

The International Implications of China's Water Policies

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Introduction

This paper examines the Chinese government's policies regarding conservation and management of its water resources and assesses the international impacts these policies may have. Water is an important commodity as there is no substitute for water and, as well as sustaining life, it is key to all aspects of the economy and agricultural production, making it a strategic resource (Jiu-te 2011, para.4). China is an important player in the international arena, therefore, it is imperative for policy makers to be aware of China's actions and their potential consequences. China is increasingly running out of usable water, and so will probably employ more proactive and far reaching policies to address these shortages.

In this paper, references to China's water scarcity, unless stated otherwise, refer to the lack of potable freshwater in China. China's water policies refer to policies that effect China's water resources, either directly, or policies such as environmental protection or energy production that impact water resources, and this paper also includes the concept of virtual-water, which is the amount of water used in the production process of goods and services, which is an indicator of how water-intensive goods are to produce (Hoekstra 2011, p.193).

Research Design

To assess China's water policies and their potential international implications, China's current water situation and its effects on domestic life were initially examined to determine the extent and severity of China's water problems. Measures that the Chinese government are currently or considering employing to address these water issues were examined to determine the effects, or intended effects, these policies could have. From this, causal implications that these policies may have globally, and how countries could potentially react in response to China's actions were extrapolated. These investigations revealed that China's water policies may have the greatest international impact in relation to international trade and China's treatment of trans-boundary rivers and so these policies and their international implications were the focus of this study.

Attempts to use academic resources to gain an understanding of the situation in China with respect to China's foreign policy and the effects of water policies, revealed a paucity of academic writing in this area. This scarcity of literature is probably due to the issue being relatively contemporary; especially as China's 12th Five Year Plan (FYP), which has been heralded as the turning point for China's environmental (and so water) policies, has only recently been implemented. Therefore, a range of resources was used to examine the international impact of China's water policies, including, newspaper articles, various governments' trade and security reports, and environmental non-government organisation (NGO) reports. These provide a current account and give an overview of different perceptions and arguments surrounding issues, enabling a more comprehensive and accurate conclusion to be reached. It should be noted, however, there is an issue with transparency when dealing with China, making it difficult to assess the full extent and success of China's water policies.

Literature Review

There is much literature regarding China and its water resources, but few papers have looked specifically at China's

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water policies and the potential effect they could have internationally. Literature was reviewed to gain a better understanding of the current water situation in China, Chinese policies and their likely effect. Greater weight was given to academic articles published within the last decade, as these are considered to provide a more accurate account of the current situation, and a better indication of future actions and consequences.

China's foreign policy and relationship with key international actors was assessed to determine how China could manoeuvre in the international arena, so China's foreign relations and relationships with countries, such as America, since the Cold War (Sutter 2012, 2010) were considered to give a grounding to this paper. Foreign perceptions of China were also considered to determine how Chinese actions, especially in relation to environmental security, have security implications for other countries (Mochizuki & Zhang 2011).

China's water situation was effectively and critically documented in Ma Jun's seminal book, *China's Water Crisis* (2004). China's water resources are considered by many to be in critical condition and an outline of China's water situation often serves as a precursor to further discussions in papers in this area (e.g. Schneider et al 2011). There are some authors that believe China's water problems are over-exaggerated, but this argument appears to be in the minority (Holsag 2011).

Aspects of China's policies and potential solutions to its water crisis have been addressed in the literature, with stringent pollution-reduction policies and the South-North Water Diversion Project (SNWDP) in particular receiving much attention. It was found that China's environmental policies are often secondary to China's economic objectives and many writers take a Western perspective by speculating how the West can influence China's climate policies (Schröder 2012). The relationship between water and energy, and the potential for conflict in China's policies in this area are examined (Ji 2011, Schneider et al 2011), as well as the potential negative domestic impacts of China's proposed diversion project, which includes environmental damage and high-end water prices (Schneider et al 2011). Specific water policies are considered, including China's proposed implementation of water tariffs and problems that the government faces in this respect (Zhong & Mol 2010). Previous academic focus was largely on the domestic impact of China's policies, but as China's water policies are more comprehensively addressed, increasing focus should be placed on water policies that have the potential to impact international relations.

An understanding of China's record of implementing and enforcing environmental policies is important to determine how China could enforce its proposed water policies. China's environmental record is not encouraging due to China's governmental structures and priority of economic over environmental policies (Economy 2007, 2012a, 2012b). If current and proposed water policies are ineffectively implemented and weakly enforced then they are unlikely to have much impact internationally. However, the impact of recently introduced environmental policies was shown to be largely successful in the manufacturing trade (Hering & Poncet 2011), giving an indication that policies designed to control water pollution may be similarly effective.

Most literature regarding China's water problems focuses on how China's export-orientated economic growth has caused environmental damage, with little focus on water (Zhang et al 2011). There has been little attention to how China's attempts to address water issues will affect its international trade. Several trans-boundary tensions that could arise from China's poor environmental practices have been addressed in relation to the damming of the Mekong River, and how China could increase engagement with affected states to alleviate these tensions (Mochizuki and Zhang 2011). Kazakhstan's success in negotiating with China regarding the Irtys River (Economy 2012b) is used as an example to illustrate how India may engage China. The potential trade effects of Chinese export and import tax policies aimed to ease environmental pressures in China have been examined (Zhang 2011) but were not elaborated on in great detail.

The literature maintains that India could be affected by China's water policies due to decreased flow of the Brahmaputra River. Articles on this were explored to determine effects on Sino-Indian relations, potential Indian responses to Chinese policies, and tensions between the two including Tibet and Pakistan (Bajpaee 2010). The role of Tibet in shaping Sino-Indian relations was analysed, which includes the Sino-Indian border disputes (Sikri 2011, Topygal 2011). Pakistan as a factor in Sino-Indian relations was considered as China's relationship with Pakistan is negatively perceived by India (Yuan 2011). Research on the threat perceptions of India and China gives an account

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of their security relationship and additional points of tension, including uneven economic trade (Saalman 2011). The two countries' international influence has been examined and some authors conclude that China will lose out globally due to India being a democracy (Kilman 2012), while others believe China holds the advantage due to its economic and military strength (Malhotra-Arora 2012).

More specifically, there are concerns on the potential for China's trans-boundary river plans to cause water disputes due to the adverse economic and humanitarian consequences of interfering with these rivers (Clue 2012, Economy 2012b) and so China poses a potential threat to India's water security (Ranjan 2010). There are academic discussions on the likelihood of China diverting the Brahmaputra River; the effects this could have on India (Jha 2011); and China's actions as the hydro-hedgemon in Asia, what this entails and how India can mitigate China's threat to their water security (Svensson 2012). Much of the discussions relating to China's plans regarding the Brahmaputra are from a mainly Indian perspective (Ranjan 2010, Jha 2011).

Several academics examine the potential for a water war between China and India and the adverse effects China's river plans will have on lower-riparian states and believe that water will be a growing point of tension between the two, potentially destabilising the region (Holsag 2011, Malhotra-Arora 2012, Kugelman 2011). This paper looks to take these arguments beyond potential Sino-Indian water disputes and consider the wider international implications of a water dispute and conflicts between the two countries.

Academic literature regarding Chinese water policies' impact on international trade is sparse. There is writing on how higher irrigation costs will decrease agricultural productivity in China and how this will impact international food trade (Huang et al 2007). Similarly, farmers' ability to pay increased irrigation costs is low, suggesting further problems with this policy (Liao et al 2008). More research has been devoted to China's 'go global' policy, focusing on Chinese resource and land acquisition or investments, mostly in South America and Africa. In Africa, China is acquiring inexpensive African resources through exploitation of Africa's political institutions (Woels 2012). China's 'land grabbing' in a global context and how these actions are viewed unfavourably internationally are issues that have been considered (Hofman & Ho 2011). The literature reveals how Chinese firms have a negative impact on the environment and how African officials do little to address this (Munson & Ronghui 2012, Kotschwar 2011). Therefore, Chinese acquisitions could lead to conflict (Kugelman 2012) and China has the potential to exacerbate the problem of strong international demand by locking up resources and gaining a monopoly (Kotschwar 2011). Chinese involvement in South America also creates security implications for America, due to the potential for China to become a strong competitor in this region and the negative economic, political and environmental consequences China could cause (Ellis 2005).

A review of the literature, therefore, shows that there is little literature in English that give a comprehensive focus on the international implications of Chinese water policies, and that in general articles tend to examine issues in isolation, or the relationship between China's economic and environmental policies. Therefore, there is a knowledge gap in the current literature that this paper aims to contribute to addressing by specifically detailing the wider potential international implications of China's water policies.

Background

To determine the impact China's water policies will have internationally, China's foreign policy and its relationship with America, as the world's superpower, and India, as the regions other emerging power, need to be examined to understand possible international outcomes of these policies.

China's Foreign Policy

Since the Cold War, Chinese foreign policies have primarily focused on promoting China's economic development and maintaining political and social stability within China. Main foreign policy objectives look to sustain an international environment that supports economic growth and stability by reassuring its neighbours and concerned international powers (particularly America) that China's rise is not an international threat. China, therefore, is willing to yield to international pressure on certain issues when resistance is seen to be detrimental to wider Chinese

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policies, and has accepted growing trends of multilateralism and interdependence in regard to economic issues (Sutter 2012, pp.1-29).

However, China's poor record regarding human rights, intellectual property rights, product safety and its rising military presence has caused many (predominantly Western) countries to view China as a potentially destabilising influence in the international balance-of-power. This distrust is fed by China's demand for natural resources and its differing political and ideological views. This has resulted in the 'China threat theory' and is the dominant line of thinking in Western foreign policy discourse (Al-Rodhan 2007, pp.41-63, Mochizuki & Zhang 2011, p.5). Chinese leaders look to overcome this perception by promoting 'peaceful development' as its primary foreign policy doctrine, which involves commitment to multilateralism, peace and achieving a 'moderately well off society' through scientific development (Mochizuki & Zhang 2011, p.5). Chinese leaders are therefore eager to avoid problems abroad and seek international cooperation as China develops and rises peacefully in international affairs (Sutter 2010, p.111).

However, China's rapid military modernisation makes it questionable how peaceful China's rise will be. China's military modernisation has made China the leading military power in Asia. This military development seems aimed at maintaining China's territorial sovereignty, especially in regards to Taiwan; preventing and protecting against potential attacks and dealing with 'local war' possibilities, such as territorial disputes with Japan or India. China's military capacity is increasing in capability, size and technology, enabling China to look further abroad in its deployment, and pre-emptively strike when protecting itself from perceived international threats. This seems at odds with Chinese policy of peaceful development (Sutter 2010, pp.111-119) and suggests the likelihood of China employing military force to achieve its national interests.

Chinese nationalism and security priorities highly affect China's foreign policy, as Chinese leadership is sensitive to national sovereignty and international security issues near China's borders. Therefore, in areas of security or political affairs, Chinese leaders are likely to view international relations in terms of balance-of-power (Sutter 2012, pp.1-29). However, among Chinese leaders, there is a growing understanding of the importance of environmental protection for national security. The paradigm of environmental security, where environmental degradation acts as a 'threat multiplier' and so destabilises states, provides an alternative to the state-centric and military focused security theories, as environmental issues, particularly climate change, transcend national sovereignty and borders. Chinese leadership initially resisted the idea that issues like climate change could threaten national security, but increasingly recognise the importance of environmental conservation, as the associated security risks, especially exacerbating threats to security and social stability due to food and water availability, become more apparent (Mochizuki & Zhang 2011, pp.3-5). Environmental issues, such as water security, could therefore be perceived by Chinese leaders as issues of national security, to be dealt with in an uncompromising manner, which may threaten other countries' security interests.

The realist threat perception of China tends to overlook China's increasing engagement and cooperation internationally, and that international peace and stability are beneficial to China's development. Nevertheless, it would be naive to ignore China's assertiveness with respect to national interest priorities. Therefore, this paper aims to provide a balanced perception of the potential international consequences of China's water policies by highlighting possible areas of cooperation and tension internationally.

Key Chinese International Relationships

America

America's potential responses to China's water policies depend partly on the state of Sino-American relations. China's water policies will impact America through their potential effects on China's exports and impact on countries that America has close ties with.

Traditional realists generally view China's rise as a threat to US hegemony in the international system, and so believe that China must be contained (Krishner 2011, p.1). This view believes that rising powers tend to challenge the existing superpower so conflict between China and America is inevitable. Alternatively, from a constructivist

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perspective, China holds a positive perception of America and seeks to learn from its modernisation process, while America believes in having a special relationship with China. Therefore, both countries are predisposed to cooperation as the international system allows for both to realise their interests. Enhanced bilateral, regional and global cooperation has made it increasingly unlikely that the two will see each other as threats (Pardo 2009, p.20).

Interdependence between the two countries has grown, especially in their economic relationship (Sutter 2010, p.131). America is focusing on reviving its economy, which requires maintaining amicable relations with China due to China's position as the dominant emerging economy and holder of most of America's debt (Bajpae 2010, para.18). Consequently, there is recognition that China with its surplus and America with its deficit, should cooperate to rebalance the global financial system (Hadar 2011, para.3), reinforcing the constructivist perspective of the need and desire for cooperation.

However, in issues of military, security and nationalism, Sino-American relations tend to follow a hard-lined realist approach. America authorising military sales to Taiwan angered China, and tensions are increasing at sea where US naval and military exercises with South Korea are concerning China. Additionally, America is opposed to China's territory disputes in the South and East China Seas (Hadar 2011, para.2), which has led to arms build-ups in both countries (Sutter 2010, p.131). America appears to be looking to India to counterbalance China, as India represents an alternative to Chinese hegemony in Asia (Sahgal 2012, para.1). India's developing relationship with America chafes China and, as India is a democracy; its rise is accommodated by America (Kilman 2012, para.17). America, for example, has committed to upgrading defence cooperation, particularly in arms trade and technology transfer, with India to build a stronger defence and strategic partnership to reassure Asia against Chinese aggressive intentions (Sahgal 2012, para.5).

Policymakers in China and America appear mistrustful of each other's intentions, especially in areas involving Taiwan, Japan and North Korea and any developments that could strain ties between them. Although cooperation has improved, a major increase in cooperation is unlikely in the short-term due to a range of conflicting interests and disputes. These centre on China's opposition to America's actions; such as American support for Taiwan, America playing a dominant role in the borders of Asia and aspects of American leadership in world affairs. America also views China unfavourably due to issues, including inequalities in the Sino-American economic relationship, American dependence on China financing its budget deficit, Chinese lack of enforcement of intellectual property rights, the build up of the Chinese military and the threat to US strategic interests in Taiwan, China's involvement in states that have a bad reputations internationally, plus China's poor human rights record. Currently, it remains doubtful that these differences will be resolved (Sutter 2010, pp.131-151) and these tensions could escalate in the future.

India

China's water policies include projects on trans-boundary rivers that could greatly impact India. As India is the other large developing nation in the region, Sino-Indian relations are examined to envisage potential outcomes of China's river policies.

Historically, Sino-Indian relations have been tense (Holslag 2011, p.19). Relations were minimal until China occupied Tibet in 1950, when the countries came to share a border. However, Communist China viewed India with wariness and suspicion as a capitalist reactionary country, and believed the Indian leaders were too influenced by Britain. The Indian Prime Minister of the time also believed Tibet should be independent, so was viewed unfavourably by the Chinese Communist party (Sikri 2011, pp.56-57). Tibet, therefore, plays an influential role and remains relevant in Sino-Indian relations, especially as the Tibetan plateau is the source of many of the region's rivers.

After the Tibetan occupation, India and China had to engage diplomatically to establish an agreed Indian-Tibet border. India maintained that the McMahon Line, drawn up in the Simla Accord of 1914 between Britain, India, Tibet and China, was the border. China, however, refused to recognise the Line as, by doing so, it would cast doubt on the legitimacy of their takeover of Tibet. Recognising the validity of the Line would imply that Tibet was an independent state, not an inalienable part of China, and so China's occupation would have been an imperial

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conquest (Sikri 2011, pp.59-60). Due to this, Arunachal Pradesh is still claimed by both India and China and is an area of frequent tension (Bajpaee 2010, para.3).

The Indian government granted the Dalai Lama asylum and provided refuge to many Tibetans after the Tibetan uprisings. These actions were seen as acts of provocation by China (Sikri 2011, pp.61-62) and the 1962 war over the disputed boundary further compounded the breakdown of Sino-Indian relations (Holslag 2011, pp.19-20). As a result, India allowed the Tibetans in India to form a government-in-exile, although this has never been formally acknowledged, and has also given the exiled Tibetan community significant assistance over the years (Sikri 2011, pp.61-62).

Since 1976, Sino-Indian relations have begun to thaw but Tibet still remains a contentious issue. Tibet is an issue of national security for China as it provides a natural barrier between China and India, and is the origin of several major rivers. The legal foundation of China and India's border claims stem from the Tibet issue. China, especially after the 2008 Tibet uprising, is insecure about Tibet, and especially wary of India in this respect. India provides sanctuary to over 100,000 Tibetans and Tibet has always had a high degree of spiritual identification with India (Topgyal 2011, p.118). The present Dalai Lama has also stated that India has a more legitimate claim on Tibet than China (Sikri 2011, p.58).

Despite tensions around Tibet, there are growing levels of political and economic engagement, which has helped stabilise the relationship and deter conflict. Economic relations, in particular, are viewed as an area of interdependence. Despite this perception, trade between the two has been described as superficial and uneven with India suffering from a widening trade deficit with China. India's exports to China largely consist of commodities and raw materials with little value-added, while China exports manufactured value-added goods to India. This disparity has led to India protesting and being the initiator of anti-dumping actions against China, which aggravate tensions between the two countries (Bajpaee 2010, para.17).

China's persistent relationship with Pakistan is a point of tension in Sino-Indian relations and considered a significant threat by India. China and Pakistan's close relationship grew from a shared hostility towards India and has remained strong due to China's concerns over energy security; ethnic unrest in China's western territories; and the need to counter India's potential as a future rival. India views these close ties as an attempt to encircle and contain it. Additionally, China and Pakistan have extensive defence ties, with China assisting to build Pakistan's conventional missile and nuclear capabilities. Pakistan is of strategic importance to China as it provides an alternative route for future energy supplies from the Middle East and the Persian Gulf. China uses its relationship with Pakistan mainly to advance its own interests, as demonstrated by China's varying stance over Kashmir and refusal to become militarily involved in Pakistan-India conflicts. China does, however, continue to supply Pakistan with military equipment and this is how analysts believe China intends to confine India's influence (Yuan 2011, pp.39-42, Sutter 2010, p.249).

India's fears of containment are compounded by security concerns over China's 'String of Pearls' strategy. India fears that China's actions in increasing its geopolitical influence through extending its access to ports and airfields; developing special diplomatic relationships; and modernising military forces that extend from the South China Sea through the Malacca Straits across the Indian Ocean and to the Persian Gulf, is an attempt by China to gain a strategic foothold in the Indian Ocean and encircle India. While China claims that these ports are for trade purposes, India fears they could be used for military or strategic purposes, particularly if oil becomes scarce as India is positioned in the middle of China's supply route (Rehman 2010, para.1-6, 14-17).

Recently, China has been developing a more balanced South Asian policy, which requires balancing support for Pakistan with improving Sino-Indian relations. Chinese leaders desire this as an Indian-Pakistan war would destabilise the whole region (Sutter 2010, p.243), but Pakistan still remains a sore spot in Sino-Indian relations. This conflict is exemplified by the issuing of unofficial visas by China to Indian residents of Jammu and Kashmir, implying that China believes these territories to be disputed. Similarly, in 2010, a visa was denied to the Indian army officer as he was considered to be commanding over a 'disputed area'. India responded by immediately cancelling defence exchanges with China (Yuan 2011, p.45). The Indian Foreign Secretary stated that India "has genuine concerns regarding aspects of the China-Pakistan relationship, particularly...China's role in Pakistan-Occupied Kashmir,

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China's [Jammu and Kashmir] policy and the Sino-Pakistani security and nuclear relationship" (cited in Yuan 2011, p.51). This has led analysts to suggest that China has undergone a policy reassessment towards India, possibly in response to India's closer relationship with America and its 'Look East' policy of forming close ties with nations also concerned with China's rising power (Yuan 2011, p.45-46).

China's Water Problems

China is suffering from a lack of potable water, having to support 20% of the world's population on 5% of the world's renewable freshwater (KPMG 2012, p.6). The usable water resources that China possesses are under increasing strain and the Chinese Ministry of Water Resources has stated that water use has "already surpassed what our natural resources can bear" (cited China Water Risk (CWR) 2012, p.2). Water is vital to the economy, agriculture, industry, energy and people's livelihoods, and so is a hugely important resource and decreasing water resources are becoming a great concern to the Chinese government.

China's water resources are unequally distributed. China's northern regions are naturally water-scarce whereas the southern regions are water-rich (CWR 2011a para.4). 19 out of China's 31 provinces, autonomous regions and municipalities have less water than the national average and these 19 account for 84% of the country's total industrial output and 67% of total agricultural output (CWR 2011a, para. 4-6). Additionally, the water-rich south is losing water, increasing these concerns. Water pollution further adds to water issues: 78% of China's water is unfit for human consumption (Hays 2008, para.24); 90% of groundwater is polluted (Economy 2012b, p.1); and 19% of China's seven river basins and 35% of its 26 key lakes and reservoirs are too polluted for agricultural or industrial use (CWR 2011b, para.4). Polluted water is, however, still used due to huge demand and dwindling water resources, which leads to soil and crop contamination (Schneider et al 2011, pp.714-715)

Agriculture

Water is the main constraint on food production and so water scarcity has an adverse effect on agriculture. When coupled with an increasing population, decreasing agricultural production threatens China's self-sufficiency (Pearce 2008, para.7). The Chinese agriculture sector is highly inefficient in its water use – it accounts for 66% of the water use in China but wastes over half of this (Economy 2007, p.42), which further limits productivity. Water shortages result in water for agricultural use coming under increasing competition from industrial and municipal sectors (Rosegrant et al 2002, p.137).

Irrigation is heavily relied on to increase crop yields and is the largest water use in agriculture, relying mainly on groundwater extraction. This reliance on groundwater causes overexploitation and is unsustainable (Yang & Zehnder 2001, p.85). Furthermore, China plans to increase its irrigated land by 2.7 million hectares by 2015 (Tan 2012a, para.15) requiring more water. Due to the lack of water for agriculture, fertilisers are used to increase crop yields (Tan 2012a, para.14) but over-use of fertilisers has the counter-productive effect of polluting water. Agriculture is the main source of water pollution in China, due to livestock farming (especially factory-farming, Jian 2010, pp.72-73), and fertiliser and pesticide run-off (Grain 2012b para.43).

China has the largest population in the world to feed and its economic growth has resulted in an increasing affluent class. This has contributed to water scarcity as it has resulted in a dietary change towards meat consumption, which requires significantly more water to produce than crops (Liu & Savenijie 2008, p.893), which has driven an increase in more water-intensive factory farming, especially of pigs.

Industry

The power sector is a major water user, as almost 96% of China's electric power generation requires water (Tan 2012b, para.1) and in 2010, China became the world's largest energy consumer (Mochizuki & Zhang 2011, p.2). China is reliant on energy from coal, which requires vast amounts of water to mine, wash and for cooling power stations. Furthermore, China plans to expand coal mines and power plants in its water-scarce northern and western regions, which could create a water crisis and drought in these regions (Lion 2012, para.1-7). This expansion is

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aimed to meet government estimates that Chinese energy companies need to produce a billion metric tons more of coal annually by 2020, and the mining process to meet this demand requires 15 billion m³ of water (Schneider et al 2011, pp.716-717).

Although China has benefited economically from its position as the world's manufacturing factory, this requires potable water to produce goods, which are then exported to other countries – essentially exporting potable water in a virtual form. China is left with the pollution and wastewater from this manufacturing process, limiting its own supply of usable water (Zhang et al 2011, p.2878). Chinese industries are inefficient in their use of water, generally requiring 10 -20% more water than industries in developed countries (Economy 2007, p.42). The Ministry of Environmental Protection stated in 2009 that annual industrial wastewater discharge was 23.4 billion tonnes.

China's Water Policies

Water management in China is, therefore, receiving increasing attention due to the worsening nature of the crisis. To attempt to address this, experts in China are pushing policies such as water pricing reforms, conservation, and recycling. Some of these are being enacted, but not enough as China's plans focus on major projects such as the SNWDP, which could result in additional economic and environmental costs (Economy 2012a, para.1).

China has implemented several policies that directly look at tackling water pollution or promoting water conservation, but several of its other policies have an effect on its water resources. These include a number of pollution and environmental policies, as climate change exacerbates droughts in the northern regions and the melting of the Himalayan glaciers limit river flows, energy policies, due to the interlinked nature of energy and water, as well as various economic policies, all of which effect China's water resources.

Recent reforms to address China's water problems, including the 11th Number One Document (which for the first time focused on water), have been heavily criticised for not going far enough to protect China's water resources. Fundamental changes are needed, rather than unattainable and difficult to enforce targets and consumption caps that do not address the reality that water resources are being polluted and overexploited without liability and accountability (Shih 2012, para.5).

12th Five Year Plan 2011-2015

China's 12th Five Year Plan (12FYP) aims to address flaws in previous water policies and has been described as the "turning point to a brave new world" (Tan 2012d, para.9). The 12FYP recognises China's water crisis and been described as the "most stringent water resource policies to date" (Hao, cited in Schneider et al 2011, p.734). The quotas and targets set in the 12FYP are now part of the Central Plan and its pollution and efficiency targets ensure these are met in the long term and not only during official inspections (Tan 2012d, para.9). The government recognises that water will be a choking point for economic development (Tan 2012b, para.14) and so effectively has no choice but to address this issue. The 12FYP focuses on conserving and cleaning water resources and introduces a range of policies aimed to do this; however, the present paper is focused on Chinese policies affecting water under this plan that have potential international implications.

The measures under the 12FYP that will possibly have international implications include those that raise the cost of operating in China, as these affect the cost of Chinese goods and exports. These include measures to curb water pollution and encourage water efficiency; mainly through setting targets. These targets include reducing the Chemical Oxygen Demand, by 8% by 2015 (Schneider et al 2011, p.734) and six new pollution targets that impact fertiliser use in agriculture. These targets include a 10% target for nitrogen oxides which is intended to encourage industries to move away from coal and implement pollution-reducing technology, reducing water use and pollution (Greenpeace 2011, pp.5-6). Penalties will be applied to enterprises or public institutions that contravene pollution standards of any surface water bodies and groundwater. A country-wide system of imposing a levy on discharges and fines for any violations of the permissible standards has also been introduced (ADB 2011, p.8). Water usage caps have been implemented to ensure that demand does not exceed supply (Tan 2012b, para.14), which means that enterprises will have to operate using less water, and if these quotas are exceeded the enterprise could have its business permit

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revoked (CWR 2012, para.9).

Market-based policy mechanisms are increasingly employed to conserve water resources (Zhang 2011, p.36). Water prices will be reformed to reflect water scarcity and a progressive pricing scheme is planned for 2015. This means that the price of water will rise exponentially as water consumption increases. High water rates will be adopted for water-intensive industries (Tan 2012d, para.13) and in rural areas a system will be implemented whereby discounts are given when water use stays within quotas, but water prices will rise if the quota is exceeded. Water tariffs, to encourage water efficiency and improve water management, have been significantly raised for urban and industrial use, although prices vary between provinces (China Daily 2012, para.5).

Export taxes have been placed on energy and resource-intensive goods, including a 5% export tax placed on coal, oil and coke, in order to discourage these goods being exported and to save scarce resources (including water in virtual form). Export tax rebates were eliminated or cut for 553 high-energy, pollution and resource-intensive products. Import tariffs on 26 energy and resource-intensive products were cut from 3-6% to 0-3%. There is also smaller export VAT refund on energy and resource-intensive goods. This policy is complementary to China's export tax policy and the two are designed to limit exports and increase the world market price of the affected goods. This policy seems to be effective as Chinese exports are less water-pollution intensive than Chinese imports and between 1995 and 2004, the water-pollution intensity of exports fell by about 84% (Zhang 2011, p.26).

South-North Water Diversion Project (SNWDP)

The government believes that water conservation alone will not meet the country's energy and water production demands. In the past, water shortages were dealt with by water-transfer projects; however, the government is planning a long-term permanent solution – the SNWDP. The SNWDP consists of building three giant canals to transfer water from southern to northern China. Construction began in 2002 and the Eastern and Central lines are to be completed by 2014 and will remove almost 36 billion m³ of water annually from the Yangtze River basin and transport it to the north. The project will cost an estimated USD 62 billion. Authorities insist that the project “makes perfect sense” and is essential to developing the fastest growing cities in the northern and western regions of China, which are rapidly running out of water (Hao cited in Schneider et al 2011, p.722).

The Western line of the project is the most controversial of the three lines as it includes building a dam on the Great Bend of the Yarlung-Tsangpo, where the river curves into the Assamese plain of India and becomes the Brahmaputra. China is likely to construct a large hydropower station and storage dam in this area (Malhotra-Arora 2012, pp.148,) diverting 200 billion m³ of the Tsangpo's water to the Yellow River. China's exact plans for the SNWDP are difficult to ascertain due to conflicting sources, but several issues have caused it to be delayed, including, unstable geological conditions; freezing temperatures; technical challenges of the construction; diverting water impeding the capacity and operation of current hydropower projects downstream; and the mass relocation of villages (Lan 2012, para.17), but this route holds the greatest potential water transfer (Malhotra-Arora 2012, pp.148-149).

Dam Projects

China's 12FYP calls for an increase in the use of hydroelectric power as under the 11FYP China only achieved 2/3 of its hydroelectric projects (Economy 2012b, p.2). China is damming trans-boundary rivers to achieve its hydropower targets, increasing its water-storage capacity and minimizing coal use; thereby reducing pollution and helping control climate change (Mochizuki & Zhang 2011, p.11). China shares six river systems which originate from the Tibetan plateau in China with nine of its neighbours, which gives China an advantage utilising them. China has rejected the notion of national integrity over shared water resources (where states have the right not to be negatively affected by activities of upper-riparian countries), instead following a policy of absolute sovereignty (Economy 2012b, p.2). China has built more dams on its rivers than the rest of the world combined (Chellaney & Tellis 2011, para.5), and has no water sharing agreement or treaty with any of the states it shares rivers with. China is also not signatory to the 1997 UN Convention on Non-Navigable Use of International Water Courses (Malhotra-Arora 2012, p.152).

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China is already building eight out of a proposed 15 dams along the Lancang section of the Mekong River. Three of these dams are operational, but there has been little consultation with downstream countries. Similarly, China's Yunnan Provincial Government is proposing one of the world's highest dams on the Salween River, which flows into Myanmar and Thailand. This dam would be in an environmentally sensitive area according to the World Wide Fund for Nature, and the Provincial Government has not consulted Myanmar or Thailand (Clue 2012, para.27).

China has also started its dam projects on the Tsangpo, with currently six hydropower developments, and the Zangmu dam, predicted to be fully operational in 2014. In total, China is planning to build 28 dams along the Tsangpo. All the hydropower projects will be run-of-the-river dams (i.e. will not have storage capacity), the largest of which will be at Motuo on the Great Bend near India's border, and will have almost twice the energy generating capacity of the Three Gorges Dam and the potential to form part of the Western line of the SNWDP (Svensson 2012, pp15-22)

Despite complaints from lower-riparian countries, China has frequently stressed that dam building does not harm the environment and will bring regional benefits including improved navigation, flood and drought control (Mochizuki & Zhang 2011, p.11).

'Going Global' Policy

The Chinese government recognises that these policies will probably not be sufficient to address their water issues and so have developed a 'going global' policy, to reduce dependence on imports of agriculture and raw resources (Economy 2012b, p.2). The government has encouraged investment in agricultural land, especially in Africa, Southeast Asia and South America, to produce agricultural products and import them to China (US International Trade Commission (USITC) 2011,p.4.3). Land acquisition is particularly popular, as access to land is essentially access to water which is often free and unregulated. Water scarcity, therefore, often compels investment in agricultural land (Schneider 2012, para.11) as the water is considered more important than the land itself (Grain 2012a, para.4). The Chinese government has encouraged Chinese firms to 'go out' to seek resources by offering incentives (Munson & Ronghui 2012, para.8). In response, Chinese corporations are controlling the supply of agricultural commodities and raw materials destined for China by investing in Russia, Brazil, Argentina and Canada among other countries (Grain 2012b, para.13). In the past five years, China has become a major player in the global land market to safeguard their domestic food security (Hofman & Ho 2011, para.5-8) and has leases for agricultural land in Zambia, Tanzania, Zimbabwe (Osei-Hwedie 2012, p.17) and the Democratic Republic of Congo, and plans to invest USD 5 billion in African farming (Economist 2011b, para.22).

Policy Problems

There are, however, a number of problems with China's water policies, which cast doubts on the 12FYP, especially as China has a poor record when environmental policies conflict with economic policies (Jun 2009, para.11). The complexity of China's institutional structures means that implementation and enforcement of environmental regulations is a challenge. Ministries have overlapping functions in planning, standard setting and monitoring that lead to conflicts of interest, and inefficiencies of policy implementation and legal enforcement (Economy 2007, p.39). Once official crackdowns to ensure compliance with environmental laws have ended, "polluting industries can up pick up where they left off – as long as it will benefit GDP growth" (Jun 2009, para.11). China's environmental authorities are weak (Jun 2009, para.11) and the Ministry of Environmental Protection lacks financial influence and manpower compared to other agencies in China's Administration (Xie 2009, p.40). The State Council recognises these problems, stating that "laws are not observed or strictly enforced, violators are not brought to justice; local protectionism, departmental protectionism and difficulties in law enforcement occur" and noting that government officials take bribes and bend the law, and abuse their power and authority to override the law (State Council, 2008, p.1).

The Central governments delegation of power to local governments causes difficulties in policy implementation and regulatory enforcement. According to a well respected Chinese environmental lawyer, barely 10% of China's environmental laws and regulations are enforced; and when they are, pollution fines are often less than the cost of

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adopting pollution control technology, so there is little incentive to reduce pollution. Even when local officials do collect pollution fines, they often only collect about 30% of the fine (Economy 2007, p.51).

Market-based mechanisms, such as increasing water tariffs, generally result in increasing water use efficiency, but the implementation of water tariffs is problematic due to unclear responsibilities, poor collection-rates and institutional capacities (Zhong & Mol 2010, para.25-27). Additionally, an increase in water prices will not have a long-term effect if the demand for water is inelastic (Tan 2011, para.13). In Beijing, for example, water prices are high, but water demand continues to grow. Ultimately, the end-users' income level and awareness affects how much water is saved (Ji 2011, para.31).

The government has also issued conflicting policies, including plans to double the size of the economy in 10 years and urbanize another 350 million people over 20 years. Energy is needed to reach these goals and it is unlikely that the demand will be met by clean energy; therefore more coal will be required. Coal mining and use is highly water-intensive and it is unlikely that China's freshwater supply can meet this demand. Also, measures for addressing water scarcity need energy to operate, and national energy policies do not fully consider their impact on freshwater consumption, and vice-versa, which will create unsustainable outcomes. Government targets under the 12FYP to control pollution require energy to build and operate waste treatment plants, and achieving water targets also requires energy use, so reaching both of these targets increases energy demand (Ji 2011, para.10).

Additionally, the Chinese government's preference for large projects prevents effective planning in managing water resources (Economy 2012b, p.2) and there are problems with the SNWDP, which hinder its potential to address water issues. The SNWDP will take at least 10 years to complete, so in the short-term, it will not alleviate water concerns, plus it will not transfer enough water to fulfil present, let alone future demand (Schneider et al 2011, p.723). The Ministry of Water Resources recognises this inability to meet demand, stating that the project will not solve China's water problem, but described it as a "lifeline" (Zhimin cited in Schneider et al 2011, p.722). There are also concerns over whether the water transferred will be clean enough to use when it reaches its destination (Schneider et al 2011, p.725). Extra treatment facilities are, for example, required for the Yangtze River's water, which currently is too polluted to be usable despite it already passing through over 400 water treatment plants and pollution control projects.

The majority of water transferred by the SNWDP is intended for industrial use, with a small percentage destined for agriculture, despite the concern that agriculture is in greater need of the water due to the risk of food shortages. Water from the project will be expensive for municipal and industry use, and probably prohibitively expensive for agriculture. High water prices make desalination a cheaper alternative. There is also the issue of possible water shortages in the south due to the project, as the south is already losing water. Several transfer regions are concerned they will not be left with enough water to meet their demand, which causes conflict between the supply and transfer regions. The Western line's chief, however, believes the political and cultural resistance can be resolved and authorities maintain that the line will be built (Schneider et al 2011, p.724-726).

Summary

Internationally, China's environmental policies are met with scepticism by realists, believing that China has implemented these policies to "protect its sovereignty, acquire foreign aid and technical assistance, and promote its economic development" (Harris cited in Mochizuki & Zhang 2011, p.7). Nonetheless, China has shown commitment to several environmental policies, implementing measures such as closing down inefficient fossil fuel power plants; improving fuel economy standards; introducing feed-in tariffs for wind energy; and in 2009 investing USD 36.6 billion into renewable energy, which represents over twice that of America's investment that year. China is moving steadily away from the economic path of develop first and clean up later, and this increasingly proactive stance on environmental issues is reflected in the 12FYP (Mochizuki & Zhang 2011, pp.6-7).

China's water policies under the 12FYP mainly focus on reducing water pollution through targets, quotas and caps, meeting industrial and urban water requirements in dry regions through the SNWDP and saving water through increasing water tariffs and looking abroad for water intensive-resources. If China does successfully manage to

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implement and enforce policies relating to water conservation and preventing water pollution, these policies will have international repercussions. Specifically, these policies may have international effects on trade relations through increasing costs of manufacturing and operating in China, they may impact agricultural production; and may affect lower-riparian states through trans-boundary river policies, which are therefore the areas of focus for this paper.

International Implications of Trans-Boundary River Policies

China's water policies include major projects on trans-boundary rivers, which will impact lower-riparian nations. China has built several of its dams on shared rivers, which has influenced downstream hydrology, causing sediment erosion of riverbanks and changing nutrient profiles (Clue 2012, para.19). This has caused increased tensions between China and its neighbours, especially as information to assess the impacts of these dams is generally not available. Downstream countries are susceptible as China has strong political influence and access to capital, and so can manage its water resources in a manner contrary to the interests of lower-riparian countries (Clue 2012, para.33). Furthermore, the SNWDP has the potential to divert water from the Brahmaputra River which is important to India, Pakistan and Bangladesh.

With respect to the Mekong River, Thai fishermen claim Chinese dams are responsible for the depletion of fish and the unpredictable flow of the Mekong since dam building started (Clue 2012, para.19). Downstream states have frequently requested China to participate in multilateral consultation and have formed the Mekong River Commission (MRC), which China has refused to join. This reluctance to participate in regional, multilateral engagement is down to China's increasing water scarcity and worries of similar demands by other downstream states. A severe drought in 2010, however, caused China to become more willing to cooperate, with Chinese delegations participating in MRC discussions and data sharing. Nonetheless, the Chinese delegation emphasised that the drought was due to forces of nature and not China's hydropower development and assured the MRC that China's projects will not severely impact downstream water flow (Mochizuki & Zhang 2011, p.12).

China's river plans could potentially affect Nepal, as some of its major rivers originate in Tibet, where China is contemplating more dams and diversion projects. This could also impact India, as tributaries from these rivers account for 46-71% of the Ganges River's water, creating problems for downstream India and Bangladesh (Jha 2011b, para.6-7). There is, however, little evidence that these plans are high on the political agenda, especially compared to China's plans regarding the Tsangpo.

China has no water sharing agreement or treaty with any of its lower-riparian states. Thailand, Laos, Cambodia, Vietnam and Myanmar have all been affected and expressed concerns over China's treatment of these shared rivers (Clue 2012, para. 7-34). These countries are, however, unlikely to have a significant effect on China's policies or stance towards trans-boundary rivers, as they probably will not form a united-bloc against China as they are fighting amongst themselves over their water issues (Chellaney & Tellis 2011, para.13) and the power-dynamic remains in China's favour (Economy 2012b p.2). However, India, as the other emerging regional power, is increasingly threatened by China's plans and may be able to challenge China, and so Sino-Indian relations with respect to China's designs over the countries shared rivers will be an important focus of this paper.

In terms of policies impacting Sino-Indian relations, China's policies regarding trans-boundary rivers are unclear. In 2010, Chinese Premier Wen Jiabao assured Indian leaders that China will not undertake projects that will affect countries downstream; similarly, the Chinese Foreign Ministry spokeswoman told India that "at present, the hydropower station on the Yarlung Tsangpo...will not lead to any big change in the downstream water levels or affect the harnessing efforts by the downstream countries" (Yu cited in Mittra 2011, para.10). She stated that China "will fully consider impacts to downstream countries" and that "the dam being built on the Brahmaputra River has a small storage capacity. It will not have a large impact on water flow or the ecological environment downstream" (Yu cited in Gray 2011, para.20). Chinese specialists, however, maintain that the shrinking of the Himalayan glaciers will cause the Ganges, Yangtze and Yellow Rivers to have seasonal flows, making water security an issue of food and political security. Therefore, these threats dictate that China should exercise territorial sovereignty, exerting unlimited rights over resources within its territory (Jianxue cited in Holslag 2011, p.30).

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The Tsangpo, or Brahmaputra, is important to India, as it is one of India's largest non-seasonal rivers and accounts for over a 25% of India's total water resources and 29% of the total run-off of India's rivers. The Tsangpo currently flows into Assam in India, where it forms the Brahmaputra and then joins the Ganges to form the world's largest river delta, providing water to over 300 million people. This river has largely escaped Chinese notice until recently (Raj 2010, p.158, Ramchandran 2010 para.21), and, due to its importance to India and the region, China's designs have the potential to impact a huge number of people.

Chinese Dam Policies

China maintains that the purpose of building dams along the Tsangpo is to generate electricity which will not require storage of water in large reservoirs. A senior engineer from the Zangmu dam's construction company stated that the river will not be stopped during construction and when operational, the water's flow will not be reduced. However, as demonstrated by China's dams along the Mekong River, India could still be affected in several ways.

Potential Impact on India

Any damming of rivers affects their flow, and China plans to build numerous dams on the Tsangpo. India believes that China's current dams on the river have had an effect on the Brahmaputra. In Arunachal Pradesh, it was claimed that the Brahmaputra almost dried up due to China's dams (Economic Times 2012, para.4). If this is so, then the reduced flow will have an adverse effect on the economy and environment of India's north east. The Zangmu dam project, which is under construction, is reported to have the potential for 'flood control and irrigation,' which requires water storage and diversion and suggest that this dam could reduce the Brahmaputra's flow and have a greater impact on India than China claims (Gupta 2010, para.8).

Even if the dams do not have a significant effect on the Brahmaputra's flow, hydropower dams still impact downstream ecology by removing silt, which can block turbines, from the river before it enters the dam. This silt is nutrient-rich and vital for agriculture in India and Bangladesh. Most people living in the Brahmaputra's catchment area are farmers (Gupta 2010, para.14) so the loss of this silt could adversely affect agriculture, especially if there is a reduction in water flow from the Brahmaputra, which raises concerns over India's food security. Pollution from the dams' construction will also be carried downstream, impacting farmland and depleting fish stocks, adding to food security concerns (Jha 2011a, para.10). Air pollution is also believed to contribute to melting the Himalayan glaciers, further depleting the regions rivers. The great potential for food shortages could cause social instability in India (Jha 2011b, para.14).

There are concerns that these dams pose geological risks, especially dams built on the Great Bend, which could cause seismic activity (Lan 2012, para.7). In a worst-case scenario, the dams could collapse, creating a giant wave and destroying anything in its path, which may cause a domino effect (ENS 2012, para.19), destroying downstream dams, which could be devastating to Arunachal Pradesh.

Potential Indian Responses

China's dam projects may not have a significant impact on India, but due to India's fears and mistrust of China, India will probably take action to ensure its water security. India feels threatened by China's advantageous position as the upper-riparian state and will try to safeguard its water resources. India, in the short-term, will look to take preventative action against China to halt its dam projects, through aiming to increase cooperation and decrease mistrust between the two and through this, secure a water sharing agreement from China.

India is looking to use principles of international water law, such as "no significant harm" and "prior notification of works" (Svensson 2012, p.29), to increase its legitimacy as the lower-riparian state and enhance its bargaining position. However, India recognises that China is unlikely to cooperate voluntarily given its unpromising relations with other lower-riparian states and the MRC, and so will need to incentivise China to engage in water issues, while safeguarding against the possibility of hostile damming from China. India aims to achieve this through the de-securitisation of water resource management and by taking a river basin approach (Svensson 2012, pp.29-30).

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De-securitising water resources is important as it limits the potential for conflict, and for water to be used as a political weapon against India. River dialogue must be isolated from military and political concerns. To help defuse tensions, this separation can be achieved by presenting the issue as one of improving resource management with China. This is already underway, with the sharing of hydrological flood data between China and India, which has helped build trust. India could seek to engage China in cooperating over issues that are not politically sensitive and that are mutually beneficial, such as collaborating on improving water use in the agricultural sector, which will hopefully lead to cooperation on more contentious water issues (Svensson 2012, pp.29-36).

However, China has rejected offers to join the MRC for managing river disputes and continues to develop its dam projects on the Mekong without consulting downstream countries. This reinforces the view that China wants to consolidate the greatest amount of control over its water resources and will continue to treat them with absolute sovereignty, making it difficult to find areas where cooperation is mutually beneficial (Svensson 2012, pp.13-35). India encouraging cooperation may lead to a slight easing of tensions with China, but it is unlikely to halt China's plans on the Tsangpo, especially as China considers solving its water problems to be in its national interests.

From an Indian perspective, including Bangladesh in the engagement of China in this area is critical to finding a long-term solution. It benefits India to protect Bangladesh's interests, as water shortages in Bangladesh will likely cause migration to India. If Bangladesh is excluded, then it may feel that its sovereignty is being threatened and raises the potential for future conflict. China has signed a provision of flood season hydrological data with Bangladesh so will be unable to dismiss Bangladesh's interest as illegitimate. Collaboration in these areas will create a more amicable political climate and increases the likelihood of an agreement being reached (Svensson 2012, pp.37-38).

However, India's claims against China's water projects lose legitimacy when India's actions as an upper-riparian state with regard to Bangladesh are considered, as India is planning 168 large hydropower projects in Arunachal Pradesh. India has, therefore, effectively been acting in a similar manner as China by exploiting its water resources to Bangladesh's detriment. Given the volatile nature of the Indian-Bangladeshi water relationship, it is questionable if Bangladesh will want to side with India against China. Given that India has failed to solve water disputes with a friendly state, it seems overly optimistic that raising concerns with China will benefit India (Svensson 2012, pp.39-40). China, therefore, will probably dismiss India, as it has the MRC states, and proceed with its water projects.

In the international arena, tensions have already surfaced through disputes over Asian Development Bank (ADB) loans to India that China attempted, or managed, to block, as they included funding for water projects in the disputed Arunachal Pradesh. Situations like this are predicted to become more common as water becomes increasingly scarce in the two nations (Bajpaee 2010, para.10, Economist 2011a, para.19).

If India fails to engage China on their proposed dam projects, and the projects prove to be highly damaging to India, then India's response will probably be combined with its response towards the proposed Western line of the SNWDP. The Western line's effect on India will likely amplify the impact of China's dam projects, as diverting the river will reduce its flow even more and have greater potential environmental consequences. The options available to India in response to these negative impacts are, therefore, similar and discussed below.

The South-North Water Diversion Project

The Western line of the SNWDP is the line that will have the most impact on India. This line is also the most controversial, as it is difficult to determine the likelihood of the line being built due to the lack of transparency and reluctance to share information from China. In response to Indian concerns, Beijing denies that it is considering diverting the Tsangpo, with China's Minister for Water Resources stating that the diversion of the Tsangpo is "unnecessary, unfeasible and unscientific" (cited in Jha 2011a, para.12). Authorities close to the government, however, say the line will be built and it has been approved in China's 12FYP (Schneider et al 2011, pp.721-726). Many commentators also believe it is a matter of when, not if, the line will be built (Wirsing 2012, para.13).

Potential Impact on India

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If the Western line proceeds, it will divert 200 billion m³ of the Tsangpo's water north and could cause drastic water shortages in the north of India. This could result in India becoming dependant on China for the Brahmaputra's flow, giving China political leverage. By reducing India's water supply, China could effectively halt India's economic growth (Ranjan 2010, para.8) and India would be at China's mercy during the dry season, and for flood protection during the rainy season (Malhotra-Arora 2012, p.152).

Reduction in the Brahmaputra's flow will affect India's utilisation of the river for its own projects. India's hydroelectric power potential will be reduced by roughly 40%, discouraging potential investors in this area and limiting India's clean-energy plans. India is suffering from a scarcity of potable water and has devised its own transfer project, the 'National River Linking Project' to divert water from the Himalayas to basins in south and peninsula India. The project is not currently underway, but if it proceeds, it will depend on water from the Brahmaputra. Reducing the rivers flow would thwart this project and deny India a potential solution to their own water crisis (Ranchandran 2010, para.18-22, Malhotra-Arora 2012, p.149).

The diversion of the Tsangpo will adversely impact Bangladesh and could cause mass migration to India due to water related issues. Such a migration will create a human security issue and add to present ethnic conflicts, destabilise the region, and could strain Indian-Bangladeshi relations. There could be a greater reduction in agricultural production under the diversion of the Tsangpo than through China's dam projects due to the reduction in the rivers flow and silt, increasing the threat to food security and social stability. This threat to food security may be exacerbated by India's growing population and the influx of migrants from Bangladesh (Strategic Foresight Group 2010b, p.iv).

There is, however, the belief, mainly among Chinese scholars and analysts, that the diversion of the Tsangpo would not have a significant effect on the Brahmaputra's flow. This is as the majority of the Brahmaputra's water is collected from tributaries on the Indian side of the border and are a more significant source of the rivers waters than the shrinking glaciers (Holsag 2011, p.29).

Potential Indian Response

The best outcome for India, and the region as a whole, with respect to China's SNWDP would be to prevent China from implementing the Western line, as once China has diverted the Tsangpo it will be difficult for India to change the flow back. As proposed above, India will probably adopt a strategy to de-securitise water and encourage a basin-wide approach. There are, however, several other strategies India may employ in the hope of securing their water resources and stabilising the region, and these are discussed below.

Chinese and Indian leaders recognise that water security is a matter of national security, which legitimises the use of exceptional action. The water dispute is an issue that will probably be exacerbated with time (Holslag 2011, p.32) and is believed to be the "biggest potential point of contention between the two Asian giants" (Padukane cited in Gray 2011, para.11). India's foreign policy is developing a harder line against China, and water disputes will potentially be escalated by existing tensions between the two. Furthermore, it is believed that internal disputes over water will result in governments taking a stronger stance on external water disputes (Holslag 2011, p.30), especially as water security is likely to become an issue of political security. China believes water security is vital to its national interests so may go ahead with all its water plans on the Tsangpo taking full advantage of its position as the upper-riparian state to ensure its own water supply. While this is seemingly beneficial to China, it could be highly destabilising for the region and detrimental to downstream states with the potential to cause a humanitarian and environmental crisis.

Water Sharing Treaty

India desires a water sharing agreement with China, similar to those it has with Pakistan and Bangladesh, which could prevent the Western line of the SNWDP being built and stop some of China's hydropower projects. These existing water agreements have survived numerous conflicts, provide clarity over water rights and use, and provide mechanisms for dispute settlement. Such an agreement with China could reduce China's leverage as the upper-

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riparian state and provide a dispute settlement mechanism so disagreements can be worked out in a straightforward manner. India could attempt to obtain a treaty with China through continually engaging and opening channels of communication with China; building on previous agreements on sharing hydrological data for flood control and any mutually beneficial collaborations (Svensson 2012, pp.33-36). India could also attempt to influence Chinese water plans and secure a water agreement by playing on China's insecurity over Tibet. India keeps the Tibet issue an international issue and its support of the Tibetan community in India has allowed the survival of their language, tradition, culture and nationalism. India's policies in this area, therefore, contradict China's claims that Tibet is an inalienable part of China and adds to Chinese insecurity over Tibet. In the past year India's policy towards Tibet has taken a harder line, with India implying to China that it will not concede to China on its core issue of Tibet, as long as China refuses to concede to India on their core issues. India, in 2010, publically and explicitly mentioned India's concerns over China's plan to dam Tibetan rivers that impact India, as an Indian core issue. Therefore, it would be political suicide for any Indian government to give ground to China on Tibet without an equal concession in return (Sikri 2011, pp.65-67). Thus, this may be an area where India could politically manoeuvre to obtain a water sharing agreement.

India could look to the example set by Kazakhstan in their dealings with China over shared rivers. China has been diverting water from the Irtys River since the 1990s and planned, by 2020, to double the volume of water diverted from the river. Diverting the river has led to reduced flow and increased pollution in Kazakhstan, leading the Kazakh press to publish a series of unfavourable articles that induced China to negotiate and resulted in agreements being signed over sharing water quality information in 2006. In 2007, Russia and Kazakhstan managed to bring water usage and rights of international rivers as a discussion topic to the Shanghai Cooperation Organisation (SCO) Forum and eventually, in 2011, an Agreement on Water Quality in Transboundary Rivers was signed. Kazakhstan's success in getting China to negotiate may be attributed to the value of its copper and oil to China, and success in bringing the issue to the SCO Forum to exert pressure on China (Economy 2012b, p.3). India, conversely, only has observer status in the SCO and is not rich in copper or oil (USDA 2012, para.4), but could raise the issue of water sharing in alternative international forums to pressurise China to sign an agreement.

India has mainly pursued a bilateral approach with respect to trans-boundary rivers, but believes that Pakistan, Bangladesh and Nepal should be involved in countering China's water diversion plans as they also share rivers with China. Bangladesh has proposed joint basin-wide management of the Brahmaputra with China and India, which is hoped, will draw China into deeper engagement with lower-riparian states and set the basis for a water basin agreement. Furthermore, India aims to start a broader coalition, including Nepal, Bangladesh and Bhutan, on the Ganges-Brahmaputra-Meghna river system, which combined with increased international awareness, will induce China to formulate a river basin approach with the lower-riparian states (IDSA Task Force, 2010 p.50).

However, China seems unwilling to enter into a water sharing agreement with India as Chinese local media believe that such an agreement would be "humiliating" (Hoslag 2011, p.31). As China is exercising the principle of absolute sovereignty over Tibetan rivers (Ranjan 2010, para.3) it is unlikely to let Indian concerns prevent it from fulfilling its perceived national interests. China is also unlikely to partake in a water sharing agreement, or become signatory to the 1997 UN Convention as China was 1 of only 3 countries that voted against the convention. This makes the resolution of potential problems complex and gives China leverage (Malhotra-Arora 2012, p. 152). Additionally, there are worries in India that once water problems become more serious, it will be increasingly difficult to engage China in water treaties, as China will be unwilling to compromise its water security (Ranjan 2010, para.17). This makes it difficult to solve water disputes peacefully and increases the likelihood of conflict and tensions between the two countries.

China's track record regarding its involvement in river basin committees is not encouraging. The MRC, which is backed by Japan and the ADB, has been unable to prevent China's aggressive river projects. The Commission can only request China to "make amends" and this has not had any effect on China's projects (Thakkar 2010, p.2), therefore India's desire to involve China in a river basin management scheme regarding the Brahmaputra will likely yield similar results.

Cooperation and Conflict

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India and China already cooperate on several energy issues and share a similar stance on climate change responsibilities (Siddiqi 2011, pp.78-81). If both nations are able to de-securitise the water issue then contentious border issues could be avoided. Tensions that surround the McMahon line will, therefore, not escalate the water disputes, which will make cooperation or a water sharing agreement more likely. Cooperation over water resources is desirable as it would stabilise the region and promote better management of resources, so ensuring long-term sustainable river management and mitigate some of the negative effects of climate change on river systems. China can benefit greatly by having a positive relationship with India, due to the potential for trade expansion; increasing economic ties; and promoting peace and stability in the region (Yuan 2011, p.51). Therefore, cooperation and shared management of the Tsangpo/Brahmaputra should be possible, especially given recent cooperation in Sino-Indian relations.

Keeping Sino-Indian border issues separate from water disputes is, however, unlikely as the current Indian government is too weak to compromise on issues of 'national honour' (Malhotra-Arora 2012, p.154). Any concession to China on border issues, or failure of the government to take action against China diverting the Brahmaputra, will likely be greeted with strong public opposition. China will probably look to use water as a tool to pressurise India and gain concessions on boundary issues (IDSA Task Force 2010, p.49). Separating these issues is also complicated by the Brahmaputra supplying water to Arunachal Pradesh, which both China and India claim (Chellaney & Tellis 2011, para.11). China refuses to recognise Arunachal Pradesh as part of India, instead referring to it as 'Southern Tibet' (Bajpae 2010, para.3). China's assertion means that it claims almost 200 million feet³ s⁻¹ of water resources in the state (IDSA Task Force 2010, p.44). Therefore, a water dispute in this area could easily turn into a wider dispute about territory, where tensions are already high. Both countries have increased their military presences at the border (Bajpae 2010, para.9), which increases the possibility of a minor dispute in the area escalating into a full scale conflict.

India will probably become more possessive over its water resources due to China's hydrological advantage. India believes that as there are no water treaties, it must establish user's rights, essentially first in time, first in right (Choudhury 2012, para.7). Therefore, India may try and harness the Brahmaputra's potential in the lower regions of Arunachal Pradesh to marginalise China's intentions on the river. Water projects in Arunachal Pradesh would become of national priority and have the maximum possible storage capacity to cope with possible water shortages caused by China (IDSA Task Force 2010, p.51). However, China is unlikely to be deterred by India's claims that it has user's rights on the Brahmaputra, especially as there is no international law or mechanism where India can defend this right. This right is only defensible if there is a water sharing agreement and China's dealings with the MRC demonstrate that China does not recognise the principle of first user's right (Thakkar 2010, p.2). India will, therefore, be unable to rely on this right to protect its water resources.

China's water projects are likely to put additional strain on India's already increasing water shortages, leading India to divert more water from Pakistan. This increases the chance of conflict between the two countries and India is already preparing for the possibility of a "two front war" (cited in Saalman 2011, p.173) against China and Pakistan. China's constant support for Pakistan, and its military and nuclear assistance, would indirectly implicate it in any Indian-Pakistani conflict. Furthermore, China, India and Pakistan are all nuclear powers, so conflict between any of these nations could have disastrous consequences. Worryingly, although India and China are signatories of the no-first-use doctrine of nuclear weapons, China does not consider the use of nuclear weapons in its own territory as a violation of this doctrine. This means that China could potentially threaten to use nuclear weapons in water or border conflicts regarding Arunachal Pradesh (Saalman 2011, p.187), although the possibility of a nuclear conflict is unlikely, even in a worst-case scenario.

India's water plans in Arunachal Pradesh do not bode well for Bangladesh, which is highly dependent on the Brahmaputra's waters. India may go ahead with these projects even if the Western line is never developed, which could spark a humanitarian crisis in Bangladesh by significantly reducing their water and food supply, and increasing migration from Bangladesh to India. Indian actions in this respect would be highly detrimental to Indian-Bangladeshi relations and could result in conflict as well as increased instability within both countries (Ramchandran 2008, para.11).

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India has also proposed to counter China's diversion plans by planning a South Asian-China-ADB power project at the Great Bend (IDSA Task Force 2010, p.51), although how this will solve India's water fears regarding the Brahmaputra is unclear. Rather, it seems dangerously counterproductive as it justifies China's proposals that will potentially have the greatest negative impact on downstream countries (the giant hydropower project at Motou and diverting the river north in the project's second phase, Thakkar 2010, p.2). It may be that India believes that if it cannot prevent China's plans, it can at least benefit from a share of the energy the project will generate.

International Pressure

India hopes to raise international awareness of the humanitarian importance of Tibet's water to almost 2 billion people, to convey the principle that Tibet's water resources are for everybody and not just China's benefit. India could raise awareness through the 'UN-Water' mechanism, which devises effective strategies for integrated management of water resources (IDSA Task Force 2010, p.50) and use this raised awareness to exert international pressure on China. China has faced strong opposition from 263 NGOs over its dam construction projects on the Lancang River. These NGOs are worried about China's ability to use the Tibetan rivers as a political weapon and want a moratorium on the lower Mekong dams for at least 10 years (Jha 2011b, para.12). China Power Investment's plan to build a dam, similar to that of the Three Gorges Dam, in Myanmar (the Myitsone mega-dam project), which would supply 90% of the electricity produced to China, has been suspended due to opposition from local villagers, community groups and international NGOs. The Myanmar government, to China's shock, decided that it had to "listen to the people" and suspended construction (Economy 2012b, pp.3-4). Therefore, it is possible that India could work with international NGOs and awareness groups to bring China's projects under similar pressure and slow down or halt construction.

International Influence

Both countries are competing to increase their influence in Asia to strengthen their international positions. India has signed a Comprehensive Economic Partnership Agreement with Japan, which will make each country the other's largest trading partner. India has signed bilateral trade agreements, or comprehensive free trade agreements, with Nepal, South Korea and 10 ASEAN member countries. Together with agreements with Sri Lanka and negotiations with Bangladesh, India has the majority of Asian economies covered, increasing its economic influence in the region. Furthermore, many South East Asian countries hold a greater dislike and mistrust for China than for India, due to India being a democracy, and China has aligned itself with countries that internationally are of poor repute, such as Pakistan, Myanmar and North Korea (Wagner & Jackman 2011, para.13).

India's 'Look East' policy is another way to enhance its international position by increasing its influence in China's backyard. An Indian official stated that "our challenge will be to build our own leverage", so relationships with America, Japan and South East Asian parties are very important (cited in Yardley 2010, para.17-18). India is likely to gain momentum in this respect, which will bring it into conflict with China's traditional resistance to an expanded Indian international role (Bajpae 2010, para.13). India is currently pushing for a seat on the UN Security Council which all the Permanent Members, aside from China, have explicitly endorsed (Yardley 2010, para.5). India, therefore, is likely to be favoured regionally and internationally over China, which may lead to China curtailing some of its more controversial water plans due to concerns over international repercussions.

Tensions between India and China in the international arena have already surfaced and are likely to worsen if China diverts the Tsangpo. Although India is building up its international influence through its 'Look East' policy, it is unlikely that it will gain a permanent seat on the UN Security Council, especially as China can veto India's attempts. This could be problematic if India tried to bring an action to the Security Council, as China can veto any potential international action against it. India is, therefore, likely to strengthen its ties with America as it looks to gain support for its water grievances. India is of strategic importance to America's plans to reassert itself in the region and to contain perceived Chinese aggression (Sahgal 2012, para.14). America is likely to offer India capacity building assistance in anticipation of the challenges China poses to India in this area (Economy 2012b, p.6). Therefore, Sino-American tensions are likely to increase as America will probably view China's water actions unfavourably due to the potential humanitarian, and destabilising, regional consequences. America may, therefore, counter China's actions

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through greater political, economic and military influence in the region and thereby increase the growing Sino-American rivalry.

India and China are both vying for regional and international influence, which, with deteriorating relations and rising tensions between them, could produce external alliances. This could generate new alignments and polarise Asia, compromising each country's internal options (Strategic Foresight Group 2010a, para.6) and could result in a regional 'Cold War' type situation.

Resulting Situation

As a result of these factors, the most likely scenario is where China will be unwilling to sacrifice its sovereignty over shared rivers, and while it is difficult to ascertain if the Western line of the SNWDP will be built, it is probable that China will continue with all its dam projects on the Tsangpo. Given China's increasing energy demand it may also undertake the giant hydropower project on the Great Bend. Furthermore, if China decides that its national interests demand the projects to go ahead, it is unlikely to let lower-riparian states, or even international law, deter its interests (Svensson 2012, p.14).

Water is held to be a long-term threat to Asian stability and, given the generally dire relations between South Asian countries, water clashes will be more likely than cooperation (Economist 2011a, para.23 & 36). This is especially true as the Chinese and Indian governments will probably be unable to isolate water issues from those of security and national honour, which will confound cooperation on water issues. Climate change will make the water situation in both countries worse and exacerbate points of tension, making it more probable that China will fully exploit the Tsangpo. China's continual lack of information and transparency is unlikely to change in the short-term, so India will remain mistrustful and fearful, and continue to push its own water plans, causing concerns in Pakistan and Bangladesh. India may be able to engage China, to an extent, in areas that China deems to be beneficial to its national interests, but is unlikely to be able to dissuade China from actions perceived to be in these interests. This situation seems likely given China's track record of doing what it pleases, and India's history with Bangladesh and Pakistan undermining its grievances.

However, a full-scale military conflict, especially in the short-term, is unlikely due to the integrated nature of the region (Strategic Foresight Group 2010a, para.6); both countries being nuclear powers; and regional stability being beneficial to both. Tensions are, however, likely to dramatically increase, with "verbal skirmishes" likely between the two (Wirsing 2012, para.14). There could also be an increase in strategic competition, which may have a destabilising impact on the region and result in polarisation and resource competition.

India will be forced to take action if China follows through on most of its trans-boundary river policies, as they could be devastating for India. India will try to exert its growing regional and international influence to place pressure on China and limit its ambitions in other areas. Strategic competition as a whole will also increase, with America taking increasing action to contain China, and China responding through its 'String of Pearls' strategy.

International Implications of Policies Impacting International Trade

In 2010, China became the world's largest exporter of merchandise and second largest importer (WTO 2012a, para.1). China's export success has been based on strong price competitiveness in the world market. China has a comparative advantage in its labour force and a disadvantage in land, water and other natural resources (iisd 2004, p.3). China has become the 'world's factory', which has come at a cost to its environment and water resources (Blackmore 2012, para.1). Due to China's position in the global market, and as the world's second largest economy, policies to conserve water and reduce water pollution are likely to have a notable international impact.

Water scarcity poses significant risks to companies looking to operate in China as it can limit companies' direct operations and their supply chains, and so affects their operational costs, profits and future growth. These risks generally materialise in four forms: physical risks, caused by the lack of water; reputational risks where competition for limited usable water can lead to conflict with other water users, including local communities; regulatory risks,

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where water scarcity results in increasingly stringent regulations and increased costs; and financial risks as water shortages lead to higher energy prices, increased insurance and credit costs and lower investor confidence (CEO Water Mandate 2009, p.3). Businesses in China currently face all these risks but regulatory and financial risks are those most likely to have an international impact and so will be focused on.

Inflation

Water tariffs and increasingly stringent water pollution regulations will increase the cost of manufacturing in China, especially for water and energy intensive industries. Export taxes placed on energy and pollution intensive goods will further raise costs of Chinese goods. A study of the effects of a Chinese policy to reduce sulphur dioxide found that the policy resulted in a decline of pollution and energy-intensive exports (Hering & Poncet 2012, pp.4-5). Therefore, policies aimed to conserve water will likely have a similar effect and so less water-intensive goods will be exported, causing prices internationally to rise.

Elevated costs of Chinese goods due to increased water costs could raise concerns internationally. America is the second largest importer of Chinese goods (WTO 2012a, para.3). America is concerned as the increased costs of imports are directly passed on to consumers, or enter into production of domestic goods as intermediate inputs, and add to American producer costs. This puts American producers under pressure to increase the price of their goods, therefore, contributing to America's Consumer Price Index and shifts inflationary pressures. There are concerns that more expensive imported goods will allow external and internal competitors to also raise their prices, and thus increase inflationary pressure (Amiti & Choi 2011, para.1 & 10). The global demand for Chinese exports, and their increasing costs, may cause America's or another country's prices to get out of control, as workers demand raises in response to rising consumer prices, resulting in an inflationary spiral. This could particularly impact China's trading partners who rely on China for the majority of their consumer goods, especially as it will take time for companies to build up manufacturing in cheaper countries (Whitehouse 2011, para.4-5).

However, mass inflation does not appear likely in America and countries with high unemployment, as unemployment undermines the bargaining position of workers (Whitehouse 2011, para.4). Governments can address rising costs of Chinese imports by importing alternative, less-expensive, goods from China or other countries and local competitors can be encouraged to keep their prices low to gain market share and offset some of the inflationary pressures (Amiti & Choi 2011, para.10). Additionally, increased Chinese export taxes will probably be applied to similar goods as EU and American carbon taxes, which will prevent carbon leakage concerns, and stop Chinese goods from losing some of their competitiveness (Zhang 2011, p.26). Therefore, Chinese goods should remain comparatively cheap.

China itself is under inflationary pressures and although inflation has recently slowed, China still remains at risk due to rising prices of food imports; weak international demand for Chinese exports; and rising costs of goods locally. Global food prices are increasing and this will probably continue due to the current drought in America. China has been increasing its imports of certain agricultural products, as it is equivalent to importing water, and is currently the world's largest importer of soybeans. A significant amount of China's imports come from America, and so it is likely to be effected by increasing prices of agricultural goods (DeCapua 2012, para.10). China is planning on increasing its maize imports, and so may be further affected by increased global food prices (Grain 2012b, para.3). The rising costs of Chinese exports due to increased costs of water and water-intensive resources, may contribute to weakening demand in Europe and America, and so will probably adversely affect China's export-dependent economy (Riley 2012, para.11). There is also the risk that consumer inflation within China may rebound from its recent easing after August due to seasonal factors and the rising labour and resource costs (The Telegraph 2012, para.15)

There are concerns that these inflationary factors will constrain China's efforts to fix its economy. If inflation increases then the government will be less able to increase the money supply and fuel growth. This is a concern as sluggish Chinese economic growth could slow global recovery (BBC 2012, para.4). China's continued economic growth is vital for driving the world out of recession and a lack of Chinese growth could threaten global political stability (Arnott 2010, para.15). Some analysts are, however, doubtful that China's inflation rate will be pushed back up, (Carlson 2012, para.18). Therefore, in the short-term, rising costs due to China's water policies are unlikely to

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stall China's growth, but future rising costs could have a detrimental effect on China's economy and in a worst-case scenario harm global recovery.

Relocation

Rising labour costs and increasing resource costs are causing some companies to move out of China to other South East Asian countries, which are becoming popular with European and American businesses. Relocation is more prominent in textiles and low-technology labour intensive industries (Want China Times 2012, para.7). Rising costs associated with having to comply with pollution regulations and water tariff increases could serve to exacerbate this trend.

Relocation of companies is starting to lift some declining economic hubs, such as Penang, out of their economic slumps as it brings in foreign investment and jobs. Rising production costs in China has led to a reduction in the competitiveness of Chinese products in international markets and an increase in the industrial competitiveness of several Asian countries, who are starting to gain shares of China's labour-intensive products in the European, Japanese and American market (Haitao 2012, p.1). This trend could be positive for the economies of the countries where companies are relocating and will help dispel concerns over inflationary pressure caused by increased prices of Chinese exports. There is, however, the potential that local environments will be damaged and local resources endangered, causing similar problems to those China now faces, which could increase operating costs.

However, it is unlikely that relocation away from China will occur en masse, as there are advantages to operating in China not present elsewhere. These include China's reliable and sophisticated supply chain; its large labour force; and the increasing productivity of Chinese workers (The Economist 2012, para.10). Additionally, Bangladesh, Cambodia, Thailand and Vietnam may not be feasible alternatives to manufacturing in China, as China's plans regarding the Tsangpo and the Mekong give China the potential to limit the water supply of these states (Poon 2012, para.4). In the short-term, therefore, it is likely that there will be a diversification of manufacturing across Asia, with some low-tech labour-intensive industries leaving, but the majority of companies remaining in China. This makes it possible that the costs of consumer goods will continue to rise, which could contribute to inflationary pressures mentioned previously.

The Chinese government wants to shift towards high-technological manufacturing and is encouraging industries to relocate to China. By doing this China could become a "strong manufacturing country" (Haitao 2012, p.2) and regain market shares from losses caused by companies relocating to other Asian nations. Some believe that China's restrictions on rare earths, vital to many high-technology industries, are partly aimed to encourage these industries to relocate to China. However, high-technology manufacturing industries require a large amount of ultra-clean water in order to make semiconductors (Holbrook 2009, para.1), so it is questionable how feasible this goal is given China's water situation. Furthermore, companies in this area have reservations about relocating to China due to poor intellectual property law enforcement and technology transfer. This desired shift towards high-technology industries clearly conflicts with water conservation policies and the desire to reduce water pollution and so could be problematic in the future.

WTO Trade Disputes

China's export policies which limit water, highly polluting or energy-intensive goods being exported have international implications; this includes the exportation of rare earths. Rare earth mining is highly water-intensive and causes environmental devastation, especially to water supplies as it is highly polluting and so limits the availability of usable water in the area, and so adversely affects livelihoods and crop production. The Chinese government is looking to clean up this industry, requiring rare earth enterprises to increase their investment in environmental protection and improve production technology; increasing water efficiency and decreasing water pollution. The government has further imposed production caps, stricter emissions standards and is consolidating the industry to stop illegal mining. Together with the increased price of water, these measures mean the end to cheap rare earths on the global market. China has also introduced export duties on rare earths as well as export quotas, and these measures have become increasingly restrictive with quotas being reduced more drastically for foreign investors. China claims the restrictions

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are necessary to meet increasing domestic demand, conserve its resources and protect the environment (Morrison & Tang 2012, p.17 &30). These export restrictions have, however, created global shortages of certain rare earths and dramatically raised international prices, giving Chinese domestic companies a competitive advantage and shifting the terms of trade in China's favour (WTO 2010, Box III). Rare earths are particularly important in renewable energy and defence industries so restrictions raise national security (Grasso 2012, p.2) and energy concerns. Domestic prices are significantly lower than export prices and some analysts predict the situation will get worse as China will not be able to fulfil its domestic demand for rare earths, and so further restrict exports (Morrison & Tang 2012, p.26).

Restrictions and high prices have resulted in some manufacturers relocating to China to take advantage of lower domestic prices and more ready supply. Several companies are switching to alternatives to reduce their dependence on China, while others are curtailing production. For many companies, relocating to China is undesirable, due to worries about intellectual property infringement and that Chinese companies would benefit from the resulting technology transfer and become direct competitors (Morrison & Tang 2012, p.20-23). This worry is of particular concern for companies involved in national security and defence. Additionally, some countries are considering stockpiling certain rare earths to protect against future Chinese restrictions (Grasso 2012, p.20), which will also contribute to rising global prices and demand.

In response to China's rare earth export policies, America, Japan and the EU have brought a WTO case against China on the grounds that China's restrictive policies were "resulting in massive distortions and harmful disruptions in supply chains of those materials throughout the global marketplace" (Kirk cited in Morrison & Tang 2012, p.28) and "violated international trade rules and must be removed" (Gucht cited in Morrison & Tang 2012, p.28). China responded that their export quotas and duties were necessary for the protection of the health of its citizens and to conserve exhaustible natural resources (Morrison & Tang 2012, p.30).

This case is not presently resolved, but the facts are similar to a previous case brought against China by America in 2009, where China was found to be in violation of its WTO commitments (WTO 2012b, para.10-20). Due to the similarities between the two cases, it is unlikely that the WTO will rule in China's favour, however, it is questionable if China will honour the spirit of a WTO ruling against it, or if it will impose additional restrictions in replacement of those that it would be required to remove (Morrison & Tang 2012, p.35).

China's handling of its rare earth resources has led to worries about the potential of China to use rare earths as a political weapon due to China's virtual monopoly and rare earths' industrial importance. Rare earths could be used as a bargaining tool to gain advantage over another country, such as China's rare earth embargo against Japan due to a territory dispute. China denies that it intends to do this but countries remain concerned. The 2012 WTO case has been initiated by some of the world's largest economies and China's largest trading partners. The case indicates to China how seriously these countries view China's rare earth restrictions and implies that these countries may be willing to form a united front and take actions against China beyond the WTO (Morrison & Tang 2012, p.35).

International disputes may also emerge over preferential treatment given to state-owned enterprises in China. State ownership of enterprises mitigates some of the effects of environmental policies, allowing these companies to continue high pollution or energy-intensive activities, and ultimately export more pollution and energy-intensive goods (Hering & Poncet 2012, pp.4-5). This gives state-owned firms a competitive advantage over foreign and privately owned firms. This discriminatory treatment will probably be viewed unfavourably by foreign firms who may put pressure on their governments to bring actions against China.

Food Security

China has almost 20% of the world's population but only 7% of its arable land (Economy 2012b, p.4) and 5% of the world's renewable freshwater resources (KPMG 2012, p. 6). Therefore, China has concerns over food security and has addressed this issue by growing grain domestically at all costs (Economy 2012b, p.4). However, a rising population, more sophisticated diets, and dwindling water resources mean that China is unable to produce enough food domestically and so must resort to alternative solutions.

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Increase in Imports

China became the second largest agricultural importing country in 2009 and imports are expected to increase as domestic demand increases. China is also a key global exporter of many agricultural products; due to this, China's water scarcity has global pricing implications (Tan 2012c, para.10).

China's aims for food self-sufficiency, particularly in grains, conflicts with its water conservation policies as grains require more water per hectare than alternatives (USITC 2011, p.4.23). By increasing imports of water-intensive agricultural products, China is effectively importing water and saving its own resources (Renault 2002, p.1). However, there are concerns that China's water problems, measures being taking to address them, and growing demand will increase food shortages in China, resulting in China becoming a major food importer. It is feared that this will accentuate the global food crisis (Kugelman 2011, para.5) and is especially problematic as it is predicted that China may not be able to feed itself by 2030 (Greenpeace 2008, para.1).

Water prices are set to rise in China (China Daily 2011, para.1), and will probably increase substantially to encourage water savings and efficient irrigation, however, a farmer's ability to pay increased irrigation costs is low (Huang et al 2006, pp.2-3, Liao et al 2008, p.vi). Even when the SNWDP is complete there will still be a lack of available water for irrigation as the transferred water will be prohibitively expensive for most agricultural users and the majority of water transferred is destined for industrial and urban use (Schneider et al 2011, pp. 724-725). High water prices will result in lower crop production, especially water-intensive grain crops. Chinese farmers have come to rely on fertilisers to increase output under limited water resources; however, fertiliser runoffs are highly polluting and the government has imposed restrictions on fertiliser pollutants (Tan 2012a, para.14-15) further decreasing agricultural output. These policies, therefore, could threaten national food security (Huang et al 2006, p.33).

Global food security is a rising concern, particularly in terms of feeding Asia. In 2011 the Food and Agriculture Organisation announced that global food prices had reached record highs, due to poor weather conditions causing bad harvests. Pressures on the price and availability of rice and wheat will further rise if India and China increase imports. This could have negative consequences for social stability as, when prices of local staple foods rise, consumers tend to react badly. Furthermore, it is predicted that prices will continue to rise for grain, cereal, vegetable oil and sugar, and governments could respond similarly to previous spikes in food prices and begin stockpiling grain, which will exacerbate the situation (Responsible Research 2011, pp.150-154). Some countries may benefit from China increasing its imports, such as South America and potentially America, but it is more likely that food prices will continue to rise globally due to China's huge demand.

China's increase in imports of soybeans for livestock feed in the 1990s triggered a dramatic agricultural transformation, converting 30 million hectares of rainforest and farmland in South America to soy plantations to supply China. This caused the loss of local food systems and an increase in pesticide use, causing a higher cancer rate amongst the locals. China is set to increase its maize imports to 5 million tonnes in 2012, which is more maize than China has imported in the last 25 years combined, and is affecting global food prices. China long regulated maize as a strategic crop for food security and opening up its markets to imports will likely have a similar effect as with soybeans, resulting in more local loss of land and food production, as well as environmental damage. The increase in China's soy imports, and its likely increase in maize imports is, however, beneficial to transnational agribusiness companies, grain traders and feed processors (Grain 2012b, para.4-7) and so governments will likely overlook the negative environmental effects of increased production in the short-term due to the political influence of these corporations (Foresight Project on Global Food and Farming Futures 2011, p.6).

African exports of agricultural goods to China are increasing, and as Chinese diets become more sophisticated it is likely this relationship will grow (Mobius 2011, para.2). However, Africa may not be able to continue to export agricultural products to China as it may come under pressure from its population if food available for local consumption decreases, which is already a problem in parts of Africa. Additionally, as China's investment in Africa is generally in outward-bound, export facilitating transportation projects, and African exports to China consist primarily of raw commodities while China's exports to Africa are finished value-added goods, China has been criticised of neo-colonialism (Congressional Research Library of Congress (CRSLC) 2008, p.127).

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China is in a difficult position in respect to agriculture, as if it continues business-as-usual, over-exploitation of water resources, droughts and floods will serve to limit productivity and increase imports. The impact on the Yellow River Basin of a 30% or 50% reduction in water availability by 2030 will result in a 17% fall in cereal products, which would increase global food prices by 10% for maize, 9% for wheat and 6% for rice (Tan 2012c, para.10). Chinese policies in this area aim to promote efficient water use to ensure continual production, but China's rising population and increasingly affluence are creating a greater demand for food, and even with these policies it is unlikely that this demand will be met domestically. It is questionable whether these policies will have the desired effect, as increased irrigation costs have caused some farmers to switch to more water-intensive cash crops, rather than more efficiently farming grain crops (Lohmar et al 2007, p.290).

Therefore, export taxes, increased domestic demand, and resource scarcity are likely to slow export growth in China due to a greater focus on meeting domestic needs (Hansen et al 2009, pp.14-18). This will probably be coupled with increasing imports, so raising global food prices and shortages; and placing pressure on import dependent countries. This could lead to a similar situation as in 2008 where the price of food spiked causing riots in 36 countries (Loyn 2008, para.5) as well as loss of life due to starvation (Wilson 2012, para.7).

China's 'Going Global' Policy

Importing agricultural products is, essentially, importing water in virtual form and so appears a viable policy option to combat water scarcity. China is, however, unlikely to take a positive outlook to increasing agricultural, especially grain, imports as it will become dependent on other countries. There are only a small number of countries that have a large number of virtual water trade connections to other countries, which gives them a reliable supply of virtual water, even if some of these connections may be compromised due to drought or political instability. The majority of countries, including China, have few connections so are vulnerable to market forces, and may have to pay more for imported food (Ananthaswamy 2011, para.5-9), threatening food security and local stability. The current drought in America highlights this, as China has already been affected by the global increase in soybean prices caused by this drought. If China becomes more dependent on the US for maize, then China's food sovereignty could be at greater risk (Grain 2012b, para.2-3). So, while imports to China will increase, the Chinese government will also look for alternative policy options to address food concerns caused by water scarcity.

South America

Originally, China looked to South America as a source of resources outside Asia and 77% of Chinese foreign investment went to South America in 2003 (Ellis 2005, p.V). Chinese investment is highly concentrated in natural resources so involves extraction and mining, which are highly water-intensive, and agriculture (Munson & Ronghui 2012, para.18).

China is looking to buy vast amounts of land in the region, which has left many locals feeling uneasy. To ensure a long term supply of soybeans and iron ore, amongst other commodities, China has increased its lending to South American countries (Romero & Barrionuevo 2009, para.6). China's investments in commodities like soybeans are very important to Argentina and Brazil's economies, and some analysts have suggested that a neo-colonial relationship is developing. In 2010, about 84% of Brazil's exports to China were raw materials, while 98% of China's exports to Brazil were manufactured products (Berrionuevo 2011, para.10) a trend evident in China's relations with the majority of countries in the region. This gives China leverage over these countries as they become economically dependent on exporting to China (Kelly 2011, para.11).

By expanding its trade and investment in the region, there are concerns that China will gain a stake in the region's politics and become involved in the region's security affairs, a possibility of particular concern to America. China's influence in South America may also make it a powerful competitor for America in the region. Furthermore, Chinese involvement may result in economic displacement and political unrest as China competes in the same market as many industries in South America and normally undercuts these local industries. This could lead to increased corruption, poverty and unemployment (Ellis 2005, pp.27-30).

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Africa

Africa is the primary target of international land acquisition. The International Land Coalition calculates that from 2002, 1.7% of the world's agricultural land has been acquired by foreign investors for agriculture production and of this, 60% of these deals have been in Africa. Aside from land, China is interested in African oil, mined primary commodities and timber (CRSLC 2008, pp.107 & 121) all of which are water-intensive.

China started to look for foreign sources of oil and minerals relatively recently and so many foreign reserves were already controlled by large multinationals. Leaving those that are located in less developed or volatile nations, which are generally avoided by Western firms due to problems of dealing with unstable and undemocratic governments (Munson & Ronghui 2012, para.7), has led to three of China's biggest African trading partners being Sudan, South Sudan and Angola (Woels 2012, para.3).

China's investments in Africa are concentrated in natural resources so involve mining and smelting, therefore, Chinese firms tend to have a negative impact on the environment and often violate international environmental standards (Munson & Ronghui 2012, para.18). The UN Commission on Trade and Development's World Investment Report found that non-OECD, especially Chinese, investors that operate under a 'non-interference in domestic affairs' doctrine, often undermine governance standards; engage in poor labour practices; employ corrupt habits; bribe officials and ignore or bypass best-practice environmental standards (Kotschwar et al 2011, para.16). African political elites allow Chinese firms to extract resources with limited accountability to Africa's political, economic, environmental and social structures (Woels 2012, para.2). By pursuing water-intensive and water polluting activities abroad, China is able to conserve its own water resources.

Potential Consequences

Chinese land acquisitions and investments can be problematic for targeted countries as Chinese investments are found in countries that are receiving aid from the UN World Food Program (Hofman & Ho 2011, para.9) and are already struggling with issues of land and water access (Schneider 2012, para. 14). Furthermore, in 2011 a German government official accused China of causing the famine in the Horn of Africa, although this was strongly denied (Hofman & Ho 2011, para.10). Chinese land acquisition reduces the land available for producing food for domestic markets and deprives indigenous people of access or ownership of land (Osei-Hwedie 2012, p.18). These land deals could deprive millions of access to water and risk draining freshwater sources in these regions (Grain 2012a, para.9). Investing in land in order to grow bio-fuel crop is especially problematic, as it displaces farmers and food production, and causes famine among the local population (Vidal 2010, para.18). China also tends to export its workforce to work on the acquired land (Economy 2012b, p. 4) with the Chinese Ministry of Commerce estimating that there are over a million Chinese farm labourers in Africa (Rubenstein 2009, para.8), so there is no local benefit of increased employment.

This can lead to resentment against China (Economist 2011b, para.19), especially within Africa, and contributes negatively to the global food situation by helping to driving up global food prices. China's growing unpopularity within Africa could limit its quest for resources in the country. Chinese involvement in the region contributes to worsening poverty as the flood of Chinese imports into local markets cause many local factories to collapse as they are unable to compete with Chinese products, causing unemployment and anti-Chinese sentiment (Economist 2011b, para. 4-8). However, African nations are eager for Chinese investments and Chinese companies are often financially integral to the community, so officials are unlikely to insist that Chinese companies comply with environmental regulations, instead simply urging Chinese firms to "be clean" (Munson & Ronghui 2012, para.5 -28).

These issues make land and resource-induced conflict likely, particularly as land acquisitions generally occur in nations already suffering from conflict. The combination of land and food uncertainty and poverty could spark further conflicts in the region (Kugelman 2012, para.12). Raised tensions between foreign investors and the local population are already evident and there have been clashes between foreign investors and locals over diverted water and land resources (Batha 2012, para.17). Additionally, there is no reason to expect an end to investment in overseas resources. As factors such as population growth, high global food prices, unpredictable commodity markets, water

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shortages, and a decrease in arable land are prevalent, these act as incentives for countries to acquire foreign land. Plus, the fact that resource security is becoming an issue of national security (Kugelman 2012, para.10), makes it probable that conflicts will increase in frequency and violence.

In response to these concerns, several governments are taking steps to prevent Chinese land acquisitions. Argentina has passed a law which will place a 20% cap on the amount of land available to foreign landowners; and of this 20%, no single nationality can own over 30%, as well as limiting the amount of hectares that can be bought per buyer. Brazil is contemplating introducing measures that will ban Chinese purchases of land, so China will have to continue buying commodities from the Brazilian market. As China does not permit foreign land ownership, countries can justify limiting or banning the amount of land China can buy (Economy 2012b, p.5). If more governments respond in this manner than China could be forced to become import dependent.

China's actions overseas are viewed unfavourably by the West. In Africa, many Western policy makers, politicians and business leaders view China's engagement with condemnation. They criticise China of cheaply extracting Africa's natural resources and exploiting Africa's weak political institutions for their own economic gains (Weols 2012, para.1). As China becomes more dependent on Africa's resources, its influence in Africa becomes increasingly significant, with China providing infrastructure support and debt relief in many African states. This concerns international observers, as China's relationship with non-democratic states, such as Sudan, has undermined Western efforts to promote and protect human rights and good governance. China has, for example, readily replaced Western investors when they withdraw for political reasons (Mochizuki & Zhang 2011,p.15). Chinese practices that undermine good governance have led the World Bank to ban some Chinese companies from bidding for tenders in Africa (Economist 2011b, para.14). There is a lack of information regarding China's commercial engagement in Africa and these issues set China on course for a potential conflict with Western countries if it continually fails to give proper consideration to the international community's concerns (Mochizuki & Zhang 2011, pp.15-16).

An international challenger to China's foreign policies in this area could be America due to perceived competition; the China threat perception; and the geographic proximity of South America. There are several probable short-term soft-policy options that America can employ if it decides that China's increased involvement requires a response to offset or to compete with Chinese involvement. These include reviving American involvement around the world to counter China's increasing influence, which can be achieved by increasing American bilateral cooperation, trade and military relations with Africa. America can seek to be granted observer status in institutes such as the SCO, East Asia Summit, and advocate China and African countries to create observational status within the Forum on China-Africa cooperation, giving America insight into the group's policy priorities and the ability to participate in consultations (CRSLC 2008, p.14). Therefore, China's greater involvement in South America and Africa could be met with increased American engagement in the same areas, creating the potential for Sino-American cooperation, but more likely, American involvement will be viewed by China as competition so could contribute to tensions between the two.

Japan, Korea and India share China's concerns over food security and are engaging in similar practices to support their companies in securing a steady supply of food (Grain 2012b, para.15). This could lead to future clashes over land and resources, especially as the countries that are currently providing these hungry nations could get more protective over their food supplies in the future, as demonstrated by the South American countries considering laws prohibiting land acquisition.

The West traditionally considers Africa and South America as its own trading partners and China's increasing involvement and influence in these regions is causing "deep nervousness" in the West (Kermeliotis 2011, para.2-3). In 2009, China replaced America as Africa's biggest trade partner, and African trade with the EU and USA has fallen over the last 10 years. America is sensitive and uneasy about China's increased influence in Africa as it highlights America's declining influence as a world power, and China's rising prominence. African countries now have the power to choose among their investors, improving their bargaining position and making it difficult for Western countries to deal with them from their usual position of attaching conditions to aid and investment (Kermeliotis 2011, para.21-22).

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In South America, America remains the dominant power due to its strong historical and geographical ties with the region, but China is gaining a major share of South America's trade and taking a relative share of the USA and EU's trade. In a few years, China could replace the EU as the region's second largest trading partner (UN ECLAC 2011, p.16). This has caused America and the EU to speed up negotiations and signing of free trade and association agreements with countries in the region to combat expanded Chinese presence and influence (UN ECLAC 2012, p.7), potentially increasing competition in the region. There is the fear that due to China's increased influence there is the potential for the growth of a pro-China voting bloc in UN agencies and other international institutions (CRSLC 2008, p. 130).

China's acquisition of resources is causing political concerns that China could be buying up supplies that affect countries' national security, cornering the market, and increasing prices (Arnott 2010, para.14). Chinese moves to secure raw materials may be exacerbating global problems of strong demand by tying up supplies of natural resources; gaining preferential access to available output; and extending control over the world's extractive industries; and could give China a potential monopoly over these resources (Kotschwar et al 2011, para.7).

Most Likely Situation

In summary, the likely consequences of China's water policies in terms of international trade is increased competition for raw resources and agricultural products, therefore, an increase in trade disputes and a worsening of the global food situation. China's water policies could contribute to a worsening global food situation due to decreasing agricultural productivity, and so increasing agricultural imports and global food prices.

Chinese involvement abroad will likely continue and expand in scope, especially in Africa. This involvement could create tensions within Africa and internationally, especially as China remains insensitive to the international community's political concerns regarding the region, and China's actions contribute to poverty and instability. This will ultimately result in tensions between China and the West, as well as the potential for a humanitarian crisis due to famine.

Inflationary pressures caused by increased prices will largely be offset in the short-term, partly by some companies relocating and through unemployment preventing an inflationary-spiral occurring. The effect of increased prices of Chinese goods will probably, therefore, be minimal. Several Asian economies will get a boost from the relocation of some companies, which will be positive for the region and result in increased regional trade. This is also likely to be minimal compared to the potential international consequences for trade disputes, increased agricultural imports, and consequences of Chinese involvement abroad.

Conclusions

The aim of this paper was to assess the potential international implications of China's water policies. This was achieved by investigating the water situation in China; the policies the Chinese government is implementing to address water problems; and, based on China's foreign policy and international relations, examining the casual effects these policies could have to determine the impact they may have on other countries.

China's management of its decreasing water sources will probably have a notable impact internationally due to China's prominence in the international arena, and will contribute to exacerbating several global issues. Water security has become an issue of national interest so the Chinese government will ultimately take any actions necessary to secure its water resources. If this can be achieved within the international framework and following international norms, China will do so, but it is unlikely to be constrained in this way.

The most probable outcome will be where China's relationships with lower-riparian states deteriorate as China becomes increasingly possessive over trans-boundary rivers. While this is unlikely to result in direct conflict between China and its neighbours, it could create several flash points for conflict in the region; including potential Indian-Pakistan conflict; renewed Sino-Indian border disputes; and instability within countries. China's relationship with India will deteriorate if China diverts water from the country and could spark a humanitarian crisis in parts of India,

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Bangladesh and Pakistan due to droughts and famine. Rising food prices will exacerbate this and lead to further instability. Worsening Sino-Indian relations over water resources may result in acute rivalry between the two countries, proving destabilising for the region and could result in the polarisation of Asia.

China will be unable to locally fulfil its demand for agricultural products and water-intensive resources. Many countries are, however, eager to gain access to the Chinese market, so imports to China will increase in the short-term, proving beneficial to the economies of the exporting countries. However, this may have a negative impact on the exporting countries due to destruction of the local environment and local displacement. In the longer-term, destructive environmental methods used in countries to meet Chinese demand, or by Chinese companies abroad under China's 'go out' policy, could contribute to worsening climate change, which could cause heat waves, droughts and floods, destroying crops and so decreasing agricultural supply and increasing prices. India, Pakistan and Bangladesh, amongst other countries, will probably increase their agricultural imports if China deprives them of water from shared rivers, and it is unlikely that this demand will be able to be met. Coupled with China switching to being a predominately agricultural importing country, this could result in massive food price hikes and governments may resort to stockpiling grain, causing political instability and famine in countries.

Growing competition over resources and agricultural goods will increase international tensions as countries vie to secure resources. This will result in greater competition for acquisition of land and resources abroad, while targeted countries try and guard their resources or 'play countries off' each other to secure the best investments. While some countries like those in South America will pass increasingly restrictive laws making land acquisition by Chinese companies near impossible, resource exploitation in countries like Africa could hinder their development and increase conflict and instability within the region. There could also be a rise in armed conflict between local populations and foreign companies involved in land acquisitions. Trade disputes may increase due to countries looking to hold on to their own resources and increasing demand from other countries, particularly as China seems to be buying-up strategic resources and tying-up supplies, giving them a potential monopoly.

There is, however, the argument that the outcomes outlined above could be mainly due to China's economic and population growth, and so it is these issues, rather than its water policies per se that are driving these potential international impacts. China's rising population contributes to increasing agricultural pressures; resulting in China increasing agricultural imports and 'going out' for resources; and economic growth is fuelling China's quest for resources and hydropower. Furthermore, if China did not address its water issues, the outcome internationally, especially in terms of food security, could be the same as the situation that could occur after implementation of their water policies, as both scenarios would result in decreased agricultural productivity and a greater demand for resources.

However, the Chinese government has introduced policies specifically addressing water issues to continue feeding its population and grow its economy in a sustainable manner to alleviate the worst potential outcomes. These issues ultimately boil down to water availability. China's economic growth cannot continue without a sufficient supply of water and China cannot grow crops to feed itself without water for irrigation. In the short-term, some of China's water policies may have a similar outcome to those if the government was inactive. The fact that the government is taking action, however, will have a decisive impact and prevent the country from grinding to a halt, which in the long-term would be undesirable internationally. Projects such as the SNWDP are aimed solely at treating China's water shortages. International tensions caused by interfering with trans-boundary rivers can, therefore, be attributed to the fact that diverting rivers to meet water shortages is how China has historically dealt with its water deficits. While China's regional water imbalance has been exacerbated by rapid urbanisation and industrialisation, the SNWDP is seen as the logical permanent solution to solving the traditional water imbalance between the north and south.

Ultimately, it seems China's water policies will have a potential two-fold impact internationally; being highly destabilising to the region and increasing international tensions; but at the same time, potentially preventing China's economy from stalling, which could be destabilising to the entire international system.

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