

FROM LAWS TO LEVEES

Methods of water control in the Qing Dynasty

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This article examines the governmental and social structures that supervised and ultimately failed to maintain the large and complex infrastructure of waterworks projects during the Qing dynasty. Water management has both historical and practical importance in China, as regime legitimacy was partially tied to ensuring the people's safety from natural disasters, like floods, and rivers were also vital for irrigation and transportation. With countless numbers of dikes, dams, and canals to maintain, the central and local governments, as well as local subjects, shared responsibility in a number of innovative ways, including democratic selection of managers in Shanghai County. Some systems worked, but in many others, conflicts between local and national interests and between public and self-interest arose, and weak central supervisory powers led to endemic corruption. As similar problems appear to exist in China today, this article will examine overarching themes of conflict of interest, bureaucratic inefficiency, and corruption, and the difficulties inherent in managing water as a public good for lessons in the past that can inform the present.

In 1917, James Fairgrieve described China as “The Land of Rivers,” not only because of the powerful forces that its many waterways have exerted on the physical environment, but also because of their impact on China’s history.¹ The great basins of the Yellow and Yangzi Rivers in particular were two of the primary cradles of civilization in East Asia, but they have also repeatedly unleashed destructive floods that led to ruined harvests and loss of life. It is no wonder that the founder of the putative Xia dynasty, Yu the Great, is enshrined in classical canon for his mastery of flood prevention. Reigning in the awesome power of these mighty rivers and exploiting them for transportation and irrigation were vital to perpetuating and maintaining the legitimacy of any dynasty or government.

While the central government was very involved in both large and small waterworks projects, from the outset of the Qing dynasty local areas had relative autonomy. Even local gentry sometimes played a major role in organizing and financing dike repairs for their communities,² and in some places, large landowners clashed with officials over private dike construction for illegal land reclamation.³ As would be

¹ Ch’ao-Ting Chi, *Key Economic Areas in Chinese History. As Revealed in the Development of Public Works for Water-Control* (New York: A.M. Kelley Publishers, 1936; repr., 1970), 28.

² Mark Elvin, *Another History: Essays on China from a European Perspective* (Honolulu: University of Hawaii Press, 1996), 128.

³ Peter Perdue, “Water Control in the Dongting Lake Region During the Ming and Qing Periods,” *The Journal of Asian Studies* 41, no. 4 (1982): 756.

expected in a country of China's size, there was a great degree of vibrancy in the social institutions created to build and maintain water-control projects, with the central government representing only one role in the cast of players.

When evaluating a system as complex and integral as waterworks administration, it is important to consider the interplay between central policies and local execution. Reigning in local autonomy and considering regional characteristics, moral exhortations and corruption, and constraining rational self-interest and maintaining uniform standards are all challenges that illustrate the central-local dynamic present both in the Qing dynasty and today. This article will seek to examine both central and local methods of waterworks administration in an effort to construct a better picture of their interactions during the Qing dynasty. I first consider the central prioritization of projects, systems of control, instances of direct intervention, failures and constraints, and the unique case of direct central administration of the Yellow River. Next, I scrutinize local characteristics, such as the diverse methods of waterway maintenance, politics of local dike administration, and examples of subject-official and local-national conflicts. By studying Qing water management from a dually historical and sociological perspective, we can learn a great deal about the sociopolitical interactions required to maintain waterworks, and by analyzing the problems this complex system suffered, we can gain a new perspective from which to view China's difficult relationship with its water resources.

CHINA'S WATER RESOURCES AND BASIC CONTROL TECHNIQUES

For those not familiar with China's geography or water resources, it is perhaps useful to provide some basic information. First, China's rivers and lakes are extremely prone to flooding, requiring the construction of dikes and other embankments to contain them. Moreover, since a large percentage of the population lives in or near river basins, containing them is necessary in order to preserve both lives and crops. Further complicating the issue of water management is China's diverse topography. Stretching from the South China Sea to the Tibetan plain and from the lower reaches of Siberia to the tropical Mekong River basin, China is one of the most geographically diverse countries in the world. Immense mountain ranges are adjacent to vast, dry plains.⁴ While the south has ample rainfall and many lakes and rivers, the north is very arid and at present relies on groundwater for up to 60 percent of its supply.⁵ Residents of the Yellow River Basin in the north only receive one-quarter of China's already below-average water supply, and the Yellow River, despite its length, only supplies two percent of national water resources.⁶ These factors greatly influenced the growth of Chinese civilization, and also the policies of the central government. For

⁴ "China," *CIA World Factbook*, <https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html> (accessed Nov. 25, 2007)

⁵ Jim Yardly, "Beneath Booming Cities, China's Future Is Drying Up," *New York Times*, Sept. 28, 2007.

⁶ Mark Giordano, Zhongping Zhu, Ximing Cai, Shangqi Hong, Xuecheng Zhang, and Yunpeng Xue, "Water Management in the Yellow River Basin: Background, Current Critical Issues and Future Research Needs," *Comprehensive Assessment of Water Management in Agriculture Research Report 3*, (2004): 7, http://www.iwmi.cgiar.org/assessment/Research_Projects/River_Basin_Development_and_Management/Projects_Locations/yellow_river_china.htm.

example, political considerations led to the construction of the Grand Canal from the fertile southeast to the less productive northeast where the capital resides. The Grand Canal was maintained with great effort through the mid-nineteenth century for transportation of vital tribute grain to the capital.⁷

The central government, local officials, and farmers have used many techniques to contain rivers and lakes and exploit them for irrigation and transportation. Dikes were built along great rivers such as the Yangzi River and Yellow River to prevent flooding, canals such as the Chung Ho were dug to bypass problematic stretches of rivers, and polders were constructed for irrigation.⁸ Some dikes, called *yuan*, which were outfitted with dams and sluice-gates for irrigation, were sometimes constructed by local landowners to reclaim marshland, which often caused conflict with local officials because of the potential consequences in other areas, and the structural threat to primary dikes.⁹ In a 1727 memorial to the throne, one official lamented the actions of “ignorant” peasants who cut dams on the Su River for irrigation, which limited water flow downstream.¹⁰ In the following sections, I delve further into these problematic conflicts.

WATER MANAGEMENT BY THE CENTRAL GOVERNMENT

Early Western-trained scholars studying imperial China concentrated not so much on the details of water control on the local level, but on the reasons and motives for imperial involvement. Max Weber claimed that central management of water control was a means of legitimizing and perpetuating the bureaucracy, saying, “The water question conditioned the existence of the bureaucracy...compulsory service... [and] dependence of subject classes upon functioning of bureaucracy of the King.”¹¹ Meanwhile, Chi Ch’ao-Ting, a Columbia University Ph.D. student in economics in the 1930s, emphasized the economic interests the imperial Chinese court had in maintaining waterways and also their use as a “powerful weapon in social and political struggles” (*ibid.*, 1-2). He maintained a belief that Qing officials had little interest in societal obligations, and engaged in water management solely for political objectives (*ibid.*, 74).

Both writers offer interesting insights into imperial motives, however, their approach is quite cynical. Functioning waterworks were certainly a source of legitimacy as will be shown below, and the government had real economic motivations for maintaining them. Nonetheless, these factors could also relate to the overarching desire of most dynasties to maintain societal stability and prosperity. In any case, the government lacked the manpower and finances to undertake every water-control project, so it had to prioritize and delegate, surrendering much control over this weapon, as perceived by Weber and Chi.

7 Chang-Tu Hu, “The Yellow River Administration in the Ch’ing Dynasty.” *The Far Eastern Quarterly* 14, no. 4 (1955): 506.

8 Joseph Needham, *Science and Civilization in China, Vol.1.* (Cambridge: Cambridge University Press, 1956), 326.

9 Ts’ui-Jung Liu, “Dike Construction in Ching-chou,” *Papers on China* 23 (1970): 4.

10 Chi, 18.

11 *Ibid.*, 73.

According to Peter Perdue, the Qing state did not solely concern itself with major projects like administering the Yellow River and the Grand Canal, but also dealt with smaller works. The degree of control they exerted varied based upon the “waxing and waning of state authority.”¹² Chi Ch’ao-Ting hypothesizes that the Qing, like every dynasty before it, prioritized by the degree of economic interest involved. Greater attention was given what he calls “Key Economic Areas,” in this case comprising the Yangzi River Valley and the area surrounding the Grand Canal. Despite the inherent Marxist underpinnings of Chi’s argument, his economic theory can be reconciled with Perdue’s political one.

Chi is correct in arguing that the Grand Canal was undeniably the top priority of the Qing state, as it was seen as the best way to transport tribute grain needed to feed the capital and military. Since the Canal intersected the Yellow River in Jiangsu province, the government “emphasized flood prevention, with the prime objective of keeping the Yellow River in condition to facilitate the annual grain transport.”¹³ Irrigation projects tended to suffer as a result, though this was not uniformly the case.¹⁴ Yet, the government was still very concerned with promoting agricultural productivity. As the Qing government “did not have enough funds to support every necessary [irrigation] project,” instead it relied on subsidies, loans, tax incentives, and especially voluntary organizations to ensure the construction and maintenance of waterworks for irrigation as well as flood prevention.¹⁵

With limited resources, the government was able to finance some strategically important projects, but it was forced to rely on lower bureaucratic levels and individual communities to maintain the hydrological infrastructure. Over the course of three centuries, the main priorities of flood prevention, transportation, and irrigation did not change, but methods of administration and enforcement did. Instead of giving localities complete autonomy in decisions regarding dike construction and supervision, the Qing central government used moral authority, administrative regulations, final supervisory power, and the purse strings of the treasury to maintain its influence.

As noted by Weber, the legitimacy of the Qing state was at least partially dependent on water management. However, evidence suggests that the state leaned heavily on local cooperation, suggesting that waterworks maintenance was an indicator rather than a provider of legitimacy. Perdue claims that decentralization of water conservancy forced the state to rely on moral values to exhort subjects to cooperate in establishing functional systems. He states, “Only if official ideology was accepted by local producers, would the ‘good customs’ flourish.”¹⁶ In this way, effective water-control was a litmus test for imperial influence, whether through effective governance or moral suasion.

12 Perdue, “Water Control in the Dongting Lake Region During the Ming and Qing Periods,” 171.

13 Hu, 506.

14 Ibid.

15 Peter Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850* (Cambridge, Massachusetts: Harvard University Press, 1987).

16 Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 170.

However, the strength of moral authority was limited, especially when rational self-interest conflicted with its strictures. During the relatively stable, early years of the Qing dynasty, wealthy landowners began to own land in many distinct areas and therefore dwelt in towns and cities instead. Forcing them to maintain flood-control structures on their land was challenging. People were concerned primarily with individual short-term gains. Given the widespread corruption and bureaucratic incompetence, the Qing state could not possibly have depended solely on traditional morality to maintain the country's transportation, flood-control, and irrigation infrastructure. The foundation of imperial control truly lay in administrative infrastructure, rules and regulations, and methods of ensuring accountability. Of course, given the distances between the capital and most local magistrates and the subsequent temptations for official malfeasance, a morality-based loyalty to the state was preferable. However, the government reserved other means for keeping officials in line. They, in turn, were obligated to set a proper example for imperial subjects.

Beginning with Emperor Qianlong, Qing emperors mandated the compilation of all waterworks projects in provincial gazetteers.¹⁷ These gazetteers, which were sent to the Board of Works for periodic review, represented one point of control. Of course, officials sometimes colluded with local interests to conceal dikes from higher authorities.¹⁸ They were sometimes caught, but records cannot tell us how many succeeded in hiding projects from their superiors. After a particularly bad breach in Jingzhou in 1788, the head of the Board of Works decided that the provincial subprefect should accompany the county magistrates to determine the need for annual repairs, increasing supervision of local officials and further restraining this abuse of power.¹⁹

By the late-eighteenth century, the Board of Works also started exerting financial control over officials by supplying funds. Originally, both the Yongzheng and Qianlong emperors declared that it was the peoples' responsibility to repair dikes, and generally, the local irrigation official or magistrate collected money from subjects affected by a particular project.²⁰ However, after the 1788 dike breach, Emperor Qianlong divided the Wancheng dike into official works and people's works, allowing officials to file for repair funding through the Board of Works and civilians to request loans for all projects costing over 500 taels, which would be repaid by locals affected in amounts proportional to their land holdings.²¹ While this put more financial strain on the treasury, it gave more oversight power to the Board of Works.

Lastly, but most importantly, regulations made officials responsible for dike repairs done during their tenure for ten years after the repair (*ibid.*, 5). If a breach occurred during that period, they would be required to pay a portion of the repair costs.²² This obviously placed pressure on officials to ensure the quality of repairs.

17 Chi, 38. A 1736 version of the *Gazetteer of Jiangnan* includes the declaration that the Emperor "commanded scholar-officials to prepare the Gazetteer of the United DaQing domain."

18 Perdue, "Water Control in the Dongting Lake Region During the Ming and Qing Periods," 756.

19 Liu, 5.

20 *Ibid.*

21 *Ibid.*, 7.

22 60 percent in Jingzhou.

After a breach in the mid-nineteenth century, the former prefect of Jingzhou had to pay 28,300 taels in repair costs.²³ Official responsibility, in addition to moral exhortations, regulations, and financial control, was one of the primary tools the Qing state possessed to assert final supervisory power over waterworks projects not necessarily being actively monitored.

While the Qing state remained uninvolved in local waterworks supervision and maintenance most of the time, it occasionally responded to a particular crisis or issue. Three examples occurred in Hunan and Jingzhou. The first is the attempted abolishment of the *dizhang* system in 1739. The *dizhang* position, or dike administrator was established during the Ming dynasty and was filled by wealthy local landowners who became responsible for organizing dike repairs, hiring labor, and collecting fees. After he found that the *dizhang* were colluding with yamen, the treasurer of Hunan appealed to the emperor to enable more official involvement in the province, as there already was in Hubei.²⁴ However, after hearing to the outcry of local gentry and officials and the plea of the governor of Hunan, the Emperor decided to retain the *dizhang* position.²⁵ The attempts to eliminate the *dizhang* position represent a concerted effort at national reform by the Qing, but local interests and a general backlash against central interference stifled success.

After a disastrous flood in Jingzhou in 1788, the Qing state once again sought to impose stricter regulations on dike maintenance along the Yangzi River. A series of regulations for the Wancheng dike system called for consistent repairs, division of labor, and active management, as opposed to supervision.²⁶ Emperor Qianlong also ordered the Board of Revenue to provide two million taels for dike maintenance from the imperial treasury.²⁷ The greatest sign of central intervention, however, was Board of Works Commissioner, Agui's, personal dispatch to Jingzhou to assess the situation.²⁸ Agui overrode the governor's judgment, determining that the wealthy Xiao family had caused the flood by solidifying a sandbar in the middle of the river in order to increase their land holdings, which put too much pressure on the riverbank. As a result, the capital stripped all Xiao degree-holders of their titles, seized their property to fund relief efforts, and punished provincial and local officials for collusion.²⁹ These efforts comprise one of the most notable interventions by the central government. However, the extra regulations seem to have had only a temporary effect. Dikes countrywide again fell into disrepair.

In addition to these major interventions, governors sometimes sought to tweak the provincial systems. One minor example of involvement from higher authorities came from Governor Yang of Hunan province. Yang tried to designate certain waterworks as "strategic works" which would be repaired every three years

23 Liu, 6.

24 Perdue, Peter. *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 188.

25 *Ibid.*, 190.

26 *Ibid.*, 259.

27 Liu, 12.

28 Perdue, "Water Control in the Dongting Lake Region during the Ming and Qing Periods," 758.

29 *Ibid.*, 759.

under official supervision.³⁰ He did this as an acknowledgement of the fact that local officials could not possibly monitor the entire dike system, and it would be more efficient to put the most vital and high-risk portions under their supervision instead. However, where loss of life was unlikely, and waterworks maintenance could be easily performed and supervised by locals, high-level management was absent.

Although the Qing central government attempted to implement effective water control policies throughout the empire, records show that there were many factors that limited their ability to do so. A minor factor was lack of uniformity in dike repair and construction. With divisions between official and people's dikes, dike heights did not match up in Hunan during the eighteenth century. However, the Yongzheng Emperor refused to turn people's dikes into official dikes because of the "free-rider" problem—if they became official dikes, local people would no longer be obligated to share in the costs of maintaining them.³¹ Yet poor accountability led local officials to ignore their duties to maintain the people's dikes, instead seeking to line their own nests. Such actions resulted in the impeachment of a local magistrate and a provincial treasurer of Jingzhou in 1805.³² In another example, some officials in the area around Dongting Lake turned a blind eye to land reclamation by wealthy landowners that put dangerous pressure on the lake because of the tax revenues the new land would bring (*ibid.*, 167). Due to official corruption and the short-term self-interest of landowners, as exemplified above, the Qing state became increasingly unable to maintain decaying waterworks and a rotten system. In 1825, there were not even enough soldiers available to complete a campaign to destroy illegal dikes in Hunan (*ibid.*, 229). The state started to crumble, and dike disrepair and lack of supervision were two of the most visible signs.

As time passed, resource shortages became even more severe. In 1812, central government revenues were approximately 40 million taels.³³ In comparison, by the early nineteenth century, when dike breaches were becoming more common due to systemic decay, major repair projects cost as much as 30 million taels, the equivalent spent on two military campaigns in the mid-eighteenth century.³⁴ As the massive and inefficient bureaucracy that the Qing dynasty relied upon lost its effectiveness, the government was forced to spend more money to solve water management problems. With increasing civil unrest due to the Taiping Rebellion in the 1850s, not to mention the indemnities foisted on the state as a result of Western invasions, those expenditures decreased sharply. Tenant-landowner conflicts during the Taiping Rebellion put particularly intense pressure on the Qing dynasty, forcing it to funnel most of its resources into containing the threat. The signs of waterworks decay already present in the late-eighteenth century became irredeemable by the mid-nineteenth century. In Xiangyin County in Hunan, floods began to occur every year caused by illegal dikes and poor repairs. By 1881, the gazetteer stated, "Not one single dike remains

30 Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 186.

31 Perdue, Peter, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 230.

32 *Ibid.*, 230.

33 Hu, 511.

34 *Ibid.*, 511.

here, neither official, people's, nor illegal."³⁵ Without sufficient and competent official involvement, the complex dike systems could not be maintained. As the dynasty faltered, so did its efforts at water-control.

THE RISE AND DECLINE OF THE YELLOW RIVER ADMINISTRATION

One of the best examples of the rise and decline of water control during the Qing dynasty is the fate of the Yellow River Administration (YRA), a special central organ created to maintain the Yellow River and Grand Canal to ensure continued transport of tribute grain from southeastern China to the capital in the north. The separation between China's agricultural and political bases had existed for some time, and it was strategically necessary for the Qing to maintain the division. The YRA was established early in the dynasty as a separate organ from the Board of Works due to the tremendous importance placed on maintaining the transportation route. Originally composed of sixty people, the YRA was responsible for coordinating flood-control efforts with local officials along the river.³⁶

Initially, the YRA helped complete large-scale conservancy projects under the Kangxi Emperor, including dredging the mouth of the river, strengthening embankments, and constructing a 95-kilometer canal to bypass an important stretch. These projects were implemented so successfully that there were no terrible floods for about 60 years, a remarkable stretch of time.³⁷ Eventually, however, the bureaucracy began to expand, and by the mid-eighteenth century there were around 400 high-level officials at the department and many more subordinates, in addition to 20,000 soldiers who were directly responsible for maintenance. The bureaucracy's size and lack of expertise in water conservancy weighed down repair efforts that required extreme flexibility, thus creating a terribly ineffective mechanism (*ibid.*, 509).

In the end, the strict rules the government had created for the agency were essentially disregarded, and officials focused on securing profits for themselves, so much so that they hired "officials" whose express duty was falsifying accounts (*ibid.*, 510). Naturally, the YRA slowly lost its effectiveness. Floods became more frequent, and eventually, in 1855 a major breach changed the entire course of the Yellow River, disabling the Grand Canal so that grain had to be transported by sea (*ibid.*, 512). The YRA is a testament to the bureaucratic inefficiencies and corruption that became endemic in the Qing state. Despite its early successes, the YRA eventually became the government's most wasteful office.³⁸ Unfortunately, its duties were also vital to the survival of the state. Hu Changtu ties the abolition of the YRA in 1901 with the subsequent collapse of the dynasty ten years later (*ibid.*). Although the failure of the YRA was certainly not the sole cause of dynastic decline, it was certainly a testament to overall bureaucratic decay.

³⁵ Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 230.

³⁶ Hu, 506.

³⁷ *Ibid.*, 508.

³⁸ *Ibid.*, 510.

WATERWAY MAINTENANCE ON THE LOCAL LEVEL

Even today, the sheer distances and population size in China impose limitations on the efficacy of government attempts at direct supervision and enforcement. In previous centuries, when news traveled only as fast as the best transportation available, the Qing state could not possibly impose a uniform water conservancy program at the local level. Additionally, social, economic, and political differences were intensified by geography. Perdue explains that:

“The long, straight dikes along the Yangtze in Hubei were well adapted to a rationally organized bureaucratic structure, with responsibility divided among circuit intendants, prefects, and district magistrates. The Hunan enclosures were each self-contained units dominated by...powerful families, relatively autonomous from official control.”³⁹

With such variations in the very layout of dikes, consistent administration was difficult. These physical realities seem to have led the central government to tacitly allow local experimentation in water control methods. Various localities applied many different systems of waterway organization and supervision, including proto-democratic selection of managers. Ultimately, the fundamental factor that helped to determine the viability of a particular system was how well questions of self-interest were dealt with, as natural human tendencies had to be contained to ensure maintenance of a “public good,” such as dikes and canals.⁴⁰

While there were surely some inconsistencies in late-Ming water administration, it appears that the primary method of administration in the early-sixteenth century for works too small to be organized by the state and too large to be dealt with by individuals was the dike administration system. In 1577, the Regional Inspector of South Zhili declared that the wealthiest landowners in a district should be conscripted *dizhang*.⁴¹ These *dizhang* were to be held responsible for the district’s repair work, and could be punished with fines or the cangue if they failed.⁴² While the position of dike administrator allowed some local autonomy for intermediate-size repairs, the system was subject to abuse and began to break down by the transitional period.⁴³ The governor of the Southern Metropolitan Area lamented that “evil government clerks have burrowed in,” forcing fees on local people and making the dike administrators serve their own purposes, often bankrupting them.⁴⁴

The Ming system was formally abolished in 1667, and local areas began adopting different systems relatively free from government intervention provided there were no serious problems. Some places created systems that dealt with recent changes in the basic social makeup of many rural areas rather effectively. With the

³⁹ Perdue, “Water Control in the Dongting Lake Region during the Ming and Qing Periods,” 750.

⁴⁰ *Ibid.*, 751.

⁴¹ Elvin, 115.

⁴² *Ibid.*, 115.

⁴³ Perdue, “Water Control in the Dongting Lake Region during the Ming and Qing Periods,” 750.

⁴⁴ Elvin, 117.

rapid urbanization of landowners, which resulted in their removal from the land and practical responsibility for dike repair, new people were needed to take their place as *dizhang*. In Shanghai County, commoners initially continued to be used as low-level administrators.⁴⁵ Gradually, however, a system of gentry supervision evolved, where local degree-holders participated in organizing the dredging of rivers and streams in the county, which needed to be kept clear for commercial transportation.

By 1775, the position of “gentry director” was formally established in Shanghai County for the “levying of funds and the dredging...on ‘market rivers’” (ibid., 127). The gentry directors, who were sometimes actually elected or appointed, had substantial power. They were empowered to levy supplementary taxes, allocate labor, and manage funds (ibid., 128). Most importantly, they were effective. Directors responsible for different parts of a river actively discussed and coordinated repair-work across district wards. Magistrates contributed interest-free loans for projects, which were repaid by all members of society who could afford to do so, not just landowners. According to Mark Elvin, Shanghai County clerks and local deputies “disappeared as organizers” of river dredging and dike maintenance.⁴⁶ The new system, which relied on a “network of personal obligations” effectively limited corruption and created an organic system for water control by placing community members in charge whose reputations would be tarnished by any foul play.⁴⁷ Putting local residents in charge also made sense because they were more familiar with local conditions and more likely to be accepted by the community.⁴⁸ Elvin also notes a democratic system of water management in Guangdong, where “regular annual meetings of publicly selected representatives and the systematic public selection of hydraulic managers were well-established practices.”⁴⁹

These democratic or semi-democratic structures were one method that some Chinese localities applied during the Qing dynasty, but they were the exception rather than the rule. Neither Shanghai County nor Guangdong faced frequent flooding threats, allowing the Qing state to minimize its involvement. Other regions had greater bureaucratic involvement, and some, such as Hunan province, even retained the dike administrator system into the early eighteenth century.⁵⁰ By the time of the Qianlong emperor’s reign, there was a general desire among upper-level officials to replace the Hunan system with one that increased official involvement and required households to provide funding for projects on a level proportional to their landholdings.⁵¹ Protests in Hunan stopped the reforms, but officials continued to add regulations, including a rotational system of shifting responsibilities to eliminate rampant corruption.⁵² The *dizhang*, because of their low social status, also had difficulty forc-

45 Ibid., 119.

46 Elvin, 129.

47 Ibid., 130.

48 Liu, 13.

49 Elvin, 132.

50 Perdue, “Water Control in the Dongting Lake Region during the Ming and Qing Periods,” 750.

51 Ibid., 750.

52 Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 192.

ing some landowners to carry out repairs without government intervention.⁵³ Therefore, while the government attempted to give local landowners some autonomy to do their own repairs, many times they resisted due to self-interest. The presence of free-riders who shirked their responsibilities led to frequent breakdowns and official intervention in the collective repair system, yet Hunan residents still maintained some autonomy due to active resistance of state encroachment.

Other social structures that formed to address dike repair met with similar official annoyance but more successful changes. Around Dongting Lake, the governor in 1777 discovered that people had instituted their own system of dividing dikes into sections according to landholdings, with landowners merely reinforcing their own stretch.⁵⁴ He quickly brought an end to this practice, seeking to create a communal structure with official supervision. After the terrible flood in Jingzhou in 1788, the government made an even greater effort to achieve some form of supervision along the Yangzi River. In Jingzhou, the main Wancheng dike was divided into official work and people's works in order to ensure some official supervision. The people were assigned to maintain their own stretches using an "earth fee" that would be collected by local gentry entrusted to do so by the community, instead of the notoriously corrupt yamen clerks. There were also elections held by local townspeople as an attempt to remove yamen clerks completely from the system of fee collection.⁵⁵

These are only a few examples of the systems that were applied to water control in the centuries after the transition from the Ming to the Qing dynasty. Officials generally allowed local communities to deal with their own water control installations wherever possible, but reserved the right to supervise and intervene, if necessary. There were many advantages to such an approach, such as reduced expenditures, greater utilization of local knowledge, and increased local support of the government in other endeavors. Unfortunately, the problems of individual self-interest and the so-called tragedy of the commons continued to be a thorn in the side of the Qing state. Greedy yamen clerks and river administrators were not the only corrupt group; many landowners also pursued selfish goals at the expense of the community by building illegal dikes to reclaim land or by refusing to contribute to repairs. Despite the clear damage these landowners inflicted on community interests, there are numerous examples of protracted struggles between local landowners and officials over waterworks where the community supported local landowners.

One of the most common conflicts dealt with the construction of illegal dikes near main dikes for the purpose of reclaiming land for agricultural use. These dikes were dangerous because of the structural risk they placed on the main dikes and, in the case of Dongting Lake, the pressure they put on the lake itself by narrowing it.⁵⁶ Most of the time, landowners building illegal dikes would seek ways to cover it up, sometimes by requesting permission to repair other dikes as a pretext, as Gov-

⁵³ Ibid.

⁵⁴ Perdue, "Water Control in the Dongting Lake Region during the Ming and Qing Periods," 751.

⁵⁵ Liu, 17.

⁵⁶ Perdue, "Water Control in the Dongting Lake Region during the Ming and Qing Periods," 748.

error Kai Tai discovered in Hunan (he canged the perpetrators as punishment).⁵⁷ Regardless of how people strove to maintain their ill-gotten holdings, most governors saw them as a serious problem and worked hard to destroy them. After the Jingzhou flood, most illegal dikes were removed, except for those that posed no harm to the main dikes.⁵⁸ Of course, the preservation of illegal dikes could result from political influence or bribery, but the state sought to limit these factors, and as late as the end of the eighteenth century, achieved moderate success in removing most illegal dikes.⁵⁹ Late in the Qing dynasty, however, the government simply lacked the resources to inhibit illegal dikes and local interests won out.

Some individuals chose to appeal to the government through legal means. In Hunan province, as officials sought to clear dikes that were increasing flood risk, “members of the local community appealed to higher-level officials, either to adjudicate conflicting claims between two local groups or to impeach a local official for unjust acts.”⁶⁰ Perdue observes that these lawsuits were an invitation for high-level officials to intervene in conflicts that often arose over placement of water control projects and “could only be settled by an outside party.”⁶¹ There were in fact a profusion of cases regarding water control, almost all related to land and property. However, as the state gradually lost control over such problems later in the Qing dynasty, officials only intervened in cases where land disputes resulted in murder.⁶² As time progressed, officials despaired of the inability to justly apply laws. The weaker the state became, the easier it was for local interests to influence officials, which ultimately led to disaster in many places.

Finally, one of the more interesting conflicts of the latter part of the Qing dynasty occurred in a small, mostly impoverished rural county in Hubei. To summarize the fascinating case study compiled by William Rowe, over the course of 14 years from 1862 to 1876, a group of local gentry submitted petitions four times to the local magistrate, who forwarded them to the governor, asking for permission to build a dam. The request was denied four times, despite attempts at bribery and entreaties by sympathetic superior officials. This did not deter the gentry however, and they collected funds and labor to construct it without official permission. The four leaders, in order to pay for the dam, instituted a toll on merchant boats selling goods at a “private market” next to the dam. Hearing of this, the new governor, Li Hanzhang, shut down the market because of the illegal tax, and upon requests from local landholders and officials, sent a gunboat to destroy the dam. However, due to their duties maintaining other dikes on the Yangzi River, the four leaders remained free on the condition that they turn themselves in when they completed their duties.

⁵⁷ Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 224. It is interesting to note that all silted land and shoreline was theoretically controlled by the government, but the Qing state eventually became powerless to prevent illegal possession of it.

⁵⁸ Liu, 4.

⁵⁹ Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 226.

⁶⁰ Perdue, Peter. “Water Control in the Dongting Lake Region during the Ming and Qing Periods,” 748.

⁶¹ *Ibid.*, 749.

⁶² Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850*, 91.

The situation became more volatile when the four rebuilt the dam, despite an imperial edict forbidding further construction. They convened a public meeting, as called for by established regulations, to propose the dam, and allegedly gathered over 10,000 people to build it. Governor Li once again destroyed the dam and sent soldiers to face the militiamen assembled by the four leaders. When the leaders fled and began to stir up further rebellion, Li discharged troops, who caught and executed the leaders.⁶⁴ The irony of the case lies in what happened next. The imperial court ordered former Admiral Peng Yulin to make his own determination as to whether the dam should be built. After traveling to the county, he responded in the affirmative, sparking a debate that revealed the region's complicated interests.

The primary conflict in the dam controversy was the fact that while the dam may have improve the lives of people in the county by limiting flooding, it would have increased pressure and flooding in counties upstream (*ibid.*, 368). This conflict, in addition to a number of smaller concerns regarding taxes and financing, epitomizes the difficulties in balancing state interests and local interests in local waterworks. Externalities such as those that existed in this case are a constant problem for waterworks projects and the history of water control during the Qing dynasty can be seen as a struggle between the public interest and local well-being. In the end, the court ruled that the dam should be built, but it was not until 1923, when a local warlord possessed enough power to collect construction fees, that it was built. Sixteen years later, it was destroyed by bombs during the Japanese invasion, but in its lifetime it proved to be very effective.

CONCLUSION

China has long been subjected to typhoons, earthquakes, and particularly, floods. Little can be done to prevent earthquakes and typhoons, but effective water control systems can prevent flooding. Thus, waterworks held great importance in Chinese society. The mounds of tamped-down earth and stone that formed most dikes at the time represented many things: the government's interest in protecting lives and social stability against unpredictable rivers, the efforts of communities to stake out an existence in a precarious environment, and the choices of individuals forced to choose between personal happiness and responsibility to a larger group. The ubiquitous nature of waterworks projects makes them an ideal lens through which to assess of law and society in a country as wide and varied as China.

While this article hints at a chronological progression from bureaucratic efficiency and effective management to eventual decline, disrepair, and disarray, it is not primarily historical in nature. It focuses on the systems of management and the factors that led to their eventual failure. The Qing dynasty peaked early in its reign, when large public works on the Yellow River led to a long period of successful flood control and new methods were explored on local levels to replace the inefficient Ming

⁶³ William T. Rowe, "Water Control and the Qing Political Process," *Modern China* 14, no. 4 (1988): 356.

⁶⁴ *Ibid.*, 358.

dynasty system of water control. Some of these new methods emphasized group responsibility, government oversight, and accountability, and were very successful in low-risk environments. However, in places where water maintenance was more vital, and also profitable, short-term monetary interests tended to win out over responsible administration. In those fragile areas, the interests of individual communities conflicted with national priorities or even those of places just downstream. The Qing government tried to rectify some of the endemic problems in water management, but ultimately excessive bureaucratization, corruption, lack of resources, and conflicts of interest led its efforts to a watery grave.

One of the most interesting qualities of water management is the overwhelming importance of externalities in the exploitation of water resources. Waterworks projects suffer from a free-rider problem, but they also often bring direct benefits to some groups of people and disadvantages to others. A dam built in one place can prevent flooding and irrigation for one area but cause flooding upstream. It is apparent that an authoritative power is needed in order to resolve conflicts and maintain infrastructure. Central oversight and enforcement is necessary to provide order, enforce laws, and settle disputes. Without a strong central management, peaceful resolution of conflicts between two groups of self-interested individuals becomes extremely difficult. Moreover, it is evident that, as central power weakened in the latter years of the Qing dynasty, consistent waterworks maintenance became impossible even in vital areas; illegal dikes popped up everywhere and floodwaters ravaged regions already in social turmoil.

While I do not claim that the effectiveness of waterworks administration can serve as a complete proxy for societal order, in hindsight, the deterioration of waterworks during the Qing was a certainly a warning sign. As this article demonstrates, effective water management is a vital prerequisite for sustained prosperity in China. The Qing government made great efforts, especially in its early years, to organize a responsive bureaucracy to administer China's most important water resources, and through its interactions with local levels attempted to follow policies to control flooding and manage irrigation and water transportation. In much the same way, China's current ruling regime, the Chinese Communist Party (CCP), seeks to create an effective administrative system that provides for the new priorities of industrial and municipal use, energy production, environmental conservancy and pollution control, irrigation, and of course, flood control. In doing so, both the CCP and the Qing dynasty created complex systems of hierarchal priorities, responsibilities, laws, and regulations, which reveal the tremendous impact of water management on Chinese society.

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