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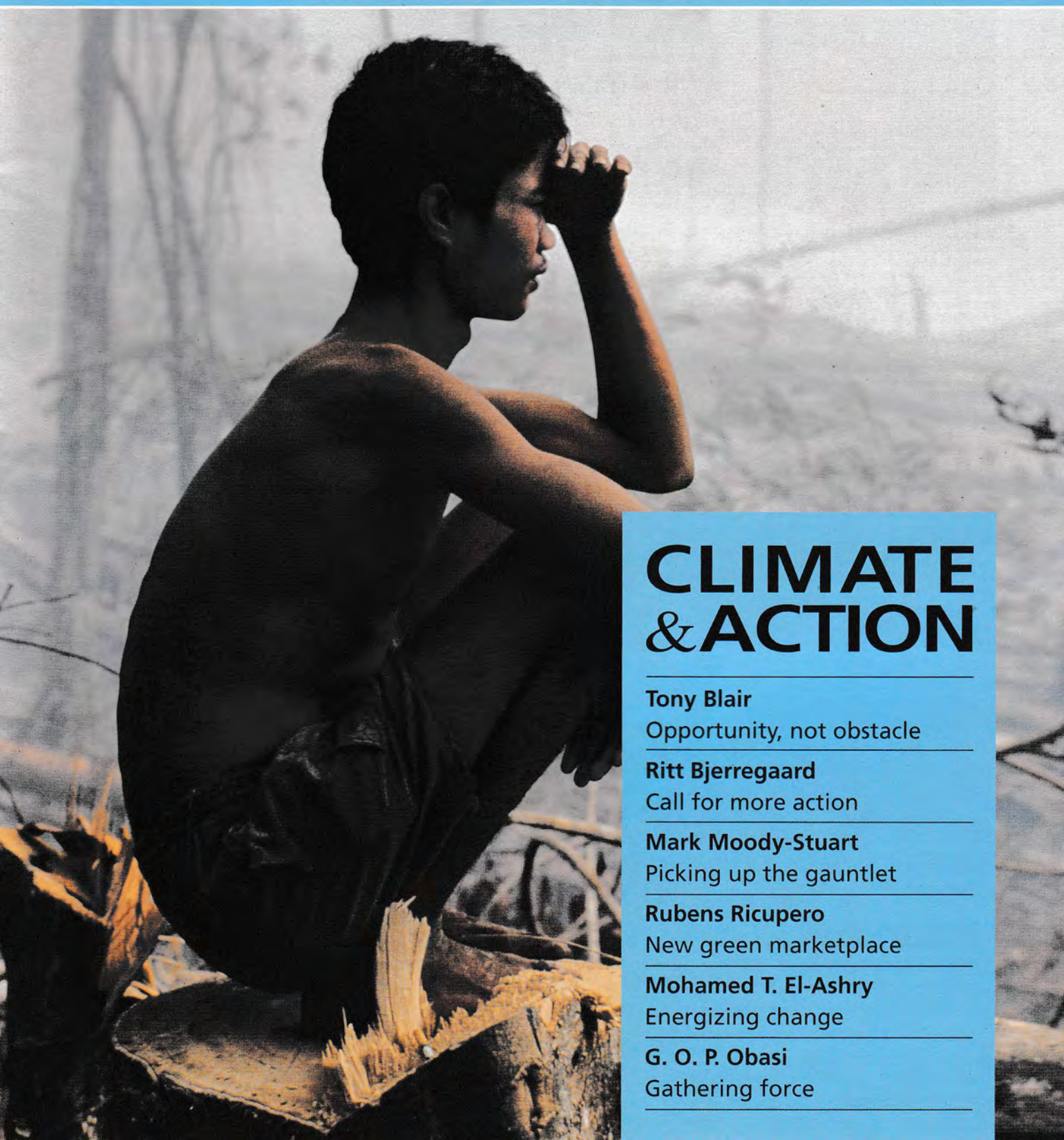

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This magazine is printed on paper made from 100 per cent recycled waste material. It is bleached without any damage to the environment.

THE LOST CAMELS OF TARTARY (Little Brown, £18.99) describes four expeditions – three sponsored by UNEP – that John Hare made to the Gobi desert in search of the wild Bactrian camel, one of the world's rarest animals. As a result of these, he is currently raising funds to establish the Lop Nur Nature Sanctuary and working on an environmental awareness-raising campaign for China.

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EDITORIAL

KLAUS TÖPFER
United Nations Under-Secretary General and Executive Director, UNEP

The Fourth Conference of the Parties to the United Nations Framework Convention on Climate Change will be different from the Third. More than a year ago, intensive deliberations resulted in the Kyoto Protocol.

Sober reflection on what was forged at Kyoto reveals a sense of optimism that, despite inadequacies, there is a solid platform upon which effective carbon emission control can be built.

Some feel that the Kyoto Protocol lost sight of the ultimate objective of the parent Convention on Climate Change, that is to stabilize atmospheric concentrations of greenhouse gases. Nevertheless, it has sent an important signal to investors and industries about the need and opportunities to introduce technologies that reduce carbon emissions. The Protocol contains the seeds for new markets in emissions that will, in the coming decades, take their place alongside traditional markets in commodities and financial instruments. The Kyoto Protocol could also be a turning point in making an orderly transition to an economy powered by renewable energy sources and production of more fuel-efficient vehicles.

Buenos Aires should be a 'nuts-and-bolts' meeting anchored in common sense whereby Kyoto's theory can be transformed into reality. All the basic elements are there – sequestration and sinks, joint implementation and emissions trading and the revolutionary Clean Development Mechanism.

It will be up to the delegates at Buenos Aires to give substance to these elements. There is widespread agreement that the Clean Development Mechanism provides ample opportunities for early and substantial emission reductions which can involve all parties, irrespective of their regional or economic affiliations, in collaborative, cost-effective emission reduction and climate control. The importance of the Mechanism should also be seen in its value as a bridge – with incentives – between developed, industrialized countries and the developing world.

UNEP's contribution

In collaboration with a number of relevant organizations, (the Convention on Climate Change, the Intergovernmental Panel on Climate Change (IPCC), the United Nations Conference on Trade and Development (UNCTAD), the United Nations Development Programme, the United Nations Industrial Development Organization and the World Bank, amongst others) UNEP wants to contribute to the development of these international instruments, just as it did in establishing the IPCC with the World Meteorological Organization. UNEP intends to move beyond the information and science-based approach to define practical instruments, in particular economic instruments, to move forward to the implementation of the Kyoto Protocol and to lay the basis for its future strengthening.


Schnack

In this regard UNEP and UNCTAD have jointly launched an initiative for an International Forum on Economic Instruments for Environmental Policy. The Forum will create a consultative process which is intended to contribute to efforts leading to the use of economic instruments for sound environmental policy. The process will also allow the consolidation of analytical work and experience to assess, compare and build coherence in the use of different economic instruments as part of a package of measures to achieve internationally agreed approaches. The process will involve close collaboration with relevant organizations, including those mentioned above.

Common sense tells us that it will require a concerted effort of both developed and developing countries, acting together, before we can guarantee stabilizing climate at a level that will prevent adverse effects – an objective adopted by all Parties and to be achieved with due account of historical obligations and differentiated responsibilities.

People's action

However, in the search for partners, we must not neglect domestic opportunities. While governments ponder, people are acting. There is no scientific conundrum more familiar to people than climate change. There is a groundswell of opinion requiring corrective action. Municipalities are applying energy saving schemes and adopting transport policies that provide documented emission savings and air quality improvements beyond the most optimistic targets of their national governments. They are doing so at little monetary cost and often have savings which further enhance municipal development. Awareness at the family level and application of simple solutions result in savings in domestic fuel bills. Enlightened utilities and small businesses are replacing energy costs with profits. Associations of business and service industries have climate awareness high on their agenda. Some, like the insurance and travel industries, are working with UNEP on codes of conduct that demonstrate environmental responsibility that others should envy.

Kyoto was looked to as an opportunity to make amends for the inaction in the post-Rio period. We must now look to Buenos Aires for the practical steps which will make effective emission control a reality•

FIRE watch

JOHANN G. GOLDAMMER describes how global warming and forest wildfire disasters may become locked in a vicious circle

Many types of forest, historically adapted to outbreaks of fire from both natural and human sources, are now becoming increasingly vulnerable to it. This is the result of changes in demography and land use, and the cumulative effects of the disturbances brought about by humanity.

Fire is an important recurrent natural phenomenon in all vegetation zones, ranging from the tropics to the northern circumpolar conifer forests. In some ecosystems it maintains the dynamic equilibrium responsible for high biodiversity and economic productivity. In others, such as lowland and mountain rain forests, it destroys the forest cover and leads to long-term site degradation. But, in most areas of the world, wildfires burning under extreme weather conditions have severely damaged economies and human health and safety and caused major disasters.

Extended wildfires in the Indonesian and Malaysian provinces on the island of Borneo during the drought of 1982-1983 – caused by the El Niño-Southern Oscillation (ENSO) – burned more that 5 million hectares of forest and agricultural land, at a total cost of around $9 billion. The effects of similar fire episodes in 1997-1998 in Indonesia, Brazil and Central America have not yet been fully assessed but preliminary estimates suggest that the total value of damage to health, industrial production, tourism, agriculture, timber and other forest products, biodiversity, and air, ground and sea transport – together with the cost of fire-fighting – exceeds $5 billion.

Australia's Ash Wednesday Fires of 1983 – also linked to the extreme ENSO drought of 1982-1983 – killed 75 people and nearly 300,000 sheep and cattle, and destroyed 2,539 houses. In 1987 wildfires in the People's Republic of China killed 221 people (mainly as a result of high carbon monoxide concentrations in forest villages), made 50,000 homeless and burned 1.3 million hectares of mountain forest. Indeed between 1950 and 1990 a total of 4,137 people were killed in forest fires in China. The last major fires in central Eurasia were in Mongolia, where 10.7 million hectares of forest and steppe vegetation were burned in 1996, followed by a further 12.4 million hectares in 1997.

Health hazards

Smoke pollution from burning vegetation sometimes causes death and illness. The most serious pollution problems in the 1980s and 1990s have been in the Amazon Basin and in Southeast Asia. The most recent large smog episodes in Southeast Asia were in 1991, 1994 and 1997 when land-use fires and uncontrolled wildfires in Indonesia and neighbouring countries created a layer of smog which covered a wide region for several weeks. A study on asthma attacks in children showed that high concentrations of carbon monoxide, nitrogen dioxide and inhalable suspended particulate matter, all generated by the fires, were to blame – the smog of September 1997 caused the worst smoke pollution ever recorded in the region.

Wildfires in vegetation contaminated with radioactivity cause uncontrollable releases of such radionuclides as caesium 137C, strontium 90 and plutonium 239. This happened, for instance, in the severely contaminated region near the Chernobyl nuclear power plant.

Vegetation fires also produce emissions that affect the composition and functioning of the global atmosphere – and interact with those from burning fossil fuels and other technological sources which are the major cause of human-induced climate change. Recent estimates suggest that some 2 to 5 billion tonnes of carbon stored in vegetation may be released annually by fires and other burning of plant biomass including biofuels. Most of this, however, is sequestered by regrowth of vegetation.

Net emissions

The net emission of carbon into the atmosphere from deforestation has been estimated to be in the range of 1 to 1.5 billion tonnes per year. Savannah fires, land-use changes, shifting agriculture, agricultural waste burning and fuelwood consumption all make important contributions to the total worldwide burning of biomass, and are included in these figures.

Emissions from tropical vegetation fires are dominated by carbon dioxide (CO_2), but products of incomplete combustion that play important roles in atmospheric chemistry and climate are also emitted: these include nitrogen oxide, carbon monoxide, methane and reactive hydrocarbons, which influence the concentrations of ozone and hydroxyl radicals and thus the oxidation efficiency of the atmosphere. These particularly affect tropical regions during the dry seasons – August to November in the southern hemisphere and January to May in the northern one; they are manifested in strongly enhanced tropospheric ozone concentrations, which extend throughout regions regularly affected by forest conversion and dry forest burning in Brazil, by savannah fires in southern Africa, and by land-use fires in Southeast Asia. Concentrations of methyl chloride and methyl bromide – which, with methane, play a significant role in stratospheric ozone chemistry – are also strongly dominated by vegetation fires.

The most critical fires occur during extreme droughts, and the El Niño-induced climate variability is usually closely connected with increased fire activity and damage. Droughts are expected to be more frequent in a world where the atmosphere contains twice as much CO_2 as it did at the beginning of the industrial revolution, and which – the Canadian Climate Centre's Global Circulation Model predicts – will be 3.5°C warmer. The fire season will grow longer, leading to more large, high-intensity wildfires. Canadian scientists predict the season will increase by an average of

V. Silnov/UNEP/Topham Picturepoint

some 30 days a year, with the area of their country's boreal forests that burns each year increasing by a fifth. Increased fire activity will also be particularly critical for the larch forests of eastern Siberia, where it is expected to cause large-scale losses.

Feedback loop

Drought and fire may also release carbon from the peat bogs and swamps of the boreal zone. Between 66 and 98 billion tonnes of carbon are estimated to be stored in living and dead plant biomass in the global boreal forest area. Thus more fires, arising from more frequent and intense drought, may produce an additional pulse of CO_2 to the atmosphere, acting as a feedback loop in global warming. Global climate models also predict more frequent and more intense El Niño events in a warmer world, causing drought, fire and socio-economic problems in many parts of the planet.

In the past, forests have been an important buffer against climate change because of the way they absorb carbon. But warming, bringing more frequent drought and fires, may affect the balance of the global carbon pool and release extra CO_2 into the atmosphere.

Urgent action is required at all levels of politics and policy, strategy development and management, with action plans being based on fundamental research. Fire management strategies – including preparedness and early warning – cannot be generalized because fire has such multidirectional and multidimensional effects in the different vegetation zones and ecosystems and because many different cultural, social and economic factors are involved. So UNEP faces a challenging task in coordinating the United Nations response to fire, and depends on contributions from such interdisciplinary science programmes as the International Geosphere-Biosphere Programme, and from other United Nations efforts, like the International Decade of Natural Disaster Reduction and the International Tropical Timber Organization, the World Meteorological Organization's Global Atmospheric Watch Programme and the World Health Organization's Guidelines Project on Health and Forest Fire Events•

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