (WSSD), the Division of Technology, Industry and Economics (DTIE) facilitated regional industry consultations in the autumn of 2001. These consultations, which took the form of workshops organized in cooperation with the UN Industrial Development Organization (UNIDO), were aimed at identifying how industry can advance the sustainability agenda at the regional level. The results of the regional industry consultations fed into the Regional Preparatory Committee meetings for WSSD, which assessed overall progress on Agenda 21 and identified ways forward.

About 30 invited participants took part in each workshop. The workshops' objective was to ensure that regional industry and environment issues were addressed in the outcome of each Regional Preparatory Committee meeting. Participants represented the region's major industry sectors, including SMEs as well as national and multinational companies. They were also geographically representative. Reports outlining industry activities in the region, and highlighting key associated environmental issues, were produced to help frame workshop discussions. These reports also provided guidance for generating recommendations. The recommendations of the regional consultations were then presented at the relevant Regional Preparatory Committee meetings.

These recommendations are intended to provide a comprehensive overview of how industry is contributing to sustainable development. Ultimately, what UNEP hopes to bring to the table is a better sense of how business partnerships can contribute to the goal of sustainability.

The following section summarizes the recommendations of each regional industry consultation. The complete documents are available on UNEP DTIE's website (*www.uneptie.org/wssd/regional.htm*).

Contribution of industry stakeholders in Africa

Representatives of business and industry, with other civil society and international organizations including UNIDO, UNDP and the UN Economic Commission for Africa (ECA), concluded that although some progress had been made towards the achievement of the goals of Agenda 21, much remains to be done.

Participants identified the achievement of peace and security, and partnerships among stakeholders, as two of the major priorities. They recognized that addressing the opportunities and threats posed by globalization is one of the greatest challenges facing Africa.

Participants recommend that the following issues be incorporated in the agenda of the World Summit on Sustainable Development:

- more sustainable use of (and greater benefits from) African resources;
- extension of basic services to all people;
- increased debt relief linked to sustainable development, good governance and poverty reduction;
- creation of enabling environments for increased investment;
- formation of partnerships among all stakeholders;
- technology transfer.

Participants emphasized that promoting industrial development on a sustainable basis would make a significant contribution to poverty reduction and improved natural resource management, and that the Summit presents an opportunity for Africa's special needs in this regard to be addressed. They recognized that sound corporate governance in the public and private sectors, and the achievement of political and social stability, are prerequisites for successful implementation of any Summit decisions.

A number of issues were identified for governments to consider as input to the Summit agenda, so that the Summit's outcome includes a clear action plan and commitment to its implementation from all stakeholders.

During the deliberations many more practical suggestions were made for improving industry's contribution to sustainable development, particularly to poverty reduction and natural resource management.

The spirit of the workshop was one of eagerness to work together to improve industry's contribution to sustainable development.

Issues identified

Social

- provision of cost-effective energy services (including renewables) in rural areas;
- bridging the digital divide;
- reversal of the current brain drain from Africa (retain skills by creating viable local education and training and an economic activity base);
- food security;
- alleviating the effects of (and avoiding) natural disasters;
- communicable diseases, e.g. HIV/AIDS, malaria, tuberculosis;
- educational levels;
- technological skills to sustain industrial development;
- occupational health and safety.

Economic

- creation of an enabling environment, including a platform for partnerships (e.g. by forming national councils made up of different stakeholders for collaborative discussions to promote the right incentives for sustainable development);
- development of research and development facilities in Africa;
- promotion of intra-African cooperation and use of local knowledge;
- strengthening industrial and trade associations and linkages among them at the national, regional and international levels;

- ♦ improving efficiency in the agricultural sector;
- ♦ improving infrastructure and communication;
- ♦ establishing an appropriate institutional framework for sustainable industrial development;
- ♦ technological skills to sustain industrial development;
- ♦ corporate governance in the public and private sectors;
- ♦ a range of financial and economic instruments to promote sustainable industrial development, of which examples are:
  - • local budgetary provision for Cleaner Production initiatives;
  - • establishment of a revolving fund to promote Cleaner Production;
  - • use of a portion of central bank reserves to fund environmental initiatives;
  - • establishment of a sustainable development treasury bond;
  - • linking poverty reduction and debt relief to Cleaner Production;
  - • financial liability for environmental degradation; and
  - • preferential exchange allocations for environmental equipment;
- ♦ promotion of SMEs and of small-scale mining;
- ♦ support for the informal sector.

Environmental

- ♦ the need to address emerging environmental issues (e.g. water, greenhouse gases and carbon sinks, marine and other types of pollution);
- ♦ working in partnership with other stakeholders;
- ♦ establishing appropriate institutions and policies to improve environmental performance, of which examples are:
  - • resources to meet environmental standards;
  - • environmental policies (regional and national);
  - • regional and national environmental agencies;
  - • creation of awards (environmental and consumer) as incentives for environmental improvements;
  - • promoting renewable energy use;
  - • raising financial institutions' environmental awareness; and
  - • creating specialist advisory services;
- ♦ promoting waste recycling and reuse of waste;
- ♦ promoting indigenous technologies.

Nairobi, 15-18 October 2001

Contribution of Asia-Pacific industry stakeholders

UNEP and UNIDO consulted with over 300 industry organizations in the region to review the context, achievements and current position of industry in Asia and the Pacific with respect to sustainable development. The following recommendations resulted from that review.

Industry operates primarily according to economic parameters. Its ability to respond to sustainable development issues is closely linked to whether such responses can be justified in economic terms. Therefore, it is important that governments' policies and strategies vis-à-vis industry are in accordance with economic conditions in the market. Market conditions supporting sustainable development investments can be established by governments through economic instruments such as pricing of natural resources, removal of counteracting subsidies, and provision of subsidized funding for sustainable development investments.

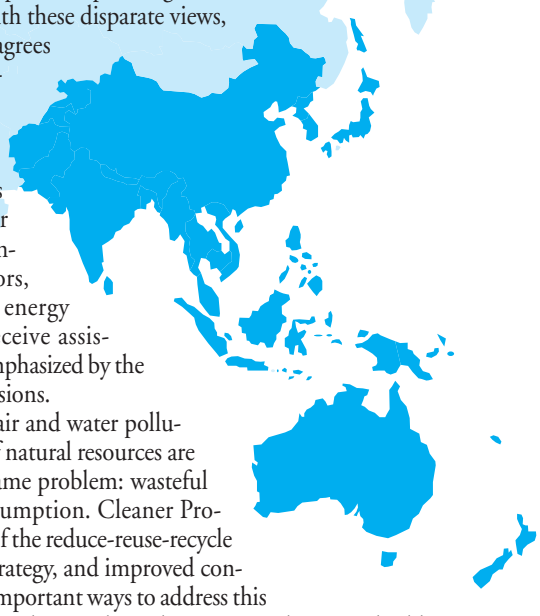
In a world where globalization is a main force affecting industry, it is important that economic instruments aimed at supporting sustainable development do not create an unfair competitive situation for industry in the international context. Industry calls upon governments to ensure that sustainable development strategies and policies are supported by economic conditions in the market, and that these conditions are set so as to provide a level playing field, nationally as well as internationally.

Considering the large numbers of small and medium-sized enterprises in the region, and their impacts on all aspects of development, it is essential that efforts to integrate them into programmes and activities aimed at sustainable development are enhanced. Industry through its supply chains, governments through legislation and support programmes, and NGOs through participatory efforts should all increase their activities in order to achieve this goal.

Access to financing for investments in sustainable development needs to be enhanced through institutional capacity building in industry – as well as in the financing community. Official Development Assistance (ODA) and Foreign Direct Investment (FDI) are major funding sources for any kind of investment in several of the region's developing countries. Furthermore, this type of financing provides good opportunities for developed/developing country partnerships, including transfer of best management practices and environmentally sound technologies.

It is recommended that industry and financing institutions develop their capacities to facilitate access to funding of sustainable development. This may include removal of protective interest rates and simplified screening procedures for loans. Governments in developed as well as developing countries should seek to increase ODA and FDI levels through reviewing and streamlining conditions and procedures.

Climate change is recognized by some key industry sectors as an issue with large potential impacts on their business. Potential impacts and concerns can be almost opposite in different industry sectors (e.g. the tourism and insurance sectors stand to be negatively affected by climate change effects, while the energy, chemical, steel and transportation sectors are more concerned about the impacts of remedial measures). Industry impacts are also affected by the types of responses governments are adopting. Even with these disparate views, industry commonly agrees that responses to climate change need to be worked out in partnerships between industry, governments and civil society. For some of the above mentioned industry sectors, the need to improve energy efficiency (and to receive assistance to this end) is emphasized by the climate change discussions.



Waste generation, air and water pollution, and depletion of natural resources are basic aspects of the same problem: wasteful production and consumption. Cleaner Production, application of the reduce-reuse-recycle waste management strategy, and improved consumer awareness are important ways to address this problem. These ends can be met through institutional capacity building, revision of governmental policies and legislation, transfer of technologies, and outreach programmes for consumers. All sectors of society have roles to play in this regard, and these should be initiated through public-private sector partnerships as exemplified by the Global Compact.

Public awareness, life styles and consumer behaviour are basic factors influencing the demand for products and services provided by industry. Improved education and dissemination of information to the public on sustainable development issues are basic requirements for the creation of sus-

tainable development markets. Governments, NGOs and industry share a responsibility to provide such education and information. Supporting tools such as ISO standards and occupational health and safety management systems, as well as eco-labelling, greening of supply chains and social responsibility, should be further integrated in industry's standard business management systems, supporting Agenda 21 in the Asia-Pacific region.

Human resources are a key asset for sustainable development. Unequal opportunities (e.g. for men compared with women), violations of basic labour rights (e.g. child labour, neglect of health and safety) and lack of regard for local cultural values all counteract sustainable development. Stringent enforcement of relevant legislation, including labour rights, in combination with codes of conduct, transparency of operating conditions within the industry, and enlightened leadership by local community leaders and industry CEOs are needed to address these issues. Educational programmes in enterprises to develop worker skills, as well as poverty alleviation, are other responsibilities of governments and industry.

The framework for developing industrial activities provided by governments needs to be well defined, reflected in realistic legislation and division of responsibilities among authorities and ministries, and integrated with planning in other sectors of society (e.g. environment, agriculture, infrastructure). To minimize graft and corruption, transparent decision-making and the accountability of decision-makers at all levels should be supported.

Bangkok, 22 November 2001

Contribution of UN/ECE industry stakeholders

Business has an important role to play in improving people's lives today and for generations to come, and at the same time preserving our natural resource base and the environment. This brings significant responsibilities for business to ensure that it is understanding and meeting these diverse needs in the products and services it provides, and in the way it operates.

Because business finds it effective to work towards clear targets, it requests that they be set in key areas related to sustainable development. Once clear targets are set, it is important for them to remain consistent. To facilitate this, existing public targets should be inventoried prior to filling gaps and agreeing key overarching global targets; once these targets are set, a process will be needed for cascading them to companies and geographical areas in an equitable manner.

Business wishes to strengthen the Global Compact with a view to establishing the basis for a new business model. This should build on the framework provided by the Compact and bring together related efforts, such as the Global Reporting Initiative. Business values the Compact's potential to articulate the goals of the World Summit on Sustainable Development.

Business has ongoing opportunities to improve its resource productivity and reduce its waste intensity (life cycle management is a tool that can be used in this context). Encouragement is required from leading business partners and governments. Effective and fair application of the polluter-pays principle, reliance on precautionary approaches, and the implementation of existing international framework agreements are of central importance.

New business models are needed in all parts of the world to promote sustainable development, particularly through introduction of cleaner technologies, products and practices; implementation of new work and employment systems; and effective partnership structures.

Key elements of the new business model are transparency, increasing accountability through reporting, implementation of codes of conduct, understanding of stakeholder needs, and appropriate responsiveness to these needs. Business wishes to see government and civil society similarly transparent and accountable.

Business governance needs strengthening to ensure that its economic power is balanced by increased democratic input through stakeholder involvement. The power of the market, whereby consumers "vote with their purchases", and the power of shareholder questioning should not be underestimated.

Companies must eliminate discrimination and set clear targets for women and minorities to achieve levels of high responsibility.

Business requests that public authorities take a leading role in setting out sound market conditions for business to act towards sustainable development. Corruption must be stamped out, and the role of law strictly enforced, to ensure fair operation of the market. Effective conflict resolution mechanisms are required in business and (when needed) at national and international levels.

Business needs to engage with stakeholders on issues and concerns related to globalization. Business and government need to create mechanisms for dealing with issues outside the competence of nation states in a more globalized world.

Business needs to develop effective means to meet the needs of stakeholders and government for appropriate, transparent information. To this end, the potential of new partnerships (building on the experience accumulated from the development of existing voluntary initiatives) should be fully exploited.

To reach the goal of sustainable development, more commercial capital must be directed towards investments that meet sustainability requirements. Capital flows have to be redirected towards sustainable development.

Business generally prefers voluntary action, but it recognizes the importance of a number of other possibilities:

- Price incentives and economic instruments are important tools for addressing specific sustainability concerns;
- Governments/regulators should reduce or eliminate subsidies and "perverse incentives" with respect to water, energy and other resources, which would have the effect of higher prices and, in turn, would increase the competitiveness of investments in eco-efficiency.

The administrative capacity to collect "polluter-pays" fees and fines must be improved, including in Central and Eastern Europe and the Newly Independent States. Awareness and information campaigns must be designed to help the general public and business better understand the cause and effect of market prices.

The finance sector (especially commercial banks) should be involved in incentive programmes to gradually direct larger parts of their credit to sustainable investment. Banks will want to consider setting ambitious targets for how much they should invest; efficient monitoring will be required.

Extra government revenue from "polluter-pays" revenue could be used to create or replenish eco-funds, which could act as guarantee funds for eco-efficiency investment as well as compensating for social disparity in the ability to pay market prices in transition periods. Gradually consumers must be encouraged to save precious resources through pricing.

Geneva, 3 September 2001

Contribution of industry stakeholders in Latin America and the Caribbean

Participants recognized the following:

Industry's important role in improving people's lives today and for generations to come, and at the same time in preserving our natural resource base and the environment. This brings significant responsibilities for industry to ensure that it understands and meets the diverse needs related to the products and services it provides and the way it operates.

The increasing contribution of industry to GNP in the region and the need to expand the region's industrial capacities based on the sustainability concept, decoupling economic growth from pollution and reducing the exhaustive use of natural resources.

The continuous effort to create more employment opportunities in the industry sector, which requires focused attention on education, applied research and training.

Ongoing opportunities in industry to improve resource productivity and decrease waste intensity (life cycle management and Cleaner Production are tools to be used in this context). Encouragement from leading business partners and governments is needed, as are effective and fair application of the polluter-pays principle, reliance on precautionary approaches, and implementation of existing international framework agreements of central importance.

The need for the finance sector (especially commercial banks) to be involved in incentive programmes to redirect gradually increasing amounts of financing to sustainable investment.

The need to devote more attention to micro, small and medium enterprises in order to continue providing opportunities for job creation. The development needs of SMEs, in terms of technology, finances and access to environmental services, should be addressed: for instance, providing capacity building in the area of advanced technologies and developing appropriate indigenous technologies to increase competitiveness.

The fact that while the globalization process may present promising opportunities for industry in the region, it needs to be adapted to the sustainable needs of Latin America and the Caribbean. A reduction in the percentage of highly pollutant industries should be promoted, as well as an increase in high added value products in the export sector.

Furthermore, industrialists in Latin America and the Caribbean acknowledge the need to:

Address the impact of climate change in the region by giving high priority to the Kyoto Protocol, particularly the Clean Development Mechanism, and to call on developed countries to honour their commitments by complying with the "common but differentiated responsibilities" principle.

Embrace a Cleaner Production strategy and the transfer of environmentally sound technologies to prevent industrial pollution and its consequences, supporting Cleaner Production and renewable energy centres.

Promote adoption of sustainable production and consumption practices that comply with the principles of eco-efficiency. In addition, promote implementation of corporate programmes based on the business philosophy of optimizing and generating wealth, while providing better social and environmental performance.

Introduce appropriate procedures to minimize adverse health and environmental effects by a) developing safer packaging and labelling standards; b) considering the concept of products' life cycle through the use of Environmental Management Systems, Cleaner Production techniques and integrated waste management; and c) developing voluntary procedures for self-evaluation, monitoring and reporting to assess performance and take self-corrective measures.

Promote energy saving, energy efficiency and use of renewable energy.

Prioritize use of clean fuels in transport.

Develop mechanisms that ensure quality and sustainable availability of water resources, including wastewater treatment, in order to contribute to industry competitiveness in a socially responsible manner.

Stimulate management and reduction of toxic waste and materials.

Promote broader discussion of the criteria for sustainable use of biodiversity and access to biotechnology, including the industry sector as an important stakeholder.

Ensure proactive participation of industry, with governments and NGOs, in developing and perfecting regulations and environmental standards in national regulations and international agreements.

Promote an appropriate economic and political environment for savings and investment. Sustained periods of stability and growth should be generated to avoid recurring crises.

Expedite deregulation, consolidate the financial system, and guarantee public and legal safety to people in the region (as well as the safety of their patrimony and property rights).

Articulate World Trade Organization (WTO) agreements with multilateral environmental provisions contained in multilateral agreements to harmonize trade measures with environmental objectives.

Avoid use of environmental regulations as trade barriers in international commerce.

Develop and/or review policies for promoting technological change and stimulating the environmental market and the use of fiscal incentives for environmentally sound investments.

Promote openness to competition in areas where monopolies still exist, in order to overcome underdevelopment, and expand and modernize operations in these areas and make them more efficient.

Develop each country's internal market, promote the manufacture of high value-added products, and increase regional economic cooperation to improve the region's competitive edge in the international market.

Foster tourism that is in harmony with nature to reduce the environmental impacts that have been increasing, as well as the most serious threats related to modification and destruction of habitat.

Increase participation of enterprises in the region in implementing joint venture projects and actions that will lead to sustainable development, in collaboration with UN agencies.

Promote dissemination of voluntary initiatives that include social, environmental and economic aspects of sustainable development and aim at improving quality of life.

Adopt transparency as a standard attitude optimizing access to information to decision-making processes and to justice.

Foster implementation of high-quality education and capacity building programmes for the development of leadership and human resources, in accordance with the economic and social requirements of a sustainable global market.

Rio de Janeiro, 18-19 October 2001

Contribution of industry stakeholders in West Asia

Industry stakeholders from the Arab region considered the following areas:

In the international arena

On the frontiers of globalization there have been negative effects on industrial activities thus far. However, globalization could provide promising opportunities if countries in this region organized their activities in such a way as to benefit from it. This could be achieved by determining the unique contributions to be made by the region in certain fields, which would place it in an effective position in the international arena.

Liberalization of international trade has not helped industrial development in this region. Moreover, stringent World Trade Organisation (WTO) wording concerning intellectual property rights (TRIPs) may harm the region's interests, especially in the area of availability and transfer of new technology (e.g. in the pharmaceutical industry).

Forcing environmental and labour matters to be included in the WTO's treaties may cause it to veer from its original path and interfere with the scope of other treaties that are the responsibility of different international organizations.

Impressive developments in information and communication technologies have increased the Northern countries' economic advantages at the expense of developing countries. At the same time, such technologies may have facilitated the transfer of developed world problems such as crime, self-centred individuality, consumerism and materialism.

Although the increased focus on the role of the private sector, which has resulted in shrinking the size of governmental bureaucracy, has had its benefits, the greater proficiency of the private sector should not be allowed to result in monopolies or shortages when it comes to people's essential needs.

Countries in the region with advanced capacity for transformative manufacturing industry and skilled labour are indeed qualified to benefit from globalization. Regional economic cooperation can increase our region's competitive edge within the international market.

More emphasis should be given in the UNFCCC and Kyoto Protocol negotiations to the implementation impacts on developing countries (including oil-producing countries) related to response and mitigation measures, and to calling upon developed countries to honour their commitments in this regard.

In the national and regional arenas

Cooperation needs to be strengthened between governments and industry to limit the negative environmental impacts of industrial activities resulting from exploitation of non-renewable natural resources. Moreover, there is a need to initiate constructive dialogue on interactive economic and environmental dimensions, taking into account the environmental implications of considering a product's overall cost in accounting and the impacts of full-cost accounting on industry's competitiveness.

The Cleaner Production strategy should be adopted. There is a need for transfer of environmentally friendly technologies to combat industrial pollution and its consequences. In addition, industry needs to implement initiatives such as integrated waste management and Responsible Care, taking into consideration life cycle assessment and full-accounting approaches.

The concentration of regional industrial activities in large-scale industries, especially in the oil and petrochemical sectors, may result in undesirable long-term consequences. It might be prudent to address the development of new smaller-scale industries, for example in the environmental services sector.

SMEs need more attention and support in order to facilitate better opportunities for job creation. Furthermore, capacity building should be provided in the area of advanced technologies and indigenous sustainable technologies, so that SMEs can overcome any problems they are experiencing and become more competitive. SMEs would then be enabled to increase their contributions to overall national production and create more jobs, as well as forming strong and useful relationships with larger industries.

Regional cooperation and integration require facilitating and securing the movement of capital, information and personnel. This will necessitate tangible improvements in the communication and transportation fields, in addition to establishing real partnerships between industry, governments and society.

Emphasis should be given to the positive impacts of privatisation policies on industrial and technological progress and economic development in the Arab region. Nonetheless, there should be regulatory constraints and legal enforcement to avoid negative environmental and societal effects.

Participants look forward to:

Proper attention being given to regional impediments and barriers, with a focus on action to overcome them as soon as possible.

Taking of clear positions by governments in the region during the WTO meeting in Doha, through cooperation among Arab states and in coordination with developing countries, to represent our interests in the region. Northern countries are attempting to include issues that may be contrary to our interests. We ought to reject discussion of such issues and postpone addressing them until future rounds, at the same time requesting a re-evaluation of our commitments in light of the fact that we have opened our markets to products from developed countries in contrast to their attitude of placing more restrictions and constraints on our products entering their markets. The Northern countries have also procrastinated with respect to implementation of certain agreements (e.g. the 1998 agreement to donate technical assistance manifested in electronic devices and instruments to propagate electronic trade in developing countries).

Making every reasonable effort (and to the greatest extent practicable) to reduce risks through introducing appropriate procedures to minimize adverse health and environmental effects; developing safer packaging and labelling standards; taking into account products' entire life cycle using environmental management systems, Cleaner Production techniques and integrated waste management; and developing voluntary procedures for self-evaluation, monitoring and reporting to assess performance and take self-corrective measures

Sharing our knowledge and experience, in terms of the potential human health and environmental risks of activities and/or products and the economic, social and environmental benefits to governments and other industries throughout the Arab region of using such strategies.

Maintaining quality assurance and quality control systems, to ensure that manufacturing and products comply with relevant human health and environmental standards and specifications and that advertising is consistent with such standards.

Achieving fair and safe marketing and trade practices locally, nationally, regionally and globally.

Manama, Bahrain, 22 September 2001

Mining finance providers reassert their green credentials

Andrew P. Zemek, consultant, 23 Bleasdale Avenue, Perivale, Greenford, Middlesex, UB6 8LB, UK (andrew@zemek.com)

Summary
Prior to a workshop focusing on the role of financial institutions in financing mining projects organized by UNEP, the World Bank Group and the Mining, Minerals and Sustainable Development Project (MMSD), interviews were conducted with key decision-makers in the mining investment process. This article provides a snapshot of the current environmental state of mind of financial institutions that provide funds to the mining sector.

Résumé
En prélude à un atelier sur le rôle des institutions financières dans le financement des projets d'exploitation minière organisé conjointement par le PNUE, le Groupe de la Banque mondiale et le Mining, Minerals and Sustainable Development Project (MMSD), plusieurs décideurs jouant un rôle clé dans le processus d'investissement orienté vers l'exploitation minière ont été interviewés. L'article donne un aperçu de l'état d'esprit actuel des institutions financières qui financent le secteur minier à l'égard des questions d'environnement.

Resumen
Con anterioridad al taller que tratará sobre el rol de las instituciones de financiamiento en la financiación de proyectos mineros organizado por la UNEP, el Grupo Banco Mundial y el Proyecto de Minería, Minerales y Desarrollo Sustentable (MMSD), se realizaron entrevistas con responsables clave en la toma de decisiones del proceso de inversiones en minería. Este artículo brinda un pantallazo breve sobre la mentalidad ambiental actual de las instituciones de financiamiento que aportan fondos al sector minero.

Key decision-makers in the mining investment process expressed their views on the financing of mining projects in the course of extensive face to face interviews lasting two to three hours. Interviews were conducted with seven banks (including the World Bank), three technical consultancy firms responsible for feasibility studies and Environmental Impact Assessments (EIAs), an investment advisory firm, a mining research company, a stockbroker and equity provider, an insurance broker for the mining industry, an NGO focused on mining, a mining finance magazine, and one of the largest mining companies with worldwide interests. A number of other mining professionals (mainly from membership of the Association of Mining Analysts) were also asked for their views on the topics raised below.

Bearing in mind the number of people consulted, it is a fair assumption that this article reflects the current thinking of people professionally involved in provision of funds for the mining sector.

Declared high level of awareness

Most interviewees declared high levels of environmental and social awareness with respect to the financed mining projects. A majority said that they wouldn't even consider a project without an EIA, regardless of whether this was required by local regulations. Some leading technical consultants said that they would include a social impact assessment as a matter of course in their EIAs.

Some of those interviewed admitted, however, that if the sponsors were short of cash and sacrifices had to be made, a "lowest common denominator approach" might be adopted – just to satisfy the required local minimum of standards and documentation.

International and local standards

The question of following various environmental standards caused some discussion. While compliance with the local standards of the host country is required by law, there was a difference of opinion about exceeding these standards.

Most banks declared that they would follow the World Bank's "standards" or "guidelines", while one leading German bank is firmly committed to following EU standards regardless of the location of the project. The majority of interviewees found these too restrictive, however. They argued that while they are justified in densely populated Europe, the standards in geographically different and less populated countries can be less restrictive.

Some expressed the view that forcing lesser developed countries into environmental standards significantly exceeding their own can bring more harm than good to these countries, as this policy may make projects uneconomical (or less attractive) and as a result projects may not go ahead at all, depriving the local economy of jobs, revenue, improvements in infrastructure, etc.

This argument was in turn opposed by one leading consultant with significant "on-the-ground" experience in Sub-Saharan Africa, who stated that in current difficult economic conditions only the most robust projects will go ahead and, as such, they can afford the extra expense of higher environmental standards.

There was a consensus that the World Bank's standards were "just about right" and that a lot of bad press received by the mining sector is caused by older projects financed and constructed in times when both awareness and standards were lower.

Praise for multilaterals

The participation of one or several multilateral financial institutions significantly raises the project's environmental and social standards. Both the World Bank Group (IBRD/IDA, IFC, MIGA) and EBRD[1] have very high standards and elaborate procedures for environmental screening, disclosure and public consultation. Not one of the interviewees questioned or criticised the sound approach of these institutions (if anything, there was a feeling that these are standards to aspire to even if in reality meeting them is not always possible). I also found that many NGOs, usually not easy to please, found the standards of the World Bank and EBRD satisfactory. Various guidelines and reports published by UNEP were also mentioned in a positive context, except in one case where it was referred to as "international busybodies".

One could only wish that the institutions mentioned were more involved in the mining sector. The total value of mining projects financed in the developing countries[2] in the last five years was around US$ 34 billion. The total engagement of IFC and MIGA, which deal with individual projects, was US$ 1.5 billion over the same period (around 5%).

The percentage participation of IFC/MIGA by number of projects was higher (around 15%), though this figure needs to be double checked because of different counting methods used in different statistics.[3] Even small (by value) involvement in a project by IFC, MIGA or EBRD triggers the environmental vetting procedures described in their policies. In such instances their very presence forces the highest common denominator by other finance providers.

Doubts about Export Credit Agencies

Export Credit Agencies play a disproportionably big role in financing of the mining projects[4] (either by providing straight finance or guarantees for other parties). They are much less tightly reg-

ulated than other finance providers, and their transparency and disclosure policies leave a lot to be desired.

ECA activity is explicitly excluded from the World Trade Organization (WTO), despite its direct impacts on trade[5] (however, exclusion under item (k) of the WTO subsidy code doesn't directly refer to the environment). ECAs are also generally exempt from important national legislation that would impose critical environmental, social, transparency and accountability standards. In Australia, for example, the Government's Export Finance and Insurance Corporation (EFIC) was specifically exempted from the 1999 Environment Protection and Biodiversity Conservation Act.[6]

Even the leading ECAs started publishing environmental guidelines only in 1999, and in many cases they are rather vague and general.

OECD has been trying to come up with common guidelines for the last 16 months, and some agreement seems to be in sight.

The main elements of the proposal of common approaches which have been negotiated to date are:[7]

- screening all projects with a repayment term of two years or more;
- classification of projects in one of three categories, according to their potential effect on the environment, in order to indicate the extent of the information required for the subsequent environmental review;
- review of projects, including scrutiny of Environmental Impact Assessments in sensitive sectors and locations, in order for members to evaluate whether to cover or decline official support and, if support is to be provided, the extent of any mitigation requirements;
- benchmarking of projects against international standards, such as those contained in the guidelines of the World Bank group;
- exchange and disclosure of information with relevant stakeholders and with other members;
- reporting and monitoring and a review no later than the end of 2003.

Many agencies (like COFACE of France[8]) decided to unilaterally adopt these guidelines before the adoption of the official OECD agreement. COFACE is also working on a separate set of guidelines specifically for the mining sector. Japanese JBIC is also well advanced in implementing their environmental guidelines.

Heavy reliance on "competent persons"

From the first steps of exploration to mine design and production, the process requires a high level of technical expertise. The amount of detail and technical complexity makes it inevitable that external consultants have to be used by finance providers to help them assess the degree of various risks associated with the project. The word of consultants is usually taken at face value. Good practice requires the banks to seek a "second opinion" from another consultant, but this is not always done since such an audit can add up to 100 thousand dollars to the cost of the project, which ultimately has to be paid by the sponsors.

Therefore, the whole string of people, including the consortium of lenders, the insurers, the sponsors and the investors, rely heavily on the opinion of technical consultants. Consultants come from different regulatory regimes (different countries) and represent different levels of working practices and experience. As a rule, they are not licensed by any specific body as is the case with doctors or lawyers and therefore cannot "lose their licence" in case of incompetence.

It is up to the finance providers and sponsors to assess which consultants are suitable.

"We have to rely on them heavily", said one banker, "as there are only so many hours in the day and our small team has a lot of financial work to do".

"Who are we to second guess?", said another.

Errors of judgement made by the technical staff can have dire consequences. In the case of a recent cyanide spill in Romania, the consultant's report stated that water balance issues were "immaterial" and therefore did not require detailed investigation. All the parties concerned accepted that statement, while after the accident it turned out that water balance issues and the unusually heavy snowfall were critical in the chain of events leading to the disaster.

Many technical consultants are covered by professional indemnity insurance against potential court action by their clients, though this is usually much less than the value of the project. Others look to the financing banks to indemnify them from any such responsibility. The latter option could make the cost of using the consultants cheaper, but may land the banks in deep trouble if there is an accident.

The price of a good reputation

The issue of reputation is taken much more seriously by banks than by technical consultancy firms. This is particularly true in the case of banks which have investment arms (providing mining finance) as well as a high street presence.

Bad publicity associated with the mining project may sway the high street customers away from the bank. Retail branches of Australian Westpac Bank were picketed by protesters as a result of the bank's involvement (as a major lender) in the controversial Jabiluka uranium mine. A similar thing happened to Barclays at one point.

In my research I came across a view (from outside the banking community) that major banks are not very worried about environmental issues, as mining revenue is a very small part of their revenue from other sources (frequently about 1%) and an occasional loss of several million dollars (due to an environmental disaster or court case) is insignificant in financial terms.

This view was strongly opposed by the bankers. Most mining teams are small (no more than five to ten people) and they generate on average no more than 10 million dollars in profits for the bank. If a bank has to take a loss on a project of, say, 5 million dollars, this is a major blow for the team both in terms of reputation and financially. In fact, it may bring an end to the very existence of the mining team at a given bank. Even in times of economic slowdown, a single deal in the new technology sector (e.g. telecoms) can bring the bank several times greater profits than a whole year of a mining team's activity (e.g. 30 million dollars).

Relatively small losses can cause a disproportionately large impact on the bank's thinking. In recent months one of the banks involved in the infamous Baia Mare gold project in Romania decided to pull out of financing mining projects. The decision was taken "on the grounds of economics", but is hard to believe that the massive negative publicity concerning the accident had nothing to do with it. The AGM of the bank was disrupted by protesters, and the German tabloid newspapers carried headlines comparing the use of cyanide in Romania to its use during the Holocaust.

The next mining project financed by the bank in Tanzania (after the Baia Mare incident) attracted the attention of the very top figures in the bank (including the Chairman), who discussed in detail the need for the cyanide detoxification unit.

Throughout my research, I found a high level of environmental awareness among all banks interviewed. There was also a deep feeling of injustice towards the media and the NGOs. which seem not to see the improvements in environmental screening the banks introduce and just concentrate on a few bad examples.

One of the interviewees used a football hooligan analogy. Of the hundreds going to a match, only a handful cause trouble but "everybody is tarred with the same brush". Bad publicity applies to all.

In some "mining banks", such as the Standard Bank, a much higher proportion of business comes from mining or metals, so quite naturally they are more cautious in taking on board doubtful projects.

Could ISO 14000 be used as a benchmark?

Although an international licensing or benchmarking system is lacking, wider use could be made of the ISO 14000 family of standards.

Introduced in 1996, Environmental Standard ISO 14001 (Environmental management systems – Specification with guidance for use) is being increasingly adopted by mining companies, though the take-up rate is slower than in other industries. Between 1998 and 2000, the overall number of ISO 14001 certificates issued grew by 146% in all industries worldwide, but only by 105% in quarrying and mining.[10]

ISO 14000 is the family of standards, and some of them (in the view of the author) could successfully be used to benchmark environmental auditing activities of banks and technical consultants. The three standards listed below seem to be particularly suitable for the purpose:

- ISO 14004:1996 Environmental management systems General guidelines on principles, systems and supporting techniques;
- ISO 14010:1996 Guidelines for environmental auditing – General principle;
- ISO 14011:1996 Guidelines for environmental auditing – Audit procedures – Auditing of environmental management systems;

◆ ISO 14012:1996 Guidelines for environmental auditing – Qualification criteria for environmental auditors.

Most recently (in September 2001) ISO started looking into introducing a standard for corporate social responsibility, which may address the social issues associated with the mining projects.[11]

German banks are greener than the rest

The German banks Dresdner Kleinwort Wasserstain,[12] Deutsche Bank and Westdeutsche Landesbank seem to take their environmental responsibilities more seriously than others. This is probably related to the strong position of the Green Party in Germany and the generally high level of environmental awareness in German society.

Dresdner and Deutsche Bank have dedicated environmental units, which issue guidelines to other parts of the banks. EBRD also has a dedicated environmental unit, and all projects have to be approved by it. Barclays Bank has one, as well.

IFC has the whole Environment and Social Development Department (comprising three separate units) and is a leading example of practical application of environmental and social screening of mining projects.

More insurance is not the answer

In spite of their involvement in drafting the insurance policy for the project, banks take sizable risks when financing mining projects. At early stages of project construction, they are covered by a recourse to the project owners and by the fact that funds are released in instalments. For example, Deutsche Bank, which agreed to finance the TVX Hellas gold project in Greece, has not lost any money as no cash advance had been made when the project was halted by the courts. Once the project goes non-recourse, the only protection they have is recourse to the project. Environmental disaster clean-up and compensation costs should be paid out by the project's insurance, but this is usually capped. A major loss can therefore cause the project to default on the loan.

Profit margins in mining finance are slim, and taking on more insurance would erode them even further. More specialized insurance products are on offer (e.g. a dedicated environmental cover and "enforced abandonment insurance") but they are not very popular.

Some stoppage risks might be covered under political risk insurance (social unrest), but this varies considerably from project to project.

When things go wrong

When things go wrong, banks lose money and reputation. And they are very much aware of it. Unpaid loans, debt rescheduling, court cases, compensations – of course they want to avoid it, but deciding which projects to finance and which ones to drop is not easy. If banks self-impose too many restrictions on themselves, the projects dropped by them will be picked up by less scrupulous financiers or less regulated entities and will still go ahead.

The first days of the year 2002 brought further proofs that "prevention is better than cure": when the cure becomes difficult, the patient is frequently left to die.

In January 2002 BHP-Billion, 52% owners of the Ok-Tedi copper mine in Papua New Guinea, will "walk away" from the project, having written off US$ 430 million, because the problem of pollution of the Fly river is too difficult to rectify.[13] BKPB's stake will be handed over to the PNG Government, together with all its environmental legacy. If one of the mightiest mining companies on earth can't rectify the problem, who can? The mine took US$ 1.4 billion and eight years to build in 1984.

Another "walk away" as a result of an environmental disaster is the recently announced[14] closure of the Los Frailes mine in Spain, which experienced a serious tailings dam failure in 1998.

Then there is a question of a more fundamental and ethical nature: Do the finance providers have a right to interfere with local regulation and impose unilaterally different (higher) standards? To control and regulate is, after all, the government's role.

Conclusions

It seems that the combination of recent environmental disasters, pressure from NGOs and generally increased environmental awareness in western societies has forced social and environmental issues near the top of the agenda of banks and other financial institutions.

Export Credit Agencies – the major mining finance providers and guarantors – have made major progress since 1999 in asserting their "green credentials", but still have a long way to go before they reach the thoroughness of the screening and transparency standards represented by the World Bank group.

The role of technical consultants in ensuring the environmental soundness of projects is grossly undervalued.

There is a lack of an internationally recognized benchmarking system for mining finance banks and technical consultancy firms. Greater use of the ISO 14000 family of standards could possibly become a recognized benchmark.

More dialog with NGOs can bring genuine improvements to environmental management and improve the image of financial institutions and mining companies alike, but many NGOs must drop their militant rhetoric ("No to all mining!") for such a dialog to be possible.

More environmentally and socially responsible mining cannot be achieved by one group of stakeholders only, be they governments, regulators, local communities, mining companies, NGOs or financial institutions.

Partnership and information exchange between all stakeholders is the key to sustainable development and to less environmental impact by the industry, which by nature is environmentally invasive but without which our modern civilization cannot exist.

The workshop on Finance, Mining and Sustainability: Exploring Sound Investment Decision Processes was held in Paris in January 2002. The full text of the background paper circulated to participants will be published by UNEP in 2002.

Notes

1. International Bank for Reconstruction and Development (IBRD); International Development Association (IDA); International Finance Corporation (IFC); Multilateral Investment and Guarantee Agency (MIGA); European Bank for Reconstruction and Development (EBRD).
2. The World Bank Group does not finance or guarantee loans to projects in the developed countries. Therefore, for fair comparison projects in the US, Canada, Australia and Western Europe were excluded. Sources: *Mining Finance* magazine database.
3. In some statistics mine or smelter expansions are quoted as separate projects. In others they are not. This is irrelevant when counting by value, but may cause error when counting by the number of projects.
4. For example, the Australian EFIC committed 97% of its programme for Papua New Guinea to the mining sector in 1992 (G. Lawless, Address by Managing Director of Export Finance and Insurance Corporation, PNG Mining and Petroleum Conference, 31 August-1 September 1992, Sydney).
5. B. Rich, Trading in dubious practices, *Financial Times*, 24 February, 2000.
6. Aid/Watch and Mineral Policy Institute, *Putting the ETHIC into EFIC: A discussion paper on accountability standards within the Export Finance and Insurance Corporation*, Aid/Watch and Mineral Policy Institute, Sydney, 1999.
7. According to an official OECD statement (4 December 2001), published at: *www.oecd.org/oecd/pages/home/displaygeneral/0,3380,EN-document-347-nodirectorate-no-12-22688-24,FF.html.*
8. Source: COFACE. This unilateral move will be effective from January 2002.
9. For example, in the guidelines of the Australian IMM a Competent Person for reporting mineral reserves has at least five years of experience in estimating that type of mineral reserve.
10. *ISO 14000 – Meet the whole family!* and *The ISO Survey of ISO 9000 and ISO 14000 Certificates – Tenth Cycle: Up to and including 31 December 2000,* official publications and statistics of the International Organization for Standardization, Geneva, 2001. The relevant numbers for the mining sector were 88 certificates in 1998 and 181 in 2000.
11. *ISO looks into standards for corporate social responsibility,* press release No. 800, published on *www.iso.org/iso/en/commcentre/pressreleases/2001/Ref800.html.*
12. DKW withdrew from mining finance in October 2001.
13. Alec Hogg, BHPB urged to face $430m PNG nightmare, article published on The Miningweb.com on 30/12/2001. The full text could be found at: *www.mips1.net/MGCoal.nsf/Current/4225685F0043CE9F42256B32003D4070,*
14. *Mining Journal*, London, 4 January 2002. ◆

World News

Emil Salim

World Summit on Sustainable Development: Secretary-General emphasizes role of business and industry

Emphasizing that business and industry have an important role to play in assuring the long-term viability of natural resources and ecosystems, UN Secretary-General Kofi Annan has sent a message to European business leaders underlining the opportunities represented by the World Summit on Sustainable Development (WSSD) in Johannesburg. WSSD will take place from 26 August to 4 September.

In a statement (delivered by a spokesman) to the European Forum for Sustainable Development and Responsible Company Management, held in Paris in March, Annan said: "Companies that embrace sustainable development can ... find their reputations enhanced in the eyes of consumers and the communities in which they operate." He also noted the promise of green technology, an expanding area in which innovation can flourish and entrepreneurship be rewarded. "Far from being a burden, sustainable development is an exceptional opportunity – economically, to build markets and create jobs; socially, to bring people in from the margins; and politically, to reduce tensions over resources that could lead to violence and to give every man and woman a voice, and a choice, in deciding their own future."

WSSD organizers announced in February that the key WSSD discussions were likely to focus on poverty eradication, unsustainable consumption and production patterns, sustainable management of natural resources, and the need to make globalization work to promote sustainable development. Their report followed two weeks of talks at the second session of the WSSD Preparatory Committee (PrepCom 2). Several dozen recommendations for immediate action were made in each broad topic area.

Three central documents are expected to result from WSSD:

- a political declaration expressing commitments to and directions for sustainable development;
- a negotiated action programme to guide government implementation; and
- a report on new commitments and partnership initiatives.

Topic areas are summarized in a text presented at the end of this meeting by the Preparatory Committee Chairman, Emil Salim of Indonesia. This text will serve as the basis for negotiations at the succeeding PrepComs and, ultimately, for the summit programme of action.

Salim explained that the text contains only realistic, achievable recommendations: "Anything that could not be implemented was thrown out the window." The recommendations combine elements of environmental, economic and social efforts.

For more information, contact: Johannesburg Summit Secretariat, Division for Sustainable Development, UN Department of Economic and Social Affairs, Two United Nations Plaza, DC2-2220, New York, NY 10017, USA, E-mail: dsd@un.org, Internet: www.johannesburgsummit.org. ◆

OECD members back green procurement

The 30 member countries of the Organization for Economic Cooperation and Development (OECD) have agreed to pursue green public procurement policies. In the process, they hope to kick-start markets for more innovative and environmentally sound products and to encourage businesses to follow governments' lead.

The recommendation, adopted by the OECD Council, follows the backing of OECD countries' Environment Ministers in May 2001 for public procurement practices outlined in the "OECD Environmental Strategy for the First Decade of the 21st Century." Public procurement covers a wide range of sectors, from highway and building construction to vehicle use, power and water supply and sanitation. In 1997 government procurement markets accounted for 5-8% of GDP in OECD countries.

For more information, contact: Nick Johnstone, Environment Directorate, OECD, 2 rue André-Pascal, 75775 Paris Cedex 16, France, Tel: +33 1 45 24 79 22, Fax: +33 1 45 24 78 76, E-mail: nick.johnstone@ oecd.org, Internet: www.oecd.org/ env. ◆

Report calls Asia a dumping ground for electronic waste

Large amounts of hazardous electronic waste are being sent to China, Pakistan and India, where they are processed in operations that present high human health risks and damage the environment, according to an investigation by several international environmental organizations.

A report released by the Basel Action Network (BAN) and Silicon Valley Toxics Coalition (SVTC) reveals that, for example, in the Guiyu area of Guangdong Province about four hours' drive northeast of Hong Kong some 100,000 migrant workers were employed to break up obsolete computers, imported primarily from North America.

Men, women and children were involved in operations including open burning of plastics and wires, riverbank acid works to extract gold, melting and burning of toxic soldered circuit boards, and cracking and dumping of lead-laden cathode ray tubes. Tonnes of waste were dumped beside rivers, in open fields and in irrigation canals. Pollution in the rice-growing area of Guiyu has become so bad that well water is no longer drinkable. Water is trucked in from 30 km away.

Other organizations supporting this investigation were Toxics Link India, Greenpeace China and SCOPE (Pakistan).

For more information, contact: Jim Puckett, BAN, Tel: +1 206 652 5555, Internet: www.ban.org. The report is also available at www.svtc.org. ◆

Report by OECD supports biotechnology in industry

A new OECD report cites case studies as proof that biotechnology can fulfil its long-vaunted potential to provide industrial production methods that are both environmentally friendly and economically efficient.

The Application of Biotechnology to Industrial Sustainability draws on 21 case studies from the pharmaceuticals, fine chemicals, bulk chemicals, food and feed, textiles, pulp and paper, minerals and energy sectors. Examples are from Austria, Canada, Germany, Japan, the Netherlands, the United Kingdom, the United States and South Africa.

EU news

EU guidebooks on abating industrial pollution

The European Commission has formally adopted eight standard-setting guidebooks designed to curb industrial pollution across the European Union. They provide information on best available pollution control technologies. Authorities responsible for licensing large installations in the 15 EU Member States (and in potential Central and Eastern European members) must follow these guidebooks, which are the first in a series of 35.

The guidebooks will help implement the EU directive on integrated pollution prevention and control (IPPC). While they were officially adopted only recently, they have already been consulted in many countries including some outside Europe (e.g. India, Australia, South Africa, Hong Kong and Kazakhstan).

"Many European companies have still some way to go to bring their plants up to standard," said Environment Commissioner Margot Wallström. She added that implementation of the IPPC directive will bring about better protection of the environment and public health throughout Europe. The EU guidebooks are available online at *http://eippcb.jrc.es*. ◆

EU's Kyoto Protocol commitment ratified

Adopting a European Commission proposal, the Council of EU Environment Ministers has voted to ratify the Kyoto Protocol at EU level.

The decision in March means greenhouse gas reduction commitments by the 15 EU Member States (made in the June 1998 "burden-sharing" agreement) will become legally binding once the EU completes ratification, which is anticipated by 1 June of this year.

The Kyoto Protocol commits the EU to reduce greenhouse gas emissions by 8% of 1990 levels between 2008 and 2012. The protocol will not come into force until it is ratified by at least 55 countries, representing 55% of developed countries' CO_2 emissions. As the United States produces one-third of world emissions, almost all other developed countries must ratify the protocol if it is to take effect. The EU's share of these emissions is 24.3%. ◆

EC unveils 2006 packaging targets

The European Commission has proposed ambitious new targets for recycling of waste packaging. The Commission plans to amend the directive on packaging and packaging waste, setting substantially higher targets to be achieved in 2006. The proposed targets (shown in the accompanying table along with existing targets) are based on cost-benefit analysis.

Proposed 2006 EU waste packaging targets

	2001 targets	2006 targets
Overall recovery	50-65%	60-75%
Overall recycling	25-45%	55-70%
Material-specific recycling:		
Glass	15%	60%
Paper + board	15%	55%
Metals	15%	50%
Plastics (mechanical and chemical recycling only)	15%	20%

Available data related to the 2001 targets indicate that all EU countries had already achieved the overall *recycling* target by 1998, and that several have also met the overall *recovery* target.

Ireland has imposed a tax of 15 euro cents on throw-away plastic bags. Some 1.2 billion of these bags (about 325 per person) are handed out at Irish cash registers each year. Environment Minister Noel Dempsey has said that "We need to end our addiction to these wasteful bags, which we use for minutes but which survive for decades." Some supermarkets have started selling semi-permanent shopping bags (which are exempt from the tax) at 70 cents and up. ◆

Making polluters pay: EU liability measure

The European Commission has adopted a proposal for a directive on environmental liability. Its aim would be to prevent and restore environmental damage. The directive would cover water pollution, damage to biodiversity, and land contamination causing serious harm to human health.

Operators of certain activities that result in environmental damage would be held responsible for repairing the damage or made to pay for restoration. Operators damaging biodiversity, by fault or negligence, would also have to repair the damage.

"With today's proposal," said Environment Commissioner Margot Wallström, "the Commission is sending a clear message: the time has come for the EU to put the polluter pays principle into practice."

The proposal does not have a retrospective effect. Final adoption of a draft directive usually takes two to three years, after which Member States have two years to turn the directive into national law.

For more information on these EU environmental activities, contact: Margot Wallström, Commissioner for the Environment, B-1049 Brussels, Belgium, Tel: + 32 2 298 1800, Fax: + 32 2 298 1899, E-mail: margot.wallstrom@cec.eu.int, Internet: http://europa.eu.int/comm/dgs/environment/index_en.htm. ◆

Two major areas covered are renewable resources and bio-processes (such as catalysts and enzymes).

The report points out that, to be most effective, biotechnology applications may need to be used in tandem with other tools or integrated into other processes. Despite this caveat, the report finds that biotechnology use invariably leads to reduced operating costs, capital costs or both. It concludes that governments of both developed and developing countries stand to gain by promoting appropriate use of biotechnology.

For more information, contact: Iain Gillespie, Head of Biotechnology Unit, Directorate for Science, Technology and Industry, Tel: +33 1 45 24 92 32, E-mail: iain.gillespie@oecd.org, or the OECD Online Bookshop (http://oecdpublications.gfi-nb.com/cgi-bin/oecdbookshop.storefront). ◆

Social investment assets continue to grow

KLD Research & Analytics and Nasdaq are teaming up to launch what they call the first socially screened investment index based on a specific stock market. The KLD-Nasdaq Social Index comprises 280 Nasdaq companies, representing about 75% of a total $2.7 trillion market capitalization in the technology sector, according to Zoë Van Schyndel, KLD's Senior Vice President for research products.

The index excludes companies involved in, for example, alcohol, tobacco, gambling, military contracting and nuclear power. Other criteria involve assessments of environmental stewardship, employee relations and non-US operations.

The first socially responsible mutual fund was created in the United States in 1971. Assets in such US funds reached over US$ 100 billion in 2001. The Social Investment Forum's *2001 Report on Responsible Investing Trends in the United States* says that despite a market slump, assets in socially screened investment portfolios under professional management increased by over one-third between 1999 and 2001 to top the $2 trillion mark for the first time (out of a total of $19.9 trillion). Portfolios include socially screened mutual funds and separate accounts managed for socially conscious institutions and individual investors.

For more information, contact: Zoë Van Schyndel, Senior Vice President of Research Products, KLD Research & Analytics, Russia Wharf, 30 Atlantic

Avenue, Boston, Massachusetts 02210, USA, Tel: +1 617 426 5270, Fax: +1 617 426-5299, E-mail: zvanschyndel@kld.com, Internet: www.kld.com. Also see www.socialinvest.org. ◆

Study finds Europe better than US at corporate voluntary agreements

So far, negotiated agreements between companies and governments to reduce pollution have been more effective in Europe than in the United States. A new study concludes that this is partly because European negotiators, to avoid potential conflicts, work out details in cooperation with NGOs.

Magali Delmas, assistant professor at the University of California-Santa Barbara's School of Environmental Science and Management, says one reason European agreements have been more effective is that NGOs have been involved from the beginning. In the United States companies may not deal with NGOs until forced to do so by litigation. European negotiations also tend to be better organized, and thus less expensive for companies.

Delmas and a colleague, Ann Terlaak, reported in the *Journal of Comparative Policy Analysis* that companies receive definite benefits from negotiated agreements in both Europe and the United States. They also found that such agreements tend to stimulate companies to innovate more.

For more information, contact: Magali Delmas, Donald Bren School of Environmental Science and Management, 4670 Physical Science Building North, University of California, Santa Barbara, California 93106-5131, USA, Tel: +1 805 893 7185, Fax: +1 805 893 7612, E-mail: delmas@bren.ucsb.edu. ◆

Industry Updates

"No-till" farmers sell CO_2 offsets to electric company

Entergy, a US utility, has signed an agreement with the Pacific Northwest Direct Seed Association to buy CO_2 offsets from its members. PNDSA members minimize tilling when planting – a practice known as direct-seed or "no-till" farming, which retains carbon in soil.

PNDSA did not disclose how much it will receive in exchange for assigning about 30,000 tonnes of CO_2 offsets to Entergy over the next ten years. However, a spokesperson for the association said payments might cover PNDSA membership dues (now around $50 a year) as well as paying for research concerning the amount of carbon that can be sequestered by soil under differing conditions.

Based in New Orleans, Entergy delivers electricity to about 2.6 million people in Arkansas, Louisiana, Mississippi and Texas. It has pledged to stabilize its greenhouse gas emissions at 2000 levels by 2005 and, eventually, to set longer-term reduction goals.

For more information, contact: PNDSA, Information and Education Committee, PO Box 4262, Pasco, Washington 99302, USA, Tel: +1 509 543 2054, Fax: +1 509 543 9758, E-mail: tanya@directseed.org, Internet: www.directseed.org. ◆

Shell recycles closed refinery

The Royal Dutch/Shell group's decommissioned Sola refinery in Norway has been recycled to an "unprecedented" degree: 99% of materials have been put to use elsewhere, according to a company statement.

The Sola refinery closed in 2000. Shell reports that 30,000 tonnes of steel and 60,000 tonnes of concrete were reused and valuable plant equipment was sold. A group of farmers in Stavanger, near the refinery site, are using fans from the refinery to dry manure for fertilizer use. The Belgian Refinery Corporation has bought a total isomerization plant for production of unleaded fuel. Liquefied petroleum gas storage tanks have been sold to Refineria Dominicana de Petroleo in the Dominican Republic

"Our goal now is to ensure that the soil on which the refinery stood is clear of pollutants," says Sigbjorn Egeland, manager of the recycling project.

For more information, contact: Sigbjorn Egeland, A/S Norske Shell, PO Box 1154 Sentrum, N-0107 Oslo, Norway, Tel: +47 22 66 50 00, Fax: +47 22 66 51 48, E-mail: sigbjorn.egeland@shell.no. ◆

Cruise lines settle with Alaska on air pollution

Seven companies operating cruise ships in Alaskan coastal waters have agreed to pay $402,500 for air quality violations during the 2000 season, under the Alaska Cruise Ship Initiative (ACSI) of the State Department of Environmental Conservation (DEC). A further $ 175,000 in fines was suspended.

The DEC said diesel fumes and other smoky exhaust from cruise ships must not reduce visibility in coastal communities by over 20%. The seven operators found to have been in violation of the state law agreed to pay civil penalties. They have also improved equipment and operations to reduce the number of incidents.

DEC considers that through this and other actions ACSI has achieved its goals. Its work, begun in November 1999, will go forward under the new Alaska Commercial Passenger Vessel Environmental Compliance Programme.

For more information, contact: Marti Early, Alaska Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801-1795, USA, Tel: +1 907 465 5009, Fax: +1 907 465 5097, E-mail: marti_early@envircon.state.ak.us, Internet: www.state.ak.us/local/akpages/env.conserv/home.htm. ◆

First environmental report from Australia's food industry

The Australian Food and Grocery Council (AFGC), representing Australia's largest manufacturing sector, has released its first public environmental performance report following over two years of work. Its *Environment Report 2001* describes environmental performance and management practices of the Council's 170 member companies during the past decade.

"The report identifies both achievements and opportunities for improvement for AFGC companies," said Environment Minister David Kemp. For example, there have been "gains in the area of water management, with ... a significant reduction in waste water." However, Kemp pointed out that "while companies that are signatories to the National Packaging Covenant ... are making progress in reducing packaging waste, most companies are still not stipulating covenant membership or other environmental standards from suppliers."

The Environment Minister, who praised the report overall, said he hoped other industry asso-

ciations would follow the AFGC's example. The Australian food industry has annual sales of US$ 28 billion and accounts for some 20% of the country's manufacturing workforce.

For more information, contact: AFGC, Locked Bag 1, Kingston ACT, Australia 2604, Tel: +61 2 6273 1466, Fax: +61 2 6273 1477, E-mail: info@afgc.org.au, Internet: www.afgc.org.au. ◆

Body Shop and Greenpeace launch renewables campaign

The Body Shop and Greenpeace have begun an international campaign to increase support for renewable energy forms, especially in the developing world.


Sir Mark Moody-Stuart

The objective of the Choose Positive Energy campaign is a commitment from the coming World Summit on Sustainable Development that renewables technology will be made available to 2 billion of the world's poorest people within 10 years. A new study, "Power to Tackle Poverty," outlines ways in which this target can be met.

Speaking at the launch of Choose Positive Energy, Sir Mark Moody-Stuart, chairman of Business Action for Sustainable Development and co-chair of the G8 Task Force on Renewable Energy, challenged Western governments to increase their renewable energy supply targets. He urged removal of "inappropriate subsidies" in the energy sector.

For more information, contact: The Climate Campaign, Greenpeace International, Kiezersgracht 176, 1016 DW Amsterdam, Netherlands, Tel: +31 20 523 6222, Fax: +31 20 523 6200, E-mail: greenpeace.info@choose-positive-energy.org; or Campaigns Team, The Body Shop International Plc, Watersmead, Littlehampton, West Sussex, BN17 6LS, UK, Tel: +44 1903 731 500, Fax: +44 1903 726 250, Internet: www.choose-positive-energy.com◆

Venture capital for the "hydrogen economy"

Mitsubishi Corporation, Shell Hydrogen, and Johnson Matthey Plc have announced the formation of a venture capital company focused on fuel cells and related hydrogen technologies. The companies have said Conduit Ventures Ltd, based in London, would be the first such firm in Europe.

Conduit's initial focus is on Europe and North America. Other investors will be invited to join in an effort to raise up to US$100 million. "We believe that fuel cells and related hydrogen technologies have enormous potential to become the fuel technologies of the future," said Don Huberts, CEO of Shell Hydrogen. Conduit will concentrate on companies with technology that is close to commercialization.

Johnson Matthey supplies precious metals and technology for fuel cells. Mitsubishi has interests in all aspects of what it calls "the emerging hydrogen economy."

For more information, contact: John Butt, CEO, Conduit Ventures Limited, 52 Upper Brook Street, London, W1K 2BU, UK, Tel: +44 20 7468 7468, Fax: +44 20 7468 7436, E-mail: jb@conduit-ventures.com, Internet: www.conduit-ventures.com or www.matthey.com/environment/fuelcell. ◆

For BP and ChevronTexaco, a wind power first

BP and ChevronTexaco are building a 22.5 MW wind farm at their jointly owned Nerefco oil refinery near Rotterdam. The US$ 23 million project, due to start operating in the second half of this year, represents the first substantial use of wind turbine technology by either company.

The nine Nordex wind turbines will generate electricity equivalent to consumption by 20,000 households and "displace" 20,000 tonnes of CO_2 a year, the companies said. The electricity is to be sold locally. The Dutch government has a target of increasing the amount of energy supply from renewable sources to 5% by 2005 (from 1.3% in 1999).

A Nerefco refinery spokesman noted that the coastal site is exposed to strong consistent winds, and that the project's visual impact will be minimal given its industrial surroundings. Costs will be shared in line with the companies' ownership of the refinery: BP 69%, ChevronTexaco 31%.

For more information, contact: Jane Wharton, ChevronTexaco Press Office, Tel: +44 20 77 19 44 59, E-mail: whartj1@chevrontexaco.com, Internet: www.chevrontexaco.com, www.bp.com

. ◆

UNEP Focus

UNEP

Governing Council approves environmental governance report

At a special session in Cartagena, Colombia, the UNEP Governing Council endorsed the report of a special intergovernmental ministerial group on environmental governance. The main recommendations include strengthening UNEP's role and financial situation; improving coordination among (and the effectiveness of) multilateral environmental agreements, or MEAs; boosting capacity building, technology transfer and country-level coordination; and enhancing coordination within the UN system. The Council will review implementation measures and possible further action following this summer's World Summit on Sustainable Development (WSSD).

The February meeting – the seventh special session of the Governing Council and third session of the Global Ministerial Environment Forum – brought together representatives of over 120 countries, including 90 ministers. Other Council decisions concerned a strategic approach to international chemical management, compliance with and enforcement of MEAs, enhancement of civil society engagement in UNEP's work, and implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities.

The new approach to chemicals management outlines 18 key areas of action. These include improving developing countries' capacity for dealing with chemicals and the issues surrounding them; promoting Cleaner Production of chemicals; and shifting from "highly toxic chemicals to those with lower toxicity or non-chemical alternatives."

With respect to MEAs, there are over 500 international treaties and agreements related to the environment, 302 of them (60%) dating back to the 1972 UN Conference on the Human Environment in Stockholm which led directly to the creation of UNEP. The Council adopted draft

guidelines on compliance with MEAs, and on capacity strengthening and effective national enforcement.

The Council also agreed that UNEP should assess the environmental situation in the Occupied Territories of Palestine. Israel and the Palestinian Authority invited Klaus Toepfer, UNEP's Executive Director, to visit the area as a first step. UNEP recently carried out environmental assessments in the Balkans. In December it launched a new Post-Conflict Assessment Unit, based in Geneva, which replaced the UNEP Balkans Unit. Afghanistan, too, may be of immediate concern.

For more information, contact: Tore J. Brevik, Director of the Division of Communications and Public Information, Tel: +254 2 623292, E-mail: tore.brevik@unep.org. ◆

Rotterdam PIC committee targets three pesticides and asbestos

A committee of government appointed experts says three widely used pesticides should be added to the list of substances subject to trade controls under the Rotterdam Convention. It also says all forms of asbestos should be listed.

The pesticides are monocrotophos, Granox TBC/Spinox T, and DNOC. Monocrotophos is an insecticide used in many developing countries. Actively traded, it is manufactured by over a dozen firms (almost all in Asia). Like other organophosphorus insecticides, it poses an acute hazard to farm workers, especially where lack of protective clothing and modern equipment makes it more likely they will come into direct contact with chemicals. Monocrotophos is highly toxic to both birds and mammals; alternatives exist.

The February recommendations by the Interim Chemical Review Committee (ICRC) set the stage for a final decision on whether to add monocrotophos to the Rotterdam list. The Intergovernmental Negotiating Committee of the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade will make that decision when it meets in Bonn from 30 September to 4 October 2002.

The recommendation to add five remaining forms of asbestos to the PIC list (one form is already listed) launches a process that will conclude in 2003. A similar process is under way for listing the related pesticides Granox TBC and Spinox T, a mixture of fungicides and the highly toxic insecticide carbofuran, which is used in powdered form by peanut farmers. DNOC, an insecticide, weed killer and fungicide, was once widely used but is being targeted for inclusion in the PIC procedure to further restrict its remaining uses.

The Rotterdam Convention, under the auspices of UNEP and the UN Food and Agriculture Organization (FAO), gives importing countries the tools they need to identify potentially hazardous chemicals and exclude those they cannot manage safely. Signed by 72 governments and the European Commission, it has been ratified by 18 countries so far. It will enter into force 90 days after the 50th ratification. Meanwhile, governments are applying the PIC provisions voluntarily.

For further information, contact: Michael Williams, UNEP press officer in Geneva, Tel: +41 22 9178 242/244/196, E-mail: michael.williams@unep.ch. ◆

Pioneering projects to help countries cope with global warming

Improved weather forecasts for farmers in western Africa and studies on the links between temperature and dengue fever in the Caribbean are among new initiatives presented at a UNEP experts' meeting in February. The aim of these initiatives is to help developing countries overcome the worst effects of climate change.

Other projects include a study on making it possible for grazing land in Mongolia to survive in a hotter world. Another project in Sri Lanka, focused on tea and coconut plantations, will identify drought-resistant varieties and develop a coconut harvesting calendar based on expected changes in seasonal rainfall.

Almost 100 international and national experts, involved in the Assessment of Impacts and Adaptation to Climate Change in Multiple Regions and Sectors (AIACC) programme, met at UNEP headquarters in Nairobi to launch the 25-project effort. The AIACC programme, funded by the Global Environment Facility, is based on scenarios predicted by scientists advising the Intergovernmental Panel on Climate Change. A second workshop in February addressed the integration of climate adaptation projects and policies concerned with the wider issue of sustainable development.

For more information, contact: Ravi Sharma, UNEP Division of Policy Development and Law, E-mail: Ravi.sharma@unep.org, or Mark Griffith, GEF Scientific and Technical Advisory Panel, E-mail: mark.griffith@unep.org. ◆

Worldwide project to promote biosafety will assess transgenic products

A multimillion dollar project to help developing countries assess the potential risks and rewards of genetically engineered crops was launched at an African regional workshop on biosafety in January. Financed by the Global Environment Facility (GEF) and implemented by UNEP, the project will help up to 100 countries develop the scientific and legal skills needed to address health and environmental issues related to imports of so-called "living modified organisms".

The three-year, US$ 38.4 million project is seen as a key initiative to help developing countries prepare for the entry into force of the Cartagena Protocol on Biosafety adopted in January 2000. To date, 107 governments have signed the protocol and 10 have ratified it; 50 ratifications are required for its entry into force.

Representatives of over 46 countries participated in the workshop at UNEP headquarters in Nairobi. They discussed how to implement this project through National Biosafety Frameworks, as well as how to promote collaboration regionally, sub-regionally and between regions.

For more information, contact: Tore J. Brevik (see above). ◆

Guidelines to reduce hazards posed by plastic waste

Experts from around 100 governments have adopted a set of technical guidelines for protection of human health and the environment from improper management and disposal of plastic. Prepared under the auspices of the Basel Convention on the Transboundary Movements of Hazardous Wastes and their Disposal, the guidelines respond to growing concerns that many developing countries lack the legislation and facilities to cope with growing volumes of such waste.

In many countries plastics are disposed of by means of open, uncontrolled burning and landfilling. Governments will begin using the new guidelines to promote environmentally sound management of plastic waste. The guidelines address a range of waste management issues such as sorting for mechanical recycling, health and safety, shipping and transport, feedstock recycling, compaction, energy recovery and final disposal.

The guidelines were adopted in Geneva by the Basel Convention's Technical Working Group, for final action at the sixth meeting of the Conference of the Parties to the Convention tentatively scheduled for December 2002 in Geneva.

For more information, contact Michael Williams (see above). ◆

Ireland and Norway pledge extra funding for African environment

The Irish and Norwegian governments are providing special funding to UNEP to help tackle some of Africa's most pressing environment problems.

IrelandAid (Ireland's development cooperation programme) will give at least 3 million euros over three years for activities related to freshwater resources, access to environmental information, protection of the marine and coastal environments and biodiversity conservation. This commitment confirms Ireland as an important new donor. Last year the Irish Environment Ministry doubled its contribution to UNEP's Envi-

ronment Fund. It will increase its contribution by a further 25% this year.

Ireland's announcement was made not long after the Dutch government doubled its contribution to the Environment Fund. The Netherlands, already a key contributor, added some US$ 2.1 million to its 2001 funding, for a total of about $4.5 million.

Norway also pledged additional multimillion-dollar funding for a UNEP project to strengthen environmental information management capacity, in support of national, regional and global environmental assessment in African countries.

The project, to be presented at WSSD in Johannesburg, will connect all African countries in an African Environmental Information Network. It will be designed to provide a seamless environmental information structure for the continent and significantly reduce the digital divide with respect to access to environmental information in Africa.

Project implementation will be by GRID-Arendal, in cooperation with UNEP's Division for Early Warning and Assessment and Regional Office for Africa. UNEP and Norway have also announced that GRID-Arendal, internationally known for its work in mapping, telecommunications and environmental early warning, is being elevated to the status of a full UNEP centre.

For more information, contact: Tore J. Brevik (see above). ◆

Global Reporting Initiative appoints first board of directors

The Global Reporting Initiative (GRI), created in 1997 to develop an internationally accepted sustainability reporting framework for companies and other organizations, has appointed its first board of directors. It is also considering moving its headquarters from Boston (USA) to the Netherlands.

The 14 board members, who come from 11 countries, include Jacqueline Aloisi de Larderel (Assistant Executive Director of UNEP), Toshihiko Goto (chairman of Environmental Auditing Research Group), Sir Mark Moody-Stuart (chairman of Business Action for Sustainable Development) and Peter H.Y. Wong of Deloitte Touche Tohmatsu, Hong Kong (a board member of the International Federation of Accountants). Their first duties will include hiring a chief executive and establishing the GRI's governance structure. To date, over 100 major companies have used the GRI guidelines in producing their sustainability reports.

For more information, contact: Global Reporting Initiative, 11 Arlington Street, Boston, Massachusetts 02116, USA, Tel: +1 617 266 9384, Fax: +1 617 267 5400, E-mail: info@globalreporting.org, Internet: www.globalreporting.org. ◆

UNEP Division of Technology, Industry and Economics (DTIE) HIGHLIGHTS

Mapping developing countries' renewable resources

UNEP has launched a pioneering project to map the solar and wind resources of 13 developing countries. Experts say the Solar and Wind Energy Survey Assessment (SWERA) is likely to prove that the potential for use of solar panels and wind turbines in these countries is far greater than was previously thought.

Funded by the Global Environment Facility, SWERA is intended to reduce uncertainties related to sun and wind intensity. The project's findings will be linked with a geographic information system (GIS) to help prospective developers pinpoint promising locations.

Surveying will be carried out in Bangladesh, Brazil, China, Cuba, El Salvador, Ethiopia, Ghana, Guatemala, Honduras, Kenya, Nepal, Nicaragua and Sri Lanka. SWERA is a joint effort involving the US National Renewable Energy Laboratory, GRID-Sioux Falls, GTZ, the State University of New York, the Danish National Laboratory, the TATA Energy Research Institute in India, and the Brazilian and German space agencies.

For more information, contact: Mark Radka, Energy Programme Coordinator, UNEP-DTIE, Tel: +33 1 44 37 14 27, Fax: +33 1 44 37 14 74, E-mail: mark.radka@unep.fr. ◆

New communication tools to help protect coral reefs

In response to growing threats to coral reefs, UNEP and the International Coral Reef Initiative (ICRI) have introduced five communication tools designed to help the tourist industry explain the importance of protecting coral reefs.

Examples of one of these tools, a wall calendar produced with the Caribbean Alliance for Sustainable Tourism, were distributed at MarketPlace, the largest Caribbean travel trade show, in Cancun, Mexico. For each month the calendar recommends actions in an area such as wastewater treatment, solid waste management, pool management, energy use or souvenir shopping.

The UNEP World Conservation Monitoring Centre produced the groundbreaking *World Atlas of Coral Reefs* last year (*Industry and Environment*, Vol. 24 No. 3-4). Its lead author, Mark Spalding, and other researchers write in a recent issue of the journal *Science* that they have identified the world's top 10 coral reef "hot spots" – areas rich in marine species found only in small areas and therefore highly vulnerable to extinction.

In introducing the UNEP-ICRI tools, Jacqueline Aloisi de Larderel (Assistant Executive Director of UNEP) emphasized that coral reefs are "a major tourist attraction in many coastal areas, and protecting them is essential not only for the environment but also for the tourism industry. We believe that by raising awareness and so changing the behaviour of tourists and local tourism industry workers alike, the damage to coral reefs can be reduced."

The calendar, a children's quiz and three other products, in five languages, are available free of charge on CD-ROM in Quark Xpress. These products have a special area where the logo of the company or organization printing or distributing them can be inserted.

For more information, contact: Giulia Carbone, Tourism Programme, UNEP DTIE, Tel +33 1 44 37 14 68, Fax: + 33 1 44 37 14 74, E-mail: gcarbone@unep.fr, Internet: www.icriforum.org. ◆

Fishing subsidies linked to environmental and social impacts

Developing countries that open their waters to foreign fishing fleets may lose far more than they gain, according to research carried out in Argentina and Senegal in collaboration with UNEP. Eventual costs include income loss for local fishermen, environmental damage and depletion of native fish stocks. Released in December, these findings are part of UNEP DTIE's work on trade liberalization and subsidies.

"Some developing countries with reasonably healthy levels of stocks have, in their search for foreign, external earnings needed to pay off debts and stimulate economic growth, entered into fishing agreements which allow foreign fleets into their waters," said Klaus Toepfer, UNEP Executive Director. "But our research indicates that, unless strict safeguards are in place, this can be a costly mistake. Last week European fisheries ministers agreed deep cuts in quotas, as well as other measures, designed to help Europe's depleted fish stocks recover. We welcome this decision. But we would urge governments from developed countries to be cautious about exporting overcapacity to the waters of developing countries until such countries have the necessary policies and regulations which can ensure the sustainable management of their fish stocks."

Hussein Abaza, chief of UNEP DTIE's Economics and Trade Branch in Geneva, added: "Unraveling the precise impacts of trade liberalization and subsidizes on the environment is not an easy business ... Our two country studies have shed some important light on this crucial and sometimes controversial area. They have also given some strong pointers as to actions that need to be taken if developing countries are to truly benefit."

For more information, contact: Hussein Abaza, Economics and Trade Branch, 11-13, Chemin des Anémones, CH-1219 Châtelaine, Geneva, Switzerland, Tel: +41 22 917 8298, E-mail: hussein.abaza@unep.ch. ◆

Ecodesign manual comes out in Japanese

The Japanese translation of UNEP DTIE's manual *Ecodesign: A Promising Approach to Sustainable Production and Consumption* is now available courtesy of the Mikuniya Environmental Management Systems Institute. The manual aims at enabling a company to gain experience in ecodesign, tailor the initial approach to its own situation and needs, and ultimately integrate ecodesign into product development as well as improving existing products.

For more information, contact: Ms. Rieko Tanimoto, Project Coordinator, E-mail: riekott@mxq.mesh.ne.jp. ◆

Private sector funding for the International Year of Ecotourism

Development of sustainable tourism in some of the world's most beautiful (yet fragile) natural environments received major support with the announcement of a US$ 500,000 gift for a project linking conservation and tourism at six World Heritage sites. The announcement came shortly before the launch of the International Year of Ecotourism at UN headquarters in New York in late January.

Funds from Aveda, a global cosmetics company, will be matched by the United Nations Foundation. This funding will be used in a project jointly managed by UNEP, UNESCO and the RARE Centre for Tropical Conservation.

The World Heritage sites concerned are the Sian Ka'an and El Vizcaino biosphere reserves (Mexico), Tikal National Park (Guatemala), the Rio Platano biosphere reserve (Honduras) and Komodo and Ujung Kulon National Parks (Indonesia). The project aims to use ecotourism as a tool to help mitigate threats to biodiversity conservation.

For more information, contact: Oliver Hillel, Tourism Programme Coordinator, UNEP-DTIE, Tel: +33 1 44 37 76 21, Fax: +33 1 44 37 14 74, E-mail: oliver.hillel@unep.fr. ◆

New Finance Initiatives signatories

UNEP's Financial Institutions Initiative (FII) was founded in 1992 to engage financial institutions in dialogue on sustainable development. New signatories to the Statement by Financial Institutions on the Environment and Sustainable Development are:

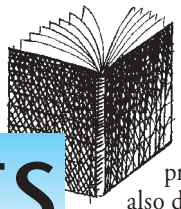
- ◆ American Bank of Albania (ABA) (first signatory from Albania)
- ◆ Banco Africano de Investimientos, Luanda (first signatory from Angola)
- ◆ Banco Nacional de Obras y Servicios Publicos SNC, Mexico
- ◆ Bank of Shanghai (first signatory from China)
- ◆ Finansbank, Istanbul (first signatory from Turkey)
- ◆ FleetBoston Financial, United States
- ◆ Garanti Leasing, Istanbul, Turkey
- ◆ IPE Capital, SA, Lisbon, Portugal
- ◆ Middle East Investment Bank, SG Group, Amman, Jordan

In collaboration with UNEP Financial Initiatives (FI), a group of leading insurance reinsurance and pension fund companies has developed a Statement of Environmental Commitment for the Insurance Industry. New signatories are:

- ◆ Interpolis, The Netherlands
- ◆ KPA SA, Sweden
- ◆ Legal & General Group, United Kingdom

For more information, contact: Ken Maguire, UNEP Finance Initiatives, Economics and Trade Branch, 11-13, Chemin des Anémones, CH-1219 Châtelaine, Geneva, Switzerland, Tel: +41 22 917 8178, Fax: +41 22 917 8076, E-mail: maguirek@unep.ch, Internet: www.unep-fi.net. ◆

Books & Reports



General

Digital Futures: Living in a Dot-Com World

This report is the product of the Digital Futures project, launched in early 2000 by Forum for the Future, a UK-based NGO, and completed in March 2001. The Digital Futures project assessed relationships between the digital and sustainability "revolutions". Participants included three UK government departments, eight think tanks and 14 companies, ranging from large multinationals such as Unilever and BP to web-based companies like AOL and Amazon. *Digital Futures* looks at the impact of e-commerce on society, jobs, local communities, cities and the environment. Each chapter is in the form of an essay with a commentator's response. The summary report and a chapter from the book are available for downloading as PDFs on the Digital Europe web site *(www.digitalfutures.org.uk)*. Digital Europe is the successor to the Digital Futures project.

J. Wilsdon, ed. (2001). Earthscan Publications Ltd., 120 Pentonville Road, London, N1 9JN, UK, Tel: +44 20 7278 0433, Fax: +44 20 7278 1142, E-mail: earthinfo@earthscan.co.uk, Internet: www.earthscan.co.uk. Hbk., 228p. ISBN 1-85383-789-X. A paperback version will also be published this year.

International Environmental Law and Policy

The second edition of this publication from the Foundation Press's University Casebook Series explores the dynamics of lawmaking and the increasingly critical roles of transnational actors, citizens, NGOs, scientists and business. The authors discuss relating scientific understanding to legal responses, and relating various types of problems to the global economy. The book includes explanations of the use of "soft law" (non-treaty agreements), framework agreements, binding obligations, the precautionary principle and the polluter pays principle. It also describes how technology transfer and multilateral and bilateral financial mechanisms function.

D. Hunter, J. Salzman and D. Zaelke (2002). Foundation Press, 395 Hudson Street, New York, NY 10014, USA, Tel: +1 212 367 6790, Fax: +1 212 367 6799, E-mail: christopher.hart @westgroup.com, www.fdpress.com. Hbk., 1547p. ISBN 1-58778-084-4.

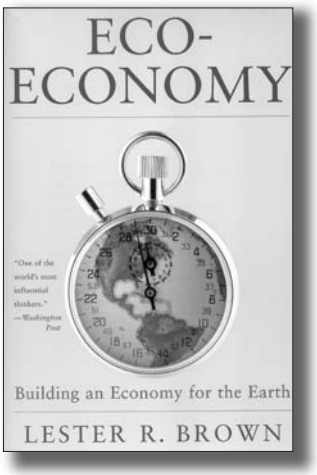
International Environmental Law and Policy: Treaty Supplement, 2002 Edition

The *Treaty Supplement* is a complementary volume by the same authors.

D. Hunter, J. Salzman and D. Zaelke (2002). Foundation Press (see above). Pbk., 463p. ISBN 1-58778-379-7.

Eco-Economy: Building an Economy for the Earth

Described as "a work in progress," *Eco-Economy* serves as a manifesto for author Lester R. Brown's recently created Earth Policy Institute (World News, *Industry and Environment*, Vol. 24, No. 1-2). Brown, also well known as the founder of the Worldwatch Institute, describes a global economy



"out of sync" with the planet's ecosystem. He outlines his vision of a new economy based on renewable energy, a radically restructured material economy, population stability, and a tax system reformed so that the market reflects environmental realities. *Eco-Economy* can be downloaded at no charge from the Earth Policy Institute web site (see below) using Adobe Acrobat.

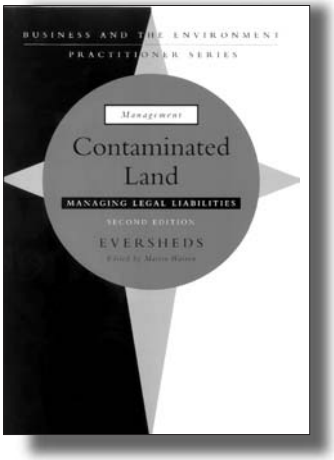
L.R. Brown (2001). W.W. Norton & Co., Inc., 500 Fifth Avenue, New York, NY 10110, USA; or Earthscan Publications Ltd. (see above). Hbk., 334p. ISBN 1-85383-826-8; Pbk., 334p. ISBN 0-393-32193-2.

Hardback, paperback and free on-line versions available from the Earth Policy Institute, 1350 Connecticut Avenue, NW, Suite 403, Washington, DC, 20036, USA, Tel: +1 202 496 9290, Fax: +1 202 496 9325, E-mail: epi@earth-policy.org, Internet: www.earth-policy.org.

Contaminated Land: Managing Legal Liabilities

This practical guide, which has been published in a new edition, is written for non-lawyers (though the UK business law firm Eversheds holds the copyright) and is aimed at a business readership. Focusing on the British legal regime for contaminated land, it discusses such issues as clean-up mechanisms, civil liability, water protection, and who should pay for clean-up. It appears in Earthscan's Business and the Environment Practitioner Series.

M. Warren, ed. (2001). Earthscan Publications Ltd. (see above). Pbk., 47p. ISBN 1-85383-747-4.



World in Transition 2: New Structures for Global Environmental Policy

The latest report by the German Advisory Council on Global Change launches the Council's second "World in Transition" series. Council experts analyze the "international institutional and organizational architecture" dealing with the environment. They propose the formation of a tripartite "Earth Alliance" made up of an Earth Assessment body, an Earth Organization (initially with UNEP as its core) and an Earth Funding mechanism.

(2001). German Advisory Council on Global Change (WBGU), Reichpietschufer 60-62, 8th Floor, D-10785 Berlin, Germany; translation published by Earthscan Publications Ltd. (see above). Hbk., 211p. ISBN 1-85383-852-7.

Yearbook of International Co-operation on Environment and Development 2001/2002

Among notable developments in the ninth edition of what used to be called the *Green Globe Yearbook* are the inclusion of the Stockholm Convention on Persistent Organic Pollutants, presentation of the International Organization for Standardization (ISO) as a separate entry, a new style and format for Country Profiles, and major revisions to entries concerning several intergovernmental organizations including UNEP and UNDP (the UN Development Programme). Among the main themes discussed are UN fragmentation and coordination in environmental governance, pros and cons with respect to ISO environmental standards, prospects for the Basel Convention in its second decade, and the environmental weaknesses of World Bank lending practices.

O.S. Stokke and Ø.B. Thommesen, eds., Fridtjof Nansen Institute (2001). Earthscan Publications Ltd. (see above) or www.greenyearbook.org. Hbk., 384p. ISBN 1-85383-775-X.

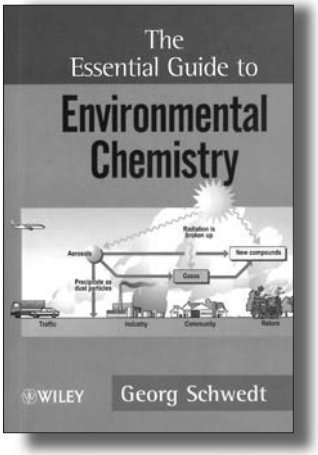
Corporate Environmental Management

Richard Welford's series has added a third volume (*Towards Sustainable Development*) and now includes a second edition of the first volume (*Systems and Strategies*). With the second volume, *Culture and Organisations*, this series is a good introduction to the main practical and theoretical issues in the field of corporate environmental management. *Corporate Environmental Management* should be useful to both researchers and managers.

R. Welford (1997-2000). Earthscan Publications Ltd. (see above). Pbk., 270p., 187p., 184p. ISBN 1-85383-599-5, 1-85383-412-2, 1-85383-641-9.

The Essential Guide to Environmental Chemistry

The author is a professor at Clausthal Technical University in Germany. The *Essential Guide*, designed primarily as textbook, is aimed at management students as well as budding environmental chemists. It should be a useful primer for people working in monitoring agencies, river authorities, waste management companies and other organizations. Published in pocket-sized format, with text and illustrations on facing pages, the guide covers material cycles, atmosphere, water, soil, toxins and heavy metals, and principles of environmental analysis.

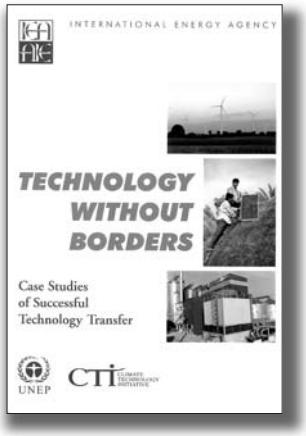


G. Schwedt (2001). John Wiley & Sons Ltd., Baffins Lane, Chichester, West Sussex PO19 1UD, UK, Tel: +44 1243 779 777, E-mail: cs-books@wiley.co.uk, Internet: www.wiley.com. Pbk., 268p. ISBN 0-471-89954-2.

Climate Change/ Air Pollution

Technology Without Borders: Case Studies of Successful Technology Transfer

In *Technology Without Borders* the International Energy Agency (IEA), in cooperation with UNEP and the Climate Technology Initiative, presents a selection of "climate-friendly" technologies that have moved out of the laboratory and into markets in developing or transition countries. Case studies (some adapted from a special report by the Intergovernmental Panel on Climate Change) include photovoltaic systems in Kenya, wind power in Honduras, and energy efficiency financing in Hungary.



(2001). International Energy Agency, 9 rue de la Fédération, 75739 Paris Cedex 16, France, Tel: +33 1 40 57 65 00/01, Fax: +33 1 40 57 65 59, Internet: www.iea.org. Pbk., 118p.

Transport and the Global Environment: Accounting for GHG Reductions in Policy Analysis

This publication from the UNEP Collaborating Centre on Energy and the Environment is intended to provide technical experts and policy-makers with guidance on taking environmental impacts into account when they make transport planning decisions. Expanding on the "Global Overlay" methodology developed by the World Bank, it attempts to determine the costs of greenhouse gas mitigation strategies and to outline decision-making rules based on cost concepts. Case studies are included.

K. Halsnaes, et al. (2001). UNEP Collaborating Centre on Energy and Environment, Risø National Laboratory, PO Box 49, DK-4000 Roskilde, Denmark, Tel: +45 46 32 22 88, Fax: + 45 46 32 19 99, E-mail risoe@risoe.dk, Internet: www.uccee.org. Pbk., 187p. ISBN 92-807-2097-X.

Industry Sectors

Forward Drive: The Race to Build the Clean Car of the Future

The author is the editor of *E: The Environmental Magazine.* He is also a car columnist for several US newspapers. As self-confessed car addict, he presents the history of (and prospects for) several types of alternative personal transport. Research under way in Europe and Japan is considered. *Forward Drive,* written in a racy personal style, is for general readers as well as automotive and environmental specialists.

J. Motavalli (2001). Earthscan Publications Ltd. (see above). Hbk., 258p. ISBN 1-85383-785-7.

Good News & Bad: The Media, Corporate Social Responsibility and Sustainable Development

This is the fourth sector report in the Engaging Stakeholders series, prepared by SustainAbility in cooperation with UNEP. *Good News & Bad* looks at how the media has dealt with issues such as ethical investment, climate change, genetic modification and major NGOs during the past 10 years. It is based on an analysis of the media and interviews with over 50 people in the business. Among its conclusions: coverage of critical issues by the media is "abysmal" (the one bright spot being the business media) and so-called "new" media have great potential to influence events.

(2002). SustainAbility, 11-13 Knightsbridge, London SW1X 7LY, UK, Tel: +44 207 245 1116, Fax: +44 207 245 1117, Internet: www.sustainability.co.uk. Pbk., 44p. ISBN 1-903168-04-X.

Urban Transport, Environment and Equity: The Case for Developing Countries

Traditional transport policies in cities in the developing world have led to unfair distribution of accessibility, health risks and environmental externalities. This book proposes alternative approaches, focusing on the need for equitable, socially sustainable urban transport. Pointing out that the methodologies most often used to select transport infrastructure and services originated in industrialized countries in the 1950s, the author outlines a methodology for today's developing countries. *Urban Transport, Environment and Equity* is primarily written for transport professionals, policy-makers and academics, but would also be of interest to those in the planning, geography, environmental and social sciences fields.

E.A. Vasconcellos (2001). Earthscan Publications Ltd. (see above). Pbk., 333p. ISBN 1-85383-727-X.

Ecotourism: Principles, Practices & Policies for Sustainability

This guide was prepared by UNEP and The International Ecotourism Society (TIES) as a contribution to the International Year of Ecotourism (*Industry and Environment*, Vol. 24, No. 3-4). It highlights the risks as well as the potential of nature-based tourism, focusing on projects, guidelines and procedures that have proved successful in different parts of the world. The author is the founder and president of TIES.

M.E. Wood (2002). UNEP. Available from Earthprint Ltd., PO Box 119, Stevenage SG1 4TP, Hertfordshire, UK, Tel: +44 1438 748 111, Fax: +44 1438 748 844, E-mail: orders@earthprint.com, Internet: www.earthprint.com. Pbk., 64p. ISBN 92-87-2064-3.

How Small and Medium-Sized Enterprises in Developing Countries Can Protect the Ozone Layer

This handbook, produced by UNEP's OzonAction Programme, is addressed above all to owners and managers of smaller companies in the refrigeration/air conditioning, foam, aerosol and solvent sectors. It provides basic information on the ozone layer and the implications of ozone depletion, discusses alternatives to ozone-depleting substances, and explains how SMEs in developing countries can become eligible for aid from the Multilateral Fund for the Implementation of the Montreal Protocol.

(2000). UNEP. Available from EarthPrint Ltd. (see above). Pbk., 65p. ISBN 92-807-1717-0.

National Training on Good Practices in Refrigeration: A Support Guide for NOUs

The most recent volume in the UNEP OzonAction Programme's series on "Phasing Out ODS in Developing Countries" is directed at national ozone units (NOUs). Intended to help national ozone officers organize training sessions for refrigeration and air-conditioning technicians, it covers two training phases and includes sample workshop elements (e.g. questionnaires).

(2001) UNEP. Available from Earthprint Ltd. (see above). Pbk., 104p. ISBN 92-804-2020-1.

Manual for Training of Extension Workers and Farmers: Alternatives to Methyl Bromide for Soil Fumigation

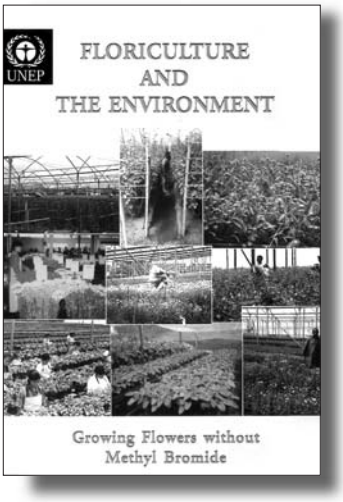
A cooperative effort between UNEP's OzonAction Programme and the UN Food and Agriculture Organization (FAO), this manual is concerned with integrated pest management training for replacement of ozone-depleting methyl bromide. It includes a bibliography and web site references. It will be of particular interest to researchers and development workers.

(2001). FAO and UNEP. Available from Earthprint Ltd. (see above). Pbk., 76p. ISBN 92-5-104632-8.

Floriculture and the Environment: Growing Flowers Without Methyl Bromide

Floriculture and the Environment is a general guide to methyl bromide alternatives in the cut-flower industry. Aimed at growers, trainers, technical assistants and people involved in phasing out use of methyl bromide, it is largely devoted to providing practical information on techniques such as integrated pest management, steam sterilization and composting.

(2001) UNEP. Available from Earthprint Ltd. (see above). Pbk., 124p. ISBN 92-87-2057-0.



Global Report on Validated Alternatives to the Use of Methyl Bromide for Soil Fumigation

This compilation of information on successful use of methyl bromide alternatives around the world is intended for agricultural researchers and extension workers. It can be used together with *Manu-*

al for Training of Extension Workers and Farmers: Alternatives to Methyl Bromide for Soil Fumigation (see above). Individual chapters are devoted to Latin America, North America, Southern Europe, Asia and Africa.

R. Labrada and L. Fornasari, eds. (2001). FAO and UNEP. Available from Earthprint Ltd. (see above). Pbk., 95p. ISBN 92-5-104633-6.

Chemicals, Pollution and Accidents

IPCS Environmental Health Criteria 221: Zinc

This is the latest title in a series published by the International Programme on Chemical Safety (IPCS), a joint venture between UNEP, the International Labour Organization (ILO) and the World Health Organization (WHO). The series provides critical reviews of chemicals' potential health and environmental effects. These reviews are primarily risk evaluations, based on published and unpublished studies. The series is published in English, with summaries in French and Spanish.

(2001). World Health Organization, Marketing and Dissemination, 1211 Geneva 27, Switzerland, Tel: +41 22 791 2476, Fax: +41 22 791 4857, E-mail: bookorders@who.int. Pbk., 360p. ISBN 92-4-157221-3.

International Activities Related to Chemicals

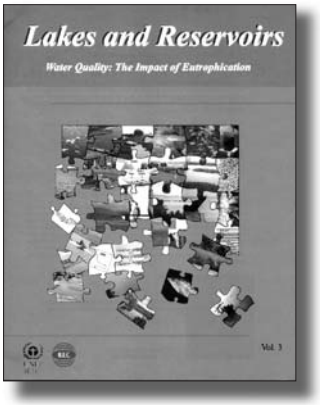
This is the third annual update of the report by UNEP's Chemicals Branch. Subtitled "Overview of International Agreements/Instruments, Organisations and Programmes Concerning Chemicals Management," its purpose is to provide an introduction to intergovernmental activities in the field that can be used by a wide range of readers in the public and private sectors. Major developments between mid 2000 and mid 2001 are reviewed.

(2001). UNEP Chemicals, 11-13 chemin des Anémones, CH-1219 Châtelaine, GE, Switzerland, Tel: +41 22 917 1234, Fax: +41 22 797 3460, E-mail: chemicals@unep.ch, Internet: www.chem.unep.ch. Pbk., 235p.

Water

Lakes and Reservoirs

Two new booklets have appeared in the Short Series on Lakes and Reservoirs, published by UNEP's International Environmental Technology Centre (IETC) in cooperation with the International Lake Environment Committee Foundation. Written in simple language and copiously illustrated, they are accessible introductions to fairly technical subjects.



Volume 2, The Watershed: Water from the Mountains into the Sea. *Pbk., 36p. ISBN 4-906356-29-X.*

Volume 3, Water Quality: The Impact of Eutrophication. *Pbk., 26p. ISBN 4-906356-31-1.*

(2001). UNEP-DTIE-IETC. Available from Earthprint Ltd. (see above).

Sourcebook of Alternative Technologies for Freshwater Augmentation in West Asia

This is the sixth volume in a set of regional reports produced as part of the UN International Environmental Technology Centre (IETC) Technical Publication Series. Each report presents a comprehensive overview of technologies used to augment freshwater supplies. The reports are particularly addressed to water resource planners and managers. The West Asia volume, prepared in collaboration with the Damascus-based Arab Centre for the Studies of Arid Zones and Dry Lands, includes detailed technology profiles and case studies of successfully adopted technologies.

(2001). UNEP-DTIE-IETC. Available from Earthprint Ltd. (see above). Pbk., 341p. ISBN 92-807-1811-8.

Introduction of Nuclear Desalination: A Guidebook

Introduction of Nuclear Desalination, which appears in the International Atomic Energy Agency's Technical Reports Series, is a response to existing or planned nuclear desalination projects by IAEA member countries. It is also part of the follow-up to the agency's 1997 Korea symposium on the subject. Aimed not only at engineers and scientists, but also at policy planners and decision-makers, this guidebook includes an overview of nuclear desalination. It examines special aspects of (and considerations relevant to) nuclear desalination's introduction and details the steps involved in the process.

(2000). International Atomic Energy Agency (IAEA), Wagramer Strasse 5, PO Box 100, A-1400 Vienna, Austria, Tel: +43 1 26000, Fax: +43 1 26007, E-mail: sales.publications@iaea.org, Internet: www.iaea.org/worldatom/books. Pbk., 281p. ISBN 92-0-102400-2, ISSN 0074-1914.

Carrots for the Sea: Voluntary Initiatives for the Protection of the Marine Environment

This UNEP-commissioned study by the Netherlands Committee for IUCN-the World Conservation Union was made on behalf of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA). It examines the potential of voluntary initiatives to implement the GPA, using case studies, meta analysis, questionnaires and interviews with experts. Among its conclusions are that voluntary initiatives require a high level of environmental awareness by government and industry, trust between the parties concerned, and incentives ("carrots") or threats of punitive measures ("sticks").

(2001). UNEP/GPA Coordination Office, PO Box 16227, The Hague, Netherlands, Tel: +31 70 331 4460, Fax: +31 70 345 6648, E-mail: gpa@unep.nl, Internet: www.gpa.unep.org. Pbk., 79p.

National/Regional

Environmental Performance Reviews: Norway, Portugal

These two country studies are among the first in the OECD's second series of Environmental Performance Reviews (EPRs), which include an assessment of countries' responses to the recommendations made by the OECD in the first series. Like the earlier EPRs, the new series presents information on each country's management of environmental media, waste and biodiversity. Also covered are environmental-economic and environmental-social integration and policy implementation. The Environmental Performance Reviews are published in English and French.

Norway. Pbk., 203p. ISBN 92-64-19654-4.

Portugal. Pbk., 216p. ISBN 92-64-19653-6.

(2000). OECD Publications, 2 rue André-Pascal, 75775 Paris Cedex 16, France, Tel: +33 1 45 24 82 00, Internet: www.sourceoecd.org.

MAP Technical Reports Series

The Technical Reports Series is a collection of reports resulting from activities under UNEP's Mediterranean Action Plan (MAP) in areas such as Pollution Monitoring and Research (MED POL), the Priority Actions Programme (PAP) and Specially Protected Areas (SPA). Recent titles include:

No. 130, Atmospheric Input of Persistent Organic Pollutants to the Mediterranean Sea. *MED POL and the World Meteorological Organization (WMO). Pbk., 78 p. ISBN 92-807-2010-4.*

No. 132, Remedial Actions for Pollution Mitigation and Rehabilitation in Cases of Non-Compliance. *MAP and WHO. Pbk., 91p. ISBN 92-807-2031-7.*

No. 133, Atmospheric Transport and Deposition of Pollutants into the Mediterranean Sea. *MED POL and WMO. Pbk., 142p. ISBN 92-807-2070-8.*

(2001). UNEP/MAP, 48 Vassileos Konstantinou

Web Site Highlights

SustainAbility's first e-report
www.virtualsustainability.com

The UK-based consulting firm SustainAbility, in cooperation with UNEP, has produced its first *Engaging Stakeholders* report available only in electronic form. The Virtual Sustainability web site requires users to buy a password giving full access to all pages of the report, which examines how the Internet can relate to "triple bottom line responsibility." (The *Virtual Sustainability* report is also available on a CD, but SustainAbility recommends using the on-line version.)

For more information, contact: SustainAbility, 11-13 Knightsbridge, London SW1X 7LY, UK, Tel: +44 207 245 1116, Fax: +44 207 245 1117, Internet: www.sustainability.co.uk.

Tour Operators Initiative
www.toinitiative.org

This is the new web site for a key initiative of the UNEP DTIE Tourism Programme. It has been developed in order to disseminate information on progress made by the initiative and its members. The site is intended to demonstrate members' commitment, raise awareness of the need for sustainable tourism practices, share ideas and experience, and facilitate communication among members. Included are general information on the initiative, members and supporting organizations; how to apply; news and events; good practices; and activities and achievements of the initiative's three working groups.

For more information, contact: Giulia Carbone, Tourism Programme, UNEP DTIE, Tel: +33 1 44 37 14 68, Fax: + 33 1 44 37 14 74, E-mail: gcarbone@unep.fr.

EPA on-line trading system
www.epa.gov/airmarkets/transfer/index.html

The US Environmental Protection Agency (EPA) has launched a web-based trading system to make it easier for companies to barter emission allowances directly. The Online Allowance Transfer System (OATS) allows entities trading SO_2 and NO_X allowances to record their trades on the Internet instead of submitting forms to the EPA for processing. It also helps companies monitor and report on current emissions. OATS has not been not set up for trading of greenhouse gases, but it could be used for this purpose if the United States decided to initiate national or regional carbon emission trading.

For more information, contact: US EPA, Clean Air Markets Division, 1200 Pennsylvania Avenue, NW, Mail Code 6204N, Washington, DC, 20460 USA, Tel: +1 202 564 9150.

Avenue, 116 35 Athens, Greece, Tel: +30 1 72 73 100, Fax: +30 1 72 53 196/7, E-mail: unepmedu@unepmap.gr, Internet: www.unepmap.org.

Radiological Conditions of the Western Kara Sea

This report presents the findings of the International Atomic Energy Agency's International Arctic Seas Assessment Project. It examines the radiological impacts of dumping radioactive waste in shallow Arctic waters over some 30 years, particularly by the former Soviet Union. A study of dumping in the Kara and Barents Seas concludes that, while efforts should be made to locate and monitor all this waste, the risk it poses is relatively low.

(1998). IAEA (see above). Pbk., 124p. ISBN 92-0-104098-9, ISSN 1020-6566.

Third International Workshop on Regional Approaches to Reservoir Development and Management in the La Plata Basin: Proceedings

IETC Report No. 14 consists of the proceedings of a workshop held in Posadas, Argentina, in March 2001 on "Informed Decision Processes for Sustainable Development of Reservoirs," particularly as applied to the Plata River basin. The Plata flows through Argentina, Bolivia, Brazil, Paraguay and Uruguay.

(2001). UNEP-DTIE-IETC. Available from Earthprint Ltd. (see above). Pbk., 262p. ISBN 92-807-2089-9.

« Penser globalement, agir localement » (René Dubos, 1975)

A l'association Espaces, nous connaissons la revue *Industry and Environment* du Programme des Nations Unies pour l'environnement. Elle nous renseigne sur les savoir-faire des secteurs de l'industrie et des services qui contribuent au développement durable à travers le monde. Nous-mêmes menons des activités qui soutiennent le développement durable à l'échelle locale.

Agir localement c'est ce que notre association a entrepris il y a huit ans en France, dans la grande région Ile de France au coeur de l'agglomération parisienne, autour du site emblématique de Renault-Billancourt en reconversion industrielle. Nettoyer, aménager, réhabiliter les berges de la Seine, les grands espaces naturels du Val de Seine en employant des personnes en difficulté : tel est le double pari d'Espaces.

Avec le soutien des pouvoirs publics et des collectivités locales, l'association développe de nouvelles techniques de gestion de l'environnement en milieu urbain tout en créant de nouveaux emplois. Les chantiers d'insertion forment des personnes peu qualifiées aux métiers de l'environnement et facilitent ainsi leur réinsertion dans la vie active. Les équipes d'éco-cantonniers, de jardiniers et de palefreniers de l'association sauvegardent les sites naturels dans le respect de la biodiversité végétale et animale. Elles assurent une veille écologique qui a permis d'inventorier plus de 350 espèces végétales et 400 espèces animales dans les territoires gérés par Espaces.

Cette action locale peut être facilement adaptée et transposée dans d'autres types d'environnement urbain.

Association ESPACES, 37 route de Vaugirard, 92190 Meudon, France, Tél. +33 1 55 64 13 40, espaces@globenet.org

Correction

Wolfgang Strasdas, author of "Ecotourism in Development Cooperation" (*Industry and Environment*, Vol. 24, No. 3-4, pp. 12-15), has drawn our attention to a paragraph on page 13 in which some words were unintentionally deleted. The paragraph in question should have read: *Phase I: "classical" tourism promotion (financing of conventional tourism infrastructure, hotels and marketing without paying attention to environmental or social issues) in the 1960s and 1970s.*

Industry and Environment regrets any inconvenience caused by this mistake.

THE UNEP DIVISION OF TECHNOLOGY, INDUSTRY AND ECONOMICS

Current uses and development of natural resources, technologies and production processes, as well as urbanization patterns, have negative effects on human health and the environment. This is illustrated by unsustainable use of water, land and energy, air and water pollution, persistent and toxic bio-accumulative chemicals in the food chain, and other industry-related problems.

To have a healthy environment, we need to change how we produce and consume goods and services. This change involves revising and developing economic policies and trade practices, so as to integrate environmental issues in the planning and assessment processes.

UNEP's Division of Technology, Industry and Economics (UNEP DTIE) was created in 1998 to help decision-makers in governments, local authorities and industry develop and adopt policies and practices that:

- are cleaner and safer;
- use natural resources efficiently;
- ensure adequate management of chemicals;
- incorporate environmental costs;
- reduce pollution and risks for humans and the environment.

UNEP DTIE, whose main office is in Paris, is composed of:

◆ **The International Environmental Technology Centre (Osaka)**, which promotes the adoption and use of environmentally sound technologies, with a focus on the environmental management of cities and freshwater basins, in developing countries and countries in transition.

◆ **The Production and Consumption Unit (Paris)**, which fosters the development of cleaner and safer production and consumption patterns that lead to increased efficiency in the use of natural resources and reductions in pollution.

◆ **The Chemicals Unit (Geneva)**, which promotes sustainable development by catalyzing global actions and building national capacities for the sound management of chemicals and the improvement of chemical safety world-wide, with a priority on Persistent Organic Pollutants (POPs) and Prior Informed Consent (PIC, jointly with FAO).

◆ **The Energy and OzonAction Unit (Paris)**, which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition, and promotes good management practices and use of energy, with a focus on atmospheric impacts. The UNEP/RISØ Collaborating Centre on Energy and Environment supports the work of this Unit.

◆ **The Economics and Trade Unit (Geneva)**, which promotes the use and application of assessment and incentive tools for environmental policy, and helps improve the understanding of linkages between trade and environment and the role of financial institutions in promoting sustainable development.

UNEP

UNITED NATIONS ENVIRONMENT PROGRAMME

DIVISION OF TECHNOLOGY, INDUSTRY AND ECONOMICS

39-43, QUAI ANDRE-CITROËN
75739 PARIS CEDEX 15, FRANCE
TEL: (33) 1 44 37 14 50
FAX: (33) 1 44 37 14 74
E-MAIL: unep.tie@unep.fr
http://www.uneptie.org

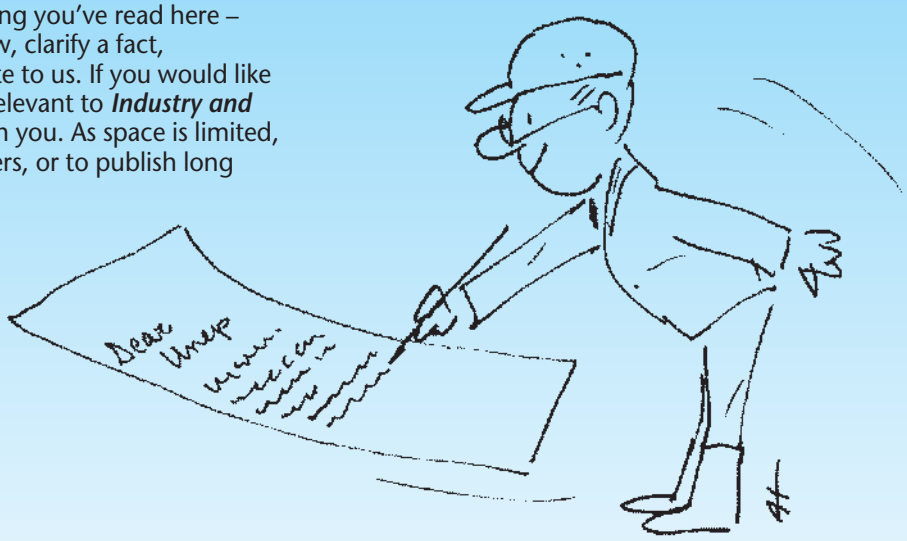
FEEDBACK

If you would like to respond to something you've read here – to agree or disagree with a point of view, clarify a fact, or provide additional information – write to us. If you would like to air your views on any other subject relevant to ***Industry and Environment***, we also hope to hear from you. As space is limited, we cannot guarantee to publish all letters, or to publish long ones in full.

Send your Feedback letters to:

Feedback
Industry and Environment review
UNEP DTIE
Tour Mirabeau
39-43, quai André-Citroën
75739 Paris Cedex 15, France

Fax: +33 1 44 37 14 74
E-mail: unep.tie@unep.fr



Industry and Environment

a publication of the United Nations Environment Programme
Division of Technology, Industry and Economics

For over 20 years, the quarterly *Industry and Environment* has provided a forum for exchanging information and experience. Articles are contributed by industry managers, government officials, researchers and others active in the field of sustainable industrial development. Besides reporting on developments of broad international interest, each issue focuses on a particular theme. The themes of recent issues have included the agri-food industry, consumption patterns, urban environmental management, sustainable energy, and mining and sustainable development. Recent issues and archives are available on-line at www.uneptie.org/media/review/ie_home.htm.

The next issue of *Industry and Environment* will present viewpoints on industry and sustainable development.

Industry and Environment is an English language publication, but it often includes articles in French and Spanish. All contributed articles are accompanied by summaries in English, French and Spanish.

The review is also published in Chinese.
For further details, please contact:
Professor Liu Xiaogwang
Research Center for Eco-Environmental Sciences
Chinese Academy of Sciences, P.O. Box 2871, Beijing 100085, China

Industry and Environment
SUBSCRIPTION ORDER FORM
Subscription per volume: US$ 60.00

Name: _____

Organization: _____

Address: _____

_____

Country: _____

(Delete as applicable)
E-mail/Tel./Fax Number: _____

❒ I enclose a cheque for $_____ €_____
(Made payable to EarthPrint Limited in US dollars or Euro equivalent)

❒ Please debit my credit/debit card as follows:
Card name (Amex/Visa/Mastercard): _____

Number: _____ Expiry date: _____

To order online, visit **http://www.earthprint.com**

Note: Institutions and public libraries may request billing.
Companies and individuals, please send payment along with this order form.

Back issues may also be ordered from Earthprint

Please send your order with payment to:
EarthPrint Limited
P.O. Box 119, Stevenage, Hertfordshire SG1 4TP, United Kingdom
Fax: +44 1438 748 844, E-mail: subscriptions@earthprint.com

With copy to: UNEP DTIE, 39-43, quai André-Citroën
75739 Paris Cedex 15, France
Fax: +33 1 44 37 14 7, E-mail: unep.tie@unep.fr