

POLITICAL ECONOMY OF CHINA AND INDIA: DEALING WITH AIR POLLUTION IN THE TWO BOOMING ECONOMIES

Zhiqun Zhu

University of Bridgeport, United States. E-mail: zzhu@bridgeport.edu

Recibido: 22 Febrero 2005 / Revisado: 26 Marzo 2005 / Aceptado: 27 Abril 2005 / Publicado: 15 Junio 2005

Resumen: China and India are two booming economies today, but both are suffering from environmental damages. To achieve sustainable development, the two countries have to pay more attention to the protection of environment. This article first examines the causes and consequences of the serious air pollution problem and suggests ways for improvement. The autor argues that air pollution control and environmental protection in general are a comprehensive project that requires concerted efforts by governments at all levels, the scientific community, businesses, legal scholars, non-governmental and grass-roots groups, the international community, and individual citizens. Education and stricter law enforcement remains the key to success. China and India's experience in air pollution control provides some useful lessons for other developing countries.

Palabras clave: China, economy, India, relations.

INTRODUCTION

At the beginning of the 21st century both China and India are blessed with a booming economy. The rise of China and India will have significant political, economic, security, and cultural impacts on Asia and the world. The study of the political economy of China and India has focused on such areas as the two powers' economic growth rate, government policies regarding foreign investment, their economic development strategies, the consequences of the growing economic, political and military strength of the two nations, as well as the current and potential problems between the two giant neighbors. One area that has been understudied is the air

pollution problem in both countries, especially from a comparative perspective.

In fact air pollution is so serious that it has sounded the environmental alarm bells in both countries. Obviously air pollution and environmental protection in general deserve more scholarly research and policy attention. Air pollution knows no boundaries. The air pollution issue not only affects the two countries themselves in terms of sustainable development, it also has important regional economic, political and security consequences. The study of China and India's air pollution problem also provides lessons for other developing countries during their economic modernization.

AIR POLLUTION: SOURCES AND EFFECTS

The Industrial Revolution in Europe in the 18th and 19th centuries saw the beginning of air pollution, which has gradually become a global problem. Air pollution and environmental destruction have been aggravated in the 20th and 21st centuries in many developing countries like China and India as a result of industrialization and modernization.

Sources of the air pollution problem come from several developments including untreated industrial smoke, increasing auto exhaust emissions, growing cities, expanding energy consumption, and weak government law enforcement policies. Most significantly, rapid industrialization and urbanization have resulted in the emergence of industrial centers without corresponding growth in civic amenities and pollution control mechanisms. It is well known that large cities in China and India like Beijing,

Shenyang, Taiyuan, New Delhi, Mumbai, and Chennai are some of the world's most polluted. Urban air quality in India and China ranks among the world's worst. Burning of garbage and tree leaves is still very popular in China and India, especially in rural areas. India and China have invested little in natural gas or other clean forms of energy to reduce air pollution.

One of the major sources of air pollution in China and India is from sulfur-dioxide emissions. The major contributor to the sulfur-dioxide emissions is due to increased coal consumption in the industrial sectors in both countries. More than 70% of China's energy still comes from brown coal, the dirtiest fuel of all.

A growing auto market has contributed to poor air quality in China and India. For example, by the end of September 2004, the number of vehicles on Beijing's road had reached 2.4 million. Vehicle exhaust emissions and particles account for more than 40% and 20% of the total air pollution respectively in Beijing¹. In India 70% of air pollution is due to vehicular emissions².

The problem of indoor air pollution has assumed significant attention lately, an issue of special concern in rural areas and urban slums. Coal burning for cooking and heating is still widespread in the countryside of both India and China, creating serious indoor air pollution – a direct cause of many asthmatic, respiratory and lung diseases.

India and China are not unaware of air pollution and other environmental problems. But the warnings about environmental catastrophe often go unheard because of weak government policies to enforce environmental laws. In China, local party officials reportedly take bribes from commercial developers and win plaudits based on local economic growth rate, and thus have little incentive to halt construction that pollutes air and ruins local ecological balance.

The consequences of air pollution are substantial and alarming. Air pollution damages public health, agriculture, tourism, and economic activities in general, among other things. One of the most costly and environmentally damaging effects of air pollution is acid rain. Exposure to acid rain negatively impacts both the quantity and quality of crops produced. According to one study, wheat yields could decrease by as much

as 34% when exposed to acid rain pH 2.5, while the protein content of soybean would drop as the pH falls below 4.0³.

Another major negative consequence of air pollution is smog, which not only hurt public health directly, but also presents a substantial threat to agriculture and economic security. Economic losses due to pollution may account for 3 to 4% of the country's gross national product⁴. If left unchecked, one can expect this number to increase, leaving open the strong possibility that India and China's economic growth will eventually be limited by its compromised environmental conditions.

Smog produces a vast haze and prevents sunlight from reaching farmland. As a result, crops fail to receive the solar energy they need to grow and agricultural output suffers. According to William Chameides, an atmospheric chemist at Georgia Institute of Technology, "every one percent of dimming reduces crop growth by an equal one percent"⁵.

Average citizens suffer enormously from polluted air. According to China's environmental protection agency, the quantities of carbon, nitrogen and other gases in Chinese cities will make the air too toxic to breathe in the most polluted urban areas within a decade. And by 2020, about 550,000 Chinese will be dying prematurely of chronic bronchitis from airborne pollution, and tens of millions will be affected by respiratory distress⁶.

Living in Chinese cities with the worst air pollution does more damage to an average Chinese person's lungs than smoking two packs of cigarettes a day, according to a report⁷.

Air pollution also causes tourism industry to suffer. For example, known for its spectacular views overlooking the city's harbor, Hong Kong has long been considered a popular vacation spot by travelers from around the world. But a 2002 survey by the Hong Kong Tourism Board indicates that visitors' rosy views of the city are increasingly clouded by smog.

Asked to identify their biggest complaints about their experience in Hong Kong, the survey's respondents listed air pollution as the top problem⁸.

AIR POLLUTION IN CHINA

Two-thirds of Chinese cities have air quality below World Health Organization (WHO) standards, by far the worst rate of any large country in the world. Several have the highest rates of airborne carbon monoxide in the world.

A majority of the air pollution problems lie in the urban areas of the country. The pollution levels in many of the cities have reached levels several times that of the standard proposed by the WHO. For example, air pollution levels in China's industrial Pearl River Delta are two to five times higher than U.S. air quality standards, according to a Hong Kong think tank⁹.

Air pollution has taken its toll on public health in China. In northeast China's rust-belt Liaoning province, for example, death from lung diseases is four or five times higher than in developed countries, according to one study¹⁰.

Heavy smog caused by burning coal, industrial pollution and car exhausts have ruined air quality in Chinese cities and reduced visibility to as low as 200 meters (660 feet). Serious air pollution has interfered in the daily life of many city residents. The Beijing Municipal Environmental Bureau sometimes even has to warn local residents to stay home and away from the smog-filled air.

Poor air quality has even interfered in normal international activities. For example, to the disappointment of some 50,000 spectators and a slight embarrassment to the Chinese government, the performance of the French Air Force aerobatics, as part of the scheduled events during French President Jacques Chirac's October 2004 visit to China to celebrate 40 years of Sino-French diplomatic relations, had to be postponed and rescheduled due to poor visibility in Beijing¹¹.

Pollution in southern China's Shenzhen has become more serious as the population and the number of cars continues to rise. Shenzhen had 131 smoggy days in 2003, the most in 50 years, based on an official report. According to the same report, there were only 8 and 58 hazy days reported during the whole 1970s and 1980s respectively. Even during the 1990s there were only 773 days of smog¹².

China Radio International reports that China's Pearl River Delta region is starting to suffer photochemical smog due to heavy air pollution in the cities¹³. Emissions from factories, power plants and the rapid growth of vehicles in cities are providing the raw materials for photochemical smog. The smog is caused by the chemical interaction of large amounts of nitrogen oxides and hydrocarbon compounds caused by ultraviolet radiation from sunlight. Breathing smoggy air can result in eye, nose, and throat irritation, acute and chronic bronchitis, asthma, headache, and permanently reduced lung capacity.

In Hong Kong, the city's falling air quality has become a major concern for many residents suffering from the acrid clouds of pollution that sweep across from mainland China, adding to emissions from local vehicles, factories and power plants in the densely populated city. Air pollution in Hong Kong hit record levels in September 2004, prompting the government to warn people with heart and respiratory problems to stay indoors. On many days of the year now, the city is shrouded in smog and it is nearly impossible to see across its famous Victoria harbour¹⁴.

Construction dust is also a major pollutant of air in China. Major cities like Beijing and Shanghai have thousands of big construction sites, a major producer of the dust pollution. It's not uncommon to see dust flying in the air with bare eyes.

Coal remains the lifeblood of China. It is still near the top of the list of industries critical to maintaining China's robust economic expansion. Despite frequent, tragic coal mining accidents, China is expected to pull 1.9 billion tons of coal from the ground in 2004, up 10 percent from the previous year. And in 2010, it aims to raise that to 2.2 billion tons. Furthermore, three-quarters of China's 400,000 megawatts of installed power capacity, the world's second largest after the United States, are fired by the jet black fossil fuel¹⁵.

AIR POLLUTION IN INDIA

Air pollution has directly threatened public health in India since most pollutants in the atmosphere can be breathed into the human body triggering respiratory illnesses and even lung cancer. For example, of the three million premature deaths in the world that occur each

year due to outdoor and indoor air pollution, the highest number is assessed to occur in India¹⁶.

According to the WHO, the capital city of New Delhi is one of the top ten most polluted cities in the world. Surveys indicate that in New Delhi the incidence of respiratory diseases due to air pollution is about 12 times the national average.

According to another study, while India's gross domestic product has increased 2.5 times over the past two decades, vehicular pollution has increased eight times, while pollution from industries has quadrupled¹⁷. Like in China, industrialization is accompanied by severe air pollution and environmental damage in India.

The use of biomass as a fuel source has been a major health hazard in India. Independent estimates say that there are more than three billion people worldwide, including an estimated 90% from rural India who use stoves that burn smoke-producing fuels for cooking and heating. The smoke produced is a major factor producing various respiratory and lung diseases in India.

The burning of household fuels poses a particularly serious health threat to women and children in India. India currently bears the largest number of indoor air pollution (IAP)-related health problems in the world, with 75 percent of its households burning wood, dung, and crop residues – the "traditional" biomass fuels. According to the World Bank, an estimated 500,000 women and children die in India each year due to IAP-related causes –this is 25% of estimated IAP-related deaths worldwide¹⁸.

Millions of people in India, mostly women, spend hours crouched over smoky stoves every day. Often the smoke is so toxic that, according to one estimate, Indians lose 15 years of their lives, said Ashok Khosla of Development Alternatives, one of the non-governmental organizations in India. Although residents of cities like New Delhi tend to burn gas, a recent government study revealed that two of every five residents in the capital city of 14 million suffer from lung ailments¹⁹.

In India, in addition to pollution caused by coal burning which provides over 50% of its energy, aerosol use also adds to the air pollution problem. The aerosol pollution has created a

brownish haze over 10 million square kilometers over the Indian Ocean during the monsoon season. The pollution comes from the mainland but is carried over the ocean when monsoon seasons arrive, making it extremely visible.

EFFORTS TO CURB AIR POLLUTION

Air pollution control is a comprehensive project that involves concerted efforts by governments at all levels, businesses, technological and scientific communities, legal scholars, educators, grassroots and non-governmental organizations, and individual citizens.

Although both India and China have realized the importance of environmental protection and sustainable development and have taken measures to protect the environment, their efforts to curb air pollution have not always been satisfactory and effective. For example, since mid-1980s, the Beijing municipal government has moved over 200 heavy industrial polluters, mainly those factories engaged in the production of machine tools, woodcutting and musical instrument production, to Beijing's suburban region. While this may have helped the city itself, relocation of heavy polluters does not eradicate the sources of pollution and simply spreads pollution elsewhere.

More and more resources will have to be devoted to remedying air pollution problems. Scientific and technological research must be encouraged to find ways to reduce the amount of pollutants. This means investing more in the research and development of environmentally sound technology, adopting, implementing and enforcing more stringent emissions standards.

For China, the 2008 Olympic Games offer further incentive to clean up air, especially for Beijing. The Beijing government has promised to upgrade its fuel to meet pre-2008 Olympic Games anti-pollution standards. The city has ordered all petrol stations in the capital to sell gasoline and diesel that meet the Euro II fuel cleanliness standard from October 2004 in a bid to cut air pollution²⁰.

Air Pollution Regime

India's environmental protection institutions were established earlier than China's. India was the first country to insert an amendment into its

constitution allowing the state to protect and improve the environment for safeguarding public health, forests and wild life. Protecting the environment was enshrined in the 42nd amendment to the constitution in 1976. India participated in the United Nations Conference on the Human Environment held in Stockholm in June 1972. The Air (Prevention and Control of Pollution) Act was adopted in 1981 and amended 1987.

Following the 1984 Bhopal disaster, in which a toxic leak from the city's Union Carbide chemical plant resulted in the deaths of more than 3,000 people, environmental awareness and activism in India increased significantly. India passed the Environmental Protection Act in 1986 and created the Ministry of Environment and Forests (MoEF) to strengthen India's commitment to environmental protection. Under the 1986 Environmental Protection Act, the MoEF is tasked with the overall responsibility for administering and enforcing environmental laws and policies.

The burgeoning awareness of the 1970s did not mark the first efforts by India on the environment. In fact, the country has had a long history of environmentalism with the passage and codification of acts such as the Indian Penal Code (1860), the Bengal Smoke Nuisance Act (1905), the Indian Forest Act (1927), the Factories Act (1950s and 1960s), and the Water Act (1974).

In comparison, China started later in establishing an environmental protection regime. The first national conference on environmental protection was reportedly held in the 1970s. In 1982 the Chinese leadership placed an environmental protection section in the nation's constitution. Beginning in 1983, the State Council declared that environmental protection was "one of the basic national policies"²¹.

In 1989 the National People's Congress (NPC) passed the PRC Law on Environmental Protection. It was not until 1995 that the NPC passed the PRC Law on Air Pollution Prevention and Control. Article 15 of the Law states: "In order to reduce the generation of air pollutants, enterprises should give priority to adopting cleaner production technology which has higher energy efficiency and generates less waste."

In 1996 the NPC passed the PRC Law on Water Pollution Prevention and Control. Article 22 of the Law states: "Enterprises should adopt cleaner production technologies to achieve higher efficiency of resource use and to generate reduced levels of pollutants. Enterprises should strengthen house-keeping to reduce the generation of pollutants."

After the Rio International Conference on Environment and Development held in 1992, the Chinese government formulated China Agenda 21, a governmental agency that studies and promotes sustainable development as a major strategy in the modernization drive. Between 1994 and 1996, the Chinese government convened two China Agenda 21 senior officials' round-table conferences to seek international cooperation in pushing forward China's work in environmental protection and sustainable development²².

In the mid-1990s, Chinese environmental NGOs were the first to register when Beijing passed legislation granting legal status to citizen-organized social groups. Individuals wishing to create green NGOs were inspired into action by not only the severe pollution problems, but also by the growing presence of international environmental NGOs in China. By early 2004 more than 2,000 environmental non-governmental organizations have been formed in China. The Chinese media also have become more attuned to environmental issues—the number of environment-related articles in Chinese newspapers has more than doubled since 1995—and willing to criticize the government for ecological disasters²³.

China's State Environmental Protection Administration (SEPA) was officially reorganized in 1998. And in June 2002 China enacted the Cleaner Production Promotion Law, which established demonstration programs for pollution remediation in ten major cities and designated several river valleys as priority areas²⁴.

Despite legal efforts of both countries, they face the challenge of strictly enforcing these rules and laws. Given the huge size of both countries, insufficient public awareness, lack of scientific breakthrough, and poor enforcement of existing laws, India and China have a long way to go to improve air quality.

Grassroots Movement

Chinese university campuses have become an increasingly warming hotbed of environmental protection activity. Within the last few years most universities have witnessed the rapid growth and development of student led and organized environmental groups. Most student groups have been established only in the recent few years - at Qinghua (Tsinghua) University in 1995 and at Renmin University in 1996. Their membership is small but growing. For example, out of an entire student body of 12,000 Qinghua University has a Green Society membership of about 400 members²⁵.

Student environmental organizations at Chinese universities have exploded in number: from 22 at the end of 1997 they have now increased to 184 student groups, located at 176 universities in 26 provinces²⁶. In the early 1990s, university administrations created the first student green groups, but today most groups are initiated by students, who do green work on and off the university campus (e.g., waste reduction and environmental awareness activities, summer green camps for university students, monitoring water quality in local areas). Student green groups have created networks to share information on their green activities. These student groups are helping to cultivate a growing pool of environmental activists and more environmentally aware graduates entering the workforce. The emphasis of these groups is on education. If the future leaders of China have an understanding of the importance of environmental protection then widespread action cannot be very far away.

India's non-governmental organizations have a longer history. For example, the Center for Science and Environment (CSE), an independent, public interest organization which aims to increase public awareness on science, technology, environment and development, was started in 1980. For more than two decades, CSE has been challenging the Indian government and the public to confront environmental problems and searching for solutions that government and communities can implement effectively.

Grassroots environmental groups are becoming increasingly important in raising awareness of the air pollution issue in China and India, but much remains to be done. Educational and research institutions such as The Energy and

Resources Institute (TERI) and Environment Protection Training and Research Institute (EPTRI) in India and Cleaner Production in China should continue their efforts to disseminate information about the environment and to educate the public about the importance of environmental protection.

International Cooperation

Both India and China have sought international aid and cooperation in fighting against air pollution and environmental deterioration.

For example, to help improve the health, livelihood and the quality of life of Indian and rural households, the United States announced in November 2004 two grants worth \$230,000 to India for community-based programs to reduce indoor air pollution from household energy use²⁷. The pilot projects, under the aegis of the Partnership for Clean Indoor Air (PCIA) aim to address the increased environmental hazards faced by the rural Indians from traditional biomass fuels. The U.S. Environment Protection Agency (USEPA) is also looking at working to reduce indoor air pollution in China, Africa and Latin America based on India's experiences.

The city of Kolkata's air pollution levels were among the highest in the world. 400,000 residents breathed air highly polluted by emissions from the 50-year-old coal-fired power plant operated by Calcutta Electric Supply Corporation (CESC) –the largest private thermal power company in Eastern India. The CESC plant was just one of 81 similar coal-fired thermal power plants in India. The U.S. Agency for International Development (USAID) utilized proprietary technology from Beltran, a small New Jersey-based company, to help improve the CESC plant. USAID helped install the air pollution system for all eight of its coal-fired boilers. The technology, new to India, will reduce emissions at the plant and is more efficient than the conventional equipment currently used to limit pollution generated from the plant's emissions. As a result, CESC's 400,000 neighbors are breathing cleaner air, with markedly reduced particulate matter - the chief cause of respiratory ailments. The reduction also prevents the CESC facility from closing, saving 700 jobs of primarily local residents who depend on the plant for their livelihoods. USAID plans to share the technology with other similar coal-fired power plants in India²⁸.

According to Clean Air Initiative for Asian Cities, a World Bank and Asian Development Bank related group that promotes air quality in Asia, the Japan Bank for International Cooperation (JBIC) has initiated Air Quality Management (AQM) intervention programs in six Asian countries, including China and India²⁹. China has also received cooperation and aid from Japan Environmental Management Association for Industry (JEMAI) for air pollution control.

Both India and China ratified the Kyoto Protocol in August 2002. In addition to their own efforts to clean air at home, they are also actively participating in international environmental protection activities and cooperation.

PROBLEMS AND SOLUTIONS

Both Chinese and Indian governments realize the importance of protecting the environment. They face the task of dispelling air pollution and improving air quality for their citizens. Despite initial successes in some areas, there are several major obstacles in the process for both India and China. These problems and suggested solutions are listed below:

Public transport

Given the large populations in China and India and their poor and limited road systems, both countries probably need to prioritize the development of public transport and encourage the development and efficient use of clean fuels instead of promoting sale of private cars.

Since vehicle emission is the single largest pollutant in cities, old gas must be replaced by liquefied petroleum gas and natural gas. By 2002, Beijing had the largest fleet of natural gas buses in the world – a total of 1,630 vehicles³⁰. Subways and light rail systems in Beijing are also being expanded to provide more convenient transport for the public. Air quality has somewhat improved in Delhi since the public transport was ordered to switch to compressed natural gas in 2002³¹. These achievements are encouraging, but one should not become complacent.

Urban transport is a conspicuous contributor to the accelerating pollution levels and the consequent menace to the health of citizens, local atmospheres, and global climate. The

gravity of such impacts necessitates urgent resolution of problems like outdated automotive processes, ill-maintained vehicles, congested traffic, obsolete fuel refining technologies, and lax inspection standards.

Possible solutions include the development of environment-friendly and energy-efficient vehicles and fuels, upgrading to cleaner fuels, and setting up of clean air standards and specifications for automobiles. Improving public transportation systems will also help India and China to discourage the purchase and use of private automobiles that their roads are not prepared to accommodate and to make travel and commute more pleasant.

Renewable energy

Despite the potential problems, the number of automobiles will likely continue to increase in India and China, creating both energy and pollution problems. In China, for example, local governments have mammoth vested interests in a lucrative auto market and are not likely to control the number of vehicles entering the road every day. Though rules and regulations have been passed at the central and local levels, how they are to be properly enforced is a big question.

Both India and China must diversify sources for their energy generation. Renewable energy includes solar and wind power, hydropower, and nuclear power. In India about 70% of all electricity produced is coal-based and less than 5% comes from renewable sources. With India's abundant sunlight and wind power, new private sector projects in these areas should be given incentives. India and China have the capability and resources to make use of these renewables for the increasing demand of energy. Both countries also need to conduct more environmental and energy-efficiency policy research.

About 80% of India's vehicles run on diesel and only 20% on gasoline. India is the world's second-largest producer of sugar cane, which is used to make ethanol. Ethanol is a renewable source of energy, it's eco-friendly and the increased production will also benefit agricultural sector and farmers. India is researching, in cooperation with Brazilian institutions, on how to blend ethanol with diesel³².

To reduce indoor air pollution, effective approaches must be introduced to increase the use of clean, reliable and safe home cooking and heating practices so as to reduce exposure to indoor air pollution caused by burning coal, wood, crop waste and cow-dung.

The efforts of India to promote renewable energy are commendable since India is the only country that has a separate government ministry, the Ministry of Non-Conventional Energy Sources, which promotes and regulates use of renewable energy.

India and China could also introduce a program similar to the New York State Energy Star Program, which provides economic incentives to individuals and businesses that implement state-approved, energy efficient technology³³.

Education

Education is vital in the process. Both China and India must raise public awareness of air and environmental pollution and encourage grassroots participation in addressing these problems. Resources must be made available to educate the public about the dangers associated with air pollution and the benefits associated with undertaking a more environmentally conscious lifestyle.

China has the largest smoking population in the world. Smoking is a source of both indoor and outdoor pollution and a direct cause of many diseases. The bad culture of smoking and using expensive cigarettes to pry opportunities in a competitive society must be abandoned.

Tree planting

One of the most important measures to counter pollution is planting trees. With neem and peepal being the largest emitters of oxygen, planting them in the gardens purifies the surrounding air and helps in maintaining hygienic conditions. While champa, mogra and chameli have better chances of surviving pollution in summer, bulbous varieties do better in winter.

While thousands of trees are cut, one per cent of India turns to desert every year. And about 100 million families use firewood for cooking³⁴. Just like China, India needs to be re-greened. Both India and China should promote tree planting.

It's economical and easy to do, but its benefits are far-reaching.

Vigorous enforcement of laws and rules

India and China have passed laws and rules regulating air and protecting the environment, but the environmental legal regime is not backed up by effective enforcement, especially at the local level.

In 1998, for example, India's Supreme Court issued a ruling requiring all New Delhi's busses to be run on compressed natural gas (CNG) by March 31, 2001. Compliance was to be achieved either by converting existing diesel engines or by replacing the buses themselves. However, only 200 out of a total fleet of 12,000 CNG-fueled buses were available by the initial deadline and public protests, riots, and widespread commuter chaos ensured as some 15,000 taxis and 10,000 buses in the city were banned from use. To ease the transition, the local government changed course and allowed for a gradual phaseout of the existing diesel bus fleet³⁵.

China's environmental protection department is woefully understaffed. It roughly only has one-hundredth as many staff members as the U.S. Environmental Protection Agency, though China's population is four times as large as the United States. The prevailing dust cap over many Chinese cities shows the impotence of existing dust control measures. They are either too weak or not taken seriously.

Given China's reliance on coal as a major source of energy, it is perhaps impractical to cut coal production. However, China can optimize the energy consumption structure by focusing on the clean use of coal. And China can accelerate the pace of reducing sulfur pollution from fuel-powered electricity plants³⁶.

India's Central Pollution Control Board (CPCB) has established a national network of ambient air quality monitoring station. This nationwide program, called the National Ambient Air Quality Monitoring (NAAQM) was launched in 1984 with a network of 28 monitoring stations covering 7 cities. Now the network comprises 290 stations spread over 92 cities and towns across India³⁷.

In addition to the above-mentioned measures, India and China could also seek international assistance in their efforts to combat air pollution and improve the quality of their pollution control technology. Both the World Bank and the International Monetary Fund attach great importance to the protection of environment in their programs. As major recipients of loans from the two institutions, India and China can take advantage of these programs to invest in technological research and education of the public.

CONCLUSION

The right to clean air has become an important component of human rights. The issues of pollution and development should not be treated separately, but as interactive and interdependent factors in modernization and urbanization. Air pollution control is a comprehensive project that requires efforts by a diverse spectrum of stakeholders, for instance, auto-makers, oil companies, engineers, health workers, academics, legal experts, media representatives, and policy and decision makers.

Both China and India are developing countries with an impressive growing economy. Their energy consumption is rising rapidly, and both still rely heavily on coal—China for more than 70% of its commercial energy and India for over 50%. The International Energy Agency projects that rising energy demand in China and India

will account for more than two thirds of the expected global increase in coal use between now and 2030.

These population giants will have enormous impacts on the global energy market and the environment in the decades ahead. Therefore they must reconcile their ambition for modernization with their need for environmental protection. For their economic growth to continue and not to be a short-lived phenomenon, it is absolutely necessary to protect air and environment. Enforcement of environmental laws and education of the public are the keys to success. When India and China are committed to protecting the environment during their economic growth, their rise will be more likely to be welcomed by the international community.

Modernization and industrialization, while improving living standards for people in many developing countries, also bring with them ever-increasing environmental degradation. What these countries and the international community can do to help protect air and the environment is a challenge to all concerned. China and India are two primary examples of how the government and the public are gradually realizing the seriousness of the issue and are taking measures to control air pollution. Their efforts provide some valuable lessons to other developing countries as these countries also start to embrace the concept of sustainable development.

NOTAS

¹ Guo Zi, "Efforts Needed to Give Beijing More Blue Skies," *China Daily*, October 13, 2004, retrieved from the same day.

² "57 Ways to Make India a Better Place," *India Today*, August 23, 2004, 22-70.

³ Feng Zongwei, et al., "Effects of Acid Deposition on Terrestrial Ecosystems and Their Rehabilitation Strategies in China," *Journal of Environmental Sciences*, 14-2 (April 2002), 3.

⁴ Zhang Shiqiu, "China's Energy, Environment, and Policy Perspective," *Journal of Environmental Sciences*, 12- 3 (September 2000).

⁵ Gorman, Jessica, "The Dragon Eats the Sun", *Discover*, 21-5 (May 2002), 14.

⁶ Economy, Elizabeth, The River Runs Black, quoted in "China's Blurred Horizon", *The Washington Post*, September 19, 2004, B01.

⁷ "China's Blurred Horizon", *The Washington Post*, September 19, 2004, B01.

⁸ Keith Bradsher, "A Rosy, Pink Cloud, Packed with Pollution", *The New York Times*, September 10, 2002.

⁹ "Pollution in Southern China Exceeds US Standards--Study", Reuters, November 10, 2004

¹⁰ "Breathing the Air of Success", *The Economist*, February 15, 1992, 40.

¹¹ "Air Pollution Hits Air Shows", *PA News* (UK), October 10, 2004, accessed online from the same day.

¹² "Air Pollution Worsens in Shenzhen", *Xinhua News*, October 27, 2004, accessed online from the same day.

¹³ "Pearl River Delta Getting Photochemical Smog", *Xinhua news service*, accessed from on November 3, 2004.

¹⁴ "Pollution in Southern China Exceeds US Standards--Study", Reuters, November 10, 2004.

¹⁵ John Ruwitch, "China's Dependence on Dangerous Coal Keeps Growing", *World Environment News*, October 12, 2004, accessed from <http://www.planetark.com> the same day.

¹⁶ "India: Environmental Issues", Energy Information Administration (EIA), US Department of Energy, July 2003, from EIA's website at <http://www.eia.doe.gov>

¹⁷ "Corrosion in India", accessed online from on October 28, 2004.

¹⁸ "Indoor Air Pollution: Fighting a massive health threat in India", the World Bank, report available at.

¹⁹ "United States to fund two projects to reduce air pollution in India", *Planet Save Network*, November 8, 2004.

²⁰ "Sinopec to Clean up Fuel as Olympics Sponsor", *Sports Illustrated news*, October 11, 2004.

²¹ "Environment Sacrificed to Development?", *Australia & World Affairs* 24 (Autumn 1995), 14.

²² Chen Jinhua, "China and Sustainable Development", March 2001.

²³ "China's Blurred Horizon", *The Washington Post*, September 19, 2004, B01.

²⁴ "China: Environmental Issues", Energy Information Administration (EIA), US Department of Energy, July 2003, from EIA's website.

²⁵ "PRC ENVIRONMENTAL NGOS PART VII: COLLEGE GROUPS", An August 1999 report from US Embassy in Beijing

²⁶ Jennifer L. Turner, "The Growing Role of Chinese Green NGOs and Environmental Journalists in China", report for Congressional Executive Commission on China, accessed from on November 10, 2004.

²⁷ "US aid to reduce indoor air pollution in rural India", *New Kerala (India)*, November 8, 2004.

²⁸ "Cleaner Air for 400,000 Residents in India: USAID helps 50-year-old thermal power plant in India clean up its act", accessed from USAID website at November 11, 2004.

²⁹ *Clean Air Initiative news*, accessed on November 11, 2004.

³⁰ "China: Environmental Issues", Energy Information Administration (EIA), US Department of Energy, July 2003. Accessed from EIA's website.

³¹ "Delhi: Metro Mater", *India Today*, December 15, 2003, 44.

³² "India: Tackling Import Dependence", *Petroleum Economist*, December 17, 2002, 18.

³³ The Energy Star Program is a New York State energy rating program funded by New York Energy Smart. A partnership agreement is established between the builder and the New York State Energy Star Program. In essence, this agreement raises the performance standard for the construction of new homes in New York State. An ENERGY STAR Labeled Home is at least 30% more efficient than a comparable home built to the model energy code. Additionally, to qualify for NYSERDA incentives, the builder agrees to: a) Include a total of 300 kWhs of estimated annual savings from ENERGY STAR labeled lighting and appliances in the new home. b) Include the capability to deliver automatically controlled mechanical ventilation of at least 15 cfm plus and additional 15 cfm per bedroom. The builder

will also work with a Home Energy Rating System rater to obtain design reviews as needed and to verify ENERGY STAR labeled homes meet all requirements described in the commitment.

³⁴ "57 Ways to Make India a Better Place", *India Today*, August 23, 2004, 70.

³⁵ "India: Environmental Issues", Energy Information Administration (EIA), US Department of Energy, July 2003, from EIA's website.

³⁶ According to Gu Xiulian, vice-chairwomen of the National People's Congress Standing Committee, China will not build any new coal-burning plants in and around large and medium sized cities. See "China Pledges to Curb Air Pollution", *CCTV News*, September 29, 2004. Accessed online from on October 13, 2004.

³⁷ "Air Pollution Monitoring in India", Clean Air Initiative for Asian Cities (The World Bank & Asian Development Bank), accessed online from on October 13, 2004.