

EU Country Environmental Profile

CHINA

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Country Environmental Profile

CHINA

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Important note:

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An attempt has been made to use as much recent and topical information as possible. Certain judgements on the state of environmental management in China may prove to be too optimistic or indeed too pessimistic. A report that is devoid of ‘judgement calls’ runs the risk of being too anodyne to stimulate the policy debate and response that can help China avoid the more ‘perilous paths’ in its long term economic development.

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1. PROFILE SUMMARY

Key Environmental Issues

Undertaking an environmental profile of China, including critical environmental issues, in a short report is a formidable task. Not least is the scale of the country, which under different historical circumstances might be as many as ten or twenty separate nations. It is often remarked that the backward western provinces and regions might be viewed as separate developing countries on their own, while the coastal provinces would easily fit a model of middle income countries. Chinese cities such as Hong Kong and Shanghai have quarters which would make many parts of European cities look dilapidated and quaint.

With this scale comes inevitably an enormous diversity in livelihood systems. These range from extensive pastoral modes in the north and west, where overgrazing is a sustainability factor, to intensive rice land production; here excess biocides and fertilisers have serious environmental consequences. In the south and east there are arable wheat lands, while in the far west in Tibet-Qinghai special mountain adaptations and cultural systems are now being eroded by social change. In central regions of China inland fishing and aquaculture practices are being seriously affected by water abstraction and drainage projects, also by the pollution that has damaged river and coastal marine fisheries.

The urban environment sees water-short cities and towns in the north, with a polluting heavy industry, while in the rural interior village textile and intensive livestock enterprises too often function without any reasonable consideration of local environmental and health impacts. Model light technology industries of the south east may offer desirable models for 'limited environmental impact' development, but exploitative labour conditions and poor waste disposal practice may equally apply. Waste disposal and water treatment by municipalities is an area where poor practice outside the most progressive centres is universally reported.

Sustainable Development Policy

The 2001-2005 Five Year Plan programmed for an "improved environmental performance in pollution control while the deteriorating trend in the ecological environment will be halted." At his speech to the National People's Congress of 2004, President Hu Jintao called for balanced growth with the objective of *Xiaokang*, an 'all round, well-off society'. Policy statements at the highest level have therefore recognised the environmental – and possible social – consequences of the legacy of past policies which focused on economic growth. While investment in environmental management in the early 1990s was restricted to 0.8% of GNP, today the figure is at 1.3% of GNP and is programmed to increase to 1.7%.

China has subscribed to all the major Multilateral Environmental Agreements (MEAs) which, with international encouragement and development cooperation, has seen positive responses in domestic policy-making, not least in tightening up the environmental assessment of new projects. Severe difficulties remain however in implementation of policy in the context of weak environmental governance. The 1992 UN Conference on Environment and Development (UNCED), requiring a national response through implementation of 'Agenda 21' policy areas and a 'mainstreaming' of environmental criteria in development policy, was met with a positive and significant policy response in China.

The Chinese leadership is committed, and is well placed to achieving most of its UN Millennium Development Goals (MDGs) in the areas of poverty alleviation, health and

education, but a notable possible exception is in Goal 7: Environmental Sustainability. These goals indeed reflect key elements of the ‘*Xiaokang Society*’ to be achieved by 2020 which include a balanced development between a) urban and rural areas, b) different regions, c) economic and social factors, d) humans and nature, and e) domestic security and an open society.

Assessment of Environment Management

Certain particular factors which have to be taken into consideration in a study of the state of the environment and its management in China are worth emphasising at the outset. These relate to the quality of available research and scientific information. The following points are therefore salient.

- There is a special history of isolation from the West and a poverty of documented and independent social and scientific research on land use change and environmental pollution parameters – never a priority for decision-makers;
- Such scientific data as exists, and is now being increasingly generated, needs to be treated with considerable caution because there is a past history of data which has been falsified or is politically construed – even recent trends are difficult to establish because of this and a lack of consistency and care in the use of statistical data, also the fact that change is happening so fast; and
- First hand social science research still cannot be freely undertaken to understand the nature of poverty and social deprivation, even in the environmental context, because this too may be associated with corruption in local government. The best social science insights depend on individual stories, where broader studies tend to represent untested generalizations.

Yet the research context is not universally gloomy; there is an acknowledgement at the highest levels of the seriousness of environmental sustainability issues. There is also an increased readiness to publish environmental data however dire, and with this an opening up to sharing such data with civil society through the media. This is seen to bring pressure to bear on key decision makers in provincial and county offices of government who have responsibility for controlling environmental pollution and managing and implementing the law. As will be seen the law is not well implemented and is often ambiguous and even unrealistic or over demanding. In this context the World Bank in its report of 2001 “China – Air, Land and Water” acknowledges however its completeness.

Environmental Decision-Making

China has a top down administrative culture and an inherited belief in regulation by law, even if its interpretation might seem relativistic. In the case of accident or pollution incident, for example, the first appeal is to the law – it was not implemented, or even that new legislation is required. However, the critical problem is in fact in too many permissive decisions being taken to achieve a consensus of the interests of social stability, lack of resources and, also, vested personal interests. More resort to courts is considered desirable, but to conduct cases there are certain deficiencies requiring rectification: a) judges need to be better trained, b) costly evidence to support a case needs to be resourced, and c) court decisions must be implemented – and seen to be implemented. There is in many ways a better prospect of these

eventualities with increasing private sector ownership and citizen participation to bring public attention to environmental transgressions.

Past decision-making with negative environmental consequences has happened behind closed doors; social connections are invoked (*guanxi*) to avoid taking tough decisions. In any case decisions with financial implications (penalties) where the state owns all the means of production simply involve a transfer from one service to another. The private sector abuse of the law should become easier to control in the future, provided that is that local companies are not part owned by government officials, which is unfortunately too often the case following privatisation initiatives.

One significant positive development is an apparent reinvigoration of EIA with a new law, in 2003, which requires that investors design projects to mitigate their potential environmental impacts more seriously. Developers are also to be required to consult civil society. Despite this, controversial projects and factory location decisions may not be so open to challenge. EIAs are conducted by certified government scientific departments some of which are becoming privatised and more independent of government.

There is an apparent lack of research into the quality and realism of such EIAs, or to what extent wider public interests as opposed to narrow industry interests are taken into account. It is reported, however, that EIA statements are available for consultation in local government offices. Whether any serious challenge might be made is doubtful; indeed there is not enough information in the public domain or indeed enough of a culture of questioning government decisions to lead to meaningful counterproposals.

Environmental Policy Development

Environmental Impact Assessment and Strategic EIA, is also required of government plans which would incorporate policy EIAs in the natural resource sector. Indeed there has been policy research undertaken on the potential environmental impacts of China's entry into the WTO, whose work is drawn on in relation to certain sector impacts in this report (CCICED, 2004). Potentially greater growth rates and therefore energy use are expected, also more intensive horticulture and livestock in the east coastal areas is in prospect with accompanying environmental risks. The comparative disadvantage of the Western Regions for new industry is expected to be more marked.

European countries are involved in the massive foreign capital inflows into new industries in China. Such firms mostly come to take advantage of a stable business (and political) environment and cheap and disciplined labour. They also come with a culture of environmental and labour law compliance; and, in the case of internationally known companies, with a reputation (public image) to defend, with company policies and international standards of environmental due diligence (EDD) and corporate social responsibility (CSR). Five thousand companies in China are approved as ISO 1400 certified. Promotion of voluntary instruments such as CSR may indeed be an area where the EU can bring pressure for improved environmental performance.

Chinese businessmen exporting to Europe are certainly conscious of their legal requirements to fulfil product health and safety regulations of the EU. That labour is paid on time and not abused or that wood products might have a history of sustainable or legal sourcing raises other questions. But if free trade and competition has any meaning it would require at least one element of 'fair trade' which is that employees of participating countries and companies are paid according to their contracts – and that these are not themselves abused, as is widely reported in China (see, for example, *China Development Brief*, vol IX No 3, April 2005).

Also it is axiomatic that signed international treaties on labour and Multilateral Environmental Agreements (MEAs) be respected.

Future Scenarios

Although the volume of production and consumption is rapid, with GNP recently reported to be rising last year at 9.5%, China is now allocating 1.5 % of GNP to environmental management. Some Chinese experts and The World Bank (2001) says this should be nearer 2%. This figure in the early 1990s was just 0.8%. China is nevertheless planning to introduce a system of green accounts which may highlight environmental costs of its development path. A much quoted calculation referenced in The World Bank report above suggests that pollution of air and water and land degradation is costing China 8-12% of its 1.4 trillion GDP in direct damage to crops and buildings from acid rain, from Fishery losses, medical bills and lost work for illness, from money spent on disaster relief following floods aggravated by forest destruction and from soil erosion, the human induced part of 'natural' disasters.

The UNDP Human Development Report 2002 foresees two scenarios for future environmental change and development sustainability in China: a) The Perilous Path Scenario and b) The Green Reform Path Scenario.

The Perilous Path

The perilous scenario sees a continued rapid growth in the economy but a failure to control greenhouse gas emissions which could be, by 2050, three times 1995 levels. Urban environmental degradation and massive uncontrolled migration into cities, puts pressure on sanitation and physical infrastructure, and vehicle emissions are not significantly improved because of a lack of political will. It sees irreversible losses in biodiversity and in the quality of natural resources (water and soil), and eventual social conflict which destabilises society as increased protest is engendered against corruption and poor environmental governance.

The Green Reform Path Scenario

In the green scenario market-based instruments are allowed to function, promoting efficiency, for instance in water allocation and pollution mitigation. Improvements in energy efficiency in industry by application of new technologies are successfully facilitated. Emission standards continue to be upgraded for vehicles as is already happening in Beijing. With continued economic growth and rule of law the government is able to raise revenues (taxes, user charges and realistic fines) for environmental management and provide valued services to citizens, not least better environmental information.

The public are in turn enfranchised through an opening to civil society whose support for better environmental management, and better governance, is harnessed by political leaders committed to the environmental agenda. The quality of marine and coastal environments is improved and biodiversity fostered and protected in and outside reserves, and these are increasingly valued by citizens who have increased leisure time. The impacts of consumption growth is contained by changing demands for environmentally benign (eco-labelled) products and foods produced under acceptable and openly scrutinised responsible social and environmental practices.

Opportunities for Reform

The role of the international community, and the EU in particular, might then be to help Chinese authorities to develop the framework for development along the green path. A long term view will be required. The essential areas where the EU can participate and assist Chinese authorities are then in:

1. **Environmental education and awareness building** among school children government officers, which is universally acknowledged by environmental interest groups as essential.
2. **Assisting in the governance agenda**, for example training judges in environmental law and transferring know how for facilitating tax revenue collection (higher water user fees and realistic pollution charges).
3. **Supporting research and data provision** relevant to environmental management decision making.
4. **Environmental capacity building and institutional development**, for example inter-ministerial mechanisms for managing resources (eg biodiversity and river basin management), CSR developemnt, legal framework and environmental standards).
5. **Assisting in technology transfer** for renewable energy and “clean development” processes (eg for treating effluents and air pollution emissions, waste management, green buildings).
6. **Supporting civil society groups** in a sensitive manner (financing their research, encouraging tax reform so they can raise their own resources domestically from membership and charitable contributions).

An additional area worth highlighting is the potential of Chinese tax reforms along EU and US models which encourage donations to approved charities (see Concluding Comment). These would help enhance Chinese solidarity with fellow citizens, creating conditions for a positive social and cultural environment, another necessary condition for avoidance of the perilous development path.

Report Content

The following section of this report, Section 2: The State of the Environment, summarises the nature of environmental issues in the context of geographic regions. Because China is such a large country it is deemed helpful to have an introduction to the different land uses, economic activities and livelihood systems in the different physical and climatic zones. This is also helpful because a central policy consideration in China is the divide between the so-called Great Western Region and the coastal regions.

Poverty is widespread in the West where Minority ethnic groups form substantial elements in the population; they define traditional culture and livelihood systems. Some 120-150 million people have migrated to the East Coast. The population of Beijing is reckoned to be one third migrant, but it is to Shanghai and down the cost to Guangdong behind Hong Kong that most

of the foreign capital is attracted – where new high technology and light industries have been founded. Yet here there is an intensity of growth that puts new pressures on the quality of natural resources and environment health.

The substantial part of this report is in Section 3: Environmental Management, which reviews environmental policy and performance. This section begins with an examination of environmental laws and environmental decision-making, which is not an easy area to tackle. In the same section key environmental management ‘sectors’ are addressed, under the following titles: 3.A Nature Protection and Forestry, 3.B Agriculture and Land Use, 3.C Water Resources Management, and 3.D Air Quality and Energy. Here more detail is presented on the state of the environment in these areas linked to policy response. The extent of the problems addressed and the Chinese response to the issues are reviewed using a wide range of sources and there is comment on its adequacy.

Substantial research on environmental management is sparse as mentioned, nor is access to government documents as free as it is in most other countries. Many Chinese experts working in environmental management tend to have specialised expertise and naturally prefer to comment in areas of personal field experience. Indeed environmental performance varies wildly within provinces and between regions across the country. Comment on the potential value and prospect of new and alternative approaches and instruments to those currently in practice tend also to be difficult areas to explore where experience of other systems is necessarily limited.

Poor governance is naturally a difficult area to explore with Chinese consultees, but a desire for more openness and disclosure of information in the environmental field is evident. The conclusions and recommendations section attempts to develop the potential for cooperation in the areas listed above.

Map of China

(showing provincial capitals and boundaries)



This map was produced by the Map Design Unit of the World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgement on the legal status of any territory or any acceptance of such boundaries.

[Source: World Bank (2001) China: Air, Land and Water]

2. STATE OF THE ENVIRONMENT

2.1 Introduction

China is the third largest country in the world after Russia and Canada covering an area of 9,956,960 sq km with a border of 20,000 km and a coastline of 18,000 km. The distance from the northernmost town of Mohe on the border with Russia to Hainan Island off the South coast is 4,000 km. Two key rivers which flow west to east are the Yellow River (Huang He) and the more voluminous and economically important 6,300 km (3,964 mile) Yangtze River (*Chiang Jiang*) which in many ways defines China. The latter drains the large part of Southern China and is said to divide rice-eating China from that of a cereal based diet (eg noodles) to the north.

The population of 1.29 billion and is increasing by about 15 million annually. China has 20% of the World's population but only 10% of cultivable land. Ninety per cent of the population is concentrated in less than one third of the country where the average density of population is 350 persons per sq km, similar to the most densely populated countries of Europe. This population is predominantly of Han Chinese with 55 minority ethnic groups.

The Head of State and General Secretary of the Communist Party is Hu Jintao who succeeded Jiang Zemin in 2003, who was himself a westernising State. The executive of the government is the State Council whose premier is Wen Jiabao. Each line minister, for example the Ministry of Water or Agriculture, is represented in the State Council. Such ministries are then represented in provincial and other local government structures. Environmental Protection Bureau (EPB) exist at all such levels. China has 31 administrative provinces (including five 'Autonomous Regions' in Minority Areas in addition to 22 ordinary Provinces) and four City Municipalities (Beijing, Tianjin, Shanghai and Chongqing) directly under the State Council.

Pro-natalist policies prevailed in the early years of the communist regime (1960s and 1970s). Inappropriate husbandry practices and rapid deforestation determined by insensitive top-down policy prescriptions (eg collectivisation at the time of the 'Great Leap Forward' launched in 1958) now exacerbates the problems of development sustainability. Strict ante-natalist policies were then pursued after the death of Mao Zedong in 1976 (except in Minority Areas) together with an opening to the market economy under Deng Xiaoping and an abandonment of communes and collectivised agriculture.

The effects of policy failure and difficult natural conditions have been especially felt in the fragile Western Regions where soils have been badly eroded. Here the climate is severe and cold at altitude and, particularly in the north, rainfall and water availability is limited and winters harsh. As a result rural poverty remains severe and agricultural opportunities limited. Meanwhile in the east coast cities the economic boom and associated intensity of economic production has created severe urban environmental problems.

Coal is the main source of energy for power generation but considerable use is made of firewood in the western zones for domestic heating and cooking. Wood fuel was once wastefully used for backyard smelting of iron ore during the so-called "Great Leap Forward". The forest industry is one which has recently come under considerably better control after a long period of rampant exploitation, with serious loss of biodiversity values and watershed protection services, associated with erosion and flooding. The national forest estate now covers 18% of the land area, up in quantity over recent years if down in quality.

2.2 Geographical Regions and Features

Overview

A country the size of China may be expected to contain distinctive regions based on physical and climatic features affecting population and settlement patterns. The main determining factor for China's climate is its position at the edge of the Asian continent. In winter extremely cold air masses are associated with high pressure zones in the centre of the Asian continent which then move southwards and result in very dry winters. North of the Huai River and Qinling Mountains rainfall is one sixth of the national average. To the south the summer monsoon brings water in abundance for a riceland agriculture (see UNDP, 2002).

The country may be divided into three climatic regions and a number of key economic zones. In this presentation a combination of physical and climatic attributes are used to define four major geographic regions. The Yunnan-Guizhou highland region is seen as a distinct region because it contains a unique combination of characteristics from the other three regions. The Eastern and Coastal Region is divided into four sub-regions as in the UNDP Human Development Report (2002) for which environmental considerations and current issues are summarily presented. [More detail is presented on 'sectoral' environmental issues in Sections 3.A-3.D].

- A. The Tibetan-Qinghai Plateau
- B. The Northwest and North Interior Region
- C. Yunnan-Guizou Highlands
- D. Eastern and Coastal Region

The Backward 'West' and Dynamic East Coast

The first three regions compose what is described as 'The West' or "(Great) Western Region" which has become a target zone for special policy measure because of its comparative economic backwardness. These are the areas where 'Minorities' (ethnic groups) still form substantial populations. The West is remote from the centres of economic dynamism and experience many natural disadvantages, with constraints on productivity of natural resources; it suffers the effects of severe deforestation and land degradation from inappropriate agricultural practices and overgrazing.

With a combination of distant market centres, inappropriate industrial development and inadequate environmental safeguards, Western Region poverty and depressed living conditions are in evidence in both rural and urban areas. Hence a massive migration to eastern and coastal regions has taken place in the last twenty years following the relaxation of controls on internal migration and the move to the market economy. Nevertheless, considerable quantities of natural resources have recently been found in the region, particularly minerals and now natural gas.

In 2000 the Western Development Programme was launched by the Chinese government as part of the 10th Five Year Plan in an attempt to narrow economic disparities. It involves huge investments in infrastructure development, rural electrification and telecommunications system development. These initiatives have been supported by the World Bank, ADB and other donors. Poverty alleviation projects including environmental rehabilitation have

received much of bilateral donor support. Women in these areas are often particularly vulnerable (see Box).

The Eastern Coastal Region is the heartland of the Han ethnic group (95% of total population). Here there are similar problems of industrial pollution, but older factories are being replaced by lighter industry with better environmental safeguards, and more resources are available for combating pollution. Major urban challenges remain though in municipal wastewater treatment and water management. The south eastern area of Guangdong Province, the economic hinterland of Hong Kong, is particularly dynamic.

Gender and Environment Considerations in China

- Major natural resources at risk of degradation such as water, soils, forests and biodiversity, are increasingly managed by women who constitute the majority of poor farmers as men migrate to urban areas. Farming practices have negative impacts on soils and soils degradation, exacerbating the vulnerability of poor farmers, mostly women. Yet, many decisions about control over these resources are still made by men.
- Women and children in very poor areas spend several hours per day collecting and carrying water and fuel wood, the primary cooking fuel created mostly from cutting down trees. The opportunity costs of their water carrying time are high. Women forego the opportunity to work in income-earning activities and girls forego the opportunity to attend school. Yet few World Bank transport and environment projects aim to relieve women and children of their carrying burden or to replace wood as the primary cooking fuel.
- Women primarily diffuse environment practices in the home and community. Women, as the primary caregivers of children, disseminate environmental messages to children including excreta disposal, hand washing and other sanitation practices. Nevertheless, project environmental education messages mostly target men.
- Women and children are the main collectors of medicinal plants and herbs. Although medicinal plants and herbs contribute to good health, cutting them may inadvertently harm biodiversity. But few Bank-supported campaigns to protect biodiversity target women and children specifically.
- Environmental health risks affect women heavily. Farm populations, that are increasingly feminized as more males than females migrate to towns, encounter health risks from chemicals used in farming and in rural industries. Urban workers, including many female migrants, face environmentally dangerous working conditions in factories with significant health consequences. These health risks are compounded by diminished public preventive health and insurance programs.

Source: “The Gendered Impacts of World Bank Environment and Infrastructure Projects in China” paper by Elaine Zuckerman at The Third Non-governmental Organization Forum on International Environmental Cooperation in China (November 19, 2003)

Eco-Environmental Issues by Region

A. The Tibetan-Qinghai Plateau

This remote area covering a quarter of the national territory at an average elevation of 4000 meters has an extremely harsh climate and is inhabited by less than 1% of the Chinese national population. It is the source of the major rivers of Eastern Asia, notably the Brahmaputra (*Tsangpo Jiang*), Mekong (*Lancang*), Salween (*NuJiang*), Yangtze (*ChiangJiang*) and, from the north, Yellow (*Huang He*) Rivers. The extreme altitude is associated with thin air, extreme diurnal temperature differences and strong solar radiation, large expanses of permafrost conditions and strong winds. These factors militate against human economic activities but have entailed a peculiar and special ecology. There is almost no forest cover.

The Tibetan people rely on livestock husbandry (yaks) for subsistence and have a Buddhist culture quite different from the rest of Han China. Urban environmental issues such as wastewater, availability of potable drinking water in Lhasa and other of the few urban centres are the most critical environmental problems.

B. The Northwest and North Interior Region

Geographically situated in centre of the Eurasian continent, this vast semi-arid and arid expanse of steppeland has an elevation of 1,000-2,000 metres asl (main administrative regions of Xinjiang Autonomous Region, Gansu, Ningxia, Inner Mongolia and Shanxi). It is characterised by mountain ranges, interior drainage networks (eg the Tarim Basin of Xinjiang) and dry fragile plateau lands, eg the Loess Plateau and Gobi Desert.

Summers are hot, with July mean temperatures reaching above 25°C, but average winter temperatures for large areas attain -15 to -20°C. Precipitation is very low (average <400mm) and rivers, except for the capricious Yellow River, are not perennial and tend to disappear into interior drainage basins without access to the sea. These attributes make for a fragile ecosystem dominated by steppe grassland, sparse forest and a limited agricultural potential.

The high pressure zones over continental China create also the conditions in which dust storms generated inland from the Gobi Desert area and Loess plateau regions are a damaging and expensive nuisance in Beijing and Tianjin, and across in South Korean and even Japan (especially in early summer). These are exacerbated by soil erosion and man-enhanced desertification processes from overgrazing and deforestation to the ploughing of fragile soils. Reduction in groundwater levels from excessive irrigation extractions have rendered re-establishment of natural cover species particularly difficult.

Ethnic groups include the Uygars of Xinjiang (main city, Urumqi), who are Muslim and may use an Arabic script, and Mongolians who are traditionally Buddhist, of whom there are more in China than in the Mongolian nation itself. Both groups now form numerical minority populations in their own regions following Han settlement policies. These groups are by tradition pastoralists (cattle, sheep, goats and camels) moving between summer and winter pastures. Natural gas has been found in Xinjiang and a massive West-East Gas Pipeline Project is under review.

C. Yunnan-Guizhou Highlands

Because the Yunnan and Guizhou Highlands are at the crossroads of different physical and climatic regions they are also the most interesting from the point of view of biodiversity. At altitude (2,000 metres) this area enjoys both temperate zone flora and

fauna, with distinct seasons in the north and tropical conditions in the south which supports tropical high forest.

Yunnan is a biological hotspot with exceptional scenery and special natural sites, such as the “Tiger Leaping Gorge” on the Yangtze and other UNESCO World Heritage Areas. Because of its rich natural forest inheritance it has been subject to excessive (and illegal) logging. Being dissected by the middle and upper courses of major rivers, it is also subject to a number of potential dam projects.

The region contains distinct ethnic groups from minority populations with their own traditions. It is the primary centre of eco-tourist interest in China. Notable ethnic groups are the Sani (in Kunming) Bai (Dali), the semi-pastoral Yi, Nakhi/Naxi (250,000 around Lijiang), Mosuo, Dai, Aini, Jingpo, Yao and Jingpo (Kachin). However, Yunnan is also an area now suffering serious environmental degradation and poverty, exacerbated by AIDS and drugs, which have entered China from adjoining countries.

D. Eastern and Coastal Region

This region contains all the low lying alluvial plains in China and 95% of the population. Rainfall here is more abundant but decreases as one travels north, as of course does average temperature as one moves from the tropical island of Hainan (another biodiversity hotspot) to the cold temperate region of Heilongjiang Province. The heaviest rainfall is experienced in the summer months and typhoons may reach as far north as Shanghai. The classification of the four key economic zones below follows UNDP (2002).

The North East

Heilongjiang, Jilin and Liaoning Provinces in this zone are associated with the early industrialisation of China after 1949. Major towns are Harbin, Changchun and Dalian. Heavy industry has been highly polluting and of low efficiency. Many of the State Owned Enterprises (SOEs) have been closed down, for example because of dwindling coal resources, and resulted in high unemployment. Recent years have seen demonstrations and some social unrest as a result. There has been recent successful reinvigoration of the port of Dalian and with this prosperity improvements have been possible in environmental management. A well developed temperate agriculture is practised despite limited precipitation and very hard winters; there remains a significant forestry resource.

Dry Densely Populated "North"

This area covers Beijing, Hebei, Henan, Shanxi, and Tianjin Provinces and Municipalities, heartland of the Yellow River civilisation. Large cities suffer very bad air pollution from power plants and vehicle sources. Beijing and Tianjin Municipalities are taking steps to control vehicle emissions and plan better location of industries around their centres.

Land degradation in the surrounding areas are serious problems, together with the nuisance caused by the dust storms that have their origin much further inland. Hazards can also include flooding, which had serious consequences as recently as 1998. Major problems here result from industrial pollution and poor wastewater treatment. Water shortages are causing such serious difficulties that massive water transfer projects from the Yangtze River are in prospect (South-North Water Transfer Projects, see Section Water Management).

Central and Southern Coastal Provinces

Provinces here have experienced the most rapid growth in China. The region includes the Yangtze Delta (Shanghai) and Pearl River Delta (Hong Kong) and extends from Shandong to Guangdong to include Jiangsu, Zhejiang and Fujian. Economic reform and favourable export location advantages have seen heavy investment in new industries financed by foreign capital. Environmental performance in industry tends to be better than elsewhere but there are acute social problems from the flood of migrants and, as elsewhere in China, labour laws are not rigorously implemented.

Urban issues of sanitation and wastewater treatment remain a serious problem but finance is available for environmental improvements. Explosion in vehicle use creates

challenges for air pollution control and in the high land take of new roads. With an all year growing season in the southeast, and ready markets access, intensive agriculture is practised. There are serious concerns about over use of chemicals and their effects on groundwater and in residues of food products for domestic consumption and export.

Southern Central Region

This region is based around the Middle and Lower Yangtze Plains (from Chongqing in the west to Wuhan and Nanjing in the east), together with the Sichuan Red Soil Basin (around Chengdu). These are some of the most densely populated and intensively cultivated areas in the world. The agricultural landscape is dominated by rice paddies and market gardening (horticulture) around centres of population.

Problems of declining state industries, water and air pollution control are similar to other urban areas. Intensive agriculture is again associated with over-use (and inefficient use) of chemicals. The quality of riverwater in the Yangtze has had serious impacts on aquatic wildlife. The Three Gorges Dam and similar projects may suffer sustainability problems from siltation because of upstream erosion. This is in large part induced by deforestation and loss of best catchment cover followed by monoculture replanting and unsustainable hillside agriculture.

2.3 China Biodiversity Values (after UNDP, 2004)

As a function of size and geography China is one of the most bio diverse countries in the world. As a country covering 9.6 million km² and covering 50° of latitude and five climatic zones China has considerable habitat biodiversity within a climatic range from cold-temperate to tropical. It also straddles two bio-geographic realms (the Palaearctic and the Oriental) bounded by the Tibetan mountain ranges. Many parts of China were protected from previous glaciations allowing the survival of important species and is home to pre-tertiary relic species, for example, the Giant Panda and the Cathay Silver Fir.

China is the centre of origin of important commercial species. Approximately 1,200 species of crops are cultivated worldwide, and it is estimated that more than 290 of them originated in China where their wild relatives are still found. On-farm diversity is also very high, with an estimated 500,000 varieties of the 600 domestic plant species, and 590 varieties of domesticated animals and poultry. The diversity of natural ecosystems includes forest, desert, grassland, freshwater rivers, wetland, coastal/marine and agricultural ecosystems (See Technical Appendix B, from UNDP CBD Concept Paper, 2004). At the species level, China accounts for approximately 10% of known species in the world.

Forests

China's forest coverage increased from an historical low of 85 million hectares in 1949 to 163 million hectares in 2000, which is 17.5% of the land. Most of the forests are located in the Northeast and Southwest of China, with other smaller forests scattered around the country, primarily in the south-central areas. Despite these historically unprecedented increases in forest coverage, most studies indicate that the quality of the forests has continued to decline, in terms of biodiversity and in terms of age and biomass. The reason for this is that most of the new forest results from reforestation schemes leading to thinly covered, mono-species plantations (Biodiversity Concept Paper, 2004).

In the Northeast, the main contributor to this deterioration of quality has been the state-owned companies; 80 of these employ over one million people and continue to engage in large-scale

logging above sustainable rates in the higher quality forests. In the Southwest, logging is widely banned, and most degradation is due to unsustainable harvesting by households on family and community-owned land for locally used timber and fuel. Illegal cutting by local and foreign owned (Indonesian and Malaysian) enterprises is still an issue in some localities in the Southwest.

Wetlands

Data presented by UNDP (2004) indicates over 90% of the vast wetland plains of the Northeast have been drained and converted to farming. In the Northwest and Southwest local climate change is a factor in damaging wetlands. This continues to be exacerbated by small-scale drainage schemes (often by individual herdsman and farmers) and by the large number of dams built or under construction; there are as many as 80,000 small, medium and large-scale dams across the country. Local governments and the Ministry of Water Resources are sponsoring much of the dam construction.

In addition to drainage, over-fishing is causing widespread problems in wetlands. This is usually undertaken by individuals, but in some cases by government owned enterprises. Pollution is the other major cause of wetland degradation near to cities; this is particularly the case in the middle and lower reaches of the Yangtze River, and in all wetlands in the more industrialised eastern provinces.

Desert Ecosystems

Deserts are found mostly in the Northwest. Although they may be increasing as a result of poor land management practices they are also degraded because of the physical damage caused by: a) large-scale government-run mining, b) the physical and chemical damage caused by small scale illegal mining for precious metals, c) local people collecting wood for fuel and keeping livestock that overgraze shrubs, and d) the small-scale conversion of oasis land to agriculture by local governments in line with local poverty alleviation campaigns.

Coasts and Marine Zones

Unlike most of the important ecosystems above, China's coastal and marine diversity is found in the wealthier parts of China. Past economic development has greatly damaged these ecosystems, and many individual species are now locally extinct or threatened. The remaining biodiversity faces a series of threats from: a) large upstream dams sponsored by central and provincial government, b) numerous small-scale legal conversions of marsh and mangroves to farmland, eg for cotton or aquaculture, by both local people and local township authorities, c) over-collection of key species by local populations, d) pollution from cities, from transport and from the oil industry, and, e) coastal construction such as port developments by provincial governments.

3. ENVIRONMENTAL POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

3.1 Environmental Policy and Legislation

Sustainable Development Policy

The tenth Five Year Plan (FYP) agreed in March 2001 at the National People's Congress clearly references the need to strengthen environmental protection, not least in attending to the environmental challenges of the Great Western Development Strategy. In western regions land degradation and biodiversity destruction are seriously compromising future development options for this vast and disadvantaged part of the country. In the dynamic coastal regions water shortages (particularly in the north) with water and air pollution are recognised at the highest policy levels to have compromised the real quality of economic growth and human wellbeing.

The 2001-2005 FYP specifically includes the ambitious objective for plans and programmes to result in "improved environmental performance in pollution control while the deteriorating trend in the ecological environment will be halted." In his plenary speech to the National People's Congress of 2004, President Hu Jintao called for balanced growth with the objective of *Xiaokang*, an 'all round, well-off society'. Policy statements at the highest level have recognised the very apparent environmental (and certain social) consequences of the legacy of past policies of single-minded economic growth, "development first and clean up later".

China has subscribed to all the major Multilateral Environmental Agreements (MEAs) which have found responses in domestic policy-making and in legislation, even if there are severe difficulties in implementation. The UN Conference on Environment and Development (UNCED 1992) required a national response through the presentation of an Agenda 21 report reviewing national follow-up to the conference and the status of actions to 'mainstream' environment into economic and social policy decision-making.

The leadership in China is fully committed to achieving its UN Millennium Development Goals (MDGs) as adopted by world leaders in 2000. These MDG goals reflect of the key elements of the *Xiaokang* Society to be achieved by 2020. These are the wide objectives of a balanced development between a) urban and rural areas, b) different regions, c) economic and social factors, d) humans and nature, and e) national security and an open society.

Environmental Legislation and Rule of Law

The framework for environmental legislation exists at different levels through a host of national laws, administrative ordinances, departmental codes, and local regulations. A complete list of laws and regulations (under the headings listed at end of this sub-section) is available on the SEPA website (www.zhb.gov.cn/english/chanel-3).

The major problem, so often alluded to, is ambiguity in law and authority. Contraventions of environmental laws are often ignored following extra-legal agreements made between the various influential parties to a decision. In the unlikely event of a standoff between factions a judicial

decision may be resorted to (see enforcement below). Yet the culture in China is one of constant reference to law, that environmental management failures are simply a case of either a) lack of knowledge of the law, b) failure to implement the law, c) incomplete legislation, or d) criminality.

Examples of the types of legal instruments:

Law: Environmental Protection Law of PRC, Marine Environmental Protection Law, Water Pollution Control Law, Air Pollution Control Law, Solid Waste Pollution Control Law, and Noise Pollution Control Law.

Administrative Ordinance: Environmental Management Ordinance for Construction Projects.

Departmental Code: The Codes of Environmental Protection Bureau and other departments.

Local Regulations: regulations, guides and commands from local governments.

The law is seen as a fundamental instrument of management but its interpretation can be somewhat relativistic and conditional (Economy, E, 2004). Quibbles about the letter of the law have been less important than that a ‘socially correct’ outcome is achieved. Rights rest with the state and its purposes and not in individuals. In arbitrating the appropriate legal recourse – and indeed course of action – in the case that a factory is polluting agricultural land, consideration will be given not just to the plaintiff farmer affected but to the number of people employed in the factory and the impact that a fine or ruling would have on their livelihoods – and indeed on any relevant government production target.

Naturally other less worthy factors may also be involved where there are personal ambitions and vested financial interests. For these reasons also, occupational health and labour rights are often ignored, and the state may come to recognise few boundaries to its exploitation. In the absence of civil society representation and democratic recourses appeal can only be made to higher authority. This was once embodied in the tradition of petition to the emperor. Indeed, there is still a tradition of taking a complaint to the state government, either in person or in written form (“Write us a letter” The Economist, April 23rd 2005). But with increasing openness has come increasing scepticism of the efficacies of such approaches for corrections of evident wrongs.

The courtroom is the last resort for Environmental Protection Bureau (EPB) regulators, those accused of offences and the public-at-large when seeking redress. Resort to the court system is seen in China as an unnecessarily adversarial approach to solving a problem that usually signals the end of a relationship (Zhang Hongjun et Ferris, R 1999). Negotiations are more likely to attempt to preserve EPB ‘*guanxi*’ with enterprises and thus allow a basis for future co-operation. Additional reasons why courts are not used more frequently are that: a) EPBs want to avoid the costs of gathering data needed to support legally convincing evidence; b) many EPBs lack staff with legal training; and, c) vaguely drafted statutes make it difficult to allocate liability.

The Chinese legal system is underdeveloped and trained judges are short in supply. Some legal specialists point to other inadequacies of the court system, such as judicial ignorance of the law, corruption, pressures on judges from local governments and high level officials, and the inability

of courts to enforce their own decisions. Furthermore, even when courts are used, and as stated above, the letter of the law is only one of several factors considered in enforcing environmental rules. Courts decide on the cases by relying on official policy, the views of local governments and a court's individual sense of justice and fairness in contractual dealings (see OECD, 2004).

Furthermore parties in potential conflict are well aware, should consensus fail, that even after a judicial decision is made actual implementation of that decision is difficult to achieve by the courts. It is said that some 40% of judicial decisions are never acted on such so that compensating sums change hands between parties (The Economist, Mar/Apr, 2005). In most cases this would represent a transfer between different organs of government, eg in the fine of a state enterprise. Increasingly today a private sector plaintiff can be involved but enactment of a court decision may still be difficult to achieve. Where the private sector party is the offender of course a trial will be avoided at all costs and small fines and bribes are the likely eventuality for circumventing environmental law compliance.

Evidence of a lack of confidence in China's law courts – but perhaps also a freer and less fearful culture – can be found in the 60% increase in petitioners seeking to circumvent the courts. The Economist (April 23, 2005 p.67) reports that 10 million petitions may be ongoing but that according to the Chinese Academy of Social Sciences (CASS) only two out of every 1000 petitioners are successful. “Many petitioners claimed to have been beaten up or jailed by local officials in a bid to stop them running to Beijing telling tales”.

However, the climate of increasing openness allows judicial decisions in environmental cases to be more frequently reported in the press. While civil society groups are thin on the ground – and strictly controlled – they are now having much greater success in challenging illegal activities of for example forest companies protected or conniving with provincial/autonomous region government officers.

Environmental Laws

Environmental Regulations

- Framework Provisions
- Prevention and Control of Water Pollution
- Prevention and Control of Air Pollution
- Solid Waste Management
- Marine Environment Management
- Noise and Vibration Management
- Radiation Environmental Management
- Hazardous Chemicals Management
- Comprehensive prevention and Control of Pollution
- Natural Conservation and Bio-safety
- Urban Environmental Management
- Rural Environmental Management
- Environmental Management for Construction Projects
- Energy Management and Utilizing
- Environmental Enforcement
- Pollution Discharge and Levying
- Environmental Technology and Industry
- Environmental Labels and Products
- Environmental Engineering, Certification Management and EIA
- Environmental Standards
- Environmental Monitoring
- Nuclear Safety
- Investment Policy & Environmental Protection
- Import & Export Management and Environmental Protection

3.2 Environmental Institutional Framework

National Level Organisations/Institutions

SEPA

In 1974 an Environmental Protection Bureau with a staff of twenty professionals was set up under the State Council and undertook general environmental planning, but with no authority over environmental management at the sub-national level. In 1982, three years after the promulgation of the “trial environmental law”(see below), the State Council set up the Ministry of Urban and Rural Construction and Environmental Protection which incorporated the Environmental Protection Bureau. The bureau subsequently became a separate agency as National Environmental Protection Administration (NEPA) with 320 staff and reported directly to the State Council (see OECD, 2005).

In 1998 NEPA was transformed into the State Environmental Protection Administration (SEPA) and given ministerial rank (under Qu Qeping), though it remains sometimes a poor relation to the established line ministries. The head of SEPA (Minister Xie Zenhua) reports to the Vice Premier responsible for environmental protection but does not have a permanent seat in the State Council. The outspoken Deputy Minister is Pan Yue who hails from an elite and intellectual background and has apparently received a silent blessing to speak out on environmental issues.

The Environmental and Resources Protection Committee (ERPC) of the National People’s Congress is responsible for developing, reviewing and enacting environmental laws. It is also responsible for supervising the implementation of environmental regulations and performance evaluation of the government in the environmental sector. In the 1990s the ERPC developed into a forum for discussing environmental issues of particular concern to the People’s Congress.

SEPA is responsible for developing environmental policies and programmes and, as far as it is able, directing the Environmental Protection Bureaus (EPBs) established at provincial, municipal and county/district levels. SEPA develops regulations only for projects undertaken by the sectoral agencies at the national level, or for activities that are of national significance. In all other cases, EPBs implement industrial pollution control rules and deal with enterprises on a daily basis (OECD,2005).

NDRC and Ministries/Agencies

A number of sectoral Ministries and Agencies of the State Council are critically involved in natural resource and environmental management. Key among these are Water, Agriculture, Construction and Land Resources Ministries, also the all-important National Development and Reform Commission. The NDRC now has a crucial role in strategic national environmental policy planning; it is charged with taking a lead role in administrative reform with potential leverage in achieving policy coordination. (Formerly a State Council Environmental Protection Commission acted to coordinate cross-sectoral environmental management between different ministries and agencies, but this was disbanded in 1998.)

The tasks of NDRC (formerly the State Planning Commission – PC) include implementation of China’s sustainable development strategy in terms of cleaner production and pollution prevention as well as setting energy policy. The primary concern of NDRC has been in stimulating economic growth not environmental protection which has on occasion put it at odds with SEPA. Recently NDRC and SEPA have been promoting the awkward but much referenced concept of a ‘Circular Economy’ as a means to justify sustainable environmental interventions in the name of economics.

NDRC played a leading role in coordinating responses to UNCED’s Agenda 21 reporting following the 1992 Rio Summit. It also took the lead in formulating the Chinese policy response to climate change steered by the National Climate Change Co-ordinating Committee. The head of NDRC, Minister Ma Kai, has been chairman of NCCC since 2003. This organisation was set up in response to China ratifying the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) in 1990.

Chinese Government Ministries and Agencies with Environmental Responsibilities (excluding SEPA)

National Development and Reform Commission (NDRC) has the mandate to control and regulate China’s macro economy and future planning, including implementation of Western Region Development Program. Has previously assumed responsibility for development of China’s Agenda 21 and formulating China’s position in international negotiations on climate change.

NDRC – Department of Environment and Resource Conservation (formerly State Economic and Trade Commission) mandate is coordination of sustainable development planning, resource conservation and utilization, coordination of environmental protection work, promotion of clean production, and dissemination of new products, technologies and equipment.

Ministry of Foreign Affairs is involved in the negotiations and ratification of all international conventions and other agreements, including climate change negotiations.

Ministry of Water Resources has responsibilities related to river basin management and water management outside urban areas, water supply and river water quality.

Ministry of Construction has strong influence and responsibilities in urban infrastructure development, including wastewater treatment and solid waste management.

Ministry of Agriculture assumes overall responsibility for most of what happens outside urban areas, including regulation of township and village enterprises.

Ministry of Science and Technology has a key role in sustainable development, is involved in climate change negotiations, and has responsibilities within technology research and development.

State Forestry Administration has significant responsibilities related to forest and wetlands management, and to biodiversity conservation (in addition to replanting and commercial forest development).

State Ocean Administration is responsible for management of coastal and marine waters, including biodiversity conservation.

Ministry of Land and Resources is responsible for planning, administration, protection and rational utilisation of such natural resources as land, mineral and marine resources, including mapping and cadastral (land ownership) management.

State Meteorological Administration takes part in climate change negotiations, and has responsibilities in regional air quality management.

Ministry of Communications shares responsibilities with SEPA on vehicle emissions control, the implementation of which falls on the Public Security Bureaus.

Source: Updated and adapted from UNDP (2002) and OECD (2005)

The NCCC is composed of 15 government departments and institutions including NDRC and SEPA, the Foreign Ministry, and Ministry of Science and Technology (MOST). It is in charge of drafting national strategy to tackle the impact of climate change and managing the Clean Development Mechanism (CDM) under the Kyoto Protocol. Although China is not obliged to cut carbon emissions under the protocol, the CDM mechanism has encouraged China to reduce its own green house gas emissions.

Ministries of Communications and Public Health are the other main line ministries with which SEPA must cooperate. But inter-ministerial coordination has proved notably difficult. Relevant sub-ministerial agencies with overlapping environmental responsibilities are The State Forestry Bureau (now no longer itself a ministry), the State Meteorological Administration and the State Oceanic Administration responsible for coastal protection.

CCICED and International Dialogue

Providing an important bridge with the international community on environmental issues is the China Council for International Cooperation on Environment and Development (CCICED). This expert organisation advises the government at a very senior level and is made up of 45-50 Chinese experts and leading policy makers, with participation of international members, such as the EU Director General of Environment. It has managed seven task forces covering integrated management of river basins, agriculture, WTO and environment, pricing of natural resources, protected areas and transport/vehicle pollution. The Council members meet annually around October and its Chairman is Vice Premier Zeng Penyan.

The point of contact between SEPA and international institutions is its International Co-operation Department which has separate divisions for multilateral, regional and bilateral co-operation and dialogue on environmental protection. The Regional Environment Cooperation Division manages agreements and co-ordinates dialogue with neighbouring ASEAN countries such as tripartite Ministers Meetings with Japan and Korea, Greater Mekong Sub-Region Co-operation, and dialogue with The European Union and the OECD. The main subjects of the EU dialogue have been in the areas of biodiversity, river basin management and vehicle emission standards.

Sub-National Level Environmental Institutions

In each province Environmental Protection Bureaus (EPBs) oversee compliance with national and local level environmental and pollution control regulations and standards. These bureaus form part of the provincial administration reporting to (and depending on their funding from) the provincial Governor's Office. Only recently has SEPA acquired a say in the selection of the heads of local EPBs. At each lower level of administration the EPBs report to both the EPB/SEPA at the higher level and horizontally to the head of the local government office (Municipal Mayor, County Magistrate or Head of District).

There are a number of affiliated organizations which are charged to assist the work of the EPBs, such as an Environmental Monitoring Centre (responsible for ambient and emission monitoring), an Inspection Unit (responsible for enforcement of regulations and collection of pollution charges), a Research Institute (responsible for technical analysis and research) or an Environmental Investment Unit (managing pollution levy funds). These units have been supported by state funds to provide services for the government and the public simultaneously (See OECD, 2005).

Recently some of these institutions have undergone privatisation and may increasingly provide commercial provision of environmental monitoring and EIA services. It is such agencies that have been certified at either national or provincial level to undertake EIAs. Two other institutions at the provincial and lower levels influencing environmental policies and together coordinating agency activities related to pollution abatement, settlement of disputes and response to accidents are the Environmental Protection Committees of People's Congresses and the Environmental Protection Commissions of the People's Governments.

- The Environmental Protection Committees of People's Congresses approve local environmental regulations, review work carried out by the lower level agencies, and keep the agencies informed about environmental problems raised by citizens.
- The Environmental Protection Commissions of People's Governments, which typically consist of high level officials (agency directors and deputy directors), are responsible for coordinating EPBs work with other government organs.

3.3 Environmental Planning and Regulation Framework

Planning Authorities and Decision-making

Critical in influencing decisions affecting environmental management are the various planning authorities and line ministry decision-makers at local government level (in Provinces and Autonomous Regions and Municipalities, and in counties and districts at a lower level tier). Such officials have responsibility for controlling land use decisions and pollution control practice of government, but now increasingly of private sector activities; they are also responsible for supervising the activities of sub-ordinate staff..

Such decision-takers are influenced by pressures to respond to changing party policy dictates, but are perhaps more firmly rooted in what is often a provincial/district government consensus. This has tended to prioritise short term and narrow economic interests over long term environmental

sustainability; this is in order to maximize production and favour fullest possible employment levels on which their performance has traditionally been judged.

For Municipalities, the Mayor's offices take key decisions on large investment projects involving industrial development and environmental protection (OECD, 2005). To encourage inward investment they may be more or less exacting in applying environmental and social legislation. In any case State Owned Enterprises and 'village enterprises' (Town and Village Industrial Enterprises (TVIEs) are invariably more laxly regulated from an environmental point of view than foreign companies. In the best cases, the latter foreign investments involve new technologies applied with international corporate standards of environmental/worker safety practices.

The Mayor's offices settle disputes between the municipal EPBs and enterprises supervised by a municipality's industrial bureaus. In some cities, the Mayor heads the Environmental Protection Commissions of People's Governments. At the county level and above planning commissions are responsible for reviewing EPBs' environmental protection plans and integrating them into local economic and social development plans. Within Industrial Bureaus there are environmental protection divisions that assist enterprises associated with their bureaus with technical aspects of pollution control. Despite these arrangements, environmental and economic components of development plans are not always consistent. This occurs, in part, because agencies often fail to communicate with each other during plan preparations (OECD, 2005).

Many industrial bureaus play significant roles in day-to-day industrial pollution abatement and a number have environmental protection divisions (EPDs) that assist enterprises with technical aspects of pollution control. EPDs have generally more contacts with their affiliated enterprises and know more about their pollution problems than EPB staff. There are also tensions over the enforcement of discharge standards for releases from municipal wastewater treatment works, which are built and operated by urban construction bureaus (OECD, 2005).

Disputes sometimes arise between construction bureaus and EPBs over who should collect fees from enterprises that release waste, which violates effluent standards, and flows into municipal treatment plants. Finance bureaus manage city revenues and expenditures and play an important role in the pollution discharge fee system. The bureaus approve the municipal EPBs annual plans for use of pollution levy funds. [Much of the above information is drawn from a summary paper "Environment and Governance" (2005) prepared by Krysstof Michalak for OECD China Governance Project].

Environmental Policy Instruments

The World Bank describes China as having a relatively well developed regulatory system by comparison with countries at a similar stage of development. The legal regulatory framework has its origins in 1979 in what at the time was a provisional version of what has become the country's basic environmental law "The PRC Environmental Protection Law for Trial Implementation".

The statute required polluters to comply with pollution and waste-discharge standards, directed enterprises to assess environmental impacts of proposed projects, and required new projects to satisfy applicable environmental standards. This statute also established the national and local environmental agencies with powers to enforce environmental legal requirements. Following a 10-year trial period, the formal Environmental Protection Law of the People's Republic of China came into effect in 1989. Recently, the revised Criminal Law makes provisions also for criminal sanctions for environmental damages.

Since the 1990s the direction of changes is increasingly moving to a preventive approach incorporating economic instruments covering discharges of wastewater, waste gases, solid waste, noise and low-level radioactive waste. Pollution levies are collected by – and help finance – EPBs and are hypothecated to environmental purposes (Dongmei Guo et al., 2002). Other economic instruments have been introduced such as an ecological damage compensation system in some provinces and cities, also in one case payment from municipalities for upstream water catchment protection services. Experiments with sulphur dioxide taxes and product charges have been undertaken in some provinces and cities. The application of these instruments has not been sufficiently rigorously implemented or punitive to achieve significant environmental improvement in China's dash for growth.

The main regulatory instrument for industrial pollution control has been based on 'end of pipe solutions' whereby factories are allowed to discharge effluents to legally defined ambient concentrations and pay levies on pollutants. If these are exceeded fines are imposed. By diluting residual effluents with wastewater enterprises can reduce concentrations without seeking to minimise pollutants by treatment or use of clean technologies. In any case fines when imposed have been set at too low a level to encourage pollution abatement technology which might carry even the smallest cost (Dongmei Guo et al., 2002).

Most important, the EPB have in the past been dependent on these fines to finance their operations and therefore had no incentive to discourage industry from seriously containing their pollution emissions. (World Bank, 2001). Pilot schemes have been launched to introduce mass or load based systems "Two Compliance Policy"). Based on administrative edicts a Discharge Permit System (DPS) has also been applied so that enterprises register with EPBs, and permits for specific qualities and quantities of wastewater and air emissions are issued.

The "Three Synchronisations" system requires incorporation of pollution control measures in planning, design and operations. Clean-up deadlines can be set, as also environmental compensation fees. Centralised pollution control mechanism allows for more efficient centralised pollution treatment rather than individual enterprise "end of pipe" control. Industrial parks have recently been created to encourage a range of different industries to establish themselves together so that they can use each others residual products and collectively control pollution and waste. Ten ecological industrial parks have been established; thirty nine cities are environmental demonstration cities and 82 counties are ecological demonstration districts.

Five thousand companies are registered as ISO 1400 (total quality) compliant (Xie Zhenhua in The World Bank's Environment Matters 2004) while environmental labelling has seen a start (White Swan label). In 2002 The Cleaner Production Promotion Law provides incentive for energy saving and clean technology adoption, and SEPA provides for Environmental Management Systems Certification. However, the real world still sees extensive abuse: old, broken or poorly maintained pollution equipment, treatment technologies turned on for inspections and turned off after to reduce energy and other operational costs (Economy, E 2004).

Environmental Impact Assessment (EIA)

The concept of EIA has existed in statute since 1979. It is reported that between 1980 and 1985 445 medium sized construction projects had EIA reports submitted, and this increased to 2,592 between 1986 and 1990. It is also reported that the implementation rate for eligible projects of EIA in the whole country increased from 61% in 1991 to 81% in 1995 (Jing Wenying, Tsinghua University).

On September 1, 2003, a comprehensive new Environmental Impact Assessment Law came into effect (approved by the Standing Committee of the 9th National People's Congress on October 28, 2002). This EIA Law clarifies environmental requirements that affect foreign investors, roles of relevant government departments, and liability for non-compliance. The Law demands obligatory environmental assessment studies by construction companies for new projects and applies both to domestic Chinese companies as well as foreign construction-related investments or activities in China. In addition EIA or SEA (Strategic Environmental Assessment) is required of land use plans of local governments [Chapter II of law].

Three levels of reporting are required according to likely environmental risk. Where there is significant potential impact a comprehensive EIS (Environmental Impact Statement) is required. The developer must hold a public hearing or seek comments and suggestions from independent experts and the public before submitting the EIS for approval. Government approval or disapproval must be issued within 60 days. Where lesser environmental impacts are expected completion of an environmental impact form (EIF) is required, while in a third case of negligible risk a simple environmental impact registration (table) is completed for which government approval or disapproval is issued within 15 days

The decision on level of detail required is the responsibility of SEPA and EPBs. The EIS is undertaken by qualified institutions certified by these agencies. SEPA is generally responsible for the examination and approval of the EIS process for the largest projects representing investments larger than 200 million RMB (approximately €20 million or US\$24 million). SEPA gives approval for nuclear facilities and security-sensitive projects, those straddling more than one Province (/Autonomous Region) or special municipality boundaries (Beijing, Chongqing, Shanghai, and Tianjin), together with projects that require examination and approval by the State Council or other ministerial level administrations. Such projects will also be approved by the NDRC. Otherwise EPB and local governments are responsible for their own projects.

Investors or project developers submit the completed EIS or EIF for review through the local EPB and the relevant local industrial ministry bureau. The EIA Statement (EIS) must be examined by (and include the written opinions of) a review team which includes experts selected randomly from a list established according to rules issued by SEPA. All construction projects are necessarily required to comply with the “Three Synchronizations Policy” under which pollution-control facilities associated with the project are to be incorporated into design, installation and operation. [The required contents of an EIS is presented in Technical Appendix C. It is notable that analysis of alternatives is not required though project justification is, along with cost-benefit analysis of impacts.]

Final project approval lies with the Planning Commissions of local government. In the event of an EIA subsequently proving inadequate or to have been presented with falsified data criminal procedures may be invoked. Likewise any circumventing (malpractice or abuse) of the due process of EIA review and approval by competent authorities carries criminal responsibility. Foreign institutions that provide EIA technical services for construction projects in China must hold a qualification certificate issued by SEPA and CRAES (Chinese Research Academy of Environmental Sciences). It must have no conflict of interest with SEPA, CRAES, or the developer of the construction project.

Enforcement Capacities

An investigation by SEPA (when it was still NEPA) indicated that about one-third of environmental technology used in China is operated ‘inefficiently’ (operated during inspections

and shut down at other times), one-third is simply not operating (shut down because of cost) and one third is operated within standards prescribed by relevant legislation. Variations in enforcement practice continue from locality to locality. Zhang Hongjun and Richard Ferris (1999) suggest that although in many cases local officials may seem anxious to attract investment regardless of environmental consequences, elsewhere strengthened environmental policies have led progressive and dynamic cities such as Yantai City, in Shandong Province, to reject foreign-investment projects deemed pollution intensive; they have also induce regulators to more stringently enforce environmental laws against domestic companies.

Enforcement related problems cited by Chinese officials:

- a) legislation-related difficulties, ie vaguely drafted provisions allocating responsibility and liability;
- b) capacity-related difficulties such as personnel and finance limitations;
- c) culture-related difficulties associated with varying concepts of ownership under the Socialist system;
- d) low environmental awareness among the population; and,
- e) bureaucracy-related difficulties stemming from overly complex procedures and unwarranted interferences with investment projects.

Source: "Shaping an Environmental Protection Regime for the New Century: China's Environmental Legal Framework" by Zhang Hongjun and Richard Ferris, Jr

Whenever a new facility is found wanting in its environmental performance reference in the press is made to a failure to undertake EIA. As it turns out in many past cases it has frequently been found that no EIA was undertaken.

In December 2004 SEPA sponsored the "First China International Forum on Environmental Impact Assessment" in Hainan. At the conference, Vice Minister Pan Yue said explicitly that SEPA would begin to scrutinize EIA reports more strictly and that companies that began construction on projects without the needed EIA approvals would face "severe punishments" according to the state-run *China Daily* newspaper. Pan also said that harsher measures would be taken to discipline local environmental officials and agencies that conduct EISs which fall short of standards.

Later in December, SEPA announced that during a review of 926 environmental impact assessment organizations throughout the country, it had identified 68 that did not meet licensing requirements and that would be sanctioned. A tightening up of the law seems now to be in prospect (see box below).

Case Example of EIA Enforcement Campaign

On Jan. 18 an EIA crackdown was apparently sanctioned and SEPA ordered the suspension of 30 large infrastructure projects (value: US\$14.2 billion) over failures to comply with EIA regulations. This included 26 power plants including three projects of the China Three Gorges Project Corporation

It was said that upon issuance of the SEPA directive 22 projects acquiesced, promising to pay fines of approximately \$24,000 each and to suspend construction until their EIAs had been filed and approved. Eight, however, initially flouted the order. The three most stubborn being the Three Gorges Corporation projects, among which was the high-profile, US\$5.3 billion Xiluodu hydropower project in the southwest of the country, and two projects associated with the Three Gorges hydropower project itself

Commentators were doubtful that SEPA, with a reputation for political weakness, would be able to force the powerful state-run company to comply. SEPA had threatened legal action against the company but in a statement Feb. 2, SEPA Vice Minister Pan Yue announced that the stand off had come to an end, with the company agreeing to suspend construction on the projects until it had submitted and obtained approval for the needed EIA Statements. Most of the power plants were allowed to resume on 17 February.

The success of SEPA in enforcing the EIA rules is dependent on the backing of other, more powerful government agencies. In his statement, Pan said SEPA had enlisted the help of the China's powerful central planning agency, the National Development and Reform Commission (NDRC) in enforcing the above quoted order. The initial crackdown would not have happened had there not been a green light given to a broader campaign to raise SEPA's influence and strengthen enforcement of EIA rules generally.

SEPA hinted at an intention to enforce EIA rules more vigorously in December, when it upgraded the status of its internal department responsible for technical evaluation of EIAs.

(after report by Qin Chuan in *China Daily*, 24.1.2005)

http://www.chinadaily.com.cn/english/doc/2005-01/24/content_411926.htm

Clean up campaigns in other areas have been conducted in a somewhat arbitrary fashion. Though they may be radical their results can be short-lived. They do however raise awareness even if a drastic admission of the failure of the day to day regulatory environment. More sustained enforcement of legislation is required with an increasing exposure of polluters. This will come through such campaigns and the hesitant but growing use of information disclosure. In 2004 6,400 companies were closed down and 155 people were punished – “bosses were fined and civil servants warned, demoted or sacked”.

Information Disclosure and Civil Society Participation

Chinese policy makers are turning to the media and an emerging civil society to seek a degree of public pressure for improvements in environmental performance by industry managers and in general environmental governance by officials. The evident failure of the state in the combined role of game keeper and poacher (where personal and professional incentives favoured the latter) has seen increasing use of information disclosure and encouragement of citizen participation. “The media, academic institutions, non-profit organisations and individuals are now demanding

better information about the state of the environment and are expressing a desire to influence public policies” (OECD, 2005).

SEPA publishes State of the Environment Reports on an annual basis and, since the construction of the “Government Online” project in 1998, these reports have been posted on the internet (www.zhb.gov). The report requires involvement of EPBs at all levels as well as numerous other departments. Some of this information is quoted in this report. Trends can generally be discerned but interpretation is nevertheless difficult. Past problems with data falsification and lack of care in the measurement and use of data requires that information is treated with caution. One of the main organs for carrying environmental stories and disclosure information is the *China Environmental News*, part supported by SEPA but with a fair degree of editorial independence.

Reports on the water quality of key river basins are also published periodically in newspapers, including *China Environmental News* and *People’s Daily*. Some reports on the environmental situation (especially in urban areas) are classified as confidential and are available only to senior officials. Environmental Quality Briefs are provided to leaders of environmental protection departments. The main contents and indicators include information about air quality, acid rain pollution, urban river water quality, water quality of the main river systems, pollution of lakes and reservoirs, offshore marine water quality, and radioactive environmental quality (OECD, 2005).

Weekly and daily information reports on ambient air quality are released to the public based on a national ‘Standard on Ambient Air Quality’. The city of Nanjing was first in China to publish weekly air quality reports through newspapers and TV, while *China Environmental News* releases environmental quality reports for 46 key cities every Saturday (with air quality indices of key cities made available on the internet).

SEPA and World Bank experts are working to establish a “Green-Watch”, which is a public disclosure programme for major industrial polluters with five performance levels, indicated by coloured lights. This draws on self-monitoring reports, inspection reports, records of public complaints, regulatory actions and penalties, and other surveys. The rating system incorporates emission information for 13 regulated air and water pollutants taking into account discharge quantity and concentration. Solid wastes are rated on three criteria: production, disposal, and recycling. Reaction to pilot trials has been positive and SEPA plans to launch a nationwide implementation of such public disclosure.

Officials and managers have become increasingly responsive to growing public expressions of discontent because they can see their performance is going to be judged on a wider set of criteria than hitherto. The public are also increasingly in the frame as disclosure of information gives environmental journalists opportunities to pursue stories of poor and indeed improved environmental performance. Complaints from the public about environmental problems have been rising by 20% annually. In 2003 the number of telephone complaints reached 330,000 (“Gov’t tells polluters: No more Mr Nice Guy”, *China Daily News*, 4th April 2005).

Case Example of Environmental Protest, Donyang

A protest in Hua Xi village in Donyang (Zhejiang Province) on 10 April against industrial pollution ended in a riot with some 50,000 participants. This started with a sit in protest of old people outside a school some 250 yards from an industrial zone with 13 heavy chemical plants. These plants were

apparently causing congenital health defects in children born in the village and old people suffering respiratory diseases. “Many villagers are outraged at the fact that many local officials are said to own stocks in the 13 chemical plants.” Three thousand law enforcement officers were deployed and 128 people were admitted to hospital 36 for long term treatment and two elderly women were killed by riot police vehicles.

(Asia News.it, 12th and 14th April, 2005).

There are claimed to be several thousand such protests every year across China (see Box above). It is rare that these get out of hand or are reported. This incident close to Hong Kong was first reported in the *South China Morning Post* and was widely reported internationally. In the environmental community in Beijing few knew anything about the incident.

NGOs and Environmental Advocacy

China’s political leadership now increasingly acknowledges the value of working with civil society to raise the profile of the environmental agenda, and indeed in bringing pressure to bear on corruption and mismanagement, the governance agenda to which it is closely linked.

Earlier stands for environmental causes were taken by courageous individuals who had to face greater political risks than in the current generation to be heard, often spending periods of time in prison followed by rehabilitation. In a chapter reviewing this history Elizabeth Economy (2004) highlights the influence of Tang Xiyang and his 1993 book *A Green World Tour*, of He Bouchon and his book *China on the Edge* and that of Ms Dai Qing, whose campaign against the Three Gorges Dam found a remarkable response at the highest level. Dai’s book *Chanjiang! Chanjiang* (Yangtze! Yangtze!) was not just censored but banned after 25,000 copies had gone into circulation. For these pioneers the lack of democracy was an explanation for the poor record in China of environmental protection.

Prior to the above developments private sector policy has seen the relaxation of pass laws which once prevented internal migration from either rural to urban areas or from poorer western areas to the now dynamic eastern provinces. Labour today freely moves on a massive scale from the disadvantaged resource poor agricultural areas to the eastern cities – some 120-150 million people have migrated. This move to a market economy and the geographic dislocation involved has led to the dissolution of the social contract with the people, which formerly provided for employment and subsistence security – the so called ‘iron rice bowl’. This retreat by the state has been accompanied by policies to allow civil society to form self help groups, facilitated by NGOs, to fill the gap in state provision, allowing the emergence of civil society.

According to the Ministry of Civil Affairs there were 230,000 officially registered NGOs in 2002 and many more could be counted (see Economy, E, 2004, Ch 3). The government has been careful to confine their activities to social as opposed to political purposes. The majority of these work in the area of poverty alleviation and income generating activities for their members, often facilitated by outside groups. Many such activities are women based with a livelihood support agenda involving local environmental management and concentrated in the poorer western provinces/regions. Coordinating their representation in Beijing is CANGO, created by

government to provide organisational and training support. CANGO incorporates about 100 affiliated groups and also works itself on projects with donor finance.

In the environmental field the government first registered a number of NGOs (GONGOs – Government organised NGOs) following the embarrassing absence of Chinese NGOs at the Rio conference in 1992 (UNCED). The international call then for greater attention to NGOs in helping to push for greater global environmental awareness and commitment, and their involvement in Agenda 21 activities, led to a cautious encouragement of more genuinely independent NGOs in China.

The first NGO to be registered under Chinese law was Friends of Nature in 1994. It is led by a former academic historian who has informal policy influence at the highest level and claims no political purposes beyond the environmental agenda. Official NGOs are required to have a sponsoring government department. Some have simply registered as non-profit making private organisations. Chinese NGOs are few in number and limited in membership. Leading NGOs are nevertheless genuine Chinese interest and advocacy groups; they are active to the extent that their founders have developed particular campaigns and have obtained funding (usually external) for these and other training and awareness-building projects.

Environmental NGOs are dominated by educated professionals and, with the exception of the internationally affiliated WWF, employ a limited number of paid staff, but volunteers may be involved in anything from simple tree planting with school children to risking their lives in standoffs with illegal loggers and hunters. Listed below are the better established organisations – each of different legal status and orientation. They have all relied on determined and dedicated individuals; some, though not all, have been significantly influenced by their overseas experiences and contacts. English language website of these groups tend to be better presented because they lean more heavily toward external funding and international positioning. The most important Chinese groups involved in policy advocacy tend to be based in Beijing.

Friends of Nature (FoN). This organisation has advocated green nature protection causes and has taken courageous positions against illegal forestry exploitation and largely successful campaigns to save for example the habitat of the endangered snub-nosed monkey in Yunnan and the Tibetan antelope under threat of extinction from hunters for its neck fur used to make *shahtoosh* fashion garments in India. Membership is more than 1,000.

Green River Network and Green Earth Volunteers. Pioneered by committed environmentalists and investigative reporters. Current campaigns include those to save Nujiang River and Tiger Leaping Gorge from dam projects.

Friends of Green (Tianjin), Green Volunteer League (Chongqing). This is a similar group significant perhaps for being based outside Beijing.

WWF (China). This affiliate of the international organisation marshals the services of well qualified and experienced Chinese staff (40 of 70 at head office). WWF China has had a significant impact in advancing the environmental policy agenda in China in the area of biodiversity management, environmental education and river basin management. Its international brand status allows it formal access to high level policy-makers. Naturally it networks closely with international agencies in China, notably UNDP, and has had

privileged access to CCICED helping to coordinate the task force on river basin management. Its influence in promoting environmental education in schools will be critical to China's future development.

Global Village (GbV). Led by Ms Liao Xiaoyi (Sheri Liao) has an urban agenda including recycling and energy conservation and training. With a staff of 20 and 1,000 registered volunteers, it has been commissioned by government to coordinate environmental actions for the Beijing "Green Olympics". Global Village was prominent among Chinese NGO representation at the Johannesburg UN World Summit on Sustainable Development in 2002. Global Village has some. GbV has taken a lead in producing materials for TV broadcasts, such as *Time for the Environment* and produces an NGO networking bulletin *Voices of Grassroots* in Chinese and English,.

Institute of Environment and Development (IED). This organisation is led by Ms Li Lailai and is an applied sustainable development research and capacity building group of 15 staff. It is the contact group for the LEAD programme, promoting leadership in this area. Staff include qualified social development professionals and environmental economists. International funding is critical to maintenance of its activities.

International organisations in China, other than WWF, include Friends of the Earth which operates from Hong Kong, Greenpeace – active in lobbying for forest preservation, along with Wetlands International and The Nature Conservancy. All these organisations run their own web sites and tend to be closely in communication with one another. They also thrive on linkages with university staff and students.

Environmental journalism has emerged as a popular area of independent and investigative reporting. Naturally the internet is playing a very important role in promoting public awareness and allowing public expression on environmental issues and concerns. Two thousand environmentally-related websites are said to exist and their managers steer a careful course so as not to have their websites blocked for "citizens may be fined, questioned, or even imprisoned for messages deemed seditious or expressing dissent from government policies" (OECD, 2005).

In general these organisations do not target the state but use national policy for environmental protection to seek support from government agencies. More controversial campaigns are taken on which have the effect of pitting one agency against another, for instance in the case of the proposed damming of the Nujiang River in a UNESCO World Heritage Area on the border with Burma. The economic justification of the later project is for sale of electricity to Burma. The ultimate decision will lie with the leadership and NDRC, but clearly SEPA have a responsibility to see that EIA studies are seriously undertaken.

Several internet sites have been active in drawing attention to social and biodiversity issues in the Nujiang area, which represents a unique landscape in a biodiversity hotspot region. If a decision to build a dam cannot be prevented, design criteria for such dams are at least being more actively questioned. Some influence from environmental groups has been brought to bear on the number of smaller upstream sites planned. Press coverage is restricted while web sites maintain a low key presence to highlight non-political issues. If there is seen to be potential for political controversy media control is invoked and the conclusion is that strategic economic decisions are not easily challenged by independent groups (Ref: "Please leave China a free running river" by Green Earth Volunteers and www.nujiang.ngo.cn).

Old Summer Palace Lake Lining, Yuanmingyuan Park

A very high profile case receiving much publicity is the case of the lining of the landscaped lake at the Old Summer Palace in Yuanmingyuan Park. The municipality intended to develop the lake for recreational boating.

Water shortages have led authorities to line supply canals – and even rivers – with concrete affecting groundwater recharge and making waterways sterile and inhospitable to natural life, especially in context of the extremes of temperature experienced between summer and winter. After 133 ha of the lake bottom had been covered with an impermeable plastic membrane. SEPA suddenly acted in April 2005 to stop the project (then almost completed) and order an EIA to be undertaken. It also convened what has been described as the first open public hearing attended by NGOs, university experts and environmental journalists.

This may seem a trivial case but it is perhaps indicative of a wider policy to allow greater environmental debate in a case where there are no simple solutions and indeed no serious socio-economic issues. Referring to the almost completed lining works SEPA Vice-Minister Pan Yue said “the project is a typically illegal one that went ahead before assessment”. The authorities defending their actions stated that they had consulted experts.

Greenpeace are active in China and currently mounting a campaign against an Indonesian logging company, Asia Pulp and Paper Co. (APP), for its alleged illegal destruction of primary forest in Yunnan, the biodiversity hotspot of China. It has encouraged a boycott of its products, which include office stationery and toilet paper. To this end it has enlisted Zhejiang Hotels Association to urge its 417 members to boycott its products in order to retain their ‘Green Hotels’ status as conferred by the association and the Zhejiang Tourist Board. Much media coverage was generated by the issue and the company pursued a lawsuit against the group for damages of 2.2 million RNB (€220,000) As Chinese environmentalists prepared to travel to the hearing the company withdrew at the last moment conferring at least a temporary moral victory for the stance taken (*China Development Brief*, April 2005).

3.A Natural Environment and Forestry

Policy Background

Environmental awareness and commitment among the leadership grew greatly in the early 1990s following the UNCED conference in Rio de Janeiro, 1992. The Ninth Five Year Plan (1996-2000) for National Economic and Social Development (approved in 1996) gave green issues a serious policy profile. In 1998 floods affected many parts of the country and were seen to have been largely anthropogenic in origin. The Tenth-Five-Year Plan states that ecological improvement and environmental protection should be a part of sustainable economic development.

The 2001-2005 FYP incorporates the Natural Forests Protection Programme (NFPP) in the upper catchment of the Yangtze River, upper and middle reaches of the Yellow River and in Inner Mongolia in the Northeast. It also established the Sloping Land Conversion Programme ('Grain for Green') which takes lands on steep slopes out of agriculture. The Plan set out measures to enhance nature reserves and protect endangered species, wetlands and other habitats and to protect and recover ecological functions of the environment.

After ratifying the Convention on Biological Diversity, China quickly prepared and approved its national Biodiversity Action Plan (BAP) in 1994. The BAP has since provided guidance for conservation actions through local and donor initiatives, with support from the small but growing non-governmental presence. The EU is conducting a High Level dialogue on Biodiversity which has seen the creation of the EU-Biodiversity Partnership. The EU policy initiative has been a catalyst for development of a China Biodiversity Partnership Framework (CBPF) by UNDP. [The latter's Concept Paper (January 2004) has been drawn on in sections below.]

Legislative Framework for Nature Conservation

The legal framework in China includes the Law on the Protection of Wild Animals (1989), the Environmental Protection Law (1982, amended in 2000), the Forestry Law (1985, amended in 1998), the Grassland Law (1985, 2002), the Marine Environmental Protection Law (1982, 2000), the Sand Prevention and Control Law (2002), the Fishery Law (1986, 2000), the Water and Soil Conservation Law (1991), and the Land Law (1986, 1999). The State Council has issued complementary administrative regulations such as the Regulation on Nature Reserves and the Regulation on Wild Plants Protection.

The State Environmental Protection Administration (SEPA) takes the lead in coordinating the biodiversity conservation institutional framework, developing regulations and guidelines and monitoring. Several inter-ministerial mechanisms and working groups have been established with specific mandates, of which the most important is the Steering Committee for the implementation of the Convention on Biological Diversity BD (CBD SC). This Committee, established by the State Council in 1993, is composed of 20 central government agencies to which SEPA provides the secretariat for the CBD SC.

Several other government agencies play key roles in managing natural resources and implementing relevant legislation for conserving biodiversity on the land they manage. The most

important are the State Forestry Administration (SFA), the Ministry of Agriculture (MoA), the State Oceanographic Administration (SOA), the Chinese Academy of Sciences (CAS) and the State Administration of Traditional Chinese Medicine (SATCM). Competent ministries at local government levels have developed administrative regulations in line with national laws. The EPBs are the primary coordinating agents at each level with assistance from the State Forestry Office for terrestrial ecosystems.

Protected Areas Management

The first reserve was set up in 1956 and by 2003 1999 nature reserves had been established covering a total area of 14.4% of the national land area (6,042 million km²). Of these reserves 197 are 'national' nature reserves, the remaining are established at the provincial or county level. The national government generally provides initial infrastructure for the national reserves, whereas local governments must provide the operating costs even for the national reserves. Ownership and management responsibility of nature reserves varies as between SFA, SEPA, MOA, SOA. The annual budget for nature reserves has grown rapidly to approximately \$350 million from central government for the period 2001-2006, complemented by external donor sources.

Most initiatives adopt a protection approach with bans all production or exploitive economic activities in the area. Very often the agency responsible, such as the line ministry or the local government, is also responsible for production activities and for economic development in areas adjoining the reserve. Illegal forays into the reserves by staff, or sanctioned agents, are widely reported. Structural weaknesses of the system are that a) not all important ecosystems are adequately represented, b) local management capacity is weak and sometimes corrupt, c) the national management system is fragmented and uncoordinated, d) the financing system is too limited, fragmented and input-oriented, and e) data, monitoring and information bases are not adequate for planning and decision-making.

More than 20 natural reserves are registered as part of the World Man and Biosphere Protected Area Network. Seven protected areas have been listed in the Inventory of Wetland of International Importance. Twelve natural reserves are on the World Natural Heritage List. There are in addition to the reserves 1,078 forest reservations and 690 scenic spots, with an area coverage of 15% of the national territory. Cooperation arrangements exist with Mongolia, Russia and other surrounding countries for cross boundary reserves.

Significant steps have been made in the protection of rare and endangered species. Thirty-three nature reserves for Giant Pandas have been established, with 165 thousand ha of habitat and 643 thousand ha of protected area. However, wwchina.org report that between 1974 and 1989 half their habitat was lost. A notable campaign has been mounted to save the Tibetan Antelope launched significantly by a local NGO Friends of Nature and its influential and apolitical leader Liang Congjie. Another courageous campaign has been to save the snub-nosed monkey in Yunnan from loss of its habitat from illegal loggers which has set campaigners against local governments and their vested interests.

Conservation Outside Reserves

Additional to nature reserve management are schemes to rehabilitate catchments. The two most significant are the National Natural Forest Protection Programme (NNFP) and the Sloping Land Conversion Programme (SLCP). However, as implemented they have limited direct value to biodiversity interests. The two programmes focus respectively on reducing erosion due to general deforestation and through the unsuitable cultivation of sloping lands (>25%).

NNFP has mandated a ten year ban on logging in 30 million ha of natural forest in the watersheds of the Yangtze and Yellow River catchments. Elsewhere in the northern provinces including Hainan there is to be strict protection of natural (over-logged) forest covering 33 million ha and reductions in commercial timber extraction to be maintained until 2010. The SLP is designed to provide incentives to households to reconvert their land from agriculture to better forms of catchment cover on sloping lands (See Zhu Chunquan, 2004 for WWF).

In 1998, the State Council issued the Environmental Ecological Construction Plan, and in 2000 the Guidelines on Ecological Environmental Protection. These instruments provide both technical guidance and funding for biodiversity conservation. In order to operationalise these guidelines, SEPA and NDRC (then SDPC) introduced a new conservation tool: Ecological Functioning Conservation Areas (EFCA). The plan is to establish 110 EFCAs of which 10 will have national status.

EFCAs are established in critical ecological zones, with the aim of stimulating environmentally friendly investments, and combining nature conservation with poverty alleviation. EFCAs are typically large, and there may be several nature reserves within one EFCA, as well as land allocated to agriculture, forestry and other economic activities. The EFCA aims to provide a coherent land-use plan across its area and to encourage sustainable utilisation of biodiversity (as opposed to strict protection), as well as to address conserving biodiversity outside reserves.

Actors in Biodiversity Issues

National and local government agencies have been cooperating with bilateral donor agencies, international NGOs, UNDP and the World Bank (using also GEF funds). Lessons from project experience have yet to be incorporated into national policies which will be a prime objective of the EU-Biodiversity Partnership and the PRC/GEF/UNDP China Biodiversity Partnership Framework which has identified approximately €100 million of funding in which the EU will contribute €30 million.

There is growing national interests in nature protection articulated by the emerging NGO community. Though small and fragmented they have been encouraged by government to raise a) awareness of environmental issues b) bring a degree of civic pressure to bear on environmental and legal abuses of government agencies and c) provide the Chinese face for civil society representation in the international arena.

NGOs are not expected to question 'economic' decisions of government but are increasingly allowed to influence design of policy. A serious internal debate took place on the Three Gorges Dam Project regarding its economic benefits and environmental impacts raising considerable international media attention. By contrast the government has sought to quash any media discussion of a new dam project in a UNESCO World Heritage area in Yunnan on the Nujiang River. If the main dam is to go ahead it is possible that smaller upstream dams may not be constructed in line with expressed environmental concerns.

Forest Management: Sustainability Issues

Critical in terms of China's development sustainability has been the direct and indirect impacts of forest exploitation. For centuries China's has suffered from erosion but at the time of the 'Great Leap Forward' the situation was aggravated by the indiscriminate cutting of trees around every village to fire the backyard smelters and steel mills that Mao Zedong had decreed. The purpose was to feed a national effort to produce steel in a mad dash for industrialisation, even to the detriment of attending to the agricultural harvest (Salisbury, 1992). Subsequent large scale forest clearing has been undertaken more for timber than wood fuel.

The national forest estate has now reached 175 million ha and 18.21% of land area (as announced by State Forest Administration, Jan 2005). State owned forests are concentrated in the Northeast while collective/community forests are to be found in the Southwest Minority Areas (eg Yunnan Province), associated with biologically rich natural forests. The growing stock in the Northeast accounts for 32% of the national total and the Southwest for 39.7%.

A target has been set for 23% by 2020 and 26% by 2050. Logging bans have been implemented in large part for catchment protection considerations where replanting has been undertaken. Restored forest area though is inevitably of less natural and catchment protection interest than what has been lost, much being of single-species and destined for pulp plantations.

Improved Forest Management?

"On the whole, China's forestry policies have been well implemented in the last few years. Logging bans on natural forests along the upper reaches of the Yangtze and upper and middle reaches of the Yellow River have been followed. State-owned forest zones in the Northeast and Inner Mongolia have reduced logging of natural forests significantly. Some provinces and autonomous regions have led the efforts to reforest and recover vegetation on steep slope farmland. Logging of forest resources and use of forestland for other purposes have been placed under strict control nationwide. Efforts have been intensified to protect wildlife resources. Reforms focused on forest operations have made progress. A legal framework for the forestry sector is being built up, marked by the release of the newly revised Forest Law".

(CCICED, 2001).

With rapid economic growth the demand for timber and wood products has continued to grow, but with China's domestic forests effectively unavailable for harvesting this has led to an increasing dependence on imported timber and wood. In 10 years China has moved from seventh to second, behind the USA, in terms of value of forest products imported, and China is now the world's largest importer of industrial round wood (CIFOR, 2003).

Between 1996 and 2003 China's log imports grew from 3.2 million cubic metres (m³) to 25.5 million m³, while imports of sawn wood grew from 1.7 million m³ (RWE, round wood equivalent) to 10.0 million m³. By 2003 China also imported 28 million m³ of pulp, 24 million m³ of paper (RWE), and 6.4 million m³ of waste paper. By 2010 industrial wood consumption may expand to 171 million m³, with pulp and paper at 69 million (p.24 Zhu Chunquan et al, 2004).

The ecological footprint of this consumption is felt in source countries where illegal timber harvesting and unsustainable practices are well documented, together with high social costs on

indigenous local populations. China's demand has been directly responsible for extensive exploitation of forests in Kachin State in Burma for teak and in neighbouring Russia. [The Economist \(7th May 2005, p.63\)](#) reports massive illegal trade between Indonesia and China, citing a study by Environmental Investigation Agency which alleged that 300,000 m³ of hardwood timber from Irian Jaya (Papua) province, potentially worth \$200 per m³, is smuggled to China every.

In 2003 China was already unable to source 50% of its industrial wood products (see Zhu Chunquan et al, 2004). Russia, Indonesia and Malaya are the three largest suppliers of timber to China providing 24 million m³ of 42 million m³ imports. Imports of pulp may have less ecological impact to the extent that they tend to come from secondary plantation forests rather than natural forests.

The challenge is therefore to encourage a move to use of properly managed and certified forests both at home and abroad. The Chinese government is supporting work towards creating a standard for forest certification in China. An example exists whereby IKEA, the furniture business with outlets in China, is working to ensure wood supplied for its use is fully certified. WWF has launched a project aimed at ensuring that 500,000 hectares (1.2 million acres) of forest are managed using environmentally sound practices by 2007.

The Disposable Chopstick Issue

It was only in the mid-1980s that disposable chopsticks, mass-produced from birch or poplar, appeared in China, long after Japan, South Korea and Hong Kong had began using them. Disposable chopsticks were originally promoted to fight communicable diseases, as rigorous sterilisation was not required. China now produces and discards more than 45 billion pairs of disposable chopsticks every year, cutting down as many as 25 million trees in the process. Another 15 billion pairs are exported to Japan, South Korea and other countries. Japan has come under criticism because most of its 25 billion pairs of disposable chopsticks it uses annually are made from other countries trees. Korea's environmental awareness is improving as metal chopsticks are becoming more widely used.

International Conventions and Treaties

China acceded the International Convention for the Regulation of Whaling in 1980, the Convention on International Trade in Endangered Species of Wild Fauna and Flora in 1981, the Convention for the Protection of World Culture and Natural Heritage in 1985, the International Tropical Timber Agreement in 1986, the Convention on Wetlands of International Importance especially as Waterfowl Habitat in 1992, and the Convention on Biological Diversity in 1993. China has ratified the United Nations Convention on Prevention and Control of Desertification in December 1996, signed the Rotterdam Convention (PIC) on August 24, 1999, and signed the Cartagena Protocol on Biosafety on August 8, 2000.

In 1981 the Chinese and Japanese governments signed the Sino-Japan Agreement on the Protection of Migratory Birds. In 1986 China and Australia signed the Sino-Australia Agreement

for the Protection of Migratory Birds and their Habitat. In 1988 China and the former Soviet Union signed the Agreement on Fishery. In 1993, China and Russia initialled the Agreement for the Protection of Fish Propagation in Border Water along the Heilong River and Wusuli River. In 1990 China and Mongolia signed the Cooperation Agreement on Protection of Natural Environment.

3.B Agriculture and Land Use

Land Use Change

The core of agricultural policy in China is that food security should be assured through domestic production of 95% of grain requirements. But China with roughly 20% of the world's population has less than 10% of cultivable land; a consequence may be found in pressures on marginal land and indeed environmental risks from use of biocides and fertilisers in areas of highly intensive production.

Beijing and the cities of the north are in far less naturally well endowed areas, not least because of water shortage. The North East though does have a productive temperate plains agriculture, despite difficulties of water shortage and long term erosion of fertile black soils. Also the economic growth areas in the south are in high production areas, where rainfall is abundant and there are good alluvial soils. In this region though there is a trade-off between land take for buildings and roads and loss of best agricultural land.

In the backward Minority Areas of the South West such as Yunnan the situation is more critical, Here China has effectively traded forest extraction for catchment protection (and potential biodiversity) services. In the North of the Western Region, where water is so scarce, agricultural production has required conversion of grasslands, in many cases using irrigation, to create cropland. Agricultural development on these marginal lands, previously grazed extensively, has proved fragile and often unsustainable. This is both in relation to *in situ* productivity (loss of nutrients by erosion and salinisation) and also *off-site* effects, such as aggravated flood risks and downstream impacts of pollution from fertilizer and biocide use – and opportunity cost of water abstraction.

In 34 eastern counties of Inner Mongolia a conversion of 1 million ha of grassland to irrigated crop production has been experienced between 1986 and 1996. Conversions nationwide have contributed to the 'desertification' of eight million hectares of grassland (p18, UNDP, 2002). The overgrazing on grasslands has been estimated for northern China as a whole as of the order of 30% above carrying capacity. The director-general of the Veterinary Bureau of the Ministry of Agriculture is quoted in the *China Daily News* ("Cashmere, environment need better balancing", 19.4.05) as saying that the "average overload rate of farmland is 36.1% in the north"! Due to over-grazing there are 130 million ha of degraded grassland in China – a figure that is increasing by two million hectares annually (p.29, CCICED).

Grassland Degradation

[Table extracted from World Bank 2001]

Table 2.4 Extent of Grassland Degradation in China, 1998

Province	Grassland Area (MILLION HA)	Grassland Area Moderately to Severely Degraded	
		(MILLION HA)	(PERCENT)
Tibet	82.4	21.4	26
Inner Mongolia	79.1	45.9	58
Xinjiang	56.4	26.0	46
Qinghai	36.0	10.8	30
Sichuan	21.1	6.1	29
Gansu	17.6	8.4	48
Yunnan	15.2	0.5	3
Other Provinces	117.8	17.7	15
Total	393.6	136.7	34

Source: Ministry of Agriculture (1999)

The Chinese Academy of Sciences estimated in the early 1990s that some 375 million ha or nearly 40% of the country was affected by moderate to severe erosion (World Bank, 2002). There is however reported to have been considerable success in halting erosion on the Loess Plateau region, particularly susceptible to water erosion. Salinisation is reckoned to affect about 82-100 million ha, of which 7-8 million ha is salinised cultivated land (See Box above, MWR in World Bank, 2002).

Policy Response: Catchment protection

The erosion and flood risk danger has led to recent policy initiatives in the National Natural Forest Protection Programme (NNFP) and the Sloping Land Conversion Programme (SLP). The combined budget is \$40 billion over 10 years, for which local government must find fifty percent (UNDP Biodiversity Concept Paper, 2004). These policies were implemented as a result of the serious floods of 1988 whose origins were clearly seen in the loss of catchment protection from inappropriate deforestation and other grassland conversions in the upper watersheds of the Yellow (Huang He) River. The State Forest Administration (SFA) is responsible for their implementation.

Within the Yangtze and Yellow River catchments areas the NNFP provides for a ban on logging in 30 million ha of natural forest till 2010, the permanent protection of a further 31 million ha of forest and the rehabilitation of a further 13 million ha of land. Elsewhere, in the northern provinces of China (but including Hainan), 33 million ha of over-logged natural forest is to be permanently protected and there is to be a 40% reduction in commercial timber extraction rates between 1999 and 2003, to be maintained until 2010. The NNFP also envisaged the redeployment of 740,000 workers from forest enterprises (See Zhu Chunquan, 2004 for WWF).

The SLP or “Grain For Green” programme is designed to rehabilitate marginal lands with slopes greater than 25% to perennial production from cropland for ‘grains’ (usually income generating tree crops are preferred). The main targets groups are individual households and farmers who are paid US\$40 per ha per year to convert their land to tree cover. They are also given seed stock worth US\$90 and a ration of about 2,000 kg grain per year. These entitlements continue for 8 years in ecological forests and 5 years in timber forests. Participants have the right subsequently to use the tree crops planted. Irregularities in the management of the programme are reported, but 3.8 million hectares of land were converted during 1998-2002.

Land tenure arrangements are such that agricultural land is still collectively owned but land use rights are assigned by village leaders to individual households under the Household Contract Responsibility System (HCRS). Land use rights were originally assigned for 15 years, but are now renewed for a period of 30 years. This extension increases land tenure security and is aimed at encouraging conservation practices. However, land reallocations frequently occur and this undermines any willingness to invest. Indeed there has been a history of policy induced insecurity which has encouraged local tree cutting to the detriment of long term management.

Agricultural Intensification

China has developed a considerable export trade to Taiwan and Japan in high value but labour intensive horticultural produce. In such areas intensification has brought excessive and often wasteful use of chemical inputs. Intensification of livestock production, in the context of rapidly increasing incomes and greater meat consumption, is also significant because of

downstream impacts of poorly controlled effluents discharged from this sector. There is in addition a significant export sector in poultry production and many health risks emerging (Bird flu, SARS, etc).

Since WTO accession China's agriculture trade has continued to grow. In the first half of 2004, the country exported US\$10.62 billion of farm produce, an increase of 10.7% over the same period from the previous year. However, the country's imports increased unexpectedly by a staggering 62.5% compared to the same period in 2003 (CCICED, 2004). By comparison with other countries, China has a shortage of farmland and water for its agricultural production. China, with 22 per cent of the world's population, has only seven per cent of the world's arable land and one quarter of the world's average water resources per capita. It is projected that China will increasingly become a net importer of food (World Bank 1997).

In international markets China's comparative advantage is in labour and its disadvantages are in land and water. With accession to WTO land- and water-intensive agriculture products, such as wheat, maize and rice are expected to shrink gradually; labour-intensive horticulture products and temperate climate fruits, vegetables and livestock products should expand. Therefore it is expected that non-point source pollution from chemical applications to wheat, maize and rice will shift to more concentrated zones used for horticulture, fruits, vegetables, poultry, etc. In a benign scenario, if more workers move to manufacturing and service sectors and there are increasingly strict international environmental requirements, total amount of chemicals used could decrease.

China is the largest importer, producer and consumer of chemical fertilisers in the world. Total fertilizer consumption increased by five times between 1980 and 1998 by which time it amounted to 41 million tons a year; in 2003 it stood at 43,395 (SoE Report). The national average application rate is about 225 kg per ha, but in some coastal regions it is greater than 400 kg per ha (World Bank, 2002). However, the crop utilization rate of fertilizer is very low, only 30-45% for nitrogen, 10-25 % for phosphate, and 40-50% for potassium. The implication is that overuse of chemical fertilizers and pesticides is resulting in serious non-point source pollution and eutrophication of water bodies.

There are 4,880 lakes in China, covering 83,400 km² (0.8 per cent) of the country. According to SEPA's statistical data, every large lake and 75 per cent of total lakes suffer from eutrophication. The intensive livestock industry is the main non-point source of agricultural pollution of water, especially in suburbs of towns and around cities, for example around Shenzhen city there are a number of intensive chicken farms and pig rearing units which emit very large volumes of wastewater. In 1995, total livestock excrements were 2.5 billion tonnes; 3.9 times the total annual industrial solid wastes. Very little livestock excrement is treated before being released into water bodies. (CCICED, 2004).

Annual use of pesticide is more than 1.2 million tones, with 625,000 tons produced nationally in 1999. In 2003 China used 1,312 million tones of pesticides (State of the Environment, 2003). In 2000, the organo-chlorine and organo-phosphate pesticides amounted to 39.4% and 37.4% of total pesticides used. Pesticides are applied to vegetable, fruit, rice and wheat crops. CCICED report that 9 million hectares farmland are polluted by pesticides. In 2000 the Chinese Academy of Sciences (CAS) reported elevated contamination levels in vegetables, fruit, meat and eggs and that the situation was serious and widespread (p 59, World Bank, 2002).

Although the Pesticide Administration Rule came into effect in 1997, EPBs have almost no capacity to enforce this and related rural environmental regulations. CCICED (2004) also reports that "agricultural products contaminated with pesticides often result in food poisoning". Chemical residues in food is relevant not only to local health concerns but is a risk for export products should the situation not be brought under control. The effects for

farmers from incorrect handling, protection, storage and disposal of agricultural chemicals are serious concerns as well, and not least the biodiversity impacts from the killing of non-targeted insects.

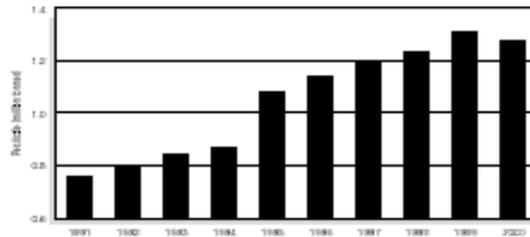


Figure 3. Pesticide use, 1991-2000.

China's agriculture products face trade barriers when exporting to other countries, for example, in 2001 EU "checked for pesticides on 62 Chinese tea products, up from six" (CCICED). Green food and organic food represent only a small portion of agricultural products but have increasing commercial potential for export and as food scares deter newly affluent urban populations from buying the cheapest fresh produce.

Other Agricultural Issues

Soil contamination is a major problem. A deputy of the National People's Congress cites research showing 133,300 ha of farmland as "occupied or ruined by solid wastes, and that polluted air is fouling production conditions for more than 5.3 million ha of arable fields" (quoted in 'Rural environment needs protection' *China Daily* 9th March, page3"). His proposed draft 'agricultural environmental and ecological protection law' is a typically reactive and legalistic response and unlikely to provide solutions.

The demand for livestock products as mentioned elsewhere has led to overgrazing in extensive pastoral systems in the north and west. There are 130 million hectares of degraded grassland in China – a number that is increasing by two million hectares annually (CCICED, 2004). One of the negative environmental consequences of this 'desertification' tendency is sandstorms whose frequency and intensity is apparently rising compared to the first half of 20th century (though of course these were not measured, prone populations and potential damage are massively greater). During 1950-1990, the average year is said to have had 1.77 sandstorms. However, in 2002 there were up to 12 sand storms. These sandstorms reach the cities such as Beijing and even those of South Korea and Japan.

Another source of air pollution from rural areas is crop straw burning. After harvest, many farmers directly burn straw in the field, resulting in very heavy air pollution. In 2002, for example, the air pollution by straw burning dramatically decreased visibility in Shijiazhuang City. The airport of Shijiazhuang City had to close for 48 hours. Every year, there are about 400 million tonnes of crop straw produced. Another issue is in the utilisation of plastic sheeting in agriculture. As long ago as 1995, nearly one million tons were apparently used, covering 6.5 million hectares of farmland (CCICED, 2004).

It has been reported that the genetic engineering industry is poorly supervised. Greenpeace claims that 950 to 1,200 tons of GM rice were grown in China in 2004 on a planted area of 1,900 to 2,400 mu (127 to 160 ha). In 2005 the planted area will grow to 20,000 to 25,000 mu (1,333 to 1,667 ha) with an output of 10,000-20,000 tons according to this campaign group. During February and April 2005 Greenpeace carried out tests on rice bought in Hubei

Province, near government trials, and found 19 out of 25 samples contained *Bacillus thuringiensis* (Bt) which produces a toxin that kills pests. Sales of GM rice are supposed to be strictly controlled (*China Daily* 14th April, 2005).

There is finally an issue in relation to humane treatment of animals used for the fur trade. Video footage of animals (mink) cruelly mistreated in a market again in Hubei (North China) was spread through the internet in February 2005. Exports were worth \$US2 billion in 2004.

3.C Water Resources (and Waste) Management

Water Scarcity Problem

China is critically short of water particularly in the north and east of the country underlining the requirement for conservation and efficiency in the management of surface river waters and groundwater. Average annual availability of water is 2,200 cubic meters of fresh water per capita, but in the eastern part of the country and particularly areas south of the Yangtze River 34% of the land areas has 81% of water resources. Northern regions accounting for 47 % of land area and have 7% of water resources.

Much of the western half of China lacks drainage to the sea, while main rivers such as the Yellow River (Huang He) run dry in winter months (for 226 days in 1997). This is in large measure because of loss of catchment vegetation cover upstream and excessive abstractions for agriculture and for the demands of industry and municipal supply. The Water Ministry reports that there had recently been zero flow of the Haihe River over ten years consecutively, even in the flood period (MWR, Annual Report 2003).

The influence of the monsoon climate is that where rainfall may be 2,000 mm per year in the south, in the north there may be little or no rain over a period of years but where and when it does rain, during summer, severe flooding may occur. In 1998 particularly serious floods led to crisis policy responses in land management (See 3.A and 3.B). Reservoirs around Beijing are driest in January and fullest in July, at a time when evaporation is highest.

Users of surface and groundwater are agriculture for irrigation (75%), industry (20%) and municipal supplies (5%). Water use efficiencies are poor in agriculture where flood irrigation is practised and evaporation high (also causing salinisation of cultivable land area). Excessive and unsustainable water use has seen water tables falling by 1m per year in northern towns and cities. An important consequence of artificially low river flows is seawater intrusion into groundwater of coastal cities and subsiding ground levels. The latter are said to be leading to problems for building constructions in the cities of Tianjin and Shanghai (UNDP 2002).

Of the total of 660 designated cities in China, 400 are short of water and 100 classified as extremely short, furthermore 20 million rural people are experiencing shortage of drinking water (MWR, 2003). In summary, nearly half the population (550 million people) live in critically resource scarce areas: 130 million people in the Haihe River basin, where Beijing and Tianjin are located, and 200 million in the Huai River basin share a mere 355 and 515 cubic meters per capita per year, respectively (UNDP, 2002).

Management Responses to Water Scarcity

There are significant water losses due to outdated water supply infrastructure, bad maintenance and poor management practices. Three factors identified by the UNDP 2003 are China account for this situation: a) artificially low prices, b) a formidable water management

bureaucracy and c) agricultural self-sufficiency policies. There is identified urgent need for more integrated policies recognising trade-offs between uses, valuing water saving programmes, and allocating water to higher value uses. But as the draft UN Common Country Assessment (2005) bluntly states, “there is little support for a much needed structural adjustment in the direction of water efficient agricultural and industrial production.”

Solutions are more often seen in technical fixes such as in water transfer plans, which though they may have their place should be accompanied by new economic instruments (such as water pricing) and inter-ministerial coordination. The EU sponsored River Basin Management Programme is intended to articulate such integrative management solutions.

The South-North Water Transfer Project will divert waters from the Yangtze at two different locations at a cost of 500 billion yuan (€50 billion). Construction began in 2002 and Beijing should benefit from 2010 (Tianjin, receiving waters from a lower off-take, from about 2007). Approximately 300,000-400,000 affected people will be relocated. The cost of this water is reckoned by the World Bank at approximately 10 yuan per cubic meter, about 5 times that used for accounting purposes for supplies in municipalities (World Bank, Advance Copy of Programme Assessment 2004).

Water Policy Requirements

1. Increasing adoption of market based instruments, in particular a move to full pricing of water so that it reflects true cost of supply and scarcity, thereby restricting wasteful (and lower value) useage – this is seen at World Bank as a first order requirement.
2. Developing river basin management authorities to plan and manage available water resources within a coordinated framework, managing supplies to achieve agreed multiple and sometimes conflicting objectives, through inter-ministerial coordination and participative approaches.
3. Privatising or corporatising water supply, including systems for domestic waste effluent charging.
4. Moving from attempts at controlling industrial pollution concentrations to control of total pollution loads. More rigorous law enforcement and realistic (higher) fines and fees required.
5. Creating incentives for cleaner production techniques (Chinese heavy industry and especially pulp mills are notably inefficient compared to international benchmarks).

Source: adapted from UNDP, 2002

Water Pollution Sources

Industries are the largest source of pollution with wastewater often only rudimentarily treated. The performance of newer industries, especially foreign owned enterprises, is the most satisfactory. Failing State Owned Enterprises (SOEs) under financial pressures tend to

‘bypass’ environmental and social regulations to maximise short term margins and delay eventual closure. They have often been poorly located and the same applies to village industries (TVIEs) which experience little exposure to serious regulation. Newer industrial parks in the dynamic parts of the country tend to have better controls.

Agriculture is a main source of pollution to groundwater and rivers with biocides and fertilisers used in excessive quantities. During the period of economic reform the increase has been from 8,840,000 tons in 1978 to 42,538,000 tons in 2002 (Chinese Statistical Yearbook 2002). Livestock and poultry units are an additional increasing source of pollution, where in an increasingly affluent population there is rapidly growing demand for meat products.

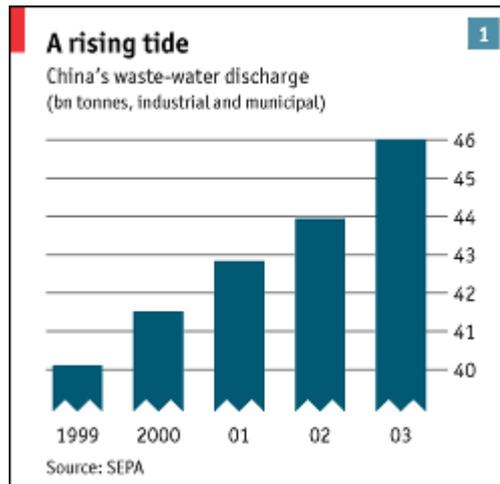
More traditional sources of water pollution though are the poorly regulated TVIEs (eg in food processing, tanneries, textile dying etc), the SOEs in heavy industries and the major towns and municipalities. Power stations - mostly coal fired (75%) – are more associated with air pollution. However, mineral mines are serious sources of water pollution; return flows from their abstractions for washing may contain high levels of heavy metals. For example zinc mines in Southern China have contaminated rice and shellfish with cadmium contributing to high rates of anaemia with kidney and bone disorders (ref: study reported in Economy, E 2004).

Municipal Wastewater

In a political climate of restricted civil society representation, poor environmental awareness and high production output orientation there has been little priority in allocating resources to municipal wastewater treatment (and almost none to solid waste management) outside the richer coastal cities. [It is also of note that back in 1999 only six of China’s 27 largest cities supplied drinking water that met state standards].

Although it is claimed that 89.25 of industrial wastewater discharge standards were met in 2003 (SEPA State of the Environment website), treatment facilities are poorly maintained, outdated and sometimes simply not used. But if most industrial wastewater is treated in some form, only 25.8% of domestic (municipal) wastewater was reported as treated in that same year.

In contrast, the Ministry of Water Resources, who collect their own data under apparently different criteria, report in their Annual Report 2003 that “the total amount of industrial and domestic waste water reached 62 billion tons, with 70% of it disposed into the rivers lakes and reservoirs without any treatment.” This source also reports that every day 1,815 cities and towns across the country discharge 86.33 million tons of polluted water, out of which 71.57 million tons is industrial and 14.76 million tons is domestic waste.



River and Coastal Pollution

The State of the Environment 2003 website shows that river water quality for seven major rivers monitored (on 407 key sections) was:

River Water: Grade I – 3.4%, Grade II – 21.4%, Grade III – 13.3%, Grade IV – 23.8%, Grade V – 8.4%, and, worse than Grade V – 29.7%.

In general it is difficult to interpret published pollution figures, even to find trends. However it would appear that while discharges have gone up, the absolute amounts of the most serious pollutants in discharges has diminished since 1997 and are now stabilised. The ‘5531 Project’ is a major attempt by SEPA and MWR to work together to find water pollution management solutions for five major cities within the Yangtze River Basin. The Yellow River Conservancy Commission has adopted a similar approach with local EPBs.

The year 2000 witnessed the worse coastal pollution on record with ‘red tides’ affecting 10,000 sq km. Red tides, caused by excessive loads of nitrogen and phosphorous, were recorded 89 times in this area. Sharp drops in fish catches are the combined result of over-fishing and pollution. Hepatitis A outbreak in 1988 and virus and bacterial outbreaks of cultured shrimp are all related causes for concern. Offshore sea water monitoring in 2003 (2002) shows the following quality classification:

Offshore Sea Water: Grade I – 19.8% (21.3%), Grade II – 30.4% (28.4%), Grade III – 19.8% (14.4%), Grade IV – 8.5% (8.9%), and, worse than Grade IV – 21.5%(27%).

Solid Waste Management and Disposal

In 2003 China’s industry generated around 1 billion tons of solid waste of which 12% was classified as hazardous. Total domestic garbage reached 136.38 million tons, an increase of 1.2 percent over the previous year. The treatment rate was recorded as 54.3 percent (SEPA, SoE 2002). A more recent report indicates only 20% of China’s 168 million tonnes of solid waste per year is properly disposed of. Each day there is about 350,000 kilograms of

municipal solid waste produced in rural areas (WRM Annual Report 2003). Municipal and solid waste management is an area of serious under investment by Chinese authorities.

China has become the dumping ground for the electronic trash and toxic waste recycling business. The e-waste has its origins in North America and Europe. Though this creates jobs in rural areas, hazardous waste imports are officially banned. Scrap electronics contain harmful substances such as lead, cadmium, hydrargyrum and chromium and China's own waste in this area is set to grow massively, along with that from old TV sets, refrigerators and washing machines, as the bulk of electronic goods purchased in the 1990s wears out. A draft law intends that such goods will be returned to electronics retailers for disposal and recycling ("Pushing circular economy tops nation's development agenda" in *China Daily News*, March 5 2005).

Two EU directives on 'Restriction of Use of Hazardous Substances' and on 'Waste Electrical and Electronic Equipment' will mitigate the above problem. The first will be restrict the use of lead, mercury, cadmium, hexavalent chromium and polybrominated diphenyl ethers in electric and electronic products in the EU market from 1 July 2006, requiring a response from Chinese manufacturers. The second will see greater recycling within European Union countries.

3.D Air Quality and Energy Use

Overview

In 1998 the World Health Organization (WHO) noted that of the ten most polluted cities in the world, seven can be found in China. Industrial boilers and furnaces consume almost half of China's coal and are the largest single point sources of urban air pollution. A report issued by SEPA in June 2003 said officials were "still not optimistic" about the overall success of efforts to curb air pollution. The air quality of about two-thirds of Chinese cities failed to meet the air quality standard for Grade II of the government standards (although emissions of soot, industrial dust and other pollution were reduced). But there was also a smaller proportion of cities 'worse than Grade III'. Recent reductions of sulphur dioxide (SO₂) appear have been achieved after peaking in the late 1990s and again in 2002.

Total suspended particles (TSP) were blamed as the leading pollutant of urban air, especially associated with the north of the country, while excessive sulphur dioxide in the air caused acid rain affecting many areas in the central and south regions, covering 30% of China's total land area. Damage to buildings, cropland and forests has real costs. A study in 1995 calculated this as 2% of GNP, while Guanxi in the extreme south is reckoned to have suffered a 5-10% loss in food production and 35% death rate among pine stands (see p29, UNDP 2002).

Acid Rain Environmental Costs

A report in the *China Daily* (19 April, 2005) presents figures for the costs of damage in Southwest China's Sichuan Province. According to a recent survey by the Institute of Mountain Hazards and Sciences, under the Chinese Academy of Sciences, acid rain causes an annual average loss of 11.3 billion yuan (c.€1.1 billion, \$US 1.4 billion) to the province. Each year the rain costs it 6 billion yuan (c.€600,000, US\$726 million) in crop damage. Acid rain has impacts on 80% of Sichuan's 21 cities and autonomous prefectures. The article highlights damage to the World Heritage listed 1,204 year old Leshan Giant Buddha even since its facelift in 2001. It also states that less than 30% of waste is treated in the province and mentions that of the 24 cities whose air quality is monitored only five meet the required standard.

Residential indoor air pollution from coal burning in town and country has also real costs in health deterioration. As a result of the various associated air pollutants respiratory diseases are said to account for 300,000 premature deaths annually.

Energy Consumption

The total primary energy consumption in China in 2002 was 1,514 billion tces, 527 million more than in 1990. This represents an annual growth rate of 2.3%. Of this 66.3% was coal, 23.5% was oil, 7.6% hydroelectricity, and 2.65% natural gas (NDRC, 2005). While residential consumption has increased its share of China's energy demand over the last decade the largest absolute increase in consumption was from the industrial sector. Carbon mitigation

strategies are focusing on technologies to reduce emissions from industrial boilers and motors.

Coal consumption in 2002 was 1.42 billion tons an increase of 34% from 1990, and 70% was raw coal directly burned without washing or dressing. The amount of sulphur dioxide and particulate matter (TSP) caused by coal burning amounted to 70-80% of total emissions (NDRC). Non-coal consumption has increased to 33.7% from 1990. Energy consumption per unit of output dropped (from 5.32 tce in 1990 to 2.68 tce in 2002 for every 10,000 yuan of GDP), but was still 2.4 times the average world level and 4.7 times that in the European Union.

Energy consumption per unit of product dropped across the range, but was still 40% higher than the most advanced levels (for thermal power 22.5% higher; for steel 21.4% higher; for copper smelting 65% higher; for cement production 45.3% higher; for synthetic ammonia 31.2% higher; and, for paper and paper board a very significant 120% higher).

Vehicles and Air Pollution

Estimates suggest that the transport sector energy consumption could grow by nearly 7% per year as the government pledges major investments in the country's infrastructure. In many southern cities exhaust emissions have become the most important pollution source. Despite improvements in vehicular fuel-efficiency standards and a gradual replacement of outdated technology, nitrogen oxide (NOx) and carbon monoxide (CO) emissions from the transport sector are set to rise. The total number of vehicles registered has gone up from 3,496,100 in 1985 to 25,727,200. Beijing has more than 2.3 million vehicles.

In Guangzhou exhaust emissions accounted for 22% of air pollution while industrial pollution was 20.4% and dust from construction sites contributed 19.2%. According to an article in the *China Daily* (January 8, 2004) residents in the province voted vehicle exhaust "the most intolerable pollutant". CCICED (2004) suggests that 70% of pollutants in Shenzhen are from vehicle emissions.

On a warm series of days between Monday 4th and Wednesday 6th April 2005 air quality slumped to the lowest possible level on the five point standard of Beijing's EPB. The worse air quality for three years was recorded on Wednesday 6th (*China Daily*, 7 April 2005) directly affecting all citizens and causing aggravation of respiratory diseases for many. Air pollution levels have been publicly broadcast and this is said to have greatly influenced representatives in their determination to control the problem.

As can be seen in the table below for Beijing, in comparison with concentration levels in 1999, there seems to have been progress in SO₂ and CO reduction despite increased vehicle numbers and power production. For other parameters it is difficult to be very positive about trends. However, it is reckoned that SO₂ is in fact now better in the last year or two. The figures do not lend themselves to great confidence yet.

Concentration Levels for Major Air Pollutants in Urban Areas of Beijing

1999-2002 (daily average, mg/m³), CCICED 2004

Pollutant Year/	SO₂	NOx	Particulates	TSP	CO

1999	0.080	0.077	0.180	0.364	3.3
2000	0.071	0.071	0.162	0.353	2.9
2001	0.064	0.071	0.165	0.370	2.6
2002	0.067	0.076	0.166	0.373	2.5
<i>% inc/dec in 4 years on 1999</i>	<i>-8.4</i>	<i>-1.3</i>	<i>-7.8%</i>	<i>+2.5%</i>	<i>-24.2</i>

Energy Use and Carbon Emissions

China's energy consumption accounts for approximately 53% of East Asia's total energy consumption (excluding Japan). In 2001, China accounted for 9.8% of world energy consumption. By 2025, projections indicate that China will be responsible for approximately 14.2% of world energy consumption.

Overall total Chinese energy-related carbon emissions (CO₂) more than doubled since 1980. With 12.7% of the world's total, China is the second largest emitter of energy-related carbon dioxide emissions after the United States. China's share of world carbon emissions is expected to increase in coming years, reaching 17.8% by 2025.

(EIA, US Department of Energy, 2003)

Per Capita Energy Consumption

While China ranks second in the world behind the United States in total energy consumption and carbon emissions, its per capita energy consumption and carbon emissions are much lower than the world average. In 2001, the United States had a per capita energy consumption of 341.8 million Btu, 5.2 times the world's per capita energy consumption and slightly over 11 times China's per capita consumption.

Per capita carbon emissions are similar to energy consumption patterns, with the United States emitting 5.5 metric tons of carbon per person. The world on average emits 1.1 metric tons of carbon per person, with China at 0.6 metric tons per person. With a growing economy and increasing living standards per capita energy use and carbon emissions can be expected to rise even if as a small percentage of total energy use.

(EIA, US Department of Energy, 2003)

Policy Response

Increased energy demand has encouraged China to accelerate the development of cleaner fuels such as natural gas and coalbed methane. China is increasing the number of combined heat and power plants, adding approximately 3,000 megawatts (MW) of hydropower annually, and developing renewable energy resources such as hydropower, wind and photovoltaics for electricity generation.

China is currently a non-Annex I country under the UN Framework Convention on Climate Change, meaning it has not yet agreed to binding emissions reductions in the Kyoto Protocol, which it ratified in August 2002. China's domestic greenhouse gas reduction activities are based on increasing energy efficiency and conservation, clean energy supply and reforestation. Policies are designed to cut energy costs and reduce local pollution, while having the auxiliary benefit of reducing carbon emissions.

China has introduced bold initiatives to cut back on coal use. In an effort to encourage a switch to cleaner burning fuels, the government has introduced a tax on high-sulphur coals. In Beijing officials are aiming to phase out coal from the city centre and have established 40 'coal-free zones'. The Shougang Group's iron and steel facility, Beijing's biggest polluter, has been required to move out of the capital (*China Daily* 7th April). At the same time the government is making plans to construct a natural gas pipeline from Xinjiang Autonomous Region in the far West to Beijing.

Similar efforts are taking place in other major Chinese cities. A system of emissions trading for sulphur dioxide, similar to that used in the United States, is being tested with pilot projects in selected cities. Unlike other developing countries such as India, South Korea and Brazil, both the amount of energy and carbon consumed per dollar of GDP have decreased dramatically in China over the past two decades. This is in large part the result of conservation efforts and modernisation of industrial plants and equipment. China's Energy Conservation Law entered into force on January 1, 1998.

The government has also reduced coal and oil subsidies. However, coal consumption is again rising after declining in the late 1990s, and China's energy intensity increased slightly in 2001. The government has continued to promote a shift towards less energy intensive services and higher value-added products, as well as encouraged the import of energy intensive products (Energy Information Agency, US Department of Energy, 2003).

In an effort to reduce air pollution in Beijing, the municipal government in 1999 ordered city vehicles to convert from leaded fuel, which has been phased out since 1 July 2000. By 2002, Beijing had the largest fleet of natural gas buses in the world – a total of 1,630 vehicles, while subway and light rail systems are being expanded. In 1999 the Euro I standard for emissions was introduced; at first, there was much complaint from vehicle suppliers and manufacturers. The Euro II Standard has since been adopted in Beijing and Shanghai (from 1 July 2002) and has been applied to other cities from 1 July 2004. To further curb car emissions the Beijing municipal government will implement the Euro III standard from 1 July 2005.

Renewable Energy

After coal, accounting for 70% of energy use, renewables (primarily hydroelectricity) account for the second largest share, 17% in 2002 of China's electricity generation. Over a period of 20 years since 1980 the renewable contribution to installed energy capacity and electric generation has actually declined slightly as a proportion (CCICED, 2004). China now hopes to embark on a multi-million dollar renewable energy strategy to mitigate pollution.

Suitable wind resources are found in the northern and western regions of China and wind turbines are suitable for both rural village electrification and large-scale grid-connected electricity production. The highest wind potential in China lies along the coast and the offshore islands, in or near many of the major population centres. The next highest wind potential region covers Inner Mongolia and the northern Gansu Province, both of which are home to numerous villages with no access at present to grid-based electricity.

Current utilization of solar energy includes small-scale uses such as for household consumption, television relays and communications. Solar energy consumption is, however, increasing steadily. The number of kitchen units is climbing steadily, restricting health risks from indoor coal burning.

While solar and wind power provide significant renewable energy potential, China's growth in renewables will in the next decade be dominated by hydropower, particularly with completion of the 18.2-gigawatt Three Gorges Dam project in 2009. The Three Gorges Dam is seen as both an important source of energy for the country's growing electricity consumption needs and, in addition, as a means of taming the Yangtze River notorious for its disastrous floods. For the once controversial dam project their still remain risks arising from the accumulation of toxic materials and other pollutants from industrial sites which remain to be cleaned up before inundation.

By 2025, the share of nuclear power used for China's electricity generation is expected to increase to 4% from the little over than 1% currently.

Future Prospect

There are many factors influencing future energy consumption and carbon emissions. These include population growth, economic development, industrial structure changes, technological progress and shifts in the energy mix. China has made strides to mitigate the potential impacts of future growth. National legislation incorporates 'Cleaner Production' regulations and a significantly altered 'Law on the Prevention and Control of Air Pollution', revised in 2002.

With higher living standards the amount of primary energy consumed will almost undoubtedly increase in the future, as will the resultant carbon emissions. These absolute increases will occur despite continued technological improvements and reductions in energy intensity. The urban population is expected to grow from 30% to 70% by 2050; with energy consumption of a typical urban household in 1995 three times higher than that for a rural household (CCA, 2005) there will be an inevitable commitment to growth in energy use. It is also salient to reflect that three quarters of the estimated energy production capacity which will be required in 2020 is not yet built.



Environment Issues in China's Energy Development

(extracted from CCICED, 2004)

Environmental Issues in Coal Development

1. Damaged land resource by coal exploration. By 2000, about 48,000 ha of land had subsided. On average, 0.2 ha of land will subside for every 10,000 tonnes of coal mined. This has increased by more than 20,000 ha per year. But the rate of recovery is now only about 20 per cent.
2. Coal exploration has damaged water resources and caused pollution. For example, 19 per cent of underground water was polluted to some extent in North China. There are 2.2 billion tonnes and 28 million tonnes of wastewater discharged respectively from various coal mining and coal washing processes.
3. Backfill from coal production reached an accumulated total of three billion tonnes, with a rate of increase of 150 to 200 million tonnes per year. This occupied land and damaged rivers and there was burning of wasted coal stone pile.
4. Methane was emitted during coal mining process, which accounts for around 10% of total methane emissions from anthropogenic sources. Methane emissions from China's coal industry accounts for up to one third of total methane emission from coal mining in the world.
5. Coal combustion is a major source of air pollution in China. SO₂ emissions were 19.5 million tonnes in 2001 and around 85% of that came from coal combustion. Acid rain fell in more than one third of the country.

Environmental Issues of the Oil and Natural Gas Industry

Emissions include hydrocarbons and sulfurated hydrogen, while leakage from accidents, such as pipeline breaks, tanker accidents, etc. have additional impacts. Evaporation and leakage from oil tanks and distribution pipes, polluted waste washing water, as well as mud in oil tanks, can all cause environmental damage when returned to the environment.

Wastewater, exhaust gas and waste residue are major pollutants transformed from sulfur, oxygen and nitrogen contained in crude oil. There were three to four tones of wastewater discharged per tonne of oil processed in 1980s in China. Emissions include SO₂, H₂S, NO_x, CO, hydrocarbon components and dust, all dangerous to human health. Chemical waste residue can pollute soil, water and air while wastewater from natural gas exploration may contain sulphur, lithium, kalium, bromine and cesium.

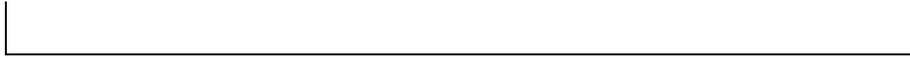
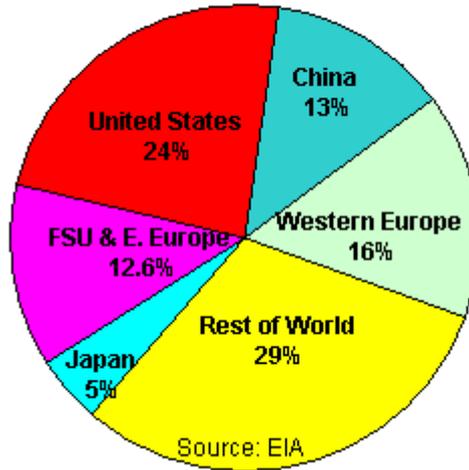


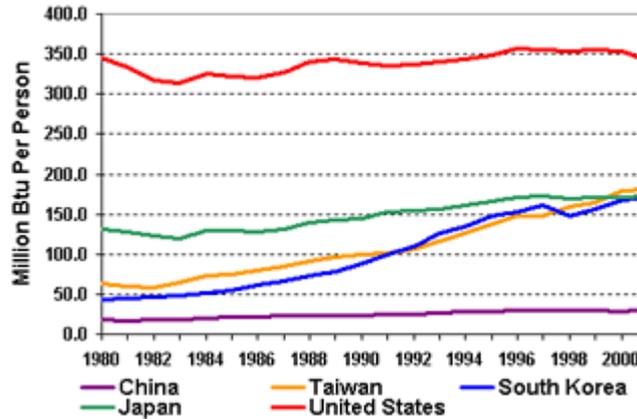
Figure 3.D Air Pollution and Energy Consumption Data

(Source: Energy Information Administration, US Energy Department, 2003)

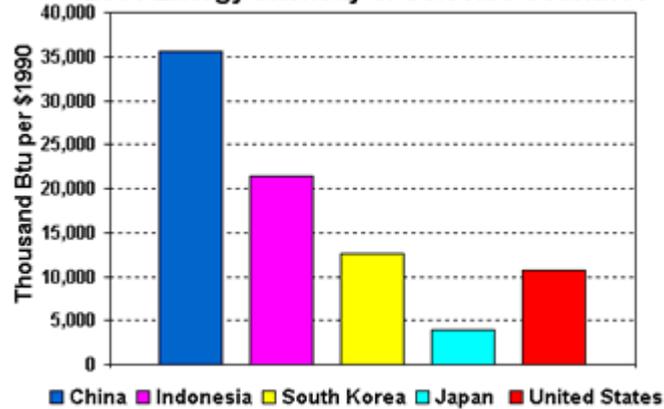
2001 Energy-Related Carbon Emissions



Per Capita Energy Consumption of Selected Countries



2001 Energy Intensity of Selected Countries



4. EU AND OTHER DONOR ENVIRONMENTAL COOPERATION

Overview

Environment and natural resources has been the major area of past development cooperation in China, now classified as a (lower) middle income country by the World Bank. Poverty is effectively being tackled through the direct and indirect effects of economic growth and opportunity, even if there are still imbalances. Donors have responded to China's regional policy agenda by supporting natural resource projects in the Western Region, where their projects have usually had an important livelihood support and poverty alleviation theme.

Though they might wish to remain active in the biodiversity area, donors have recognised that their assistance in field projects in NRM and biodiversity can only have a limited ultimate impact in an enormous country like China. In any case China has the resources to achieve much for itself with its own resources but policy restricted "to command and control approaches" has not been successful in the natural resources area. The government is now predisposed to assistance with policy development and institutional reform at the centre to incorporate know-how in tackling environmental questions. Hence there is a potential for sharing new approaches, such as use of market instruments and other integrative mechanisms of environmental management.

A full list of EU Member Country Projects is presented in Technical Appendix E. A rapid review of past and continuing projects in the environmental sector requires mention of a number of significant areas of intervention, associated with different donors, for example: UK support to land rehabilitation and livelihood support programmes in the Loess Plateau area and in water sector management; GTZ support to energy efficiency, renewable energy (especially in rural areas), biodiversity, waste management and institutional strengthening of SEPA; The Netherlands have been working on biodiversity, renewable energy and cleaner production; JICA have an emphasis in pollution control and water management. The emphasis of Sino-Italian Cooperation is in air pollution control and alternative energy.

The multilaterals have very substantial portfolios which include involvement in all these areas including transport projects, urban services and sanitation with environmental management as a cross cutting theme there is limited benefit to any generalisation. A detailed review of co-operation projects would not fit the scope of this report nor be appropriate. In any case, as indicated, the bilateral donors are pulling out of traditional aid projects in favour of know-how exchange and private sector support for technology transfer. For political reasons the US has not invested in aid cooperation projects, though energy efficiency is a focus of research collaboration.

EU Dialogue and Cooperation Programmes

The EC has developed comprehensive environmental policies which requires the application of environmental criteria to development cooperation projects and provides for assistance to partner countries in fulfilling requirements of Multilateral Environmental Agreements. The EU Country Strategy Plan (CSP) for 2002-2006 has identified the importance of environmental impacts on China's growth path and indeed on global commons and transboundary issues. The EU has built on its well established High Level dialogue with the Chinese government in the areas of biodiversity, river basin management and air pollution (including vehicle emissions).

The Commission's Communication on a Europe-Asia Cooperation Strategy for Energy (COM (96) 308) and the Communication on a Europe-Asia Cooperation Strategy in the Field of Environment (COM (97) 490), which focuses on projects to promote cleaner production methods, waste minimisation and the application of environmental standards have been key references for past programme development. In response to such policy guidance two major capacity building projects have been developed respectively as: the Energy and Environment Project (EEP) and the Environmental Management Cooperation Project (EMCP).

The EMCP project is winding up and its evaluation suggests limited sustainable outputs, the former, also conceived before the 2002-2006 CSP, has suffered development delays. The EC continues to administer a natural forest management project and has a large number of varied know-how transfer and diagnostic projects funded under grants from the Asia Pro-Eco Programme. Other field projects in agricultural and natural resource management are also winding up.

The current CSP presents the main areas of comparative advantage or appropriateness of EC assistance as: use of energy; sustainable forest management and development of forest policy; protection of biodiversity; combating air pollution and climate change; sustainable land planning and management; and, water resource management. The National Indicative Programmes (2002-2004 and 2004-2006) have seen the budgeting and formulation of two programmes in Biodiversity and River Basin Management (RBM)

The Biodiversity programme has developed out of the EU-China Biodiversity Partnership, which is designed to help China implement obligations from various international treaties, notably the Convention on Biological Diversity. The EU Biodiversity Programme to commence by 2006 will effectively group EU Member country efforts and operate primarily at national level policy support. Having developed the initiative in this area, the vehicle for project implementation will be UNDP.

Following the policy dialogue with EU, the UNDP is now itself developing a larger China Biodiversity Partnership Framework (CBDFP) agreement with the Chinese Government. An 18-month preparatory phase is in course (ref: Conserving and Sustainably Utilising Biodiversity in China: A Concept Paper, PRC/GEF/UNDP, January 2004). The following are tentative figures for partnership involvement over a 10-year period:

Gov of China:	\$100 million
GEF:	\$30-50 million
EU:	\$20-30 million
TNC:	\$12-15 million
CI/UNF/BP:	\$20-30 million

TNC - The Nature Conservancy; CI - Conservation International; UNF - The UN Foundation; BP - British Petroleum; The Sino-Italian Cooperation Project (SICP) will also make contributions.

EU supported projects will be designed to "enable China's national biodiversity programme to sustainably manage its ecosystems, and to contribute to the implementation of related international conventions" (Annex 5 of Biodiversity Partnership). In the proposal, GEF support will only contribute to those activities having global benefit, and will make a contribution in proportion to the global benefits. EU funded projects are agreed to be focussed on sector support for biodiversity management outside protection areas which is consistent with EC objectives of policy support and mainstreaming environmental management. The EU have allocated within its €30 million budget, €6.5 million for environmental awareness building activities.

For the River Basin Management Programme (€25 million) there has been close cooperation with the World Bank as the donor partner. There is here a good fit between the soft elements of the EC programme and the availability of loans for equipment through the World Bank's Changjiang (Yangtze) and Pearl River Rehabilitation Project (€82.5 million). The intention is that the EU software component for RBM will create an improved decision-making environment for determining priorities for equipment purchase and use within the framework of a masterplan in the zones of intervention for the two key rivers of China.

The two programmes in biodiversity management and river basin management represent two major generic areas of natural resource management. A number of cross-cutting issues are relevant in the approach to be adopted including accountability and governance. Poverty is addressed to the extent that those suffering from unsustainable resource use and food insecurity in upper catchments are poor farmers (in the Western Region). The millions of poor in both rural and urban areas of the river basins are potential beneficiary secondary stakeholders of environmental planning and rehabilitation. They are directly affected by polluted environments (poor quality water and air) and are less able than the affluent to make compensating expenditures.

Multilateral Projects

The multilateral organisations cover a very broad range of activities in China which includes natural resource policy work. In terms of such policy studies the nearest to an analytical environmental profile is the China Human Development Report 2002: *Making Green Development a Choice*. The World Bank's 2001 *China: Air, Land and Water* is a useful background summary document but is now dated. A list of recent and current projects and programmes of the multilaterals is here presented.

World Bank

The World Bank project portfolio features 10 major industrial pollution and urban environment projects in: Chongqing Industrial Pollution and Chongqing Urban Environment Projects; Guanxi, Hubei and Sichuan Urban Environment Projects; Huai River Basin Pollution Control Projects (1 and 2); and Liaoning, Shangdong, Shanghai and Yunnan Environment Projects. Other Urban: Shanghai Liquid Waste and Shanghai Sewerage Projects (1 and 2); Beijing Environment Projects (1 and 2, and GEF Component); Changchun Water Supply and Environment; Tianjin Urban Development and Environment Project.

General: Environmental Technical Assistance Projects; Southern Jiangsu Environmental Protection Project; Strengthening of the Technological Training Centre for Population Resettlement and Environmental Impact Project. Energy: Renewable Energy Development Projects (incl GEF); WB/GEF Renewable Energy Scale-up Programme; Energy Conservation Project; and; 4x Montreal Protocol Ozone Depleting Substances Phase Out Projects.

River and Marine: Yangtze Basin Water Resources Project; Marine Pollution and Ship Waste Disposal Project. Rural and Natural Resources: Natural Forest Biodiversity, Sustainable Forestry Development and Nature Reserves Projects; Loess Plateau Watershed Rehabilitation Project; Rural Water Supply and Sanitation Project.

Asian Development Bank

ADB has presented a new Country Strategy Update 2005-2007 (September 2004) with 'pipeline' environmental infrastructure projects. It has major current wastewater investments

in: Tinajin (\$130m loan), Hebei (\$82.4 m loan), Wuhan (\$83 m loan); water supply in Harbin (\$100m loan). Other project loans are for Yellow River Flood Management (\$150 m), Songhuajiang River (\$150m loan), Acid Rain Control and Improvement (\$147 million).

UNDP

The United Nations has a new Common Country Assessment Paper (2005). Its current programming period is 2006-2010. A central reference is assistance towards achievement of Millennium Development Goals and support for fulfilment of Multilateral Environmental Agreements (MEAs). Under the rubric of 'Environment and Energy for Sustainable Development' it is pursuing programmes in Sustainable Energy Services, Conservation and Sustainable Use of Biodiversity (see above), together with Disaster Reduction.

Donor Coordination

Bilateral donors, with UNDP, meet on a regular basis once every quarter. The reality of EU donor coordination was once compromised by a degree of donor competition, both between countries and with multilaterals. Bilateral donor fatigue now extends to coordination itself – it is said one could spend forty percent of one's time reading the reports of other donors in China and attending their meetings. In any case the agenda has moved on from poverty alleviation to political and economic support of the commercial sector (including renewable energy and environmental technology). However, GTZ do retain a significant assistance programme in renewable energy and energy conservation.

A reconsideration of the role of development assistance is evident among bilateral donors because China is an emerging economic superpower with a sophisticated government apparatus. China's progress in poverty reduction has certainly been remarkable (490 million at or under \$US1 per day in 1990 reduced to 88 million in 2002). This reduces the justification for poverty reduction cooperation activities, but does not negate the logic of support for an agenda which relates to global environmental change, and also trade.

A significant development is that the Chinese government is participating in a recently launched OECD programme to review China's environmental management performance under the environmental governance theme. This should provide detailed and influential recommendations on opportunities for reform.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Status of Environmental Management Policy

Policy Development Context

Prospects for continued economic growth in China appear secure though there are risks in the rapid economic transition for maintaining political and social cohesion. The Chinese leadership is well aware of the impact on the environment of the legacy of pro-growth policies without safeguards to secure sustainable natural resource use and maintenance of environmental services. The international community is concerned for the potential impacts on global commons, particularly impacts on climate change and the indirect impacts on third countries from Chinese acquisition of raw materials, especially timber products.

Severe pollution has impacts nationally on air quality and water resources, agriculture and regional seas, seriously affecting human health and wellbeing. Deforestation, desertification and generally unsustainable land management have *in situ* impacts on land productivity and *ex situ* impacts, for instance in flood risk aggravation and dust blow which creates serious nuisance in northern cities (such as Beijing) and neighbouring countries.

International environmental NGOs and policy institutes have highlighted the ecological footprint on the prospect of sustainable development of tropical countries involved in the timber trade where environmental governance is poor. The Chinese leadership is aware of the intensity of this debate, but with its own pressing priorities in managing the domestic economic and political agenda is not able to find a domestic constituency for any immediate response.

Entry into the World Trade Organisation (WTO) means that there could be trade restrictions imposed should China not fulfil international obligations regarding international environmental and safety standards. The EU has clear relevance in this respect as a setter of such standards and as a significant trade partner. The potential contribution of EU technology and management ‘know how’ is recognised by Chinese leaders. High-Level dialogue in environmental matters together with policy working groups, especially CCICED, allow an important sharing of experience with senior Chinese decision-makers, and there has been excellent attendance of MOFCOM and business leaders at EU seminars on health and safety legislation.

Progressive Mayors in the geographically dynamic coastal cities of the east are taking the lead in incorporating environmental criteria into development decision-making. New environmental impact assessment has been implemented and is now being enforced more rigorously. Other environmental management instruments are being introduced, notably through World Bank projects, for cleaner production systems and better end-of-pipe effluent controls. The government has recently entered into a dialogue on environment and governance with the OECD. China will be cooperating in a comprehensive external review of effectiveness in environmental policy implementation.

The government has recently entered into a dialogue on environment and governance with the Organisation for Economic Cooperation and Development (OECD). China will be cooperating in a comprehensive external review of effectiveness in environmental policy implementation.

EU Programme: Basis for Future Cooperation

The EU-China Biodiversity Partnership has developed into a new Biodiversity Programme within the current CSP. This biodiversity initiative is also leading to broader cooperation with other partners in a China Biodiversity Partnership Framework, which will receive GEF funding and whose field projects will be managed by UNDP. The EU funding is €30 million with a primary aim of national policy development, with a reference in the EU's own biodiversity strategies and action plans.

The EU River Basin Management Programme has also emerged out of High Level EU Dialogue with China. The potential of integrated river basin management has been studied by a task force of CCICED, with participation of SEPA, the Ministry of Water Resources and contributions from WWF. The programme is intended to address the clear need to manage key river basins for multiple objectives, with more rational and effective land use planning and pollution control. Improving environmental governance and inter-ministerial coordination are also critical areas for programme intervention.

The Chinese partners are interested in how EU countries through the EU Water Framework Directive are managing major European riverways and catchments to achieve a multitude of different objectives including water supply, drainage, flood control, navigation, water pollution control, nature conservation and recreation. EU experience in transboundary issues has relevance to China both in regard to the Mekong and Nujiang (Salween) Rivers, and in general in relation to equitable cross-regional water management agreements between upstream and downstream provinces. The Chinese are also embarking on major cross-watershed transfer schemes (South to North Water Transfer Projects).

The Ministry of Water is seen to have a traditional and narrow approach to management. Inter-ministerial coordination is seen by SEPA to be a high priority. However SEPA may not have the political clout to forge new institutional relations intended in the programme proposal without building support from other agencies such as the all-important and elite strategic planning super-ministry, the NDRC. There is concern expressed that line ministries may not have the right incentives or inclinations to foster inter-agency approaches new to China. Environment and governance are pre-eminent cross-cutting issues.

5.2 Opportunities for Reform and Future Cooperation

China experiences serious environmental problems in air and water pollution, land degradation and loss of biodiversity. There are also fundamental challenges in economic management because of water, energy and raw materials shortage. Using raw materials more efficiently with social and environmental costs in mind requires considerable economic and institutional reform. Incorporating cleaner technology and less waste in use of raw materials and energy, with more rigorous monitoring and control of water effluents and air emissions are required, and this is already a 'work in progress'.

As better information is made available in the public domain, this allows a better design of policy and management responses; it also allows through participation processes for useful political support for improved governance. Green Accounts are now in prospect as a tool for highlighting public policy deficiencies. The role of the international community and the EU in particular might then be to help Chinese authorities to develop the framework for development along the green path. A long term view will be required. The essential areas where the EU can participate and assist Chinese authorities are:

1. **Environmental education and awareness building** among school children government officers, which is universally acknowledged by environmental interest groups as essential.
2. **Assisting in the governance agenda**, for example training judges in environmental law and transferring know how for facilitating tax revenue collection (higher water user fees and realistic pollution charges).
3. **Supporting research and data provision** relevant to environmental management decision making.
4. **Environmental capacity building and institutional development**, for example inter-ministerial mechanisms for managing resources (eg biodiversity and river basin management), CSR development, legal framework and environmental standards).
5. **Assisting in technology transfer** for renewable energy and “clean development” processes (eg for treating effluents and air pollution emissions, waste management, green buildings).
6. **Supporting civil society groups** in a sensitive manner (financing their research, encouraging tax reform so they can raise their own resources domestically from membership and charitable contributions).

Environmental Awareness Education

The public must be educated and mobilised to see themselves as stakeholders in the protection of the environment and sustainable management of natural resources. Success stories in environmental protection come with active participation from citizens to expose poor enforcement of legal obligations; this requires greater awareness of issues and raised expectations for government responsiveness.

The notion of the “Circular Economy” has been advocated and used as a slogan but embodies little operational content. Environmental sustainability issues, even among professional classes and senior government officials outside the Beijing elite, are widely acknowledged to be poorly understood. Implications of *Xiao Kang* as a new vision of society for balancing growth, using alternative criteria for welfare assessment and, not least, evaluating true economic performance needs promotion and wide extension.

Environmental Due Diligence (EDD) for Government Agencies

Corporate Social (and Environmental) Responsibility (CSR) for Businesses

These are linked management instruments to promote image and reputation with performance in improving environmental management. By adopting EDD/CSR policy and implementing it companies enhance their reputation and staff morale to achieve (business) benefits and opportunities beyond compliance – enhancing image, reducing credit risk and potential legal costs, developing market reputation and raising staff motivation and morale. This is proactive planning to fulfil civic responsibilities beyond legal requirements (where enforcement difficulties only too apparent).

The EU has a framework for CSR Development. ISO 1400 is already a standard in China for responsible total quality management (sustainable production). Other voluntary schemes in

practice are SA8000 (Social Accountability 8000), an American NGO scheme which certifies labour law compliance in line with ILO conventions.

Emergency Response Planning/ Accident Hazard Management

Both government and businesses could be developing better planning and reaction strategies for accident prevention and response. This applies to industrial sector, transport sector and many government agencies. Such plans fit requirements of environmental and social due diligence procedures. Legal instruments may be appropriate but emphasis again needs to be on ‘*responsabilisation*’ as above, especially of senior management who should be held morally and legally accountable.

China currently has 370,000 organisations involved in the production, storage, operation, utilization and transportation of hazardous chemicals. Among the total 250,000 are chemical production enterprises, with 5 million employees working for the chemical sector (Speech by the Vice Minister, China State Safe Production Monitoring Bureau, in May 2004). The China Academy of Safety Sciences and Technology reports that there are 20,000 manufacturers of hazardous chemicals, but poor research and support for safe production and management of these chemicals.

Chemical Accidents (January-March, 2005)

Between January and March 2005 6 major accidents have been reported in the media. On January 19th phosphor trichloride leaked at a chemical plant in Xuchang, Henan Province in Central China; more than 2000 students in a nearby school were evacuated. On 31 January a chemical plant in Hangzhou, Zhejiang Province (East China) exploded with fatalities. On February 21st gases exploded at Changsha, Hunan (Central China) and 1,000 people were evacuated. On February 24th in Yixing, Jiangsu Province (East China) chemicals exploded killing 5 and injuring 11 people. On March 12th there was a blast at a chemicals store in Yubei Agricultural Park in South West Chongqing Municipality.

Most recently, on 19 March a tank truck containing liquefied chlorine hit another truck after bursting a tyre on the highway in Jiangsu Province; this caused the death of 28 villagers and hospitalization of 350 while 10,000 people were evacuated. At the time of the latest accident reference was immediately made to the inadequacy of the law, yet the reality is that management is not proactive and as more such events are reported there is serious concern about China’s industrial safety. The government has recently increased the power of the State Administration of Work Safety as a step to begin to combat the issue. There have also been a spate of mining incidents in 2005 which have reached the international media.

Source: “Hazardous chemicals pose threat” (China Daily, April 2, 2005)

The EU’s EMCP (Environmental Management Cooperation Project) Industry Development Component (Lot 3) has undertaken an initial pilot at the Shanghai Chemical Industrial Park (SCIP) to assist the Park’s administration committee (SCIP AC) with the implementation of an integrated Emergency Response Plan. The basis of the pilot has been to use and promote the EU Seveso II principles. The study showed substantial discrepancy between current Chinese legislation and the Seveso II requirements. The Seveso system requires credible

worst case scenarios (CWCS) plans – detailed prevention measures and response systems – as a pre-condition for an operating license; there is no direct requirement for CWCS in China.

The EU pilot has also highlighted organizational issues, between local and regional bodies as well as different government departments that need to be overcome to deliver a timely and coordinated emergency response. The EMCP Lot 3 pilot provides a basis for further work in the area of Industrial Emergency Response which is both pertinent and relevant.

Industrial and Municipal Waste Management

Industry in China generates around 1 billion tons of solid waste of which 12% is classified as hazardous. Total domestic garbage reached 136.38 million tons, an increase of 1.2 percent over the previous year. The treatment rate was recorded as 54.3 percent (SEPA, SoE 2002). A more recent report indicates only 20% of 168 million tonnes of solid waste per year is properly disposed of, while 350,000 kilograms of municipal solid waste is produced in rural areas each day (WRM Annual Report 2003). This is an area of underinvestment by Chinese authorities with also a considerable recycling potential. Assistance with technical aspects of municipal and solid waste management is a major need

China has a national policy to promote Eco-Industrial Parks (EIP). It has also recently introduced legislation for hazardous waste. This is the beginning of establishing a duty of care system similar to that implemented across the EU, and could be expanded to cover systems of registered carriers, licensed disposal sites and licensed operations to deal with hazardous waste. The EU could offer experience which can lead to adoption of such systems at all levels – from the enterprise to the park, to local and municipal administrations. These could then deliver the national policy statement for waste management and EIP implementation.

Green Buildings

European best practice in building product design, energy efficiency, and life cycle assessment can be further disseminated. Asia ProEco has funded successful partnerships in this area which incorporates conservation of materials and their safe and efficient use.

Facilitation of CDM

The Chinese authorities are setting up approved systems for evaluating and accounting for the conservation benefits of investments in China under the Clean Development Mechanism (CDM) of the Kyoto Treaty, which came into force in February 2005. Through this mechanism developed countries can meet their emission reduction targets by procuring Certified Emission Reductions (CERs) through investing in CDM projects in developing countries by technology transfer and/or direct investment, and thus help contribute to China's sustainable development.

The Climate Change Office of NDRC is responsible for international cooperation in this area, with support from SEPA and the Ministry of Science and Technology (MOST). In the second commitment period of the Kyoto Protocol it is possible that China will become an Annex I party. It may be assumed that there will be interest in China for international cooperation in: (1) assistance on modelling to assess the impacts of different GHG emission reduction targets on GDP, local pollution, etc; (2) preparation of GHG inventories; (3) preparation to make the transition from CDM to JI and emission trading; and (4) a general support facility that would help fund development of methodologies and other studies needed by China to assist its

decision-making process. Coordination will be required with the World Bank which is taking a lead in a number of these.

Water Policy and Pollution Control Instruments

The following areas are identified as priorities (after UNDP, 2003).

1. Increasing adoption of market based instruments, in particular move to full pricing of water so that it reflects true cost of supply and scarcity, thereby restricting wasteful (and lower value) usage – this is seen at World Bank as first order requirement.
2. Developing river basin management authorities to plan and manage available water resources within a coordinated framework, managing supplies to achieve agreed multiple and sometimes conflicting objectives, through inter-ministerial coordination and participative approaches.
3. Privatising or corporatising water supply, including systems for domestic waste effluent charging.
4. Moving from attempts at controlling industrial pollution concentrations to control of total pollution loads. More rigorous law enforcement and realistic (higher) fines and fees required.
5. Creating incentives for cleaner production techniques (Chinese heavy industry and especially pulp mills are notably inefficient compared to international benchmarks).

5.3 Concluding Comment on China's Sustainability

China is allocating more resources to environmental management and there is urgency shown from leadership at the centre. It is estimated that the country needs to spend 1,300 billion yuan (about €137 billion) in its new 11th Five Year Plan 2006-2010, up from the 700 billion yuan (about €70 billion) allocated for 10th FYP – if which only 70% is expected to be spent at the end of this period (Chen Bin, vice-head SEPA Financing Department, as reported in *China Daily* 30th March, 2005).

The Chinese economy still grows at a rapid rate (9.5% in 2004) and as a direct result the potential for environmental damage increases. However there are mitigating factors: first, many of the more noxious heavy industry State-Owned Enterprises (SOEs) are closing down and new ones are applying higher environmental standards; secondly, private sector development led by foreign owned companies in textiles and high-tech tend to be cleaner lighter industries. But this phenomenon is most apparent in the eastern regions.

Difficult to control are the thousands of TVIEs (Town and Village Industrial Enterprises) and the SOEs in western less favoured areas, which are critical to maintaining employment and social cohesion. Yet many of these industries are suffering from a lack of competitiveness and are cutting corners in relation to environmental management and labour laws. Where there is part ownership of influential government officials there are particularly awkward governance issues. Meanwhile coal burning in the power sector will continue to expand and carry the risk of increased air pollution across the country should improved environmental performance and efficiency not be achieved.

China's entry into the World Trade Organisation (WTO) means that there could be trade restrictions imposed if China does not fulfil international treaty obligations and meet improving international standards of health and safety legislation. The EU has much to contribute through cooperation in environmental technology and know-how, as well as development of the Chinese policy and legislative framework. Support for civil society organisations is a more sensitive area for cooperation but there may be areas where dialogue can assist the Chinese authorities in generating new instruments for disclosure and information dissemination.

The role of civil society in challenging officials who are mismanaging funds or abusing environmental and planning regulations against the interests of local communities is acknowledged by the leadership. The government is cautious but it is evident that such environmental NGOs that exist, rare outside Beijing, operate with minimal funding and much of this originates from overseas. At the same time a class of super-rich Chinese entrepreneurs and a prosperous middle class in the east coast cities is rapidly emerging in what is already becoming a highly consumerist society. There is serious danger of social tension from this brazen rich poor divide.

The Chinese authorities need to be looking to create tax incentives for charitable giving and thus fostering Chinese private efforts to support worthy Chinese causes. Policies to enhance citizen *responsabilisation* would have important beneficial cultural spin-offs. There is a real danger that the new money will bring a massive step up in corruption of the administration and even the political process in a culture of personal enrichment and accumulation. At the same time there are evident dangers of excessive expatriation of such fortunes for consumption overseas. To be rich may be "glorious" as Deng Xiaoping has said, but to be rich and associated with promoting and funding environmentally and socially benign civic causes in China is perhaps even more glorious.

The EU is launching very significant cooperation initiatives in biodiversity and river basin management. Additional recommended areas of cooperation are: energy efficiency and air pollution control; improved management of hazardous materials and better social responsibility practices, with due diligence in relation to health and safety; water pricing reforms; industrial pollution control with realistic fines and penalties for transgression; and, municipal waste management will all remain priorities. Relevant to all such areas of policy response are the universally acknowledged need for environmental awareness building and environmental education, and, not least, governance reforms and increasing information disclosure.

Finally, tax reforms to encourage donations to approved charities would help enhance Chinese solidarity with fellow citizens, creating conditions for a positive social and cultural environment, another necessary condition for avoidance of the perilous development path.