

# Air Pollution Foreshadows an Eco-disaster

by K B Sajjadur Rasheed and Md. Salequzzaman

THE bottommost layer of the earth's atmosphere is the home of mankind, yet man, through unwise practices, has contaminated this gaseous envelope by pouring harmful substances into it. This man-made creation of materials in the air which endangers health of humans is broadly labeled as air pollution. Air pollution is not new. In fact, our cave-dwelling ancestors also had to face smoky ambience in the cold season. The known law against air pollution was enacted in England in 1273 by King Edward I, prohibiting the use of a particular type of coal which emitted too much of smoke. The English poet Shelley once wrote that 'hell is a city much like London — a populous and smoky city'. Since early 1970s, a global awakening is noted regarding the probable deleterious effects of air pollution. Indeed, man has taken unfettered liberty to let into the air, his noxious pollutants, in the same manner as we dispose our waste products in the sewers beneath.

Air pollution cannot be controlled and monitored solely by national actions. Under the auspices of the WHO and the UNEP — the Global Environment Monitoring System (GEMS) operates a worldwide network to monitor air quality, especially in urban areas. This network is active in some 50 countries, where cities were selected to provide representative datasets on the basis of climatic conditions, levels of development, and pollution trends.

### Sources of Pollution

The major pollutants in the air — in terms of weight — are carbon monoxide, hydrocarbons, particulates (minute solid particles and liquid droplets), and oxides of sulfur and nitrogen. And the principal sources or contributors of these pollutants are the various modes of transportation (i.e., automobiles), fuel combustion from power plants, and various industries, followed by incineration of solid wastes and forest/agricultural fires. In general, automobiles contribute most of carbon monoxide and hydrocarbons; power generation emits particulates, nitrogen oxides and sulfur dioxide, while industrial plants are next to power plants in particulate and sulfur dioxide emissions, and next to automobiles in hydrocarbons and carbon monoxide emissions.

Carbon monoxide is a colourless, odourless, but poisonous gas, and it comes mainly from incomplete combustion of fossil fuels. By reacting with hemoglobin in the blood, carbon monoxide causes oxygen deprivation in the body. Short term exposures to it can impair judgement, cause headache and fatigue, but prolonged exposure may cause permanent impairment or even death. Sulfur and nitrogen oxides contribute to increase susceptibility to respiratory ailments and decreased pulmonary function. Air pollution is known to aggravate emphysema, chronic bronchitis and asthmatic symptoms.

Since the advent of automo-

biles power generation and industrial activities are generally responsible for air pollution, it is largely an urban phenomenon. The world population is going to cross the six billion mark by 2000 A D and nearly 50 per cent of them will be living in urban areas. One of the most valuable indices of air pollution is motor vehicles, which are mostly concentrated in urban agglomerations. The world's vehicle population has risen from 40 million in 1950 to over 400 million in 1990, and this rise is a pointer to the burgeoning air pollution problem. Developing countries now ac-

quality. These measures, varying from one country to another, include (a) use of low-pollutant fuel, (b) use of catalytic converters in vehicles to reduce nitrogen oxides, carbon monoxide and hydrocarbon emissions, and (c) increased energy efficiency. Largely through the use of low-sulfur oil, Norway's emissions of sulfur dioxide are now the lowest in Europe. In 1980s, carbon monoxide emissions in Japan fell by more than 50 per cent. Lead emissions from automobiles have also been reduced in Japan, EEC countries, and the USA through phasing out the

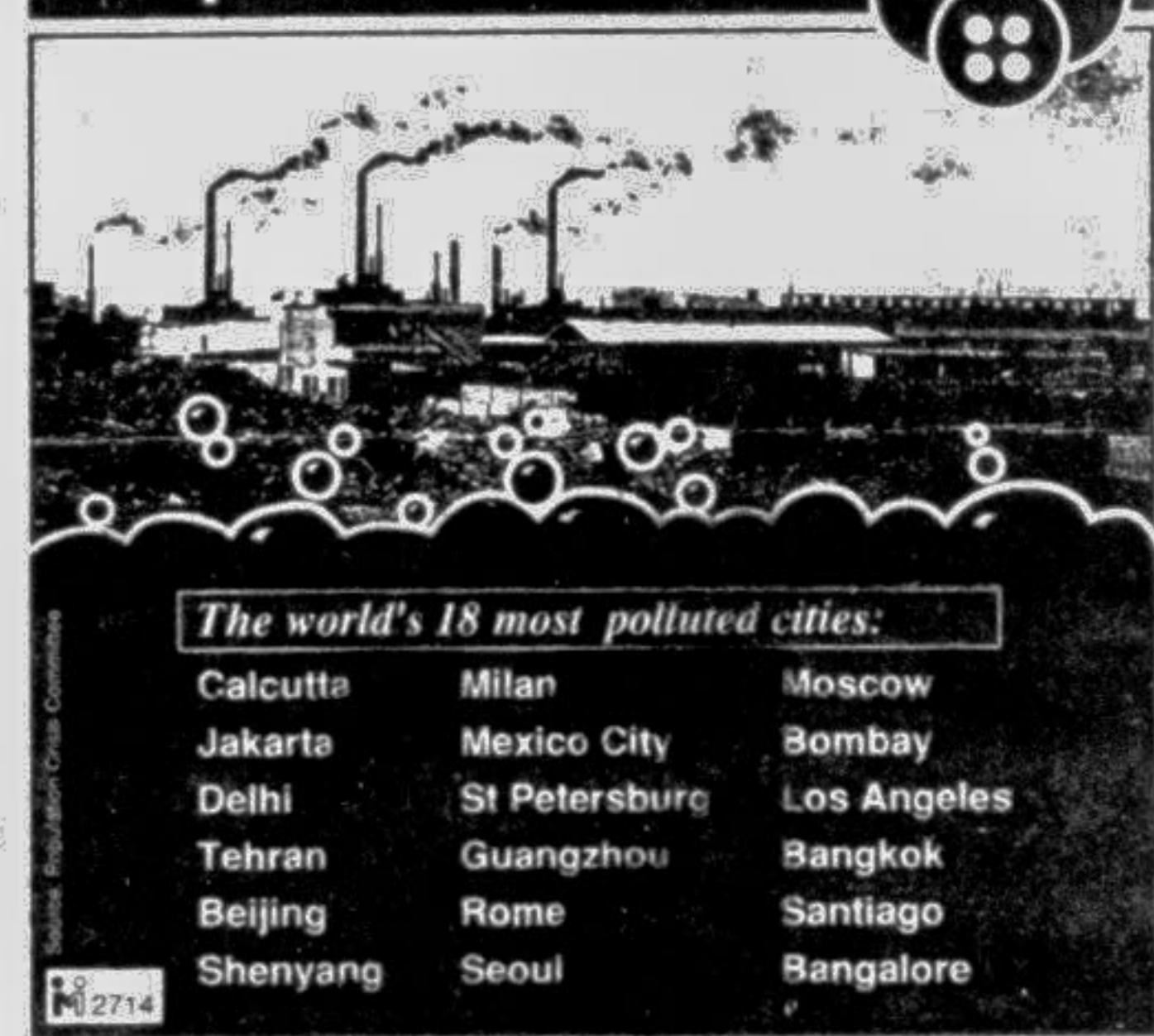
Teheran and Jakarta. Similarly, nitrogen dioxide levels have also crossed the mark set by the WHO in Bombay, Sao Paulo (Brazil) and Santiago (Chile). One study says that breathing in Bombay is equivalent to smoking 10 cigarettes a day! A major causative factor for this situation is the increase in automobile numbers. During the past two decades, vehicle ownership has more than doubled in Asia and South America.

### At Home

Environmental law aimed at combating air pollution in Bangladesh has its roots in the

Many urban centres in the developing world experience higher levels of air pollution than the WHO limits or guidelines. The GEMS data reveals that nearly 65 per cent of all urban population — mostly in the developing countries — live in areas where sulfur dioxide levels exceed the permissible WHO standards. Concentration of particulates (which remain suspended in the air) too, is highest in the big cities of the Third World. The WHO limit for particulates is exceeded in Calcutta, Bombay, Delhi, Teheran and Jakarta. Similarly, nitrogen dioxide levels have also crossed the mark set by the WHO in Bombay, Sao Paulo (Brazil) and Santiago (Chile). One study says that breathing in Bombay is equivalent to smoking 10 cigarettes a day!

## Air pollution



The world's 18 most polluted cities:

Calcutta	Milan	Moscow
Jakarta	Mexico City	Bombay
Delhi	St Petersburg	Los Angeles
Tehran	Guangzhou	Bangkok
Beijing	Rome	Santiago
Shenyang	Seoul	Bangalore

count for only 10 per cent of the global automobile population, and one may feel that automotive air pollution is mainly a problem for the industrialized developed world. But urbanization in the developing world in the next decade will be faster than the world average, and by the end of this century, 17 out of 23 urban agglomerations with a 10 million plus population (including Dhaka) will be in the Third World — exposing some 300 million people to vehicular air pollution.

### The Global Scene

Formerly, the developed countries used to address industrial air pollution problem by dispersing emissions through tall stacks and locating major plants away from the urban centres. But later they realized that more rigorous rules and efforts are needed to prevent further deterioration of air

sale of leaded gasoline. Needless to say, these control strategies carry a heavy burden of financial cost, and thus, while emissions are being curtailed in the developed world, air quality continues to deteriorate in most of the developing countries where investment in industrial expansion supersedes pollution control priorities.

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Environmental Pollution Control Ordinance of 1977. This ordinance includes air pollution aspects of the environment, and it supplanted the earlier Water Pollution Control Ordinance of 1973. The Department of Environment (DOE) is now engaged in the preparation of a comprehensive and enforceable Environmental Protection Act which would spell out control strategies. The DOE has already prepared a guideline of Environmental Quality Standards (EQS) which sets limits for all kinds of pollutant emissions, including air. These guidelines are not mandatory, but will be eventually incorporated into the new environmental act. Among air pollutants, the EQS specifies limits, which should not be exceeded, for particulates, sulfur dioxide, carbon monoxide, nitrogen oxides, as well as, for poisonous smoke emitted from auto exhausts. Complete elimination of air pollution would be impractical for economic and other reasons. The EQS thus establishes pollutant emission rates keeping in view that the limits set do not seriously compromise the hazard potential.

The database on ambient air quality in Bangladesh is weak. Nonetheless, some beginning have been made by the DOE. A survey in 1990 monitored concentrations of particulates, and oxides of sulfur and nitrogen in three representative locations in Dhaka city. The sites were Motijheel, Tejgaon and Lalmaia — chosen as examples of commercial, industrial and residential areas respectively. The maximum observed-value and the mean-value of the particulates were compared with the international standards. From January to April, i.e., during the dry months, the particulate concentrations were higher than the WHO limits in all three locations, with the highest figure recorded at Motijheel in

January. With the onset of the rains, concentrations declined. Intensity of vehicular traffic and construction activity are mainly responsible for higher concentration of particulates in the commercial zones. Sulfur dioxide and nitrogen oxides were also monitored in those three sites and compared with international standards. In general, the concentrations of these two pollutants were found to be within acceptable ranges. However, any generalization from these values should be treated with caution until long term and comprehensive monitoring is done.

Even a cursory inspection of the streets of Dhaka would alarm anyone on the level of air pollution contributed by smoke-emitting, poorly maintained and aging vehicles. According to one survey conducted by the DOE between 1982 and 1988, about 67 per cent of the vehicles monitored were emitting pollutants with the trucks and minibuses being the biggest offenders. Similarly, another set of sample observations, recorded in 1990, revealed that only 14 per cent of the vehicles in the streets of Dhaka emitted poisonous smoke lower than the permitted level set by the DOE in its Environmental Quality Standards. And of the polluting vehicles, nearly 90 per cent emitted poisonous smoke at levels considered as hazardous. Again, the biggest offenders were trucks and minibuses.

Urban air quality depends upon a number of polluting sources that vary from one location to another. Air around us is dynamic; it is in a constant state of motion and change as gases, liquids and solids are added, mixed, dispersed, absorbed and accumulated. The actual concentration of air pollutants depends not only on the amount of emissions, but also on the air to absorb or disperse these emissions. The local terrain and microclimate are also important determinants, as exemplified by Mexico city, Los Angeles and Teheran. Hence, the validity of any assessment of air pollution depends heavily upon an accurate and complete emission database and continuous monitoring exercise.

Concern for air quality stemmed from its effects on human health, but the past 20 year's evidence and research have revealed the adverse impact of air pollution on plants, animals as well as built environments. A public mobilization for cleaner air is thus overdue, especially because air pollution is not an insolvable problem. An approach is necessary that focuses on the prevention of pollution rather than pollution control. This approach will call for heavy investments, but the costs for prevention today will be lesser than the price for damage tomorrow. We cannot afford to continue to pollute the air and transform it into a vast sewer.

Dr Rasheed is Professor of Geography at the University of Dhaka and Mr Salequzzaman is Assistant Director, Dhaka Division, Department of Environment, Government of Bangladesh.

## Green Versus Greenbacks

by Janet Gardner

The same laissez-faire attitude appears to operate in Ho Chi Minh Ville. The city named for the revolutionary hero is preparing to level green areas for golfers in the heart of a protected forest park. Local officials have proposed that new trees be planted to replace those cleared for two 18-hole golf courses, 500 vacation villas and a 300-room luxury hotel.

UNDP and the UN Environment Programme (UNEP), working with the Government of Viet Nam, the World Conservation Union (IUCN) and the Swedish International Development Authority, have just completed a plan that takes such considerations into account.

This environmental action plan — which covers everything from forests to marine and

that could help lay the groundwork for more comprehensive action. In 13 provinces along Viet Nam's coast, reforestation is being carried out with support from UNDP and the World Food Programme.

But despite a \$25 million budget over the next four years, experts say that erosion caused by drought and heavy rains is making tree-planting difficult. Also hurting the effort is the fact that laws that prohibit cutting of existing trees are easily circumvented or never enforced.

"We know we need better management," says Vo Quy, director of the Centre for Natural Resources, Management and Environmental Studies at the University of Hanoi, and one of Viet Nam's most outspoken environmentalists. "Once the forests are gone, biodiversity will be destroyed."

Yet the forces working against such diversity are fierce in a country in which every tree, bird and beast carries an almost visible price tag. "There's so little money here that they'll make a commercial product out of anything," says Roger-Cox, coordinator of the World Wildlife Fund for Nature's Indochina programme.

Javan rhinos, rare elephants, tigers, monkeys — including the Leaf monkey and Gibbon monkey — and a variety of birds valued for their genetic material, are routinely hunted by poachers, he says.

"Endangered species is a new idea for Viet Nam," says Luu Quoc Minh, who heads UNDP's sub-office in Ho Chi Minh City. "Because of malnutrition, we have had to look after children before animals. We have serious social problems."

In a country that has been through so much, it seems

somehow miraculous that Viet Nam still has a wealth of resources left to protect. In the remote Vu Quang Nature reserve in Central Viet Nam, for example, wildlife experts discovered a "lost world" teeming with rare birds, animals and fish. Found here to the delight of many naturalists are a previously unknown species of tortoise and an unusual dagger-horned goat. According to scientists, stepping into Vu Quang is "like opening a door into a lost and neglected place."

The industry has also benefited from the government's pledge to make Papua New Guinea catch up with Asia's economic tigers.

Indeed, log exports have become one of the country's top dollar earners, raking in US\$ 425 million in profit last year — more than the combined earnings from gold and oil exports.

A recent report by the Rabaul-based Pacific Heritage Foundation says half of the estimated 15 million hectares of opemle forests have been allocated for harvesting and rights to another 25 million hectares are expected to be given out soon. The value of these forests is estimated at US\$106 billion.

The report says if these resources are sustainably managed and harvested by PNG companies, the country would earn an annual income of up to US\$ 3.3 billion, or US\$ 8,500 per capita — among the highest incomes in the world.

Even remote areas are being logged at a frantic pace. Loggers generally give landowners about three dollars per cubic metre. They may also offer a bulldozed road, a school room or a trip to Port Moresby for the village 'big men' in exchange for logging contracts.

Says Provincial Affairs Minister John Nilkara, "Landowners are being duped into handing over their forests for a few quick bucks. It's rape."

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most significant economic development in our area."

At a Rimbunan-sponsored press conference in July, landowners from various parts of the country slammed the proposed Forestry Act, saying it would take away their constitutional right to develop their own private property.

The Malaysian conglomerate also mounted a propaganda campaign against it, placing full-page advertisements in PNG newspapers stressing Rimbunan's commitment to the country's development.

In the past few years, Malaysian firms have invested in mining and fishing in PNG. The growing participation of

labourer cope with 40-50 tonnes a day whereas a few years ago one driver and six labourers could handle only ten tonnes.

The cost of waste disposal is very high. Participation in house-to-house service is low because residents are not prepared to pay the levy of 8,500 cedis a year. In Accra only ten per cent pay the levy.

Yet the levy is low — less than two US dollars a month — and that is per household, not per person. The WMD's revenue covers only 40 per cent of operating expenses.

The department faces other equipment problems, such as lack of adequate containers and too few vehicles. There are not enough sites where containers can be placed for residents to put their refuse in. And the pan latrines in use are causing problems.

The WMD plans to phase them out. The pans last only

procedures. The situation could get out of hand again unless the Waste Management Department (WMD), set up in 1985, can improve its finances and get public co-operation.

As the population grows with people coming in from the rural areas they do not feel duty-bound to keep their surrounding clean nor see why they should pay for disposal of the tonnes of waste they produce daily.

# Accra Cleans up in the Battle with Garbage

Daniel Kondor writes from Accra

A few years back mountains of refuse and choked gutters had helped turn Accra, capital of Ghana, into a shanty town. Today sanitation is better and the city is clean.

Yet absence of a comprehensive waste law for urban management makes it difficult to force people to comply with high sanitation standards and

landfill. Liquid waste is treated by a biological and evaporation process in oxidation ponds. Faecal sludge is composted with sawdust.

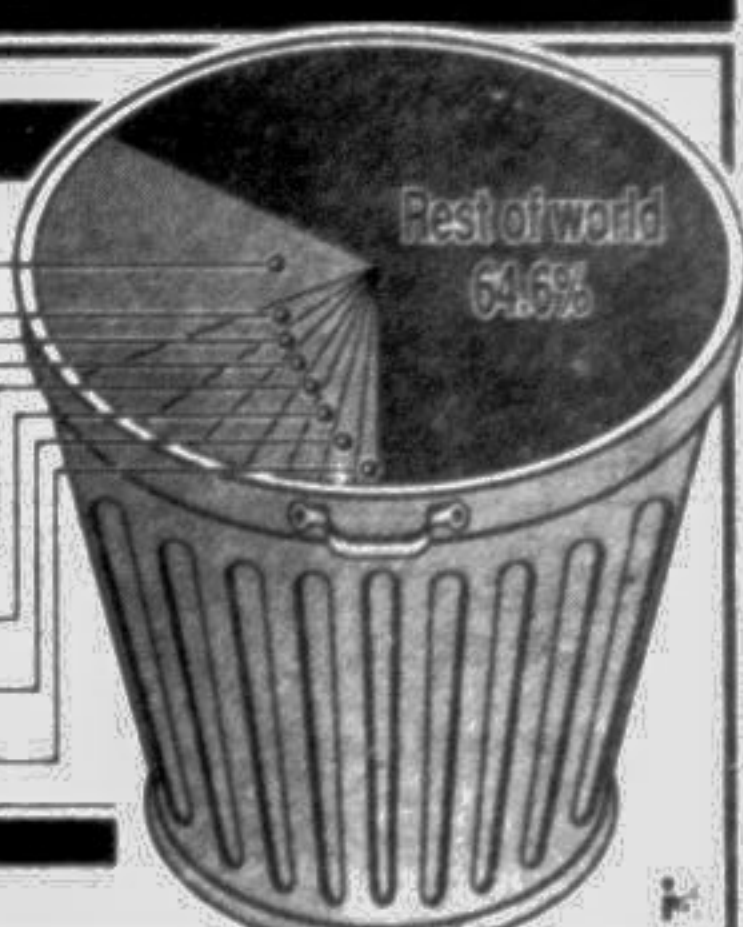
The German government has supported WMD, with vehicles worth 13.5 million deutschemarks and three technical advisers. The WMD fleet of 80 vehicles manage the situation effectively. One driver and one

three months and pose many health hazards, especially in the disposal of human excreta.

People also complain about the cost of plastic bins supplied for house-to-house refuse collection. An intensive programme has been drawn up of public information on how to remedy the situation. This includes education on user habits, and open fora and seminars to win over

## Rubbish ratio

Share of waste (m.t./day)	
US	19%
Japan	4.4%
S. Korea	2.9%
W. Germany	2.9%
Canada	1.8%
Britain	1.8%
France	1.5%
Australia	1.1%



Privatisation of house-to-house refuse collection is the latest development in the battle to clean up Accra, the capital of Ghana. In the last few years the city has become cleaner. Success has come about as a result of the setting up of a special waste management department and, reports Gemini News Service, technical advice and vehicle equipment from Germany.

About 900 tonnes of waste is generated daily in Accra. WMD chief mechanical engineer N.A. Armah says it will be difficult to cope if "our financial situation does not improve."

The department was set up to deal with waste disposal as an aspect of preventive medicine. At disposal sites it treats refuse so that it does not pollute the environment. Part of it is recycled into compost at three plants in the suburb. Some solid waste is used as

the public to help keep the city clean.

It is estimated that about 50 per cent of the people in cities in Ghana do not have adequate sanitation facilities — better than in some parts of Africa. In Sudan, Zaire, Nigeria, Ivory Coast, and Liberia the figure is up to 75 per cent.

The project manager and financial adviser in Ghana, H. R. Koch, says that a German evaluation team in 1991 commended the WMD for its remarkable performance and as a result the German government earmarked another five million deutschemarks for 1992-95.

But the financial situation of the WMD is still not good enough and so privatisation of house-to-house refuse collection in Accra is now well under way.

— Gemini News

DANIEL KONDOR is Features Editor of the People's Daily Graphic, Accra.

# Losing Asia's Last Rainforests

PAPUA New Guinea is one of the few countries in the Asia-Pacific with largely untouched swaths of rainforests, and timber-hungry loggers barred from other countries in the region are eyeing the trees greedily.

As one South-East Asian nation after another bans log exports, Papua New Guinea (PNG) and neighbouring Solomon Islands have become the one of the few remaining sources of raw logs for timber companies.

About 70 per cent of Papua New Guinea is still forest. The country is on the eastern half of an island that is also shared by the Indonesian provinces of Irian Jaya.

With world timber prices soaring as a result of the export bans, the country's forest resources are now the target of loggers in the region. Many of PNG's traditional landowners, who control 98 per cent of its forests, are eager to cash in on the logging bonanza that has swept the country in recent years.

The industry has also benefited from the government's pledge to make Papua New Guinea catch up with Asia's economic tigers.

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Ironically, Asian timber companies driven out by log bans in their own countries are

the ones chopping down Papuan forests.

The giant Sarawak-based Malaysian timber conglomerate Rimbunan Hijai Group dominates Papua New Guinea's log trade with up to 86 per cent share of its timber exports.

Forestry Minister Tim Neville, worried that foreign firms' voracious appetite for PNG timber will soon turn the country bald, proposed a package of reforms in June to make the logging industry environmentally sustainable.

Neville hopes his new Forest Resources Development Guidelines will result in sustainable yields, encourage downstream processing (only

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