

CHINA'S WATER POLITICS: IN WHOSE INTEREST?

by

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A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF ARTS in POLITICAL SCIENCE to Portland State University.

Tibet Justice Center: 2005

PAPER ABSTRACT

From the critical perspective of human interest theoretical foundation, it is important to ask a simple question of public policies: “In whose interest?” The present study looks at China's paradigmatic faith in the superiority of large-scale engineering and technocratic approach to water resources development through this critical lens.

This thesis has two immediate purposes: to provide an explicit explanation for China's “political faith” in large-scale water development projects and to illustrate its outcomes and implications by drawing on case studies. Its underlying objective is to help generate debate about identifying basic water management principles that serve the human interest in a sustainable manner.

Focusing on the political economy of decision-making in China's water development, the present study extrapolates the structure of interests served by more than half a century of a consistent development approach to water management. Based on this extrapolation, it offers the notion of a Chinese Water-Industrial Complex, the politico-economic construct that accounts for water related construction work on a massive scale.

Through various case studies, the study finds contemporary Chinese water politics unacceptable from the human-interest perspective for two main reasons: usurpation of water policy by Water-Industrial Complex to serve its economic and bureaucratic interests, and the externalization of social and environmental costs of water development. In an attempt to generate debate about practicing humane water management, it concludes by articulating desirable water policy priorities of the human interest approach, and identifies certain minimum standards for public participation in water governance.

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I. Politics of Development and the Human Interest

Purpose

Large dams are going out of fashion today. Owing to their disastrous impacts, supported by conclusions from authoritative studies,¹ and public criticisms, more large dams are being decommissioned in countries like the United States than they are built today. However, some countries, such as China, continue to view dams and large-scale water development projects as symbols of technological progress and economic development. Why?

This thesis has two immediate purposes: to provide an explicit explanation for China's "political faith" in large-scale water development projects and to illustrate its outcomes and implications by drawing on case studies. Its underlying objective is to help generate debate about identifying basic water management principles that serve the human interest in a sustainable manner.

The Human Interest Framework

The human interest framework theoretical foundation of this study is an increasingly used "alternative," critical framework of analysis that is primarily concerned with interests of people, in contrast to more traditional approaches that focus on the strategic and economic interests of states.² The scholars employing this framework often explicitly challenge the hypothesis of "trickle down" benefit of safety and wellbeing of citizens by making the state strong (measured in military capability to deter and attack) and rich (measured in macro economic statistics such

¹ World Commission on Dams, *Dams and Development: A New Framework for Decision-Making* (Earthscan Publishers, 2000).

² See, for example, the annual Human Development Reports published by the United Nations Development Program; or others such as Mahbub ul-Haq, "Human Rights, Security, and Governance," *Peace & Policy*, Vol. 3, No. 2 (Fall/Winter 1998); Sudhir Anand & Amartya K. Sen, "Sustainable Human Development: Concepts and Priorities," *Occasional Papers* (8), Human Development Report Office; Yuen Foong Khong, "Human Security: A shotgun Approach to Alleviating Human Misery?" *Global Governance*, Vol. 7, No. 3, (July-September 2001); Saul H. Mendlovitz, *On the Creation of a Just World Order: Preferred Worlds for the 1990's* (Free Press, 1970); Astri Suhrke, "Human Interest and the Interests of States," *Security Dialogue*, Vol. 30, No. 3 (September 1999); Caroline Thomas & Peter Wilkin, *Globalization, Human Security, and the African Experience* (Lynne Rienner Publishers, Inc., 1999); T. Matsurnae and L.C. Chen (eds.), *Common Security in Asia: New Concepts of Human Security* (Tokai University Press, 1995); Robert C. Johansen, *The National Interest and the Human Interest: An Analysis of U.S. Foreign Policy* (Princeton University Press, 1980); Mel Gurtov, *Global Politics in the Human Interest* (Lynne Rienner Publishers, Inc., 1999); Peter Stoett, *Human and Global Security* (University of Toronto Press, 1999); Rob McRae and Don Hubert (eds.), *Human Security and the New Diplomacy* (McGill-Queen's University Press, 2001); Cristobal Kay (ed.), *Globalization, Competitiveness and Human Security* (Frank Cass, 1997); etc.

as GDP per capita).³ Armed with empirical evidence and normative arguments, scholars of the human interest framework argue that such measurements/indicators have become increasingly disputable in terms of real world experiences. In the pursuit of economic growth by governments, the world has actually witnessed a “trickle up” effect as the gap between the rich and poor keeps increasing. These scholars thus attempt to reformulate the task from the development and security of states to the development and security of people.

For taxonomical purposes, the works representing the human interest framework could be roughly grouped under three broad categories, depending on the scope and focus of their research: those that are “primarily concerned with nonmilitary threats to the safety of societies, groups, and individuals, in contrast to more traditional approaches to security studies that focus on protecting states from external threats”;⁴ research focusing on creating a developmental environment that focuses on the fulfillment of people's potentials based on their needs and interests; and research focusing on creating a world order (primarily a paradigm of international relations) based on “the primacy of the human interest above any other—state, ideological, economic, or bureaucratic.”⁵ We could label these categories “human security” studies, “human development” studies, and “global humanism” studies, respectively.

Of the three categories, human security studies is the most popular and vibrant area of research.⁶ The concept has been adopted by a number of scholars, diplomats,⁷ Nongovernmental organizations (NGOs), states,⁸ research institutes,⁹ and international development organizations,¹⁰ with their own (often changing) definitions of the core concepts and issue areas (gender, health, environment, development, “peace and security,” etc.) and subjects (women,

³ See, for e.g., Johansen, p. 392; Anand & Sen; Gurtov, p. 90; etc.

⁴ Roland Paris, “Human Security: Paradigm Shift or Hot Air?” *International Security*, 26.2 (2001), pp. 87-102.

⁵ Gurtov, p. 76.

⁶ See, e.g., ul-Haq; Khong; Thomas & Wilkin; Matsuura and Chen (eds.); McRae and Hubert (eds.); Kay (ed.); etc.

⁷ For example: Sadaka Ogata, Former United Nations High Commissioner for Refugees; Bronislaw Geremek, former Foreign Minister of Poland; Frene Ginwala, Speaker, Parliament of the South African National Assembly; Peter Sutherland, Chairman and Managing Director of Goldman Sachs International, etc.

⁸ For example, there is a “human security network” of states that endorse the concept. See, <http://www.humansecuritynetwork.org>. States endorsing the concept include, Austria, Canada, Chile, Greece, Ireland, Jordan, Malt, The Netherlands, Norway, Slovenia, South Africa (as an observer), Switzerland, and Thailand.

⁹ Several major universities have taken up human security studies as subject of new research projects. See, e.g., Harvard University's Program on Human Security, Rutgers University-Newark's Center for Global Change and Governance; University of British Columbia's Institute of International Relations, etc.

¹⁰ E.g., the United Nations Development Programme.

indigenous peoples, worker rights, war victims, individuals, etc.). Not surprisingly, scholars and policy makers interested in specific solutions to political problems find the concept “too broad and vague ... to be meaningful ..., as it has come to entail such a wide range of different threats on one hand, while prescribing a diverse and sometimes incompatible set of policy solutions to resolve them on the other.”¹¹

Definitions of human security vary widely. Owing to the multitude of factors that could affect human perceptions of threat, narrowing the definition of human security with specific measurable elements is problematic. The most cited definition of human security is perhaps that of the *Human Development Report: 1994*, published by the United Nations Development Programme (UNDP). The report identified two aspects of human security. “It means, first, safety from chronic threats such as hunger, disease and repression. And second, it means protection from sudden and hurtful disruptions in the patterns of daily life--whether in homes, in jobs or in communities.”¹² The report goes on to identify seven specific elements that comprise human security: economic security, food security, health security, environmental security, personal security, community security, and political security. Critics argue that the “laundry list” of human security elements is analytically difficult to operationalize. Other definitions include that of Caroline Thomas, which is more concise but equally difficult to operationalize: “Human security is a condition of existence in which the basic material needs are met and in which human dignity, including meaningful participation in the life of the community, can be realized.”

Related to the concept (or the study) of human security is that of human development.¹³ While the former focus on the perception of threats, the latter complements it by focusing on empowering people to live more meaningful lives. Human development studies represent a conscious effort to put “people back at the center of development process in terms of economic debate, policy and advocacy.” These studies are largely initiated under the annual Human Development Report series that UNDP has been publishing since 1990. The term “human development” can be defined as the process of expanding people’s choices to lead lives they

¹¹ Heather Owens and Barabara Arneil, “The Human Security Paradigm Shift: A New Lens on Canadian Foreign Policy? Report of the University of British Columbia Symposium on Human Security,” p. 2, as cited in Paris.

¹² *Human Development Report 1994*, p. 23.

¹³ For works representing the human development studies, see the Human Development Reports published by UNDP, available online at <http://hdr.undp.org/reports>. Also, see, ul-Haq; Anand and Sen; etc.

value.¹⁴ “It is about creating an environment in which people can develop their full potential and lead productive, creative lives in accord with their needs and interests.”¹⁵ Through the years, the authors of Human Development Report(s) have developed a methodologically sophisticated set of "human development indices" to measure different aspects of human development such as health care, education, access to safe water, infant mortality, and gender inequality. The popularity of the methodological standards of human development indices is reflected in the fact that today more than 120 countries publish their national human development reports.

Studies that use the human interest framework that focus on foreign policy and world politics could be broadly categorized under global humanism studies. These studies represent an effort to relocate debates of *global politics* away from a focus on the state-centric international system dominated by realist and corporatist values toward people-centered humanist values.¹⁶ They seek “a slightly rearranged hierarchy of values” in global politics.¹⁷ Global humanism scholars argue that traditional realist and "corporate-globalist" values and approaches are incapable of addressing effectively some of the main problems facing humanity, such as threat of nuclear war, arms race (and arms trade), "structural violence," environmental destruction (global warming, desertification), armed conflict (both inter-state and intra-state), inequality (of power and income, within countries, between countries, and between "worlds"), globalization's (free trade regime's) backlashes. Realist and "corporate-globalist" values such as amorality, competition, elitism, materialism, and will to power, they argue, perpetuate these global crises. The global humanism scholars are thus not shy about articulating preferred “world order values” based on the human interest. The implication is that adoption of global humanist values such as morality, cooperation, community, spirituality, personal-power, and equality could potentially bring about true security for all.

Operationalization, premise and methodology:

¹⁴ See, Human Development Report: 2002, *Deepening Democracy in a Fragmented World*, (<http://www.undp.org/hdr2002/>); Arab Human Development Report:2002, *Creating Opportunities for Future Generations*, (<http://www.undp.org/rbas/ahdr/english.html>); etc.

¹⁵ Human Development Report:2001, p. 9.

¹⁶ Examples of “global humanism” studies would include, Johansen; Gurtov; Mendlovitz, *On the Creation of a Just World Order: Preferred Worlds for the 1990's* (Free Press, 1975); etc.

¹⁷ Johansen, p. 20.

A common analytical thread in the three categories of human interest studies is *valuing the worthiness* of the mainstream paradigmatic ideological approaches to security and development. One way to operationalize the human interest framework is to ask a simple question of public policies: “In whose interest?” This study looks at China's paradigmatic faith in the superiority of large-scale engineering and technocratic approach to water resources development through this critical lens.

This focus of this study is *politics* of water development in China. It is based on the essential premise that what happens in the name of development projects is a direct result of *decisions* made by political leaders to serve ideological, bureaucratic, and other interests that run counter to the human interest. Applying this premise to the Chinese political economy of decision-making, the paper extrapolates the structure of interests served by more than half a century of a consistent development approach to water management. To ascertain the structure of interests, this study analyses, among other things: ideology, professional background, and bureaucratic biases of the Chinese Communist Party (Henceforth Party or CCP) leaders who make key policy decisions. I stress the role of propaganda and decision making structure and process that shape policy outcomes.

Structure of the paper

The next chapter (Chapter II) describes China's water problem from several angles, serving as a background discussion for this study. Chapter III offers the notion of a Chinese Water-Industrial Complex, the politico-economic construct that accounts for water related construction work on a massive scale. Based on a structural analysis of interests served by this construct, the chapter concludes with a model for Chinese water resources decision-making: Concrete Triangle. To demonstrate how the phenomenon works in an actual case, chapter IV uses the Three Gorges Project, the largest engineering project in world history, as a case study and concludes that the bureaucratic and economic interests of China's water-industrial complex is benefited by, and hence supportive of, all the large-scale projects in China.

Chapter V highlights two other massive projects, which in many ways overwhelm the grandiosity of even the Three Gorges Dam, to discuss further, national water management implications of the Complex. Building upon this, chapter VI goes on to discuss regional (or

international transboundary) implications of the Complex by using the Mekong River's development as a case study.

Chapter VII concludes by engaging the global water resources management debate from a human interest perspective. It identifies certain values and principles of water resources development that may ensure sustainable human interest.

II. The Anatomy of China's Water Crisis

Despite China's large population of 1.26 billion people, its per capita water resources of 2,343 m³/person/year is substantially above the internationally accepted definition of water scarcity of 1000 m³/head/year.¹⁸ It also has an extensive body of environmental law with an elaborate organizational structure to carry out these laws. Yet, water pollution and water scarcity (particularly in Northern China) are two of the seven priority areas recognized by National Environmental Protection Agency and the State Planning Commission in China's *Economic Action Plan for 1991-2000*.¹⁹ From devastating floods to water scarcity, from pollution to corruption, from water riots to transboundary riparian conflicts, management of water supply and quality has become so problematic that many scholars have send warning signals to Beijing about the potential environmental and political implications of water issues to the regime and China's people.²⁰

China's water problems can be described from several angles: (1) *distribution* of water and population, to provide a snapshot of the problem; (2) environmental *policy and law*, to shed light on institutional frameworks designed to deal with the issue; (3) the enforcement *structure and governance* that carry out these laws; (4) *economic trends and reforms* that directly affect water demand and management; and (5) the government's predilection for *large structural solutions*.

Distribution: availability and population

As China's relatively high per capita water resources suggest, water would be reasonably plentiful were it not for the effects of uneven spatial and temporal variations in population density and availability of freshwater (See Table 2.1). Water problems are particularly serious in the areas of northern rivers—those north of and including the Yellow River—due to lower per

¹⁸ The World Bank, *China: Air, Land, and Water*, August 2001, p. 52.

¹⁹ Xiaoying Ma and Leonard Ortolano, *Environmental Regulation in China: Institutions, Enforcement, and Compliance*, (Rowman & Littlefield Publishers, 2000, p. 2.

²⁰ See e.g., Jih-Un Kim, Drifting on the Drying Water Pool: China's Water Scarcity and It's Political Foreboding," *Asian Perspective*, Vol. 25, No. 1, 2001, pp. 133-135; Jack A. Goldstone, "Imminent Political Conflicts Arising from China's Environmental Crises," *Environmental Change and Acute Conflict*, No. 2, (December 1992).

capita water availability, lower rainfall, frequent episodes of drought and floods, pollution and higher demands.²¹

This regional inequality of water availability is exacerbated by the precipitation pattern. Precipitation is highest in the southeast part of China (Pearl River basin and delta with more than 2,000 mm per year), decreasing as one moves northwest.²² The northern rivers have generally lower flow with higher variability than the southern rivers. In addition to topographic and geomorphologic factors, this has made north China one of the most flood-prone areas in the country and indeed in the world, with flood damage estimated at nearly 30 percent of the national total.²³ Furthermore, about 70% of China's total annual precipitation occurs during the flood season: that is to say, about two-thirds of the total amount of water resources can be attributed to flood run off.

(continued to next page ...)

²¹ See. Ministry of Water Resources, The World Bank and AusAID, *China: Agenda for Water Sector Strategy for North China*, 2001.

²² Gerhard K. Heilig, *Can China Feed Itself?: A System for Evaluation of Policy Options*, The International Institute for Applied Systems Analysis, (http://www.iiasa.ac.at/Research/LUC/ChinaFood/index_m.htm).

²³ Ministry of Water Resources, The World Bank and AusAID, *China: Agenda for Water Sector Strategy for North China*, p. 8.

Table 2.1: Average Renewable Water Availability in China. Figure source: World Bank (2001)

Rivers	(Billion m3/year) Total of surface water and ground water	(m3/person/year)
Northern		
Song-Liao	193	1,704
Hai-Luan	42	358
Huai	96	505
Yellow/ <i>Machu</i> /Huanghe	74	750
Southern		
Yangtze/ <i>Drichu</i> /Changjiang	961	2,388
Zhu/Pearl	471	3,327
Southeast	259	3,938
Southwest	585	31,914
Interior Basins	130	5,271
	2,8121	2,343

Population pressure and concentration of heavy industries in north China, particularly northeast China, are the main contributors to the pollution²⁴ and over-utilization of northern rivers. Industrial waste water discharge accounted for 75% of waste water in China in 1989.²⁵ Almost three-quarters of the population live in the eastern half. North China's agricultural sector is affected by severe and increasing water shortages. The situation is particularly bad in Huang He, Hai and Huai rivers, also called the 3-H rivers, where there have been reports of riots and social disruptions over water.²⁶

There were social revolts along the Huai River, so the State Council [China's Cabinet] had to react," one retired senior government official told me, recalling the most dramatic government crackdown on pollution to date. The Huai region, located about 200 miles northwest of Shanghai, is the most densely populated of China's seven major river basins: 110 million

²⁴ The main pollution indicators in these rivers are permanganate index, non-ionic ammonia, Biological Oxygen Demand (BOD), petroleum.

²⁵ See Wang Jusi, "Water Pollution and Water Shortage Problem in China," *Journal of Applied Ecology*, Vol. 26, No. 3 (Dec., 1989), pp. 851-857. Interestingly, the quantity of industrial waste water discharges has been decreasing since the latter half of 1990's (World Bank statistics).

²⁶ See e.g., Kim; Mark Hertsgaard, "Our Real China Problem," *Atlantic Monthly*, November, 1997. (www.theatlantic.com/issues/97nov/china.htm); etc.

inhabitants share 108,000 square miles of land. The river had been severely polluted for years, but it got drastically worse in July of 1994, when a sudden flood of toxins turned the river black and deadly for weeks. Hundred of thousands of people were left without drinking water, several thousands were treated for dysentery, diarrhea, and vomiting, and 26 million pounds of fish were killed.²⁷

Policy and law

Official environmental policy and positive laws for the protection of environment have only developed since the economic reform period began in China.²⁸ In 1978, reform leaders amended China's constitution to include the protection of the environment. In 1979, China's first Environmental Protection Law was promulgated. This was followed by a series of environmental regulations. At the same time China established environmental agencies at the national, provincial, and local levels to implement these regulations and to monitor their progress.

However, China's environmental law suffers from major assumptions that no longer apply in present-day China. Drafted in the early reform period, these laws presuppose a centrally planned and orderly economy.²⁹ This fundamental discrepancy widens the difference between the ways these laws are expected to be enforced and how these are actually implemented.

[T]he laws presuppose a common national commitment to the goal of environmental protection [whereas the only national commitment is really to rapid economic growth, which is detrimental to the environment] and a higher degree of administrative cohesion than currently exists. It is assumed that subnational units of government will want to meet, if not exceed, national set environmental standards. Little attention is focused on environmental problems that transcend a single jurisdiction. The laws presume that local environmental protection bureaus, which report principally to the local government officials, will successfully coordinate with the [State Environmental Protection Agency] ... Even within single subnational units of government, the laws fail to

²⁷ Hertsgaard, *ibid.*

²⁸ For discussions of environmental law and policy in China, see, Xiaoying Ma & Leonard Ortolano, *Environmental Regulation in China: Institutions, Enforcement, and Compliance* (Rowman & Littlefield Publishers, 2000); Michael B. McElroy, Chris P. Nielson, and Peter Lydon (Ed's.), *Energizing China: Reconciling Environmental Protection and Economic Growth* (Harvard University Press, 1998), pp. 371-499; Lester Ross, "Environmental Policy in Post Mao China," *Environment*, Vol. 29, No. 4, May 1987; Lester Ross, "Environmental Law and Policy in China: Prospects for Research," *China Exchange News*, Vol. 18, No. 4, December 1990.

²⁹ Wei Lianchun, "Occupational and Environmental Risk Factors for Asthma in Rural Communities in China," *International Journal of Occupational and Environmental Health*, No. 44, 1994.

anticipate the possibility that certain governmental interests, particularly those of departments with major economic possibilities, might diverge sharply from those of local environmental protection officers.³⁰

Many of these laws overlap and contradict each other, subjecting them to different manipulations and confusions.³¹ These laws also lack specificity and provisions for conflict resolution and water allocation, which are at the core of water issues in China today.³² These flaws in China's legal doctrine are accompanied by a set of problems related to enforcement mechanisms of these laws.

Enforcement structure and governance

As Lieberthal observed, “much of the environmental energy generated at the national level dissipates as it diffuses through the multi-layered state structure, producing outcomes that have little concrete effect.”³³ Authority and responsibility are delegated through a hierarchical chain of command by function and rank, causing major obstacles in implementing environmental laws. In China, units of the same rank cannot issue binding orders to another.³⁴ For example, the Ministry of Water Resources, a principle organ responsible for national water resources management, is on the same rank as a province and thus lacks the authority to issue necessary binding orders to provinces. Therefore, in order to operate effectively between organizations of the same authority or of different functional bureaucracies in China, extensive consensus building becomes necessary,³⁵ making the system more cumbersome and less efficient. Furthermore, there is no institution with sole responsibility for water supply, management, and water pollution laws—the management of China's water industry is split among different ministries and the municipal and provincial government water resource-bureaus (discussed further in chapter 4).

³⁰ Alford and Shen, p. 411.

³¹ Ibid.

³² See, e.g., Kim; Hertsgaard; etc.

³³ Kenneth Lieberthal, “China's Governing System and Its Impact on Environmental Policy Implementation,” *China Environment Series* (The Woodrow Wilson Center publications).

³⁴ Ibid.

³⁵ See, Kenneth Lieberthal and David M. Lampton, *Bureaucracy, Politics, and Decision Making in Post-Mao China* (University of California Press, 1992).

Another unique Chinese style of governance is its dual system of authority—“vertical” (*tiao* in Chinese) and “horizontal” (*kuai*). Vertical lines of administration are the Environmental Protection Agencies (EPAs) at each level of the political system (national, provincial, city, local, etc.) and horizontal lines of administration, for this purpose, are the local EPA offices of the same rank or level. *Tiao* lines of administration operate to implement functional goals (in this case, to protect the air or rivers from pollution); *kuai* serve the needs of the locality it governs. One of the most notable thrusts of the reforms has been to make the *tiao* serve *kuai*, making central-level functional units such as the Ministry of Water Resources less powerful than territorial governments, which are far more interested in achieving economic development rather than environmental protection. The result is that the entrepreneurs (local level officers) typically control the regulators (local environment officers).³⁶

Reforms and primacy of economics

Chinese leaders want to transform the economy into a technologically dynamic, efficient engine of growth. In order to mobilize people’s entrepreneurial skills, especially those of local leaders, the Chinese government made an uncodified deal that essentially says, “each level of government will grant the level just below it sufficient flexibility to enable the lower level to grow its economy rapidly enough to maintain social and political stability.”³⁷ With this, there were other changes in the governance of the system, such as “making *tiao* serve *kuai*” which provided local officials with power, flexibility, and incentive (in the form of economic gains, promotions, and other benefits) to focus on rapid economic growth. As a result, local environmental issues became secondary in importance to economic growth for these officials, who could now basically control the regulators (e.g., EPA officials).

China is one of the fastest-growing economies in the world and the trend of growth is likely to continue for some time. “Most of the growth in industrial output in the future is likely to be within the non-SOE [state owned enterprises] sector, which SEPA and the EPBs have the least capacity to regulate ...”³⁸ And with these trends, further increase in water demand can be safely predicted. Another important development of the reform measures is the mushrooming of

³⁶ See Lieberthal, p. 4.

³⁷ Lieberthal, pp. 4-5.

³⁸ The World Bank, *China: Air, Land, and Water*, August 2001, p. 63.

township and village enterprises (TVEs). There are about 25 million autonomous small- and medium-sized TVEs, and these are considered to be the most dynamic and fastest-growing segment of China's growing economy.³⁹ These are often directly linked to local political authorities, and their ambiguous legal status allows them to operate outside effective national-level control of pollution and other imposed externalities.⁴⁰ TVE's discharged approximately three billion cubic meters of wastewater into China's water systems in 1998.⁴¹

Large structural "solutions"?

The water development debate has resulted in the expansion *and* the transformation of conventional water resources management approaches around the world. The hegemony of conventional realist and developmentalist perceptions of water (as a property of a territorial unit or as a commodity to be "produced" for economic growth), for example, is now being complemented with new (re)emerging perceptions of water. The "changing [world] water paradigm" has many components, including a shift away from sole, or even primary, reliance on finding new sources of supply to address perceived new demands, a growing emphasis on incorporating ecological values into water policy, a re-emphasis on meeting basic human needs for water services, and conscious breaking of the ties between economic growth and water use."⁴² It is the common wisdom today, supported by authoritative studies, that addressing water issues requires a multi-disciplinary approach.

This thesis posits that an important facet of China's water problems is the government's predilection for large-scale structural solutions to address them (See chapter 3, 4, and 5). China's water crisis, as is apparent from preceding discussions, is far more complex than a severe case of distributional inequality or supply-demand disequilibrium. Serious institutional, legal, and policy priority changes, for example, are required to manage China's water problems more efficiently. China's current excessive reliance on engineering approaches of supply and control, particularly through large-scale construction, contributes to the problem by creating its

³⁹ Theodore Panayotou, "The Effectiveness and Efficiency of Environmental Policy in China," in McElroy, Nielson, et. al., p. 443.

⁴⁰ Chris P. Nielsen and Michael B. McElroy, "Introduction and Overview," McElroy, Nielson, et. al., p. 20.

⁴¹ The World Bank, *China: Air, Land, and Water*, p. 54.

⁴² Peter H. Gleick, "The Changing Water Paradigm: A Look at Twenty-first Century Water Resources Development," *Water International*, Vol. 25, No. 1, March 2000, p. 127.

own set of externalities—social, environmental, cultural, and political—as discussed in the later chapters.

As the World Commission on Dams report points out, a “conventional model of development decision-making—isolated from social, environmental, cultural and political implications—is no longer feasible.”⁴³ This thesis posits that China’s water crisis is in many important ways a crisis of governance—“the process of decision-making and the process by which decisions are implemented (or not implemented).”⁴⁴ The following study will focus on explicating the causes and the implications of China’s limited (engineering) paradigm to address its water issues.

⁴³ Quoted from 2002 Human Development Report, p. 109.

⁴⁴ United Nations Economic and Social Commission for Asia and the Pacific, online at <http://www.unescap.org/huset/gg/governance.htm>

III. Water Industrial Complex: China

From Mao's policy of self-sufficiency, through Deng's "open door policy" to Jiang Zemin's and Zhu Rongji's embrace of globalization trends, China's "guiding policies" have undergone dramatic changes. However, as Dai Qing noted, very little has actually changed in the decision-making affairs of the Party, which rules PRC since its inception in 1949. Policy decisions regarding major projects remain highly autarkic, under the control of a small number of Party elites, whose professional and ideological backgrounds are rooted in near-religious faith in big engineering approaches to water development.

This chapter highlights how these approaches that dominate the politics of water management in China find natural allies in the commercial interests of the industry and the bureaucratic interests of water related governmental organizations. The term, "Water Industrial Complex" (WIC) is used to label the phenomenon. The overall assumption points to the reciprocal, re-enforcing influence of the technocratic engineering paradigm on the water related bureaucracies and the industry on each other that ultimately result in the hijacking of policy by their collective interest in maintaining water related construction.

This analysis provides a critical politico-economic explanation for what scholars have been calling China's "political faith" in large structural solutions. It provides a critical hypothesis that decisions regarding major water control projects are being made to serve the bureaucratic and commercial interests of China's WIC, and not necessarily its people.

Meaning and definition

Just as many critical scholars blame the military industrial complex (MIC) for the excessive defense expenditures in countries like the U.S.,⁴⁵ there are similar (and striking)

⁴⁵ The term military-industrial complex has its origins in the US. See, C. Wright Mills, *The Power Elite* (Oxford University Press, 1956); Joel Andreas, *Addicted to War: Why the U.S. Can't Kick Militarism* (New Society Publishers, 1993); Gregg B. Walker, David A. Bella, and Steven J. Sprecher (Eds.), *The Military-industrial Complex: Eisenhower's Warning Three Decades Later* (P. Lang, 1992); Kurt Hackermer, *The U.S. Navy and the Origins of the Military-Industrial Complex, 1847-1883* (Naval Institute Press, 2001); Sam C. Sarkesian (Ed.), *Military-Industrial Complex: A Reassessment* (Sage Publications, 1972); Bruce Brunton, "A Historical Perspective on the Future of the Military-industrial Complex," *Social Science Journal*, Vol. 28, No. 1; etc. For readings on China's Military Industrial Complex, see, Mel Gurtov & Byong-Moo Hwang, *China's Security: The New Roles of the Military* (Lynne Rienner, 1998); Solomon M. Karmel, *China and the People's Liberation Army: Great Power or Struggling Developing State?* (St. Martin's Press, 2000); Mark A. Stokes, *China's Strategic Modernization:*

patterns of bureaucratic interest and power associations in China's WIC (See Table 3.1). Before discussing these patterns, it is prudent to make a preliminary note that MIC and WIC are conceptually as well as physically different. The set of factors affecting military policies is different from those affecting water policies, and not to mention the teleological differences between "water" and "military." Therefore, it is prudent to warn against drawing unwarranted parallels. This analysis also does not draw any formal relationship between the two concepts. But the structural similarities (discussed later) between the two "Complexes" do seem important.

The purpose of introducing the concept WIC is to highlight the power alliances (formal and informal, as well as professional and ideological) in the shaping of water policy in China. For analytical purposes of clarity and specificity, a definition of WIC is in order. WIC is *the professional and ideological alliance of technocratic Party elites with water-related bureaucracies and businesses that influence government policy*. The emphasis of this meaning is on three aspects: dominance of hardline technocratic elites in decision making; their professional and ideological alliance with the economic and bureaucratic interests of water industry and bureaucracies (water sector entities); and this alliance's influence on government policy to further water-related construction.

(continued into next page ...)

Implications for the United States (U.S. Army War College); David Welker, "The Chinese military-industrial complex goes global," *Multinational Monitor*, Vol. 18, No. 6 (June 1997); S.V. Lawrence, "Inside Beijing's Arms Bazaar," *U.S. News & World Report*, Vol. 111, No. 4 (July 7, 1991); etc.

Table 3.1: Water Industrial Complex of China compared to Military Industrial Complex of USA

	America's Military Industrial Complex	China's Water Industrial Complex
Ideology	<ul style="list-style-type: none"> • <i>Realism</i> • <i>Anarchic international system</i> • <i>American Primacy</i> • <i>"City on the Hill," "uphold freedom and democracy"</i> 	<ul style="list-style-type: none"> • <i>Marxist-Leninist-materialism</i> • <i>"Man over nature"</i> • <i>Strong and powerful China</i> • <i>Greatness of socialism, "Socialist re-construction"</i>
Elite involvement	<ul style="list-style-type: none"> • <i>Corporate and other private sector executives</i> • <i>Defense services, Pentagon leaders</i> • <i>Family business involvement</i> • <i>"Revolving door system" of professional and political roles</i> 	<ul style="list-style-type: none"> • <i>Party leaders</i> • <i>Engineering, "Red Specialists," "Tsinghua Clique"</i> • <i>Family business involvement</i> • <i>"Revolving door system" of professional and political roles</i>
Decision making	<ul style="list-style-type: none"> • <i>Crisis management small groups</i> • <i>Closed door system</i> 	<ul style="list-style-type: none"> • <i>Crisis management small groups</i> • <i>Closed door system</i>
Mode of public support	<ul style="list-style-type: none"> • <i>Propaganda through mainly corporate owned media</i> • <i>"Communist threat," "rogue states," "terrorist" groups</i> • <i>"Rally behind the flag" phenomenon, "national interest," patriotism, etc.</i> 	<ul style="list-style-type: none"> • <i>Propaganda through a strictly controlled and govt. owned media</i> • <i>Natural threats like flood and draught, "Thirsty North"</i> • <i>"Rally behind the flag" phenomenon, "national interest," patriotism, etc.</i>
Size of Complex	<ul style="list-style-type: none"> • <i>World's largest in terms of monetary value of production</i> • <i>Over \$ 305 billion in military expenditures (2001, SIPRI)</i> 	<ul style="list-style-type: none"> • <i>World's largest in terms of project sizes and numbers</i> • <i>22,000 of the world's 45,000 large dams</i>
Interests served	<ul style="list-style-type: none"> • <i>Economic interest of military-industrial firms connected with the iron triangle</i> • <i>Departmental bureaucratic interest in expansion of size and power</i> 	<ul style="list-style-type: none"> • <i>Economic interest of water-industrial firms connected with the "concrete triangle"(see below)</i> • <i>Departmental bureaucratic interest in expansion of size and power</i>
Influence on government policy	<ul style="list-style-type: none"> • <i>Perpetuation of military related production</i> • <i>Development of the most advanced and deadly weapons</i> 	<ul style="list-style-type: none"> • <i>Perpetuation of water related construction</i> • <i>Construction of the largest water control projects</i>

Leadership: professionalism and ideology:

Since the very beginning of the CCP, before it came into power, leadership has been dominated by individuals with technical engineering backgrounds. Although the generation of influential *hongse zhuanjia* (“red specialists,” or party leaders trained in the former Soviet Union as engineers) like Li Peng are retiring, the nature of internal Party politics ensures assumption of leadership by cadres with similar ideological and professional backgrounds.

The Standing Committee of the CCP Politburo, the highest decision making authority in China, is the most important group in which to analyze this pattern. In November 2002, there was a major power shift, from the “third generation leaders” to the “fourth generation leaders.” The “fourth generation leaders” who assumed power, although considered fresh and least dogmatic in their outlook, share with their predecessors a professional background and ideological approach to development. All seven outgoing members of the outgoing Politburo Standing Committee headed by President Jiang Zemin were engineers by training. And interestingly enough, all the nine new members of the Committee are engineers by training (See Table 3.2 and 3.3).

It is beyond the scope of this study to delve into factors responsible for the dominance of technocrats in Chinese leadership. The actuality of this striking phenomenon suffices for our purposes. Moreover, technocratic dominance is likely to continue in the next Chinese government. Engineers also dominate China’s provincial leadership, which is considered “the training ground for national leadership”. As of September, 2001, 62.9% had engineering degrees, followed by economics, physics and Chinese with 6.5, 4.8 and 4.8%, respectively.⁴⁶

⁴⁶ Cheng Li, “After Hu, Who?—China’s Provincial Leaders Await Promotion,” *China Leadership Monitor*, No. 1.

Table 3.2: China National Party Leadership: Profile of XVth Standing Politburo Members

Leaders	Academic major / training	Position	Professional experience
Jiang Zemin	Electrical Engineer	PRC President; Chair, CCP & PRC Central Military Commission; Party General Secretary	Automobile plant manager (Moscow); Mayor, Shanghai
Li Peng	Hydro. Engineer, Moscow Power Institute	Chair, National People's Congress	Supervised the construction of various power projects; Ministry of Power Industry, Ministry of Water Resources and Power
Zhu Rongji	Electrical Engineer, Tsinghua University	Premier	Engineer, National Economy Bureau of the State Planning Commission; State Economic Commission; Mayor, Shanghai
Li Ruihuan	Construction Engineer	Chair, Chinese People's Political Consultative Conference	Dean, School of Management, Tsinghua Univ; Mayor, Tianjin
Hu Jintao	Hydraulic engineer, Tsinghua University	PRC Vice President; President, Central Party School; Vice Chairman, Central Military Comm	Ministry of Water Conservancy and Power; Deputy Head, Provincial Construction Commission's; Provincial Party Secretary
Wei Jianxing	Mechanical Engineer	Secretary, Central Discipline Inspection	Aluminum processing, (Moscow, 1950's); Northeast Light Alloys Processing Factory; Mayor, Harbin City (1980s); Minister for Supervision
Li Lanqing	Automobile engineer	Vice Premier	Trained in Russian automobile factories; Ministry of Machine-Building Industry, State Economic Commission, and the Nos 2 and 3 Automobile Factories

Table 3.3: China National Party Leadership: Profile of XVth Standing Politburo Members

Leaders	Academic major / training	Position	Professional experience
Hu Jintao	Hydraulic engineer, Tsinghua University	Party General Secretary; Vice Chair, Central Military Comm.	Ministry of Water Conservancy and Power; Deputy Head, Provincial Construction Commission's; Provincial Party Secretary
Wu Bangguo	Electrical Engineer, Tsinghua University	Vice Premier, State Council	Various key Party positions in the Shanghai Municipal Committee; CCP Politburo Central Committee
Jia Qinglin	Electric Engineer	Member	Ministry of Machine Building Industry; China National Machinery and Equipment Import and Export Corporation; CCP Politburo Central Committee
Huang Ju	Electrical Machinery Engineering, Tsinghua University	Member	Managerial roles in electrical and machinery industries; key Party positions in the Shanghai Municipal Committee; CCP Politburo Central Committee
Li Changchun	Electric machinery Engineer	Party Secretary, Guangdong Provincial Committee	Managerial roles in electrical and machinery industries; key Party positions at the provincial level; CCP Politburo Central Committee
Wen Jiabao	Geologist and Engineer	Vice Premier, State Council	Vice Minister of Geology and Mineral Resources; Director of the Party Central Committee; CCP Politburo Central Committee
Zeng Qinghong	Engineer, Beijing	Member, Party Central	Ministry of Machine

	Institute of Technology	Committee	Building Industry; State Energy Commission; Ministry of Petroleum Industry; CCP Politburo Central Committee
Wu Guanzheng	Engineer, Tsinghua University	Secretary, Central Comm. for Discipline Inspection; Party Sectary, Shandong Provincial Comm.	Managerial roles in electrical and machinery industries; key Party positions at the provincial level; CCP Politburo Central Committee
Luo Gan	Mechanical Engineer, Democratic Republic of Germany	State Councilor; Secretary, Political and legislative Affairs Comm. of the Party Central Committee	Ministry of Machine Building Industry; Minister of Labor; various key positions of the Party Central Committee

Professional revolving door system and closed-door decision making

An important Party policy regarding the tenure of its top leaders is a professional revolving door system by which top provincial leaders are frequently reshuffled to avoid a situation of cadres accumulating excessive influence and power in a region.⁴⁷ Owing to common engineering background of most Chinese leaders the practice of professional revolving system results in certain technocratic bureaucracies such as the Ministry of Machine Building, Ministry of Construction, Ministry of Water Resources, Ministry of Energy becoming influential bases for these leaders to climb the Party's bureaucratic ladder. For example, Table 3.2 and 3.3 show that the VXth and XVIth Politburo Standing Committee members have all served in similar technocratic bureaucracies in their carriers. Arguably this practice feeds the influence of China's Water Industrial Complex: the technocratic bureaucracies become politically more powerful with the association of the party elites. The flip side of this is something students of bureaucratic politics would observe; the party leaders would have a professional bureaucratic bias toward these government agencies.

Party leaders are both decision makers *and* issue framers. The dominance of technocrats in China's leadership, their bureaucratic bias toward construction-related bureaucracies, and the

⁴⁷ Ibid.

fact that important decisions are made behind closed doors combine to bias government water policies in favor of structural solutions.

Propaganda and crisis control

Propaganda is a powerful tool of government. The Party-state-owned (and strictly controlled) media is used to rally support of the masses for national water policies and projects by instigating nationalistic and ideological faith. Promoters of large dams such as Three Gorges, for example, “from the 1950’s to today, have all been masters of political gamesmanship, constantly referring to “Chairman’s Mao’s desire” (*Mao zhuxide xinyuan*) and “Deng Xiaoping’s support and concern” (*Deng Xiaoping zhichi he guanxin*) for the project. By invoking the support of the country’s autocratic leaders, the dam was made virtually unassailable.”⁴⁸ To imprint faith and confidence in these projects, giant placards with large red characters are put up near the construction sites saying “*Yi liu guanli, yi liu zhiliang, yi liu shigong, wenming jianshe*,” or “First Class Management, High-Quality Workmanship, First Class Engineering, First-rate Construction,” and “*Kaifa sanxia, fazhan Changjiang*” or “Build the Three Gorges, Develop the Yangtze.” According to surveys carried out in villages that will be inundated by the dam, it has been found that the official party line is ingrained quite effectively in people’s thinking through official media.⁴⁹

The brutal suppression of the 1989 student demonstrations at the Tiananmen Square was a stark example about the Party’s willingness to “strike hard” against people who threatened its control. Despite the ruthless and unsympathetic government, social taboos (criticism of development projects would be seen as “breaking somebody’s ricebowl”), and strict censorship of media, frequent news of increasing water protests in China makes it apparent that Chinese people are increasingly critical of government mismanagement of water.⁵⁰ Most of these scattered instances of protest are local in nature and are dealt with at the local level. However, “zero tolerance” is shown to criticisms and activities that confront national water policies or

⁴⁸ *The River Dragon Has Come!*, Dai Qing (Ed.) (ME Sharpe, 1998), pp. 13.

⁴⁹ See e.g., Ding Qigang, “What Are the Three Gorges Resettlers Thinking?” and “A Survey of Resettlement in Badong County, Hubei Province” in *ibid*.

⁵⁰ Although scholars have sent warning signals regarding the dangers posed by water problems to the regime’s successful rule, it is hard to see how isolated protests (or cases of dissatisfaction) over specific local issues could translate into changing larger national policies.

projects that are directly undertaken by the central government. During Mao's era, critics of national water projects were called "rightists" and sent to labor reform camps; and now the critics are simply abducted or put behind bars as in the case of those opposing the Three Gorges project. Dai Qing, for example, was imprisoned for 10 months for publishing *Yangtze! Yangtze!*, a book expressing the views of 40 top Chinese scientists who opposed the Three Gorges dam. Similarly, there have been cases of migrant farmers being abducted by authorities for "organizing petitions by communities being resettled to make way for the Three Gorges dam."⁵¹

Water Industry: bureaucratic politics and reform

Water resources development is recognized as of "prime importance among all of the infrastructures of the national economy" in the Ninth Five-Year Plan for National Economic and Social Development and the Long-Range Objectives to the Year 2010. With a \$42 billion dam building industry⁵² and more than 2,500 projects currently under construction,⁵³ China's multi-billion dollar water industry "indicate an ever high period for water construction."⁵⁴ Since 1950, PRC has achieved an astounding 12% annual growth rate in its hydro-power production.⁵⁵ The water industry is likely to continue growing as significant sources of China's hydropower are still untapped and the demand for energy is high in the fastest growing electric power industry in the world.⁵⁶

Three main challenges to sustaining the growth of water industry are profitability, management capacity, and squandering of scarce water. Reform policies of "restructuring water industry" are being undertaken to meet these challenges. Though economic reforms have generally led to the erosion of central control, the water sector remains highly centralized. The present policy of "restructuring water industry" is basically a combination of privatization (albeit with Chinese characteristics) and increase in water price. The main purpose of the "mixed

⁵¹ For some newspaper articles re: treatment of Three Gorges migrants, see, e.g., "Dam Shame: China's Three Gorges Dam," *The Economist* (July 6, 2002); Jasper Becker, "Three Gorges Petitioners 'held by police'," *South China Morning Post*, (March 21, 2001); Wang Yusheng, *Three Gorges Probe: Three Gorges Dam Petitioners Abducted*, Probe International (March 23, 2001); *Arrests, Intimidation Confirm Human Rights Abuses at Three Gorges Dam*, International Rivers Network (March 28, 2001).

⁵² Figure source: James Borton, "Mother of Rivers," *The Washington Times* (September 2, 2002).

⁵³ Ministry of Water Resources, *Reform and Development of Water Sectors in China*.

⁵⁴ *Ibid.*

⁵⁵ *Ibid.*

⁵⁶ See US Department of Energy study online at <http://www.eia.doe.gov/emeu/cabs/china/part3.html>.

ownership” oriented reform is to attract investments from private as well as international sources, and the policy of multi-track water pricing (different water prices to different users) and the general increase in the price level is an economic disincentive for squandering of scarce water resources and to increase the profitability of the industry as a whole. These policies have been adopted mainly to overcome the budgetary shortfalls of this highly subsidized sector. Hence, the “ownership” oriented reform must not be misunderstood for actual ownership and control of the projects and plants, but more for “capital source.”⁵⁷

By law, the Ministry of Water Resources is the main agency responsible for water management in China. Analysts have long identified the Ministry’s bureaucratic self interest (and for corruption prospects) in large projects like the Three Gorges Dam. In reality, the management of China’s water *industry* is split among three ministries—the Ministry of Water Resources, the Ministry of Construction, and the Ministry of Machine-Building Industry—and municipal and provincial government water-resource bureaus. The responsibilities of these three ministries match their names: the Ministry of Water Resources plans for reservoirs and river projects, and allocates water to industry and cities; the Ministry of Construction administers large public works projects; and the Ministry of Machine-Building Industry is charged with partial oversight of the water engineering equipment sector.⁵⁸ The close functional relationship between these ministries and other institutions provides them with a similar interest—promotion and expansion of their activities.

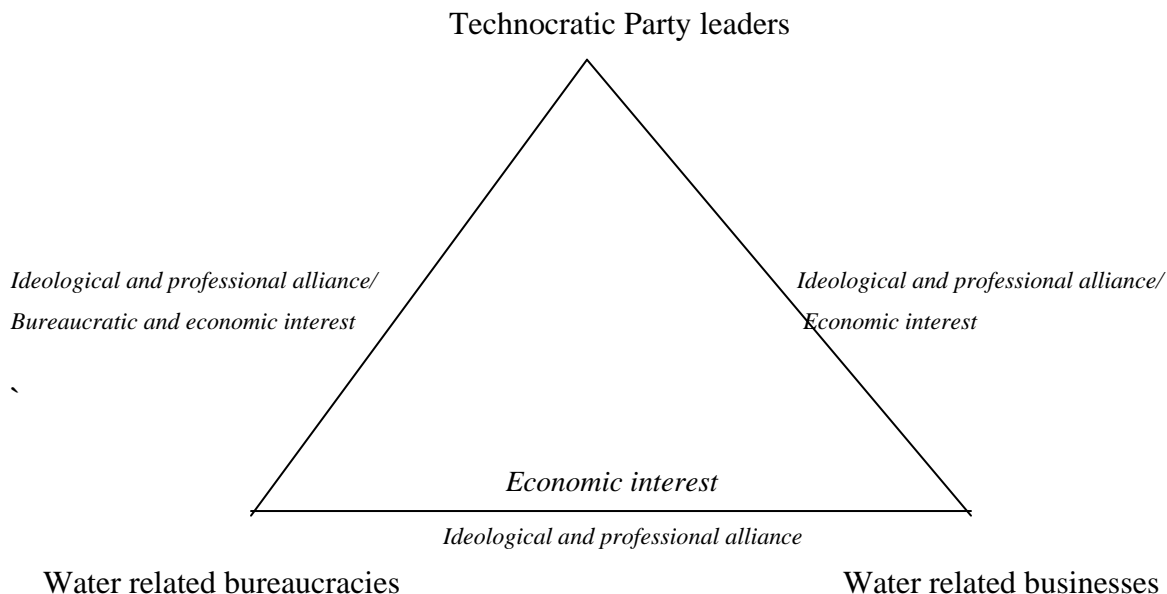
⁵⁷ These reforms will operate under the same overarching conditions of state ownership of natural resources (or water resources) and control over the formulation of laws governing their use. The state also retains essential control over pipelines and holdings. Depending on the size of the projects and holdings, ownership is concentrated under state, provincial, municipal authorities. For example, all major and inter-provincial water projects are under the direct control of state. The “private” entrepreneurs mostly invest in local infrastructure facilities, and are most often local authorities or those with strong “*guanxi*” (political connections). Investments from corporations and international lending institutions would also be encouraged under built-operate-transfer system of contractual infrastructure implementation programs.

⁵⁸ Dylan Tanner, “Opening the Floodgates,” *China Business Review*, Vol. 25, No. 2 (Mar/Apr 1998).

The Concrete Triangle

Like the “Iron Triangle” of US military-industrial complex,⁵⁹ China’s water policy decision-making structure may also be shown in the form of a triangle, the Concrete Triangle (See Fig. 1). One side of the triangle consists of the “technocratic party elites.” A second side of the triangle represents the water related bureaucracies like the Ministry of Water Resources, Ministry of Construction, Ministry of Machine Building Industry. On the third side of the triangle are the water-related businesses, both government and “private,” that profit from water-related construction and services.

Fig. 3.1: The Concrete Triangle



⁵⁹ “The ‘Iron Triangle’ forms the U.S. military establishment’s decision-making structure and includes its major interest groups. One side of the triangle includes the ‘civilian’ agencies that shape U.S. military policy—the Office of the President, the National Security Council, the Senate and House Armed Services Committees, and civilian intelligence agencies like the CIA and NSA. A second side includes the military institutions—the Joint Chiefs of Staff, the top brass of the Air Force, Army, Marines, and Navy, the powerful ‘proconsul’ regional commands, and, in a supporting role, veterans’ organizations like the American Legion and the Veterans of Foreign Wars. At the base of the triangle are the 85,000 private firms that profit from the military contracting system, and that use their sway over millions of defense workers to push for ever-higher military budgets.” See, James M. Cypher, “The Iron Triangle: The New Military Buildup,” *Dollars and Sense* (January/February 2002).

Similar professional and ideological ties connect the three parties. The common interest connecting the water-related businesses to the government bureaucracies and technocratic elites is profit seeking. The water-related bureaucracies and the technocratic elites share a bureaucratic interest in expanding their influences and power. Since the technocratic leaders are the source of WIC's influence and the "fuel" of its expanding size, the existence of the complex will primarily depend on the continued dominance of technocrats in the CCP leadership.

IV. Three Gorges Project: A Case Study for WIC's influence

This is a major event in China's efforts to achieve modernization and also a remarkable feat in the history of the mankind to reshape the nature and exploit natural resources. ... The age-old dream of the Chinese people to develop and utilize the resources of the Three Gorges of the Yangtze River has come closer to becoming true. This proves vividly once again that socialism is superior in being capable of concentrating resources to do big jobs. ... Since the twilight of history, the Chinese nation has been engaged in the great feat of conquering, developing and exploiting the nature. The legends of the mythic bird Jingwei determined to fill the sea with small pebbles and the Foolish Old Man resolved to remove the mountains standing in his way and the tale of the Great Yu who harnessed the great floods are just some of the examples of the ancient Chinese people's indomitable spirit in successfully conquering the nature.

-Jiang Zemin

Speech Marking Yangtze-Damming for Three Gorges Project⁶⁰

Table 4.1: Profile of Three Gorges Project. Adapted from Anderson and Hall, A Reflection on Water, The Ruschilikon Conference on Sustainable Water Management, 2002.

<p>The project</p> <ul style="list-style-type: none"> • Location: Sandouping, Sichuan Province, across Yangtze River • Excavated volume: 102,600,000 m³ of earth and stone • Excavated volume: 102,600,000 m³ of earth and stone • Concrete: 27,200,000 m³ • Reinforcing steel: 354,000 t • Height: 185 m at crest • Length: 2,309 m in three sections: a central spillway section (484 m) with 23 bottom outlets and 22 sluice gates; two power stations to the left and right of the spillway • Capacity: 18,200 MW (equal to 18 nuclear power stations); 26 turbine generators (world's largest hydro power units at 700 MW each) • Schedule: Phase 1 (1994-1997): initial diversion of the Yangtze River; Phase 2 (1998-2003 [projected]): water level rises to 156 m, power generation begins; Phase 3 (2003-2009 [projected]) water level rises to 175 m, full capacity power generation begins. <p>The reservoir</p> <ul style="list-style-type: none"> • Average width: 1.1 km • Length: 600 km • Impounded volume: 39.3 billion m³ • Water level: 175 m above Yangtze River level • Inflow: 451,000,000,000 m³ per year (typical) • Silt: 530,000,000 t per year (typical)

⁶⁰ See the text of the speech online at <http://www.china-embassy.org/eng/6895.html>.

The impact

- Water pollution in the demand portion of the Yangtze will double: the dam traps more than 50 types of pollutants from mines, factories and human settlements that were formerly flushed out to sea by the swift Yangtze currents.
- About 1300 archaeological sites will be moved or flooded.
- The Yangtze's heavy freight of silt will form thick deposits near the upstream end of the reservoir, and may clog important river channels to the city of Chongqing.
- Facing inundation: 632 km², 19 cities, 326 villages, 27,000 ha of farmland and orchard.
- Facing resettlement: 1.1 million to 1.9 million people.

Benefits of the project

The stated purposes of the Three Gorges Project (TGP) are threefold: generation of electricity, flood control, and improved navigation along the river. The Chinese government hopes that the most direct economic benefit of the project will accrue from its energy generation. It estimates that electricity produced by the 18,000 MW dam will generate US\$62 billion a year, which is expected to pay off all loans and interest associated with the project within three years after going into full operation in 2009.⁶¹ The project promises to boost the economy of eastern and central China and the eastern part of southwest Sichuan province by creating millions of jobs.⁶²

Independent energy analysts, however, have a different story to tell:

A 1998 study by the Batelle Memorial Institute (a Washington-based energy policy think-tank), the Beijing Energy Efficiency Center, and China's Research Institute, calculated that power from China's large hydrodams costs about six to seven cents per kilowatt-hour, compared to less than four cents for gas-fired combined cycle plants, four to five cents for new coal plants, and over seven cents for nuclear power, excluding transmission and distribution costs.⁶³ Three Gorges power is expected to be even more expensive, at 8.4 cents per kilo-watt hour.⁶⁴

⁶¹ "Three Gorges Project Seeks Extra Funding", *Xinhua* (March 16, 1999).

⁶² "Three Gorges Project and China's Economy," online at <http://www.china-embassy.org/Cgi-Bin/Press.pl?gorges03>.

⁶³ As footnoted in Patricia Adams & Grainne Ryder, "Three Gorges Dam: A Great Leap Backward For China's Electricity Consumers and Economy", *Probe International* (<http://www.irn.org/programs/threeg/991216.probe.html>): Guo Yuan & Jeff Logan et al., *China's Electric Power Options: An Analysis of Economic and Environmental Costs* (Batelle Memorial Institute, June 1998), p. 82.

⁶⁴ As footnoted in Adams & Ryder: Jeff Logan of the Batelle Memorial Institute calculated the price of three Gorges power based on the following assumptions: a capital cost of \$30 billion or \$1,650 per installed kilowatt, a 9-year construction period, a 12-percent interest rate, a 53-percent capacity factor, and operation and maintenance costs of 0.5 cents per kWh.

But 8.4 cents per kilowatt-hour still isn't the final cost of Three Gorges power as it doesn't include transmission and distribution costs.⁶⁵

In addition, demand for energy generated by the dam is likely to fall short of supply.⁶⁶ “With thousands of state enterprises shutting down, electricity consumption dropped sharply in 1998, and many power plants are running well below capacity.”⁶⁷ There has also been a gradual increase in private production of energy that is expected to be available in abundance and at low prices by the time the dam is completed.

Construction of a mammoth dam like this one, the great wall across Yangtze, provides temporary employment to a large number of people.⁶⁸ Dam-building is an industry in itself in China, employing tens of thousands of skilled, semi-skilled, and unskilled laborers. Critics say one reason why the construction of the TGP was launched is because Gezhouba dam, located 38 km downstreams from TGP in the Yichang city, was nearing completion, and the authorities had to find replacement jobs for workers.⁶⁹ Following this logic, it makes sense that the construction of the Brahmaputra diversion plan (discussed in the next chapter), which would require even more workers, is scheduled to begin shortly after the anticipated completion of the Three Gorges project in 2009.⁷⁰

Flood control is of highest priority to China among water issues,⁷¹ and the dam is regarded “as the most effective and permanent solution” to Yangtze floods.⁷² However, this reasoning also seems flawed. Much of the flood waters in the middle and lower reaches of the Yangtze actually flow from tributaries that join the river below the dam site.⁷³

⁶⁵ Ibid.

⁶⁶ See e.g., *ibid.*; James Kynge, “New Doubts Over Chinese Plant,” *Financial Times* (March 10, 2000), available at <http://www.irm.org/programs/threeg/001009.doubts.html>.

⁶⁷ Adams & Ryder.

⁶⁸ See, charts showing “changes in age structural distribution of the Chinese population in %” and “forecast on the labor resources of China (1981-2000), He Bochuan, *China on the Edge* (China Books & Periodicals, 1991), pp. 10&11.

⁶⁹ See Dai Qing, “Three Gorges Project: A Symbol of Uncontrolled Development in the Late Twentieth Century,” in Qing, Thibodeau, et. al., p. 11-12.

⁷⁰ Mcelroy.

⁷¹ Working Group on Environment in US-China Relations, “An Overview of Chinese Water Issues,” Aaron Frank (Ed.), *China Environment Series* (Woodrow Wilson Center), No. 2 (Summer 1998), p. 46.

⁷² Dai Qing, *Journal of International Affairs*, Vol. 53, Issue 1 (Fall 1999).

⁷³ See e.g., David Goodman, “Damming the Yangzi,” *China Now*, No. 126 (Autumn 1988), p. 15.

The Three Gorges project is also estimated to increase navigation on China's most important waterway by five fold.⁷⁴ An intricate system of ship locks is being built to enable even ocean-going freighters and 10,000-ton towboats to move 1,500 miles inland, thereby bringing prosperity to the people of interior provinces, especially in the new municipality of Chongqing.⁷⁵ However, U.S. engineers who were hosted at the construction site by the president of Three Gorges Development Corporation (TGDC) are highly skeptical, due to engineering defects that include those on the ship lock system.⁷⁶ It is certain that the amount of water downstream from the dam site will decrease and water quality will be altered, irrevocably hampering navigation and other downstream activities like fishing. The government largely ignores social and environmental costs or impacts like the displacement of massive numbers of people, which are the most important objections to the project from a human security point of view.

Externalities

Critics of the dam say that by 2009, the project will have resulted in the displacement of nearly 2 million people, whereas Chinese government sources at present give 1.2 million as a figure.⁷⁷ In either case, it is the largest human relocation effort in world history. The rural population among those resettled loses the most—they get compensated the least, and they will have to move to less fertile hilly surroundings with scarce irrigation facilities. Promises made to them of non-agricultural jobs under the “developmental resettlement” policy are proving to be an illusion as the local industries have hired all the people they need, and worst of all, the bureaucracy seem most indifferent to their grievances.⁷⁸

⁷⁴ “A Dream for Generations to Come True,” *The Three Gorges Project: A brief Introduction*, available online at <http://www.china-embassy.org/Cgi-Bin/Press.pl?105>.

⁷⁵ Formerly a part of Sichuan province, described by the World Bank as the world's largest single metropolitan area with a population of about 43 million, including some six million city residents. See, *Decades Needed to Develop China's Backward West*, *Reuters* (January 5, 2001).

⁷⁶ Leonard S. Sklar & Amy L. Luers, “Report on a Site Visit to the Three Gorges Dam, Yangtze River, Hubei Province, China,” online at <http://www.irn.org/programs/threeg/sklar.html>.

⁷⁷ Compare figures provided by Chinese government sources, “Some Facts About The Three Gorges Project” (<http://www.china-embassy.org/Cgi-Bin/Press.pl?gorges04>) to figures provided by critics of the project, e.g., the International Rivers Network, “Three Gorges Dam Specifications” (<http://irn.org/programs/threeg/991228.3gspecs.html>).

⁷⁸ See e.g., Wu Ming, “Disaster in the Making?: Major Problems Found in the Three Gorges Resettlement Project,” *China Rights Forum* (Spring 1998), pp. 4-9; Wu Ming, “Resettlement Problems of the Three Gorges Dam: A Field Report,” online at <http://www.irn.org/programs/threeg/resettle.html>.

The reservoir will also inundate 136 archaeological sites and cultural relics, and 30,000 hectares of fertile agricultural land. Further it will adversely affect endangered species of fish such as the white fin dolphin.⁷⁹ Scientists are saying the government is overlooking water pollution and siltation problems that could result from the project.⁸⁰ By slowing the flow of its water, the reservoir may become a giant cesspool, storing 265 billion gallons of raw sewage each year.⁸¹ Silt accumulation at the dam will have grave impacts, not just on the dam by jamming sluiceways (thereby making it vulnerable to collapse in a severe flood), but also on the morphology and stability of the alluvial channels downstream in the long run.⁸²

Gleick sums up the “enormous ecological impacts” of the dam:

The fish resources of the Yangtze river are abundant and quite vulnerable. Major changes in fish populations are likely because the dynamics of the river, the chemical and temperature composition of the water, and the character of the natural habitat and food resources available for these fish species will be altered. The dam itself will block migration of fish and spawning grounds for up to 172 different fish species. A number of species will not be able to adapt to the new environment and may suffer a dramatic reduction in numbers. In particular, the project will seriously affect the fish species in the middle reach of the Yangtze River, which is a major breeding area for four rare native fishes. Of special concern are the Chinese sturgeon and Chinese freshwater dolphin, which inhabit only the middle and lower reaches of the Yangtze river. The breeding of sturgeon has already been affected by the Gezhouba Dam, and the Chinese dolphin has been reduced to a few hundred in number. Concern has also been expressed for the Siberian crane, which is endangered and depends on overwintering habitat in the middle and lower Yangtze that will be affected by the dam.⁸³

The decision makers of the Three Gorges Dam

⁷⁹ For a detailed discussion on submergence of these archaeological sites, see, Dai Qing, “The Danger to Historical Relics and Cultural Antiquities In and Around the Three Gorges Area: Interviews with the Director of the National History Museum of China Yu Weichao,” in Qing, Thibodeau, et. al., pp 124-142. Also, see “Letter to Jiang Zemin Concerning Archaeological Sites, August 8, 1996,” Appendix F, in Qing, Thibodeau, et. al., pp. 214-219.

⁸⁰ See e.g., Luna B. Leopold, “Sediment Problems at Three Gorges Dam,” available online at <http://www.irn.org/programs/threeg/leopold.html>.

⁸¹ Jonathan Spence, “A Flood of Troubles,” *The New York Times Magazine* (January 5, 1997), p. 34.

⁸² See, *Ibid.* and Leopold.

⁸³ Peter Gleick, “The Status of Large Dams: The End of an Era?,” Peter H. Gleick, *The World’s Water (1998-1999): The Biennial Report on Freshwater Resources* (Island Press 1998), p. 90.

The controversies surrounding the project led to the withdrawal of financial support by the major international lending organizations, the World Bank, Asian Development Bank, and the U.S. Export-Import Bank.⁸⁴ The project was approved despite all of these unfavorable circumstances and criticisms, mainly due to the direct involvement of key Chinese party leaders.

The first proposal to build a dam at Three Gorges dates back to 1919 when China was led by Sun Yat Sen.⁸⁵ Later, Mao Zedong started envisioning a big dam across the Yangtze. This vision is said to have inspired him to compose a poem. He even suggested that he might resign as chairman of CCP to work on the project.⁸⁶ In March 1958, opposing plans to build a series of small dams on the Yangtze's tributaries in favor of one large dam; Mao officially endorsed the latter project. However, the nation got so preoccupied in the turmoil of the Great Leap Forward (1958-1960), the subsequent three-year famine, and the Cultural Revolution (1966-1976) that the plan was shelved indefinitely.⁸⁷

Next came Deng Xiaoping. In 1980, he inspected the proposed site and two years later, he pledged to proceed with the project. In 1984, specific proposals were drawn up by the newly formed Yangtze Planning Council under the State Council for erection of the dam. However, objections to the project were raised by different sources, including the Chinese People's Political Consultative Conference (CPPCC).⁸⁸ An investigation group was established to prepare a report in 1985 on the impacts of the project. The group concluded that the 1984 proposals were "over-optimistic and unrealistic", and that the project would be a "disaster".⁸⁹ Political opposition to the project did not last long, however. In 1989, the party leaders who opposed the project, including Party General Secretary Zhao Ziyang, lost their positions and the role of red

⁸⁴ The Chinese central government has to come up with most of the money, which is estimated to be anywhere from a staggering US\$24 billion to US\$70 billion. In "Three Gorges Project Seeks Extra Funding," *Xinhua* (March 16, 1999) the total cost is mentioned to have been estimated at 203.9 billion yuan (24.6 billion US \$). Dai Qing says some estimates run up to 72 billion US\$. See, James L. Tyson, "Ardent Foes Takes on China Dam," *Christian Science Monitor*, Vol. 89, No. 243, p. 1.

⁸⁵ The Kuomintang government, under Chiang Keisheik tried to follow up on Sun Yat Sen's proposal in the 1940's. They invited experts from the United States (US) and signed agreements with the US government to jointly design the dam, to be dropped later due to economic crises. See, "Chronology of Three Gorges Project," see, <http://www.china-embassy.org/Cgi-Bin/Press.pl?gorges05>.

⁸⁶ See footnote in Dai Qing, "Three Gorges Project: A Symbol of Uncontrolled Development in the Late Twentieth Century," Qing, Qing, Thibodeau, et. al., p. 13.

⁸⁷ In 1970, work started on the construction of Gezhouba Dam as a part of the Three Gorges Project. Gezhouba Dam is built downstream from Three Gorges site near the city of Yichang. However, China was economically in such shambles by the late 70's that its "red specialists" were unable to carry on with the construction project.

⁸⁸ David Goodman, "Damming the Yangzi", *China Now*, No. 126 (Autumn 1988), pp.13-15.

⁸⁹ Ibid.

specialists like the then-Premier Li Peng became much stronger. With Li's consolidation of power, the project received final approval from the central government in 1992.⁹⁰ Scheduled to be completed by 2009, construction work is now said to be in the last of its three phases.

Li Peng's involvement in the project could provide further insight into China's WIC. Li Peng is considered the "dam's biggest sponsor."⁹¹ Apart from serving on key positions on some of China's most powerful decision-making bodies such as the fifteenth Politburo Standing Committee and State Council (China's cabinet), Li Peng personally heads the Three Gorges Project Construction Committee. Being an electrical engineer, he has a professional bias in favor of technocratic approaches to water issues. His background as minister of power industry and as someone who has basically run China's hydroelectric program provide a further reason to assume his bureaucratic biases. Ideologically, moreover Li seems to equate the TGP with socialism's success. He calls it "a major gift to the party on the occasion of its 16th congress" that demonstrate "the fighting spirit of the Chinese people and the superiority of the socialist system."⁹²

Critics speak of China's power sector as the "fiefdom of the Li Peng family."⁹³ His son Li Xiaopeng is "the number two" at the "State Power Corporation, which owns all the China's power transmission and distribution capacity and 60% of its generating capacity." Li Xiaopeng is also "chairman of the biggest [power generating company], Huaneng Power, which is the only company to have national operations. Mrs [Li] Peng is also a shareholder in the holding company

⁹⁰ "On April 3 of 1992, the Fifth Plenary Session of the Seventh National People's Congress approved a resolution to proceed with the Three Gorges Project, with 1767 deputies for, 177 against, and 664 abstaining. The project was included in the Ten-Year Program for National Economic and Social Development, and the State Council was authorized to carry out the project at an appropriate time." See, Embassy of the People's Republic of China in the United States of America, *Chronology of Three Gorges Dam: November 5, 1997*, online at <http://www.china-embassy.org/eng/6896.html>.

⁹¹ *Dam Politics: How Three Gorges Plays in Beijing*, Global Intelligence Update, Stratfor.com, available online at <http://www.nextcity.com/ProbeInternational/ThreeGorges/newsarchive/may0400.html>.

⁹² Ted Anthony, "Final phase of Three Gorges Dam project begins in central China," *Associated Press* (Wednesday, November 6, 2002). Also available online at http://www.enn.com/news/wire-stories/2002/11/11062002/ap_48887.asp.

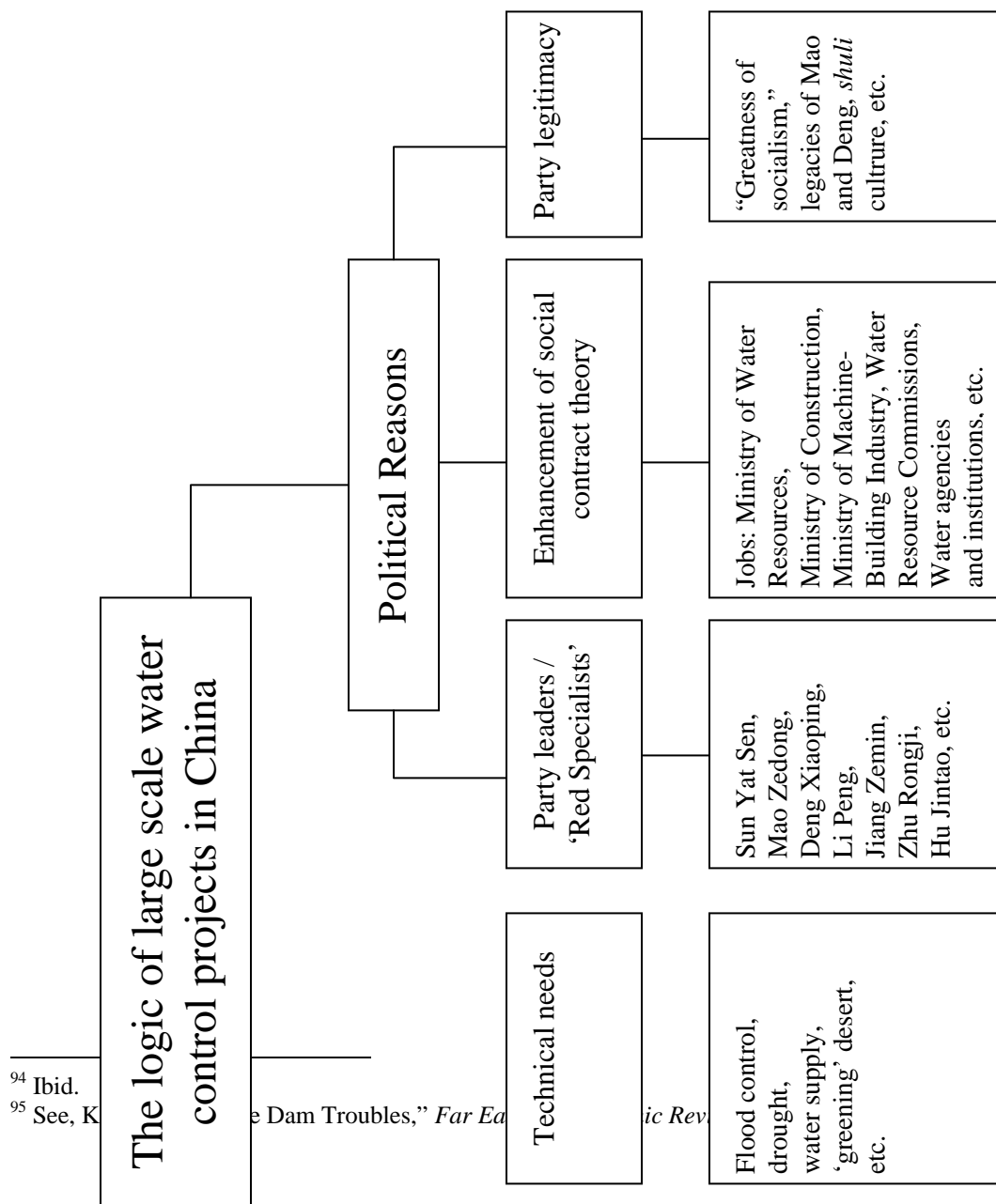
⁹³ Dan Slater, "A monopoly by any other name ... is still a monopoly," *FinanceAsia.com* (March 12, 2002). For more articles on similar topic, see e.g., Antoaneta Bezlova, "China corruption probes signal power plays," *Asia Times* (November 1, 2002); James Irwin, "China: Power Politics," *Three Gorges Probe*, online at <http://www.threegorgesprobe.org/tgp/index.cfm?DSP=content&ContentID=5764>; "The Power Monopoly Breakup," online at <http://www.friedlnet.com/news/02110103.html>; etc.

of Huaneng Power.”⁹⁴ The Three Gorges Dam, with its electric generation potential, no doubt became “Li Peng’s pet project.”⁹⁵

A conceptual framework

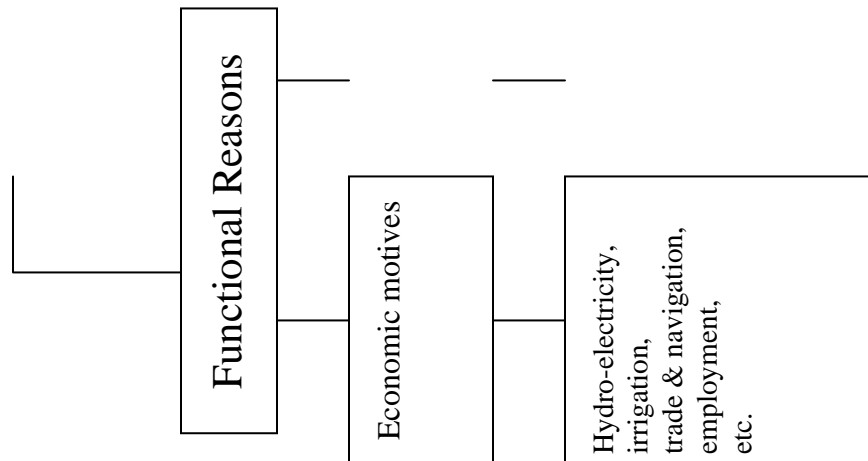
Based on preceding discussions of the TGP, it is possible to construct a framework to understand why the Chinese government is undertaking such a grandiose project. The following diagram presents the simplified framework.

Table 4.2: Framework chart



⁹⁴ Ibid.
⁹⁵ See, K...

...e Dam Troubles,” *Far East Economic Review*...



The logic of large-scale water control projects in China can be grouped under two broad categories—functional reasons and political reasons. Functional reasons include the purposes of these projects, which could be subdivided into two groups—economic motives and technical needs. Economic motives are the direct monetary gains the project is expected to generate. The economic motives of the TGP include an annual expected return of \$62 billion a year and improved trade and navigation along the river. Technical needs are those associated with the practical purpose of the projects, e.g., water transfer, greening desert, and flood control.

Non-technical factors that are strong enough to influence these policies are bound to be deeply political. In the case of Three Gorges Dam, three distinct reasons or rationalizations stand out—involvement of key party elites, strengthening of party legitimacy (such as “supremacy of socialism” and the legacies of Mao and Deng), and enhancement of the social contract theory through job creation. Essentially, these reasons represent the forces of China’s WIC.

The analytical framework provided here does not claim to provide a complete explanation. It has been constructed for analytical purposes to provide one explanation for China’s predilection for large-scale projects. As common sense would suggest, a combination of all these reasons contributes to these outcomes. Although functional reasons are grouped separately from political reasons, every reason is political in nature. Different projects have varying economic or political significance. Three Gorges has a high level of political and ideological importance to China because of the historical involvement of key party leaders as

compared to, for example, the Yangtze Diversion Project (discussed later), which has a stronger technical “supply” reason.

Two elements of China’s WIC make it the most powerful and important factor. Its power comes directly from the involvement of top Party leaders like Li Peng. WIC as the most important factor, according to our framework, comes from the analytic deduction that, *all things being equal*, the bureaucratic and economic interests of China’s water-industrial complex will be strong behind *all* large-scale projects, making it the *only* common denominator behind every large scale project.

V. Implications for National Water Management

Overview

As mentioned earlier, the Ministry of Water Resources boasts of having “more than 2,500 projects currently under construction ... indicat[ing] an ever high[er] period of water construction.” This period represents China’s “political faith” in a technocratic approach to managing water resources. Dai Qing calls this phenomenon uncontrolled development, “a blind faith that engineers and technical fixes can solve all problems,” a “conscious failure by China’s leaders to ... respect and follow ancient [Chinese Daoist] wisdom [of self-restraint].”⁹⁶

Table 5.1: World’s ten leading dam building countries⁹⁷

Country	Number of Dams
China	22,000
United States	6,575
India	4,291
Japan	2,675
Spain	1,196
Canada	793
South Korea	765
Turkey	625
Brazil	594
France	569

Although environmental protection and involvement of local people in water conservation are the stated goals of China’s national water policy, in practice these goals are mostly illusory. The reality is that they are often manipulated by officials to serve the vested interests of the WIC by interpreting “environmental protection” to mean “environmental construction.”⁹⁸ Similarly, “sustainable development” is often interpreted to mean “sustained economic development,” and “integrated water management” as the management of “integrated

⁹⁶ Dai Qing, “The Three Gorges Project: A Symbol of Uncontrolled Development in the Late Twentieth Century,” pp. 3-4.

⁹⁷ The World’s Waters: 2002-2003 (Island Press 1998), p. 297.

⁹⁸ Green washing is a common phenomenon. Planting of trees along canals and reservoirs is a common practice to portray projects as benefiting local environment. There are also rumors that officials in Qinghai province plan to pave the banks of River Machu (Yellow) with concrete to protect it from landslides and other phenomenon. Courtesy: Jhampa Dukdak, personal interview (September 2001).

water industry.” Even more revealing is how the water policy buzzword, “integrated water resources management,” has been adopted to obscure the “top down” nature of projects, making them appear to be “bottom up” approaches so as to dampen criticisms and attract Western economic and technical assistance.⁹⁹ In essence, contemporary Chinese water politics and management practice are captives of the WIC’s rapid economic model.

Before the Chinese Communist Party came to power in 1949, China had only 23 large and medium-scale dams and reservoirs.¹⁰⁰ Fifty-three years later, China has 22,000 of the world’s 45,000 large dams (those more than 15 meters in height). Excluding small farm-scale irrigation dams and mini and micro hydropower units, China has about 85,000 dams and reservoirs, with a total storage capacity of more than 460 billion cubic meters.¹⁰¹ The number of “reservoir resettlers” has been recognized by the Chinese government to be 10.2 million in 1980, although there are other much higher estimates.¹⁰²

In the era of dam decommissioning, where large dams are being decommissioned because of their social, environmental, and economic costs, the WIC of China continues to influence national policy to be one the most active dam building countries in the world with more than 90 dams of over 60 meters in height and 180 dams of all sizes currently under construction.¹⁰³ China also has over a million water diversion projects, about four million pumping projects, and about half a million irrigation and drainage stations with a total installed capacity of above 21 million kw.¹⁰⁴

Most of these projects were built during the 1950’s and 60’s. What is alarming at present is the sheer grandiosity of many of these projects. What follows is a discussion of two water

⁹⁹ Global Water Forum partners with China to facilitate integrated water resources management for the western route of South-North Water Diversion Project. This partnership has been framed within the promotion of a larger program: western development campaign. The choice of the western route is particularly interesting considering the politically sensitive nature of the route as waters will be diverted from ethnically Tibetan regions, and will be most expensive.

¹⁰⁰ See e.g., Shui Fu, “A Profile of Dams in China,” Qing, Thibodeau, et. al., p. 22.

¹⁰¹ Source of figure on the number of dams: The World Commission on Dams, “China,” *Dams and Water: Global Statistics*, available online at <http://www.dams.org/global/china.htm>. Source of figure on the total storage capacity of China’s reservoirs: Zhang Chunyuan, Vice Minister, Ministry of Water Resources, *Sustainable Utilization of Water Resources in China*.

¹⁰² World Commission on Dams, *Dams and Development: A New Framework for Decision-Making*, p. 17.

¹⁰³ Figure source: The World Commission on Dams.

¹⁰⁴ “Sustainable Development of Water Resources in China,” *Sustainable Development of Water Resources in Asia and the Pacific: An Overview*, Economic and Social Commission for Asia and the Pacific (United Nations, 1997), p. 30.

diversion projects (South–North Water Transfer Project and Brahmaputra Diversion Project) that further demonstrate China’s “political faith” in grandiose projects.

South-North Water Transfer Project

“We have to sacrifice so that people in Beijing can drink water.”

“We are moved around like prisoners.”

-People who will be uprooted by the project¹⁰⁵

The most ambitious of China’s plans to meet the growing scarcity of water in its northern cities is the Yangtze Diversion Project which will become the world’s longest and largest water transfer project ever built. First conceived by Mao Zedong more than 50 years ago, China has now decided to push ahead with what’s now called South-North Water Transfer Project (SNWTP). This involves diverting waters from the Yangtze River thousands of kilometers to the thirsty north from three routes: eastern, central, and western.

Map 5.1: South-North Water Diversion Project¹⁰⁶



¹⁰⁵ Erik Eckholm, “Chinese Will Move Waters To Quench Thirst of Cities,” *The New York Times* (Tuesday, August 27, 2002).

¹⁰⁶ Ibid.

The construction of the 1,200-km-long Eastern Route, starting at Jiangsu Province and passing through the provinces of Anhui, Shandong and Hebei to finally supply the Tianjin Municipality, is currently under construction and scheduled to be completed by 2010.¹⁰⁷ At an estimated total cost of US\$7.25 billion (including clean-up costs), the Eastern Route for the SNWTP is considered “the cheapest and easiest” to construct.¹⁰⁸ This leg of SNWTP alone is estimated to divert 17 billion cubic meters (BCM) of water annually.¹⁰⁹ Ironically, the main environmental problems associated with this route have to do with environment clean-up, rather than environmental impact. The various estimate of the clean-up and pollution prevention work along this route range from 35 percent to over 50 percent of the total project.

The Central Route will be slightly longer than the Eastern Route, stretching from the Danjiangkou Reservoir on the Han River in Hubei Province all the way to Beijing. Including the resettlement expenses, the total cost of the route is estimated at around US\$10 billion. After the completion of the two-phase construction, the route will have a flow capacity of 20 BCM of water annually,¹¹⁰ through a 1,241- km-long canal.¹¹¹ Two issues with the Central Route are generally noted: engineering issues, especially siphoning the channel underneath the Yellow River, and the relocation of 250,000 people who will be displaced by the project. Although the displacement of people is considered to be the most controversial issue of the route, considering the fact that the figure is not even a quarter the number that are being displaced by the Three Gorges project, it is doubtful that this issue is going to stop the decision makers from going ahead with the project.

The Western Route from the Tibetan Plateau is going to be the most expensive and difficult of the three routes. Plans are to divert waters from three tributaries of the Yangtze:

¹⁰⁷ “The Channel within Jiangsu Province, up to the border with Shandong, is already basically finished, complete with pumping stations, as is the segment with the North Yellow River to Tianjin.” See, US Embassy in Beijing, *Issues Surrounding China’s South-North Water Transfer Project* (April 2001).

¹⁰⁸ Ibid.

¹⁰⁹ US Embassy in Beijing, “South-North Water Transfer Ready to Start Work,” *Beijing Environment, Science and Technology Update* (November 16, 2001).

¹¹⁰ US Embassy in Beijing, *Issues Surrounding China’s South-North Water Transfer Project*.

¹¹¹ Ministry of Water Resources, People’s Republic of China, *Brief Introduction of the Planning for South-to-North Water Transfers* (1995).

Tongtianhe, Yalong,¹¹² and Daduhe in three phases.¹¹³ (See Fig. 3.3) Work for the Western Route is likely to begin sometime after 2010.

The Ministry of Water Resources estimates the total cost of the Western Route to be at least US\$37 billion. According to U.S. government reports released on April 2001, “China currently has no answers” for the engineering challenges posed by the *Bayan Ha Ri*¹¹⁴ Mountains (Bayankala Mountains) that separate the rivers.¹¹⁵ Furthermore, the elevation of the bed of the Yellow River is higher than that of the corresponding section of the Yangtze by 80-450 meters.¹¹⁶ Currently, plans are to build at least three dams—one on the *Ngagchu* with a height of 175 meters, another on the *Thogthon Chuwo* with a height of 302 meters, and a third on the *Gyarong Ngulchu* with a height of 296 meters. (Currently the world’s tallest dams are Rogun Dam (335 m) and Nurek Dam (300 m), both on Vakhsh River in Tajikistan.) A series of tunnels and aqueducts more than 300 km’s long have been planned through the *Bayan Ha Ri* Mountains. The flow capacity of these tunnels is 20 BCM annually.

Apart from the immense engineering challenges, high costs, and the potentially disastrous ecological consequences of the project and its construction, the Western Route will be accompanied by other problems, such as a short work season, transportation of water through a sub-zero environment, and construction of tunnels and aquifers through high mountains in remote locations and at high altitudes (well above 3000 meters, or 10,000 feet).

Brahmaputra Diversion Project

The Yarlung Tsangpo River is the largest river of Tibet and the highest river in the world with an average altitude of 4,000 meters. It flows eastward in southern Tibet for over 2,000 kilometers and then bends south to enter into India (as the Brahmaputra) and then into

¹¹² The Ertan Dam (240m in height) is also on the *Ngagchu* River. The Ertan Project is claimed to be Asia's largest underground powerhouse and as having one of the world's longest diversion tunnels (1167m in length).

¹¹³ The local Tibetan names for Tongtianhe, Yalong, and Daduhe are Thogthon Chuwo, Ngagchu, and Gyarong Ngulchu, respectively. Courtesy: Thinley Norbu, Steven Marshall, and Tsering Yankey.

¹¹⁴ Bayankala is a Mongolian name. The Tibetan names include *Bayan Ha Ri* and *Bayan Rigyue*. However, the local Tibetans in that region call it *Trala* (krta la). Courtesy: Tsering Yangkey, personal communication (July 14, 2002). It is common to have different names to a single river or mountain range in Tibet due to differences in local dialects and interpretations.

¹¹⁵ US Embassy in Beijing, *Issues Surrounding China's South-North Water Transfer Project*.

¹¹⁶ Ministry of Water Resources, People's Republic of China, *Brief Introduction of the Planning for South-to-North Water Transfers*.

Bangladesh, from where it enters the Bay of Bengal. At the easternmost point of the river in Tibet, the Great Bend, China has planned another big project, “part of a national strategy to divert water from rivers in the south and west to drought-stricken northern areas.”

“The Yarlung Tsangpo gorge is eight times as steep as and three times as large as the Colorado in the Grand Canyon. The river descends over 3,000 meters in approximately 200 km and this constitutes one of the greatest hydropower potentials anywhere in the world.”¹¹⁷ The Great Bend of the Yarlung Tsangpo where the project is being planned is one of the least developed, most pristine areas of the world. Sacred to the local Tibetans, the Bend is believed to be the “home to the Goddess Dorjee Pagmo, ‘The Diamond Sow,’ Buddha’s consort.”¹¹⁸ The Tsangpo project includes building the world’s biggest hydroelectric plant with the world’s biggest dam that would generate twice the electricity produced by Three Gorges. A planned 40,000 MW hydroelectric plant at The Great Bend of Yarlung Tsangpo would dwarf the potential of even the largest power stations in operation today. The waters of the Tsangpo will then be diverted thousands of kilometers across the Tibetan Plateau to the northwestern provinces of Xinjiang and Gansu. Plans also include use of “peaceful nuclear explosions” to blast a tunnel more than 16 kilometers in length through the Himalayas. The construction of this multi-billion dollar project is tentatively scheduled to begin in 2009, the year the Three Gorges Dam is scheduled for completion.

This project represents a direct threat to the water security of people living downstream in India and Bangladesh. As the controversial July 2000 breach of a natural dam in Tibet indicated—it led to floods and left over a hundred people dead or missing in Arunachal Pradesh, India—people downstream are extremely vulnerable to what goes on upstream in Tibet.¹¹⁹ Precipitation in the region is “too much” (80 percent) during the four monsoon months (between June to September), and “too little” (20 percent) for the remaining eight months.¹²⁰ China will withhold water for power generation and irrigation during the dry season, but would be

¹¹⁷ Tibetan Government-in-exile, *Tibet 2000: Environment and Development Issues*, p. 29

¹¹⁸ Peter Heller, “Liquid Thunder,” *Outside* (July 2002), p. 85.

¹¹⁹ See, “Breach in Tibet Dam Caused Arunachal Floods,” *Times of India* (July 8, 2000); “India Blames Flash Floods on Chinese Dam,” *Agence France Presse* (July 10, 2000); “Arunachal floods—dam breach in Tibet, China ‘hushed’ it up,” *Indian Express* (July 10, 2000).

¹²⁰ Suresh R. Chalise, “Water Resource Management in the Hindukush Himalaya: An Overview,” *Waters of Life: Proceedings of the Regional Workshop on the Local Water Harvesting for Mountain Households in the Hindu Kush-Himalayas* (International Center for Integrated Mountain Development, 1999).

compelled to release water during the flood season. Diversion of large quantities of water to China's northwest would be even more devastating for farmers and fishermen downstream.

There are equally catastrophic ecological implications of this project. The reservoir for a dam with a capacity of 40,000 MW would create a huge artificial lake, several hundred kilometers long, inundating vast areas of virgin forests and numerous unrecorded species of flora and fauna. The Tsangpo gorge area is said to be home to more than 60 percent of the biological resources on the Tibetan Plateau. Similarly, there would be irreparable damage to Tsangpo's 126 fish species, and to the thousands of other aquatic life forms that it supports, especially at the delta.¹²¹ Farmers would also be affected as much of the nutrient-rich sediment would be deposited at the reservoir rather than downstream. The potential use of nuclear devices to create tunnels for the project raises further serious concerns about the environmental impact of such a project on the local region and those living downstream.

¹²¹ See, Carmen Revenga, Siobhan Murray, Janet Abramovitz, and Allen Mahmond, *Watersheds of the World: Ecological Value and Vulnerability*, (World Resources Institute and Worldwatch Institute 1998), pp: 2-81, 2-92, 2-97, and 2-104.

VI. Mekong: A Case Study of Regional Implications

A Regional Overview

The Mekong flows through almost all the countries in mainland Southeast Asia. From its source in the snow-covered mountains of the eastern Tibetan Plateau, it runs over 2,610 miles south, flowing across Yunnan Province in China, forming the border between Burma¹²² and Laos and much of the border between Laos and Thailand, then flowing across Cambodia and finally into southern Vietnam, where it forms a delta to enter the South China Sea.

Map: 6.1: Mekong¹²³



¹²² “Burma” is used (instead of “Myanmar”) in accordance with the Burmese National League for Democracy, the United States Government and many other countries, and leading publications including *The Far Eastern Economic Review*, *The Bangkok Post*, *The Washington Post*.

¹²³ Map from “River of controversy,” *Asia Times* (August 9, 2002). “Tibet” as depicted in the map refers to “Tibet Autonomous Region,” not traditional Tibet.

Table 6.1: Mekong Country Profile. Sources: *World Bank, World Development Indicators: 2001, **The World's Water: 2002-2003

	China	Burma	Thailand	Laos	Cambodia	Vietnam
GDP (current US\$)*	1.1 <i>trillion</i>	...	114 billion	1.7 billion	3.3 billion	32.9 billion
GDP growth (annual %)*	7	...	2	5	5	6
Population*	1.27 <i>billion</i>	48.3 million	61.2 million	5.4 million	12.2 million	79.5 million
Freshwater availability (km ³ /yr)**	2829.6	1045.6	409.9	331.6	476.1	891.2
Fraction of population w/ access to Drinking water (%)**	75	68	80	90	30	56
Fraction of population w/ access to sanitation (%)**	38	46	96	46	18	73
No of large dams**	22,000	5	204	1	2	3

The Mekong is the main river of the region and the twelfth longest river in the world. Though it is considered one of the least exploited rivers of the world, recent developments in the five riparian countries' economies and politics and the region's increasing demand for energy are bound to change this picture. The region's inadequate infrastructure and lack of domestic resource mobilization caused by low per capita income create impediments to trade and cooperation.¹²⁴ But regional and global trade has been improving since the transition of Vietnam and China's centrally-planned, inward-looking economies to more market-based, open economies.

Development organizations and institutions of all kinds are involved in development work of some sort or other in the region.¹²⁵ Greater Mekong Sub-region (GMS) Economic Cooperation Program, e.g, initiated in 1992, by the riparian states with the assistance of the

¹²⁴ Yuzo Akatsuka, Takashi Asaeda, "Econo-political Environment of the Mekong Basin," in K. Biswas, Tsuyoshi Hashimoto (Eds), *Asian International Rivers* (Oxford University Press, 1996), p. 180.

¹²⁵ International governmental organizations include United Nations Development Program, United Nations Environmental Program. Governmental agencies include riparian countries' governmental ministries as well as non-riparian states, e.g. Denmark, Australia, Finland, Japan, Germany, Canada. Multilateral lenders like World Bank and Asian Development Bank are also deeply involved along with hundreds of NGO's.

Asian Development Bank (ADB) promotes development of the six participating countries (China participates on behalf of Yunnan Province) by helping to strengthen economic linkages among them. Similarly, large-scale infrastructural changes are taking place through programs like the GMS infrastructure development initiative funded by ADB.¹²⁶ In the last ten years, more than 100 large dams have been proposed on the river¹²⁷ as Western companies and donor countries are vying for contracts to build dams on the Mekong.¹²⁸

Riparian Cooperation for a Developmental Framework

The common interest of the riparian states is further economic integration with the river Mekong as their "common spring board" to promote economic development. So far there are six (five, if the Mekong Committee, which has "evolved" into the Mekong Commission, is not counted) multilateral frameworks through which various projects are planned and carried out.¹²⁹ These are the Mekong Committee, the Mekong River Commission, Golden Quadrangle, Forum for Comprehensive Development in Indo-China, Mekong Basin Development Program, and ASEAN-Mekong Basin Development Cooperation. These international frameworks for the Mekong region are unfortunately uncoordinated, overlapping, and driven mostly by economic and political rather than environmental interests.¹³⁰ The challenge has been the promotion of developmental framework based on sustainable and equitable practices, primarily among the six riparian states.

Among the six multilateral frameworks, the Agreement on Cooperation for the Sustainable Development of the Mekong River Basin¹³¹ signed by the four lower riparian states in 1995 could be considered the most ideal framework to meet the challenge. The agreement led to the "evolution" of Mekong Committee to Mekong River Commission. The agreement seeks

¹²⁶ See, Asia Research Center, Murdoch University, Australia, "The Mekong Basin: an International Concern," *Asiaview*, online at <http://www.warc.murdoch.edu.au/arc/asiaview/april97/press.htm#hadiz>.

¹²⁷ "Mekong Currents," International Rivers Network, online at <http://irn.org/programs/mekong/>.

¹²⁸ See, e.g., "Mekong Gold Rush: Development Alliances 1996," *Towards Ecological Recovery & Regional Alliances (TERRA), Watershed* (July-October 1996), Vol. 2, No. 1; Probe International, "Asian Development Bank Bulldozes Ahead with Mekong Dams," *Probe Alert*, online at <http://www.nextcity.com/ProbeInternational/pa97june.htm>.

¹²⁹ Donald E. Weatherbee, "Cooperation and Conflict in the Mekong River Basin," *Studies in Conflict and Terrorism* (April-June 1997), Vol. 20, No. 2.

¹³⁰ *Ibid.*

¹³¹ A complete text of the Agreement is available online at <http://www.mrcmekong.org/pdf/agree95.pdf>.

to promote “sustainable development in the utilization, management and conservation of the water and related resources of the Mekong river basin, such as navigation, flood control, fisheries, agriculture, hydropower and environmental protection.”¹³² Unfortunately, the policy outcomes of MRC have been far short of the goals it set, one reason being China’s non-participation.¹³³

China’s developmental calculus

States do not join international arrangements solely on the basis of their importance, but after a careful analysis of the costs and benefits of cooperation. Unlike the GMS Program, the MRC is not an economic agreement initiated by an international development bank but by states to promote regional “equitable and sustainable development.” Since headwaters of the Mekong are in Chinese controlled territories and the lower riparian states are economically and militarily weaker, China sees little to gain by joining the lower riparians in regional development when it weighs the cost in limitations on its “territorial sovereignty.” The absence of any apparent environmental and strategic threat thus is an important factor in China’s position of non-cooperation.

China’s policy is basically applying the infamous Harmon Doctrine: that the riparian states have exclusive sovereign rights over the waters flowing through their territory.¹³⁴ China continues to proceed with its plans to build a series of dams in Yunnan Province, that could potentially jeopardize the hydrology of Mekong River. On the contrary, China maintains that these dams will improve the hydrology of the river by evening out its flow—decreasing flow during flood season and increasing flow during the dry season. Even if the Complex were able to build a series of efficient dams, its slated downstream benefits are highly doubtful as the overwhelming amount of precipitation during the wet season (one of the wettest regions on Earth) would force them to release the water.

Mekong Cascade of Dams

¹³² Mekong River Commission, *Mekong River Commission Annual Report: 2000*, p. 2.

¹³³ For an analysis of policy outcomes of the Mekong River Commission, see Tashi Tsering, “Mekong: Managing a Transboundary River,” *Tibet: Current Environment and Development Issues* (CD Rom), Tibet Justice Center.

¹³⁴ The Harmon doctrine was put forward by the US Attorney General Harmon in 1896 in connection with the controversy between the United States and Mexico over the use of the waters of the river Rio Grande.

The Chinese government has planned a serial of 14 dams on the Mekong River to develop its hydroelectric potential. All of them will be built in Yunnan province.¹³⁵ Compared to the Tennessee Valley Authority dam system in the United States, the Mekong dams would be 12 times higher in terms of elevation and 13 times greater in total installed capacity.¹³⁶ Of the 14 dams, Manwan Dam has already been completed. Two are under construction—Dachaoshan Dam, which began construction 1996, is scheduled to be completed in 2003, and construction of Xiaowan was slated to begin in 2002 and to be completed by 2013. The remaining are expected to begin sometime after 2010.

Table 6.2: Mekong Cascade Dam Profile. Source: Plinston and Daming, 2000.

Dam	Construction time (Construction period)	Installed Capacity (MW)	Dam Height (meters)	No. of people to be relocated
Liutonsiang	6 years	550		
Jiabi	6	430		
WunengLong	7	800		
Tuoba	9	164		
Huangdeng	9	186		
Tiemenkan	9	178		
Gonguoqiao	7	750	130	4,596
Xiaowan	Jan 2002 - 2013	4,200	284.5	28,748
Manwan	8 (completed in 1996)	1,500	132	3,042
Dachaoshan	7 (Completion prd: 2003)	1,350	120.5	5,200
Nuozhadu	12	5,000	260.5	14,800
Jinghong	8	1,350	118	1,700
Ganlanba	4	150		58
Mengsong	6	600		230

Regional Implications of Mekong Cascade of Dams

The Mekong River directly affects the lives of more than 50 million people in six countries, who depend on it for agriculture, fish, water, tourism, and other social, economic and cultural activities. “About 90% of the riparian population are engaged in agriculture (principally rice cultivation) and it is now widely recognized that wild freshwater fishes from the Mekong and its tributaries are the single most important source of animal protein in the diet.”¹³⁷

¹³⁵ These include at least 4 dams—Liutongsiang, Jiabi, Wunenglong, and Tuoba—in the so-called Dechen (Chinese *Deqin*) Autonomous Prefecture, a traditionally Tibetan region.¹³⁵

¹³⁶ Hiroshi Hori, *The Mekong: Environment and Development* (United Nations University Press, 2000), p. 202.

¹³⁷ David Blake, “Proposed Mekong Dam Scheme in China Threatens Millions in Downstream Countries,” *World Rivers Review*, International Rivers Network (June 2001), p. 4.

The construction of these dams will significantly reduce the amount of silt flow, adversely affecting farming downstream. The Mekong River is the third most biodiverse in ichthyofauna (fish) with about 1,000 known species of fish.¹³⁸ The Mekong Cascades (for that matter any dam) will adversely affect the fish population in two ways: disruption of migrations and impoundment effects.

Impoundment has an impact on water quality, as water held back behind a dam is de-oxygenated, cooler and deprived of sediment compared with free-flowing water. There is thus a change in water quality for some distance below a large dam. Moreover, impoundments hold back water during the wet season and release it during the dry season. While farmers wanting irrigation water may welcome such a feature, fish that are seasonally adapted to changed water flows, and whose migrations are partly triggered by natural regimes, are likely to suffer from such effects.¹³⁹

The Mekong River Commission reports that the “overall” impacts of the Manwan, Dachaoshan and Jinghong dams will be negligible. Perhaps so “overall,” but even just hydrologically speaking, the construction of other dams is expected to have major impacts on the downstream discharge. Xiaowan Dam will have about 20 times the active storage of Manwan and Dachaoshan combined.¹⁴⁰ Thus, major changes in the downstream hydrography are bound to occur. And “[w]hen Nuoshadu is added to the system the mean dry season discharge near the Yunnan-Laos border is estimated to total 1,869m³/sec, an increase of 1,180m³/sec or 171 percent.”¹⁴¹ In addition, official figures show that the construction of these dams will result in displacement of more than 68,000 people and inundation of approximately 25,000 acres of land.¹⁴²

¹³⁸ Philip Hirsch, “Mekong Fisheries: A Hidden Resource,” *Geodate*, Vol. 11, Issue 4 (September 1998).

¹³⁹ Ibid.

¹⁴⁰ David Plinston & He Daming, “Water Resources and Hydropower in the Lancang River Basin,” *Policies and Strategies for Sustainable Development of the Lancang River Basin* (Landcare Research New Zealand Ltd. May 2000), pp. 241.

¹⁴¹ E.C. Chapman & He Daming, *Downstream implications of China’s Dams on the Lincang Jiang and their Potential Significance for Greater Regional Cooperation, Basin Wide*, available online at <http://asia.anu.edu.au/mekong/dams.html>.

¹⁴² As cited in Plinston & Daming (p. 242): Department of Strategy and Planning, State Power Corporation of China. The total area inundated figure is given as 149,564 mu’s, which is converted into acres by multiplying by 0.165 as 1 mu is 1/6th of an acre.

In the developmental calculus of China's Water-industrial complex, the economic motives of electricity generation from the series of dams are far more important than the regional environmental and social implications. Arguably, it is the same developmental strategies that China does cooperate in important regional (MRC) and global (China is also of the only three countries which voted against 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses¹⁴³) agreements.

¹⁴³ Text of the agreement is available online at <http://www.un.org/law/ilc/texts/nonnav.htm>.

VII. Towards Humane Water Development

This thesis identified the dominance and self-interested behavior of China's water-industrial complex in national water politics. From a political-economic point of view, this Complex is responsible for China's paradigmatic faith in the effectiveness of engineering approaches to water management, specifically through large-scale water development projects. And as the last three chapters elucidated, social and environmental costs of water development, the two most important costs from a human-interest perspective, are externalized by contemporary Chinese water management practices.

These practices in Chinese water politics raise many human interest questions. Which principles and practices would ensure that water management serves the human interest? What legal and institutional arrangements are required to protect human interests from powerful sectors and alliances that hijack water policy to serve their interests? What is the human-interest approach's prognosis for Chinese water crisis? These are questions that need vigorous debate. Currently, there is a dearth of scholarly studies that deal with water management from the human interest theoretical framework. In this concluding chapter, I articulate policy priorities of a human-interest approach to water management. Recognizing public involvement in water governance as a practical way to ensure the human interest, it sets certain minimum standards for ensuring effective public participation.

Policy priorities

Water is a finite resource, the same amount of which has been available throughout time. Its existence in a particular form in a particular region should be respected as a permanent feature of the landscape, along with the people and the natural environment; and it is therefore the needs of people and nature that must be given precedence. This is also the only way in which the interests and entitlements of both present and future generations can be preserved.¹⁴⁴

- Mikhail Gorbachev, Sir Ketumile Masire, Ingvar Gosta Carlsson, and Fidel V. Ramos (National Sovereignty and International Watercourses Panel, World Commission on Water for the 21st Century).

From a human-interest approach to water policy, the guiding principle must uphold the fundamental sovereignty of people in harmony with nature.¹⁴⁵ Within this principle, the two

¹⁴⁴ *National Sovereignty and International Water Courses* (Green Cross International, 2000), p. 9.

¹⁴⁵ See, *ibid.*

most sacred policy priorities must be achieving adequate supply of safe water to ensure a decent standard of living for all people¹⁴⁶ and to ensure preservation and natural regeneration of the environment. Allocation of water for commercial, industrial, energy, and other developmental purposes should be secondary in the hierarchy of policy priorities to these goals. The political objective of water development must be to foster equity, social justice, and integrity of nature.¹⁴⁷

The following chart (Table 7.1, see next page) shows how many aspects of the two development approaches are contradictory in many ways, and how their practices could lead to different implications.

¹⁴⁶ This primary policy goal is as per the Universal Declaration of Human Rights. See article 25

¹⁴⁷ See, Gurtov, for "Values, Methods, Measurements, Objectives" of "Global Humanist" approach to global politics, pp. 77-110.

Table 7.1 Water-industrial Complex compared with human interest approach

	Current practices of WIC	Human interest approach
<i>Goal</i>	<ul style="list-style-type: none"> • National economic growth 	<ul style="list-style-type: none"> • Sustainable human development
<i>Interests served</i>	<ul style="list-style-type: none"> • Ideological, bureaucratic, and economic interests of WIC 	<ul style="list-style-type: none"> • People and the environment
<i>Values upheld</i>	<ul style="list-style-type: none"> • Sovereignty of state • "Superiority of socialism to do big jobs" • "Control of nature" 	<ul style="list-style-type: none"> • Sovereignty of people in harmony with nature • Human capacity • Ecological integrity
<i>Developmental approach</i>	<ul style="list-style-type: none"> • Follow Western models of industrial and economic development • Backwardness of traditional societies ("national minorities") • "Political faith" in the effectiveness of physical projects to water management • Preference for modern technology to water management 	<ul style="list-style-type: none"> • Create "new order" due to unsustainability of Western industrial development model • Respect for local and indigenous cultures and livelihoods • Multi-disciplinary/diversity of approaches • Preference for local ingenuity and appropriate technology in water management
<i>Policy making and practice</i>	<ul style="list-style-type: none"> • Closed door decision-making • Top-down process • Zero-sum management • Use of force • Use of propaganda 	<ul style="list-style-type: none"> • Transparent and participatory • Bottom-up (with state support) • Win-win situation for all • Voluntary and cooperative • Debate and education
<i>Implications</i>		
Economic	<ul style="list-style-type: none"> • GDP growth • Large investment • Temporary jobs through construction projects • Benefit richer segments of society 	<ul style="list-style-type: none"> • Sustainable development • Inexpensive technologies • Permanent jobs, traditional livelihood • Focus on empowering poorer segments of society
Social	<ul style="list-style-type: none"> • "Reservoir resettlers" • Unrests and protests 	<ul style="list-style-type: none"> • Community development • Social cohesion
Environmental	<ul style="list-style-type: none"> • "Transform nature" • Habitat destruction • Flood control 	<ul style="list-style-type: none"> • Natural integrity • Habitat conservation • Normal flood occurrences
Political	<ul style="list-style-type: none"> • Totalitarian practice • Perpetuation of inequalities to resources and power 	<ul style="list-style-type: none"> • Democratic practice • Social justice
International diplomacy	<ul style="list-style-type: none"> • Principle of Harmon doctrine • "Us v/s them" territorial sovereignty of states (conflict) • Unilateralism • Zero-sum hydro-political dynamics 	<ul style="list-style-type: none"> • Principle of <i>res communis</i> • Common sovereignty of people in harmony with nature (cooperation) • Multilateralism • Non-zero-sum hydro-political dynamics

Humane water management: operationalization and problems

Human-interest approaches take a broad and integrated approach to understanding development. Individuals and organizations from around the world, concerned about human development, are developing various alternative indicators to measure "water well-being."¹⁴⁸ Alternatives to traditional supply-demand water indicators include, for example, "water availability, access to clean and safe sanitation, the time and effort required to collect domestic water, cost and price, quality, vulnerability of water systems to climate change."¹⁴⁹ Stockholm Environment Institute's "Water Resources Vulnerability Index," for example, uses indices such as "coping capacity," "use-to-resource ratio," and "reliability."¹⁵⁰ The "Falkenmark Water Stress Index," and the International Water Management Institute's "Indicator of Relative Water Scarcity" are two other examples of such efforts.¹⁵¹ Similarly, to encourage meeting basic human needs for water as a top policy priority, Gleick developed an indicator of "basic water requirement" of 50 liters per day per person for drinking, cooking, bathing, and sanitation and hygiene. Shifting the water debate from its current focus on measuring supply and demand to measuring the social aspects of water use and water needs are classic examples of the human-interest approach.

There are numerous technical and political problems in operationalizing this alternative approach to water development. Technical problems include lack of specificity and parsimony, lack of innovative technical studies, and lack of data. Political problems include sovereignty of natural boundaries (integrity of watersheds, etc.) rather than political units, de-emphasis on bureaucratic and technological approaches to water management, labels of "anti-capitalism" or "anti-globalization" for advocating local control and management of resources, and "excessive idealism" considering real-world politics. These problems mainly revolve around the larger

¹⁴⁸ See an excellent paper on the global efforts and methodological problems on "Measuring Water Well-Being: Water Indicators and Indices" by Peter H. Gleick, Elizabeth L. Chalecki, and Arlene Wong, *The World's Water: 2002-2003*, pp. 87-112.

¹⁴⁹ *Ibid.*, p. 87.

¹⁵⁰ "The Use-to-Resource Ratio Sub-index measures the average water related stress that both ecological and socio-economic systems place on a country's usable resources. The Coping Capacity Sub-index measures the economic and institutional ability of countries to endure water-related stresses. The three indicators [Storage-to-Flow Indicator, Co-efficient of Variation of Precipitation Indicator, and Import Dependence Indicator] that make up the reliability Sub-index all examine different aspects of uncertainty of water supply." *Ibid.*, 105.

¹⁵¹ See *ibid* for a comparative discussion of these indices.

failure of human-interest advocates' "thus far to propose a coherent world or national policy agenda to effect the transition 'from here to there.'"¹⁵²

Local governance for humane water development

As the Chinese cases prove, centrally-funded engineering and centrally-administered technological regulation are ill-equipped to address social and environmental issues of water development. Countries like Brazil and Mexico have adopted decentralized models from formerly centralized models of water management with the assumption that local participation will render decisions that are fair to all parties, leading to an overall effective management. The increasing numbers of empirical cases that support this assumption are promising indicators that resource governance *can* shift from "here to there." Other examples of the value of local-level control include proliferation of watershed initiatives in Northwestern parts of United States and local forest management initiatives in South and South-East Asia.¹⁵³

In this regard, one of the positive developments in Chinese water policy (and there are many¹⁵⁴) is the adoption of the principle of "integrated water resources management." This concept has become a water policy buzzword—most authoritative "guidelines for sustainable water development" prescribes this principle, and almost all of them identify participation of stakeholders as a key aspect of the principle. International water development organizations like Global Water Partnership, for example, has now committed to China in facilitating this principle, specifically in eliciting local participation in the construction of South-to-North Water Diversion Project's western route.

Given the centralized, bureaucratic nature of governance in China, and the government's record for "strike hard" campaigns against its policy critics, the level of free and fair local participation is highly doubtful. Therefore, mere provisions for participation are not enough. In the human-interest tradition of prognosis, a structural approach is necessary to ensure effective community participation. In order for socio-political processes to operate smoothly, suitable institutional frameworks must exist or be created. These institutional frameworks must be de-

¹⁵² Gurtov, p. 93.

¹⁵³ See, Marcus Colchester, "Sustaining the Forests: The Community-based Approach in South and South-East Asia," *Development and Change*, Vol. 25 (1994), pp. 69-100.

¹⁵⁴ Baruch Boxer discusses some of these changes in *Water International*, Vol. 26, No. 3 (September 2001), p. 335-341.

centralized in nature and offer three minimum guarantees: open, inclusive and participatory processes of water policy making (agenda setting and decision making), implementation and management; public access to information; and access to judicial remedy. The first minimum standard ensures democratic public involvement in all aspects of water management. The second minimum standard ensures complete availability of information to the public to ensure informed decisions. The last standard gives individuals and groups the ability to seek legal recourse when public authorities or businesses inhibit their well-being. These principles or minimum standards are the subject of an important international environment agreement—the Aarhus Convention, or the Convention on Access to Information, Public Participation in Decision-making, and Access to Justice in Environmental Matters—signed by 35 countries and the European Union in 1998.¹⁵⁵

There is tremendous attention that is being given to institutional and technical aspects of China's water problems.¹⁵⁶ This thesis maintains that a fundamental aspect of China's water crisis has to do with the crisis of governance. Although incremental steps are being taken in reforming this aspect as well, from a critical human-interest perspective, Chinese water politics will remain unacceptable to people as long as there are no decentralized institutional frameworks to ensure effective local participation in water governance.

¹⁵⁵ A complete text of the agreement is available online at <http://www.unece.org/env/pp/documents/cep43e.pdf>.

¹⁵⁶ See, for example, the discussions of Working Group on Environment in U.S.-China Relations (between Chinese and American scholars and policy makers) at the Woodrow Wilson Center: See, Aaron Frank, "Solving China's Environmental Problems: Policy Options from the Working Group on Environment in U.S.-China Relations," *Environmental Change Security Project Report 4*, (Spring 1998), or works of Western scholars like Baruch Boxer, *China's Water Management Options: Issues and Alternatives* (March, 1999), available online at http://www.lanl.gov/chinawater/documents/chwmoia_full.pdf; etc.

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