



CHINA WATER
RISK

China's Water Crisis

Part I – Introduction

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1. China Water: Why Worry?

1.1 A Water Crisis in the Making

Over the next 40 years, the world's population is predicted to grow by about 40%, 90% of which is expected to be in the developing world. This growth will be accompanied by increased industrial and agricultural output, urbanisation and utilisation of a limited yet interdependent resource: **water**. A look at our historical use of water indicates that demand to fuel this growth will be substantial: the World Water Council reports that whilst the global population tripled in the 20th century, the use of renewable water resources increased six fold.

As water resources have been chronically overexploited globally, shortages have cost billions of dollars in reduced economic and industrial output, lives have been lost and quality of life has remained static or has diminished for millions of poor in the developing world.

On-going interference in the water cycle and consumption on the scale seen in recent years is evidentially not sustainable. Continuation of current trends will in all likelihood have disastrous consequences for the global economy and humanity itself, potentially surpassing the impacts of climate change. Yet, according to the United Nations, water withdrawals are predicted to increase by 50% by 2025 in developing countries and 18% in developed countries.

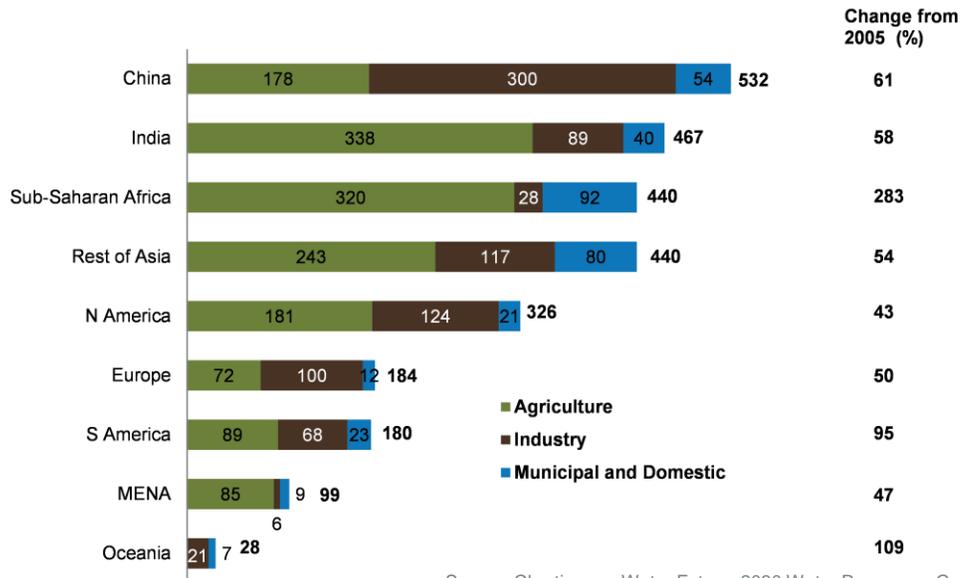
In Asia the situation is already acute. Due to the phenomenal growth of some Asian economies, coupled with inadequate governance, water crises regionally have begun to emerge, not least in the world's factory – China. The challenge a country the size of China faces in managing this finite resource sustainably is arguably without parallel in global terms.

China is in the throes of a water crisis that threatens to only worsen under present conditions. Its economy has grown at an average rate of more than 9.5% annually for the past 28 years, four times the rate of first world economies¹

As a result, skyrocketing water demands, overuse and systemic inefficiencies, combined with persistent pollution of major water resources have resulted in depleted supplies of both ground and surface water, with devastating consequences. If current trends continue, the strain on China's water resources will be extraordinary, potentially threatening economic development and social stability.

¹ Gladwin, Thomas and Porritt, Jonathon, China Facts And Trends, 2008-09 Edition

Figure 1: Increase in Annual Water Demand 2005-2030 (Billion m³)



Source: Charting our Water Future, 2030 Water Resources Group, December 2009

Box 1: Water Crisis – Indicators Timeline

1999

- As early as 1999, preeminent environmentalist Ma Jun raised the red flag about China’s looming water crisis in a book that drew attention to water pollution and scarcity. Ma cited the particularly dire situation facing China’s seven main river basins, particularly the Yellow and Yangtze rivers.

2002

- Introduction of the Water Law with a clear mandate to facilitate private sector investment in China’s water sector.

2003

- Introduction of the Environmental Impact Assessment (EIA) Law, a crucial element of pollution control in China.

2005

- World attention drawn to the notorious Songhua River pollution incident; 100 tonnes of toxic benzene substances spilled into the river following an explosion at a petrochemical plant in Jilin Province. Four million people in the city of Harbin lost access to water for almost a week as a result. Since the Songhua River flows into the Amur River in Russia, Chinese and Russian authorities also worked to minimize the impact on the nearby towns of Komsomolsk-on-Amur and Khabarovsk.

2006

- Capitalising on increased public disclosure of pollution data by government agencies, the Institute of Public and Environmental Affairs (IPE), a Beijing-based, non-governmental organisation (NGO), launches the China Water Pollution Map. The Map lists companies that are in breach of environmental regulations. Through it, the public can access thousands of environmental quality, discharge and infraction records released by various government agencies
- Xinhua News reports that glaciers covering China's Qinghai-Tibet plateau are shrinking by 7 percent a year due to global warming. Scientists warned the deterioration of the plateau may trigger more droughts and increase sandstorms that lash western and northern China.

2007

- Severe algal bloom in Lake Taihu from nutrient-rich sewage and agricultural run-off affects the tap water of 2-3 million people.

2008

- Government launches its Measures for Opening the Environmental Information, which mandates environmental disclosure by government departments
- The State Environmental Protection Administration (SEPA) attains ministerial status with the establishment of the Ministry of Environmental Protection (MEP).

2009

- Twenty years after Ma Jun's book drawing attention to a water crisis, the World Bank warns of a severe water crisis in China in its report, *Addressing China's Water Scarcity*. Based on the synthesis of 30 technical reports, case studies and background papers, the report provides a comprehensive account of the crisis.
- IPE and NRDC launch the Pollution Information Transparency Index (PITI) following introduction of the Government transparency measures on environmental disclosure in 2008. The Index evaluates government disclosure of pollution information from 113 Chinese cities and graded and ranked their level of disclosure
- China's top legislator revises the Water Pollution Prevention and Control Law, toughening punishment of company officials held responsible for water pollution incidents

2010

- A severe drought affects most of South-West China. About 51 million people faced water shortages, economic damage to agriculture and failed electricity generation from hydroelectric dams is estimated to be at least RMB 24 billion (USD 3.5 billion). The drought also affected non-ferrous metal production in Guangxi, including of electrolytic zinc, with companies in Nandan County cutting production by 30%

1.2 Water Runs the Economy

Business

As water security rises up China's Government agenda, industry will begin to feel the pressure of more stringent regulation and enforcement, the potential reputational backlash from community unrest triggered by water pollution incidents, not to mention diminishing supplies of a resource essential to operations.

Eleven of the world's 14 largest semiconductor factories are in the Asia-Pacific region including China, where water quality risks are especially severe. Semiconductor firms for example require vast amounts of ultra clean water – Intel and Texas Instruments alone used 11 billion gallons of water (over 41,000 billion m³) to make silicon chips in 2007. A water-related shutdown at a fabrication facility operated by these firms could result in USD 100-200 million in missed revenue during a quarter, or USD 0.02 or USD 0.04 per share².

Investors

Investors, who often lack critical knowledge surrounding water-related issues, are unwittingly being exposed to financial risks as a result of investing in water intensive sectors, where water security is anything but certain.

In October 2010 heavy rain triggered the collapse of a dam at a Zijin Mining Group (2899:HK) mine in Guangdong Province, killing 22 people and damaging 520 houses. The company was ordered to pay USD 7.5 million in compensation and has had to sell assets in order to generate the funds for the compensation payments.

Government

The Government has allocated billions addressing water scarcity and pollution, and analysts forecast that China may be looking at trade-offs between access to clean water and economic growth as it struggles with a growing water crisis.

In 2006, Zhou Shengxian, Minister of Environmental Protection (MEP) indicated that pollution was a threat to social stability. In 2005 alone, he says there were 51,000 pollution disputes forcing the closure of 13 polluting chemical plants. Incidents at this time were occurring at a rate of one every two days.

Community

Literally millions of Chinese throughout the country are exposed to severe health risks as a result of limited access to clean water and the illness and disease that accompany contaminated supplies.

Preliminary estimates suggest that about 11% of cases of cancer of the digestive system may be attributable to polluted drinking water in China³.

Drinking water for roughly 190 million of the rural population contains harmful substances that exceed health standards⁴.

² Water Scarcity and Climate Change – Growing Risks for Business and Investors, Pacific Institute, 2009

³ Cost of Pollution In China: Economic Estimates Of Physical Damages, World Bank, 2007

⁴ Ministry of Water Resources, 2009

2. China's River Basins

A review of China's key water resources is important to understanding the issue of water scarcity across the country.

In China there are ten river basins (see Box 2 & 3), which account for about 96% of China's surface and groundwater⁵. In addition to these river resources, China has a number of large lakes and reservoirs.

Figure 2: China's River Basins



Source: www.wepa-db.net/policies/state/china/river.htm

⁵ World Bank, Addressing China's water scarcity, 2009

Box 2: China's Southern Rivers Basins

Southern Rivers		Description	Issues
1	Yangtze River (Changjiang)	The longest river in China and the third longest in the world at 6300km, it originates in the Tibetan plateau and flows through Qinghai, Tibet, Yunnan, Sichuan, Hubei, Hunan, Jiangxi, Anhui and Jiangsu before entering the East China Sea in Shanghai. It has 8 major tributaries and a catchment area of 1.8million km ² , around 20% of China's land mass	<p>Social & environmental impacts of massive hydropower projects such as the Three Gorges Dam</p> <p>Investments that bolster integrated water resource management</p> <p>Important source for transportation and irrigation</p> <p>Suffers from sewage and industrial waste dumping</p> <p>>14% of the water quality is poor = cannot support drinking & swimming</p>
2	Pearl River (Zhujiang)	The Pearl flows through dense population areas of Yunnan, Guizhou, Guangxi, Guangdong and empties into the South China Sea between Hong Kong and Macau where it forms a delta. The river is 2,214km long and its basin is over 400,000km ²	<p>Water treatment from a range of industries including textile</p> <p>Initiatives under way to clean up the Pearl River Delta</p> <p>Surrounded by fertile soil and abundant natural resources</p>
3	Brahmaputra River (Yaluzangbujiang)	Starting from Tibet, the river first flows east and then south through India and Bangladesh into the Indian Ocean. It is about 2,900km long	<p>Important source for transportation and irrigation</p> <p>Dam building and river diversion</p> <p>Natural habitat of rare river dolphins</p> <p>Potential transnational tension with India and Bangladesh</p>
4	Upper Mekong River (Lancangjiang)	The Mekong is the longest river in South East Asia at over 2,300km. It starts in Qinghai leaving China in Yunnan, flowing through Laos and Cambodia and emptying out into the sea in south Vietnam	<p>Social & environmental impacts of dams and hydropower projects</p> <p>River flow diversion from downstream countries - Vietnam in particular</p> <p>Potential transnational tension with Cambodia, Laos and Vietnam</p>

Box 3: China's Northern Rivers Basins

Northern Rivers		Description	Issues
1	Yellow River (Huanghe)	The second longest river almost 5,500km. The river is notable for its associations with ancient Chinese culture and civilization. Originating in the Bayanhar Mountains in Qinghai Province, it meanders across 9 provinces and reaches the ocean in Shandong Province	<p>Impact of agri-chemicals on the river in China's agricultural heartland as it suffers from intense irrigation</p> <p>Water volumes decreasing and flows less predictable</p> <p>>30% of the water quality is poor = cannot support drinking</p>
2	Songhua River (Songhuajiang)	Also known as the Sungari is 2,308km long and is in the Northeast. It is the largest tributary of the Heilongjiang River and flows from the Changbai Mountains	<p>Pollution from lack of water treatment by heavy industry</p> <p>>65% of the water quality is poor = cannot support drinking</p> <p>Potential transnational tension with Russia</p>
3	Liao River (Liaohe)	Also known as the 'Mother' River, the 1,390km Liao flows through Hebei, Inner Mongolia, Jilin and Liaoning provinces. It empties into the Bohai Sea, a drainage area of over 200,000km ²	<p>Pollution from lack of water treatment by heavy industry</p> <p>>60% of the water quality is poor = cannot support drinking</p> <p>Potential for transnational tension with Russia</p>
4	Hai River (Liaohe)	The longest tributary of this sediment-rich river runs 1,329km through Beijing and Tianjin before emptying into the Bohai Gulf of the Yellow Sea	<p>Hai's flood control has a significant economic and environmental impact on Beijing and Tianjin</p> <p>Water treatment needed for a range of industrial pollution</p> <p>>70% of the water quality is poor = cannot support drinking</p>
5	Huai River (Huaihe)	The 1,078km river originates in the Tongbai Mountain in Henan province and flows through northern Anhui, finally entering the Yangtze River at Jiangdu, Yangzhou	<p>Investment in flood control</p> <p>>60% of the water quality is poor = cannot support drinking</p>
6	Heilongjiang River (Helongjiang)	The Black Dragon River marks the boundary between Russia and China and runs east across Northern China and empties into the Sea of Okhotsk. It is over 4,300km making it the 11th longest river in the world	<p>Pollution from lack of water treatment by heavy industry</p> <p>Potential transnational tension with Russia</p> <p>Natural habitat of the Siberian Tiger, black bear and many rare bird species</p>

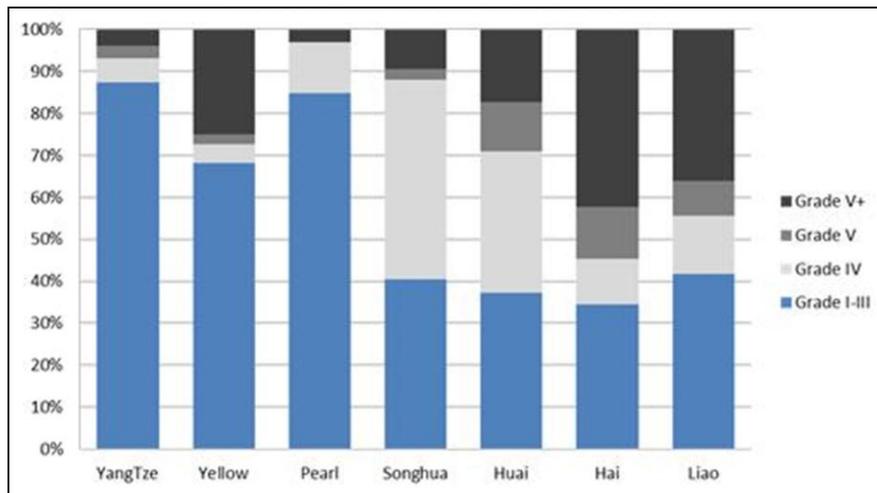
Source: Water in China, Issues for Responsible Investors, Responsible Research, CWR, ADM Capital Foundation and SynTao.

3. Pollution Driving Scarcity

Pollution of large portions of China's extensive river system is contributing to water scarcity across the country. In 2009, the Ministry of Environmental Protection (MEP) reported that on average about 43% of the water in the seven main rivers in China is unfit for human consumption (Grade IV-V).

Pollution is worse in the more arid northern regions that accommodate 45% of the population, yet supply under 20% of the nation's water resources.

Figure 3: Water Quality of China's River Basins



Source: Ministry of Environmental Protection, 2009 State of the Environment Report

China's water pollution is a result of industrial wastewater discharges, untreated domestic sewage and nonpoint source pollution mainly from agriculture. Wastewater discharges have risen steadily in recent years and in 2007 were reported by the Ministry of Water Resources (MWR) to have reached 75 billion tonnes; two thirds of which comes from industry, with the remainder being domestic sewage. While the World Bank and MWR indicate that industrial water treatment appears to have increased to around 90% in recent years, industry analysts believe it may be nearer 65% and lower in more rural areas. The treatment of municipal discharges is estimated to be in the region of just 38⁶- 56⁷%, making untreated municipal wastewater potentially the most important pollution source.

As China's surface waters are increasingly polluted, not surprisingly its groundwater supplies have been increasingly exploited, particularly in the North. As a result water tables are falling and the risk of saltwater intrusion and subsidence is on the rise.

For further information, the MEP provides annual statistics on levels of pollution of both key rivers and lakes on its website (www.english.mep.gov.cn/).

⁶ 2030 Water Resources Group, Charting our Water Future: Economic Frameworks to Inform Decision Making, December 2009

⁷ World Bank, Addressing China's Water Scarcity, 2009

4. Depletion of Groundwater

In 2005, over one-third of northern China's water supply (36.3%) was taken from groundwater, with the remainder (63.3%) from surface water. In the Hai River Basin, groundwater accounted for 66.7% of water supply. The aquifers in the Basin can provide a sustainable supply of 17.3 billion m³ of groundwater; however annual withdrawals are at 26.1 billion m³, resulting in over-extraction of 8.8 billion m³ on an annual basis.

Depletion of groundwater has far-reaching consequences. It contributes to the drying up of lakes and wetlands, and increasing salinity of groundwater supplies. Another consequence is subsidence. This occurs when the aquifer is compacted from groundwater being depleted, which in turn causes the land above it to subside, reducing storage capacity inside the aquifer. Subsidence causes damage to buildings and bridges, and has been observed in major cities in China, notably Shanghai.

Groundwater is also being polluted by wastewater discharges from industrial, municipal and agricultural sources. In about 50% of all regions in China, shallow groundwater is already polluted. In about 50% of cities, the World Bank indicates that groundwater is seriously polluted.⁸

Statistics reveal that as populations soar, groundwater is being pumped out faster than it can be naturally recharged and levels are falling fast⁹. Overpumping and contamination of groundwater is forcing cities and business to dig deeper to find clean, adequate supplies. In northern Hebei province, villages are digging 120 to 200 meters to find clean drinking water; a decade ago wells were only 20 to 30 meters deep. Deep wells cost thousands of yuan – which can be as much as half the annual income of farmers¹⁰.

Until groundwater withdrawals are managed and kept to sustainable levels, China's economic progress will be threatened by water scarcity and the accompanying high cost of depending on a scarce and irreplaceable resource.

5. The Water Supply/Demand Gap

Water availability of 1,000–1,700 m³ per person is regarded to indicate water stress and less than 1,000 m³ per person to indicate water poverty¹¹. In 2007, MWR² reported that the available water resource per capita was on average 1,869 m³¹². However, in northern China this figure dropped to 828 m³ per capita indicating a severely, water-stressed environment.

China's population is estimated to increase by around 10% to a population of 1.46 billion over the next 20 years. The McKinsey Global Institute indicates that in 20 years China's cities could add 350 million people—more than the entire population of the United States today¹³. The pressure on already scarce water resources resulting from rapid urbanisation coupled with the demands of

⁸ In 2005, Xinhua reported that 90% of urban groundwater was contaminated: Source: Turner, Jennifer L., "In Deep Water: Ecological Destruction of China's Water Resources," 2007. Original source: Chao Shengyu, Underground Water in 90% of Chinese Cities Polluted, Xinhua News, 2005

⁹ Gleick, Peter H., The World's Water 2008-2009, 2009

¹⁰ Guo, Q., Digging deeper for cleaner water. China Ministry of Water Resources, April 24, 2007

¹¹ Cited in World Bank, Cost of Pollution in China- Economic Estimates of Physical Damages, 2007

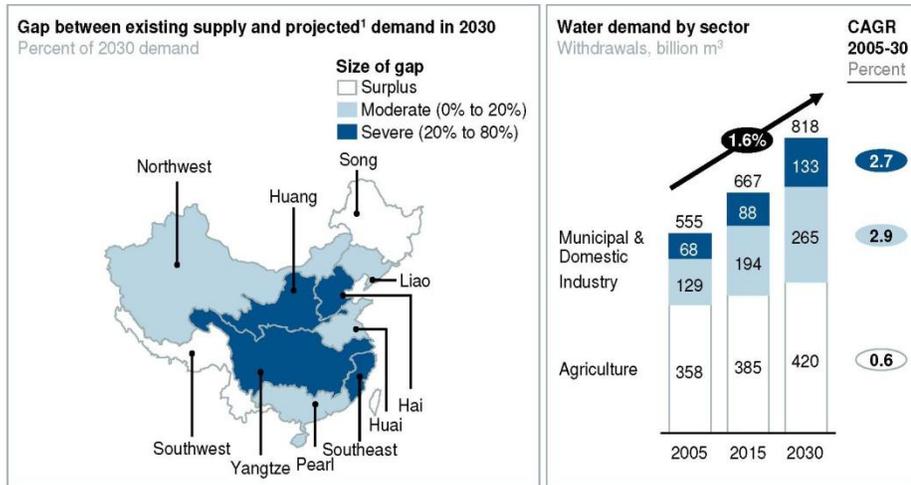
¹² Ministry of Water Resources, 2007-2008 Annual Report. Note that other organizations may have conflicting figures. In its 2009 report 'Addressing China's Water Scarcity', the World Bank refer to a figure for 2007 of 2,156m³

¹³ McKinsey & Company, Preparing for China's Urban Billion, March 2008

quadrupling per capita GDP by 2020¹⁴ mean that a business as usual scenario would be a significant threat to China's water security.

Looking forward, a recent evaluation of China's water supply and demand provided by the 2030 Water Resources Group¹⁵ indicate a worrying scenario. With a deficit projected to be in the range of 200 billion m³, based on existing supplies, the shortfall would be in the region of 25% with industrial demand being the dominant driver.

Figure 4: China's Water Supply and Demand Gap



¹ The unconstrained projection of water requirements under a static policy regime and at existing levels of productivity and efficiency

Source: 2030 Water Resources Group, Charting our Water Future, December 2009
Refer to SCARCITY in The Big Picture on the China Water Risk website for more details on which provinces are running dry and the supply and demand gap.

China's demand for water in 2030 is expected to reach 818 billion m³, of which just over 50% is from agriculture (almost half is for rice), 32% is industrial demand driven by thermal power generation and the remaining is domestic.

Current supply amounts to just over 618 billion m³. Significant industrial and domestic wastewater pollution makes the "quality adjusted" supply-demand gap even larger than the quantity-only gap: 21% of available surface water resources nationally are unfit even for agriculture. Thermal power generation is by far the largest industrial water user, despite the high penetration of water-efficient technology, and is facing increasing limitations in the rapidly urbanizing basins.

Source: The 2030 Water Resources Group "Charting Our Water Future," 2009.

¹⁴ McKinsey & Company, Global Institute Economic growth target put forward in the 17th Part Congress in 2007, Cited in "Preparing for China's Urban Billion," March 2009

¹⁵ The 2030 Water Resources Group, Charting Our Water Future, 2009. The Group was formed in 2008 to contribute new insights to the increasingly critical issue of water resource scarcity. The Group consists of a range of organisations from the private and social sectors, Initiating sponsorship for the project came from The International Finance Corporation (IFC), McKinsey & Company, an extended business consortium

6. Water and Climate Change

Water-stressed environments such as those in China face difficult times as climate change threatens to exacerbate an existing water crisis.

McKinsey's recent report, "From Bread Basket to Dust Bowl,"¹⁶ indicates that extreme drought caused by a "high climate change scenario" could more than triple crop losses in northeast China to 13.8 million metric tons, or 12% of the total production, by 2030. Furthermore, economic losses in north and northeastern China, the country's main grain producing region, could reach RMB 37 billion (\$5.4 billion) and cost 35 million farmers more than half their agricultural incomes by 2030.

IPCC's Fourth Assessment Report and subsequent Technical Paper VI, "Climate Change and Water,"¹⁷ which is based on existing evidence and predictive modeling, indicates climate change impacts on the world's water resources could entail:

- Changes in precipitation increasing flooding and drought;
- Increased water temperatures exacerbating water pollution and impacting water quality; and
- Reduced water supplies in glaciers, resulting in decreased water supplies to major mountainous regions.

IPCC indicates that observational records and climate projections provide abundant evidence that freshwater resources are vulnerable and have the potential to be strongly impacted by climate change, with wide-ranging consequences for human societies and ecosystems. Climate Change is expected to exacerbate the water scarcity situation in Asia, together with multiple socio-economic stresses.

Observed impacts of climate change on water availability in China include:

- Decreasing trends in annual mean rainfall in north and north east China;
- Increasing annual rainfall in western and south eastern China;
- Increasing temperatures, which combined with decreased rainfall and increase usage have led to drying up of lakes and rivers; and
- Droughts in delta regions resulting in drying of wetlands and severe degradation of ecosystems.

While there remains much debate and uncertainty over the *specific* impacts of climate change on water resources, there is little room for doubt that China's water crisis cannot be viewed independently of climate change and is only likely to be exacerbated as the effects of extreme and changing climatic conditions manifest themselves.

China's changing climate

Over the past 100 years, inter-regional differences in precipitation have increased, the rainfall gradually declining in north China at rates of 20 – 40 mm/decade and rising in south China at rates of 20 – 60 mm/decade. Over the past 20 years, main stream water flows have declined by 41% in the Hai River basin, 15% in the Huang River basin, 15% in the Huai River basin and 9% in the Liao River basin. According to the National Report on the Assessment of Climate Change – which was jointly issued in December 2006 by six governmental institutions, including the Ministry of Science and Technology and the Chinese Academy of Sciences – it is estimated that average nationwide temperatures will increase by 1.3 to 2.1°C by 2020 and 1.5 to 2.8°C by 2030.

Source: World Bank, "Addressing China's Water Scarcity", 2009

¹⁶ McKinsey & Company, From Bread Basket to Dust Bowl, November 2009

¹⁷ IPCC Technical Paper VI, Climate Change and Water, 2008.

The third pole at risk

In 2009 China Dialogue published a report detailing the risks facing 'the third pole' – an area consisting of the Himalaya, Tibetan Plateau and Hindu Kush. The report indicates that the region is the third largest volume of snow and ice outside of the north and south poles. While much research is still needed it would appear that snow and ice are melting at rates far beyond what the seasons dictate and are accelerating at an alarming rate. The impact on the ten river systems this region supports, which includes the Yellow and Yangtze rivers in China, could be highly significant such that river flows may no longer be reliably maintained in the future.⁴

Groundwater recharge is also being reduced and predictable impacts include food insecurity, reduced livelihoods and population displacement. While these impacts are not expected to be imminent, the period over which such changes are likely to occur is also not clear. In the meantime water shortages are affecting the region now.

Source: "The Waters of the Third Pole," Kings College London, Humanitarian Futures Programme, 2010. Koç N, Njåstad B, Armstrong R, Corell RW, Jensen DD, Leslie KR, Rivera A, Tandong Y & Winther J-G (eds), "Melting snow and ice: a call for action," Centre for Ice, Climate and Ecosystems, Norwegian Polar Institute, China Dialogue, 2009.

The 'elevated heat pump' threatens water supplies in China

Tiny air pollution particles commonly called soot, but also known as black carbon, are in the air and on the move throughout our planet. The Indo-Gangetic plain, one of the most fertile and densely populated areas on Earth, has become a hotspot for emissions of black carbon. Winds push thick clouds of black carbon and dust, which absorb heat from sunlight, toward the base of the Himalayas where they accumulate, rise, and drive a "heat pump" that affects the region's climate.

NASA research shows that soot and black carbon accumulated over the Indo-Gangetic Plain in northern India may cause:

- warming of the atmosphere-land system over the Tibetan Plateau and the Himalayas
- enhanced late spring and early summer monsoon rain over northern India and the foothills of the Himalaya
- accelerated late spring melting of the Himalayas snowpack

The research reinforces with detailed analysis what earlier studies suggest: *that soot and dust contribute as much (or more) to atmospheric warming in the Himalayas as greenhouse gases. This warming fuels the melting of glaciers and could threaten fresh water resources in the region.*

"Over areas of the Himalayas, the rate of warming is more than five times faster than warming globally," says William Lau, head of atmospheric sciences at NASA's Goddard Space Flight Center in Greenbelt, Md. "Based on the differences it's not difficult to conclude that greenhouse gases are not the sole agents of change in this region. There's a localized phenomenon at play." The mechanism is referred to as the "elevated heat pump" (EHP) effect.

These changes will have a significant impact on water resources across Asia, since the Himalayan snowpacks identified above supply freshwater to many major river systems in Asia.

NASA research also finds that the monsoon of East Asia and South China Sea is affected not only by its own pollution problems, but also by downstream effects from the India monsoon. For the last few decades, April-May rainfall over Southern China has steadily decreased, but June-July rainfall has been increased. NASA says these findings still have to be validated by independent data; but if proven, they have important implications for Asia's water supply.

Source: www.nasa.gov/topics/earth/features/himalayan-warming.html

7. Government Action

According to the World Bank¹⁸ China's water crisis is costing the country 2.3 % of its GDP, a figure that does not include ecological impacts and amenity loss from extensive pollution in most of China's water bodies.

The Chinese government has acknowledged that water scarcity and pollution are threatening its economic development. In addressing the problem, it has embarked on a programme of policy and regulatory reform and is liaising with the World Bank, the EU and the US governments amongst others on water policy and water resource management. At the same time, billions are being invested in large-scale measures to address water shortages, including the Three Gorges Dam and the South to North Water Transfer Project. Despite these efforts, progress is slow and little headway appears to have been made in curtailing the water crisis, due in part to crippling institutional weaknesses.

The South to North Water Transfer Project

Proposed in 1952 by former Chairman Mao Zedong to ease the water shortages in northern China, construction of the project began in 2002 and is expected to end in 2050. The project involves three phases with routes in the west, east and centre of China, which will ultimately transfer 36 billion cubic metres of water per year from the South to the North.

- The Eastern Line is estimated to complete in 2014 and will transport 14.8 billion m³ from the Southern Yangtze over 1,156 km to the provinces of Jiangsu, Anhui, Shandong and Hebei as well as the city of Tianjin.
- The Central Line is estimated to complete in 2014 and will transport 13 billion m³ from the Danjiankou Reservoir over 1,267 km to the provinces of Hubei, Henan and Hebei.
- The Western Line is estimated to complete in 2050 and will transport 8 billion m³ from three tributaries of the Yangtze over 500 km to the provinces of Gansu, Qinghai, Shaanxi, Shanxi, Inner Mongolia and Ningxia.

¹⁸ World Bank, Addressing Water Scarcity, 2009

Please refer to OPPORTUNITY in The Big Picture on the China Water Risk website for more information on the South to North Diversion Project.

Source: Circle of Blue, "A Dry and Anxious North Awaits China's Giant, Unproven Water Transport Scheme", March 2011, www.circleofblue.org, accessed April 2011



The Public Response

Increasingly, the public is aware of existing water pollution problems—from 2001 to 2005 Chinese environmental authorities received more than 2.53 million letters and 430,000 visits by 597,000 petitioners seeking environmental redress. Officials have expressed concern that China's environmental problems are a leading threat to social stability¹⁹. Mass riots and anti-pollution protests have been increasing by one third every year.

Many experts as well as some government officials, including MEP Vice Minister Pan Yue, believe the public has a critical role to play in China's environmental protection. Starting with the passage of the Environmental Impact Assessment (EIA) law in 2003, the government has initiated a regulatory framework that promises greater avenues for public participation. China's NGO sector is taking advantage of this emerging trend – a growing number of have begun to track water issues and to challenge projects they deem environmentally damaging.

¹⁹ Wang, Alex, One Billion Enforcers, Environmental Law Institute, 2007