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Taming the Floods: Using an Intellectual History of Chinese Hydraulic
Thought to Address Contemporary Issues in China's Water Governance

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A senior thesis submitted in partial fulfillment of the
requirements for the degree of Bachelor of Arts

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Abstract

China's current hydraulic systems are in a state of atrophy, caused by sustained damage over centuries to infrastructure that has changed very little. Added to an already weak infrastructure is a relatively new crisis of water scarcity, which is forcing the Chinese government to allocate water resources between industry, agriculture, and people. As a state accustomed to water control without the context of scarcity, the state's current governance structures are ill-equipped to solve the current crisis in sustainable fashion. The state is reluctant to approach non-traditional methods of water governance, and this resistance can be attributed to over two-thousand years of state authority over water control. This paper seeks to pose a challenge to the existing perception of modernism in Chinese hydraulic thought.

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Introduction

Global water scarcity is a contender for one of the direst environmental situations of the modern era. Statistically, 2.1 billion people lack access to clean drinking water services, 4.5 billion people suffer from lack of sanitation, and 90 percent of total natural disasters are water-related, to name a few (United Nations, 2018). In many ways, water itself interferes with the international order; it disobeys borders, and shares the boundaries between countries; freshwater is not evenly distributed across the globe, and changing climate patterns combined with geospatial patterns determine its outcomes. National boundaries and the global order conflict with water's flow patterns. Global water resource management and distribution is internationally contested, though the responsibility to manage available water resources in each territory is subject to individual systems of governance. Water scarcity is also inextricably entwined within broader debates over security, justice, and the right to governance.

Rob Nixon (2011) uses the term “slow violence” to encapsulate how modern systems of order are conflicting with the slow progression of ecological time. He writes of human temporalities as brief, flitting from one technological era to the next while the slower geological motions, habitats and landscapes absorb the collateral damage. Nixon writes,

Change is a cultural constant but the pace of change is not. Hence the temporal contests over how to sustain, regenerate, exhaust, or obliterate the landscape as resource become critical. More than material wealth is here at stake: imposed official landscapes typically discount spiritualized vernacular landscapes, severing webs of accumulated cultural

meaning and treating the landscape as if it were uninhabited by the living, the unborn, and the animate deceased. (Nixon, 2011, 17)

China's landscape, climate and society is a major recipient of the effects of slow violence. China is a society that has sustained thousands of years of civilization, and has done so by constructing longstanding forms of social order. The Chinese interpretation of the very nature of humanity is reflected in the construction of social order, kinship networks, political and governance structures, and infrastructural systems. Over time, these systems have sustained slow violence, through ideological manifestations of violence affecting perceptions of order, and in the form of ecological damage caused by resource depletion and landscape destruction. The modern era has brought these issues to a point of crisis, and the Chinese state now faces the need to modify its governance to address these crises. However, the state is also plagued by a loss of solid ideological foundations, demonstrated by an imbalance of resource allocation. Its consequences are what Nixon (2011) describes as "...visible reminders of theft [by the state] through modernity's infrastructural invasions – by oil pipelines or massive hydroelectric dams or toxic tailing from mines – foment rage at life-threatening environmental degradation combined with the state's failure to provide life-enabling public works" (42). The following project is an attempt to understand China's contemporary environmental challenges not as recent, but rather as long-sustained slow violence to a system of governance rooted in historical tradition.

The first section will present historical evidence of longstanding patterns of unsustainable governance methods contributing to the persistence of ecological damage. The second section will identify current water crises, and introduce associated methods of governance to mitigate the

resultant damage. The final section will present cases to support the conclusions drawn in the first and second sections.

The Evidence of Longstanding Social Order in China

The Way of the Sages

In China's deep antiquity, legend has it that the ancient sages took control of water to create order. In the myths, the pre-civilization world was overrun with rampant wilderness. Flora and fauna dominated the landscape, and a consistent deluge of unrestrained waters rendered the soil impossible to cultivate (Lewis, 2006). The sages were comprised of various kings and heroes whose collective aim was to create organized civilization out of the chaos.

Such accounts were recorded by Han historian Sima Qian (demonstrated in (Watson, 1961), as well as the classics of ancient Chinese literature such as the *Shangshu* (a Book of History written by Confucius), and comprised the widely regarded origin myths of China. They document the unconfirmed Xia (Hsia) Dynasty (circa 2100-1600 B.C.), founded by the sage king Yu the Great (2200-2101 B.C.), a prominent hero figure of the legends. Prior to his entrance, the landscape was unruly, absent of a distinction between Man and Nature:

...The historical work of the sages in early Chinese accounts had been to separate humans from the animal domain. Virtually all the philosophical traditions spoke of a primitive age when humans had lived both physically and morally unseparated from animals. The sages had created the tools and introduced the moral and ritual practices that rescued people from their animal condition and created distinctions where none had existed before...Yu's taming the flood and thereby fixing the Nine Provinces [demonstrated] that for the authors of the *Shan hai jing* the ending of the flood was the final step in the sages' work of creating an orderly world. (Lewis, 2006)

Among the sages, Yu was most accredited for his role as a flood tamer, for establishing control over the waterways of the landscape and thus enabling a pathway for social civilization to safely emerge. To make this final step toward establishing society, Yu determined that the unchecked waters were inhibiting humans from establishing their own formal boundaries within nature. Without constant flooding, the people would be able to participate in agriculture and form the basis of society. Yu set about restraining the floods by reshaping the very land itself; in doing so, he redirected the rivers into manageable arrangements, and facilitated the development of irrigation methods. In a famous treatise, the historian Sima Qian describes Yu's overall efforts as spanning the course of ten years, without rest (Watson, 1961). After he was able to successfully reduce the potential for floods, the people were able to settle along the riverbanks and raise crops.

Physical space plays an important role in the stories of the sages. Notable is the way in which they utilized their understanding of the world's elements to systematically separate the ordered realm (occupied by humans) from the disordered realm (occupied by nonhumans and spirits). In the flood taming myths, natural disasters represent a blurring of these realms, and must be expelled. Prior to Yu's arrival, "placing the early sages amid the monstrous peoples at the edges of the earth was related to emerging representations of power within the imperial state" (Lewis, 2006, 72). These representations were not solidified until Yu organized the rivers, described as follows:

...The earliest systematic account of Yu's taming the flood takes the form of an account of his physical travels in the course of his toils and the manner in which these establish a model for the flow of tribute from the periphery to the center. This literal 'flow' that

moves along the rivers established by Yu's channeling of the flood established the relations of center and periphery that defined the structure of the newly ordered world.

(Lewis, 2006, 72)

Yu successfully created these physical boundaries, and at last the sages and rulers would be able to predict and organize the movement of the rivers. From there, the challenge to maintain this control and its associated societal consequences would extend throughout the rest of the myths and legends, and reappear throughout Chinese history. The sages were keen on chartering the movements found in nature, to better understand its properties and thus be able to categorize natural phenomena. This extended into a cosmology that intrinsically linked humans, society, politics and the state. Historian Nathan Sivin (1995) expands this notion as central to Chinese modes of understanding, especially as the state continued to develop. He writes:

In the third century B.C., as the process of invention got under way, intellectuals bound the structure of heaven and earth, and that of the human body, to that of the state. This was not unprecedented in China, but now the links were made systematic and tight. In every instance their creators were preoccupied with political authority and its effective use. As a result, macrocosm and microcosms became a single manifold, a set of mutually resonant systems of which the emperor was indispensable mediator. (7)

Thus, the interplay of state authority and human social order has remained essential to the stability of China throughout history and into the modern era. The act of flood taming and water control is one demonstration of the ways in which that order is kept.

Historian Mark Edward Lewis (2006) identifies the floods in creation myths as representing “universal social disorder” (49). Since Yu took control of the waterways of China in order to draw a margin between man and wilderness, the return of the flood would signify a collapse of those boundaries. The rest of the associated myths build off of this theme, wherein the event of flooding represents wilderness encroaching into society and destroying political and social dominion. These can be categorized into two different types of myth.

The first type directly links flooding to “human criminality” (Lewis, 2006), or a human-driven intent to destroy societal structures. These myths often contain criminals who seek to bring calamity, and heroes like Yu who are able to apprehend them. The second type presents the flood as a result of criminal and rebel action, in which the wrongdoers must be apprehended and punished before the floodwaters can be restrained. This version uses the flood as a consequence, rather than the direct offender. In these myths “the rampant waters served as the image or embodiment of the more general problem of resistance to the state order” (Lewis, 2006).

One such example are the stories of Gong Gong. In the myths, Gong Gong was depicted as the criminal equivalent to floods, and in others he desired to bring about the floods themselves. He renounced the "Way" of the sages like Yu, and sought to bring about societal collapse (Lewis, 2006, 56). He muddled up the separation of high and low in river systems, properties integral to flood prevention by keeping the flow of the water in check. In this way, he literally used flooding to try to damage human settlement. In other stories, criminals like Gong Gong would seek to destroy aspects of civic life and government, participating in “criminality, bad government, and intellectual deviance that threatened the social order” (Lewis, 2006, 53). In this indirect fashion, they sought calamity and brought about flooding as a manifestation of the destruction of order.

Cultivating Order Through Society

The flood myths informed Confucius's ideas about categorizing natural phenomena into templates for societal order. Confucius, and later his disciples, then in turn formed the teachings that would dominate the Chinese system of ethics and philosophy for the next two thousand years.

More specifically, Confucius was presented with a world in disarray. He lived during the Spring and Autumn period (551-479 B.C.), during which time China was not unified into a single empire. He lived in "an environment where generally chaos reigned [between the feudal states] ...Aristocratic pastimes, hunting, war and extravagant living, laid crushing burdens on the common people, while at all levels human life was cheap." (Needham & Wang, 1956).

Confucius was dissatisfied with this, noting that the land was overrun with the "heterodox" theories of other thinkers of the time (Lewis, 2006, 52). He equated the teachings of these men with failure to effectively separate man from wilderness. He said, "Master Yang's advocacy of being for oneself means having no ruler. Master Mo's advocacy of caring equally for all means having no father. To have no ruler and no father means to be a bird or beast" (Lewis, 2006, 52).

Confucius looked to the past successes of the sages as a means for cultivating order. After his grand works like *The Spring and Autumn Annals* became the blueprint for Chinese society, Confucius too was included amongst the sages, for his contribution to preventing the floods:

Long ago Yu suppressed the flood and the world became level. The Duke of Zhou conquered the barbarians, expelled the wild beasts, and the peasants were at peace. Confucius completed the *Annals* and rebellious ministers and criminal sons became afraid... (Lewis, 2006, 52)

To remove power from the rebels and criminals, Confucius formed a system of order that focused entirely on human society. Mencius (372-289 B.C.), a prominent Confucian disciple, further connected Confucian order to the ways of the sages like Yu in the following:

The five grains ripened and the people were nourished. The way of people is that if they have sufficient food and warm clothing, but live at ease without instruction, then they are close to the [birds] and the beasts. The sages worried over this, and had Qie serve as Minister of the Masses. He instructed them in human relations. There was a kinship between fathers and sons, duty between rulers and ministers, distinction between husbands and wives... (Lewis, 2006, 50)

His teachings strayed from those before his time, in that he enabled a new interpretation of good and harmonious conduct. This conduct could be found by maintaining kinship in a hierarchical fashion. Confucius asserted that "the true aim of the government ought to be the welfare and happiness of the whole people, and that this would be brought about not by rigid adherence to enacted arbitrary law, but by subtle administration of customs generally accepted as good and having the sanction of natural law" (Needham & Wang, 1956, 1971). Through administration led according to kinship values, a harmonious system could be established. Mencius would later add to the teachings by reassigning the role of Heaven from nature, and place it on the people. He extracted more applicable democratic ideals from Confucian teachings; he considered the wellbeing of the people as essential to the workings of a government. His

famous mandate, "Heaven sees according as the People see, Heaven hears according as the People hear" (Needham, 1956, 16), has become a staple of Chinese philosophy.

Confucian values also forged a new distancing of humans and nature. A harmonious society would consist of Man existing in congruence with Nature, but not in definitively separate realms. So, ideas of social virtue, goodness and justice follow as direct extensions of Heaven itself, and are thus dictated in the same way as nature. Natural phenomena that occur without ready explanation would be designated to the spiritual realm, rather than dwelled upon using scientific means of explanation; Confucius had little interest in discussing events outside of the realm of human relationships and society (Needham & Wang, 1956, 15). His legacy formed an intensive focus on human order in both governance and society, while remaining somewhat lax toward those affixed on understanding the matters of nature. He largely considered the Daoists to be socially irresponsible for their adherence to allowing the way of Nature to dictate human activity (Needham & Wang, 1956, 16). By placing emphasis on governance and society as dictated by social relationships, Confucianism brought about a new construction of order based on human control.

To understand the role of water in Confucian order, the flood can be revisited. Lewis (2006) characterizes water control as a physical groundwork for more complex systems, or an “organizing principle” of authority (72); in mismanaged water systems, the consequent flood represents geophysical anarchy, and therefore a danger to society:

In short, the mythic flood here serves as a historical occasion for and a physical image of a *social* chaos produced by the collapse of *social* distinctions. Yu's fashioning of an ordered physical space through dredging the rivers and guiding them into the sea is only

one step in the larger process of constructing an ordered and hierarchically divided human realm in which the central role is played by the family as a social unit (Lewis, 2006, 50)

Here, the flood takes on a more symbolic meaning of disaster. To administer control over water systems means that the state is protecting the people, and flooding means mismanagement of that authority. Mencius extrapolated on this idea in his teachings, particularly in his discussions with King Hui of Liang during the Warring States period (circa 475-221 B.C.). From Book 1A3, the following is recorded:

King Hui of Liang said, "I... [devote my] entire mind to the state. When the year is bad within the river, I transfer people to the east of the river and transfer grain to the area within the river. When the year is bad to the east of the river, again, I act accordingly." (Mengzi, 2009).

Mencius responded to this with advice for the king to allow the people to cultivate according to natural processes and rhythms. For instance, on harvesting fish he says, "If close-meshed nets are not allowed in the pools and ponds, there will be more fish and turtles than can be eaten" (Mengzi, 2009, 3). He thus suggested a method of governance based on proper stewardship of nature according to the needs of the people. Where Daoist thought would cultivate materials with as little human interference as possible, Confucianism emphasizes responsible management of natural order.

The “paramount social importance of floods” (Needham, 1971, 223) is stressed in Confucian accounts. In the *Kuan Tzu* book (pre-Han Dynasty), there is evidence of a correlation between the physical and the social role of the flood:

Once impeded, [the water] runs wild. Running wild, it injures men. When it injures men, there arises great distress among them. In great distress they treat the laws lightly. Laws being treated lightly, it is difficult to maintain good order. Good order lapsing, filial piety disappears. And when people have lost filial piety, they are no longer submissive...

(Needham, 1971, 223)

Good hydraulic maintenance is required to keep the waters from running unchecked, and in historical China this was achieved when water systems governance followed Confucian order. Tales recorded in the *Treatise on the Yellow River and Canals* by the Han historian Sima Qian (Ssu-ma Ch'ien) demonstrated transgressions in proper governance, though not always intentional. In one instance, during the reign of Emperor Wu (circa 141-87 B.C.), the Yellow River broke from its canals at multiple points, forming new channels. The emperor was inclined to repair the breaches, however:

At this time T'ien Fen, the marquis of Wu-an, was serving as chancellor and his income came from an estate in Shu. Shu is located north of the Yellow River, and since the break was on the southern side, suffered no damage from floods; on the contrary the revenue from the estate actually increased. T'ien Fen said to the emperor, "Breaks in the banks of the Yangtze and the Yellow River are all the work of Heaven. It is no easy task to stop up such breaks forcibly by human labor, and indeed to do so would hardly be in accord with

the will of Heaven!" The emperor therefore hesitated and for a long time made no further attempts to repair the break. (Watson, 1961)

It was then assumed that the break in the river was destined to be so, in this case betraying Mencius's adherence of the will of Heaven belonging to the people. This story is followed up by tales of more changes to the Yellow River made during Emperor Wu's reign; these changes almost always serve some sort of purpose to localities. For instance, people would suggest using new breaches to irrigate stretches of farmland, or dig new canals to make transporting grain more efficient (Watson, 1961, 72-74).

Later, a period of drought and instability ensued, and the Emperor Wu was so distraught that he composed a song about the damage caused by the river. In his song, he lamented the alterations that had been made to the river by his administration, and sang of the freely encroaching wilderness:

The river raged from its boundaries...

It has left its constant course...

Dragons and water monsters leap forth,

Free to wander afar. (Watson, 1961, 76)

He then wished for the "return to the old channel", and spoke of the lack of resources impeding his administration from being able to stop up the water. He blamed the people of Wei for this, not himself. Following his song, the emperor himself set about returning the river to the channels it followed during the time of Yu.

Water Governance as Integral to State Stability

A brief survey of Chinese hydraulic systems is necessary to give appropriate context to these tales of water governance in historical China. The most noteworthy aspect of management and governance of these systems is how little it has fundamentally changed over time. Like the above story of Emperor Wu, who found solutions in returning to past hydraulic methods, so too has the rest of historical China shown continuity in water management.

This is not to say that regional control systems did not vary, and change over time; as sinologist Mark Elvin (2004) puts it, water control was not a “changeless bedrock of despotism” (117), it was subject to shifts in technology and changes in the climate and landscape. Despite superficial changes, Elvin (2004) introduces a premodern “technological lock-in” which began to afflict the Chinese water-control economy by the eighteenth century. The phenomenon describes a technological system in which an already established infrastructure is prioritized over more efficient alternatives. Elvin uses it to describe the idea that the existing Chinese hydraulic infrastructure was so thoroughly developed and engrained within society and economy that trying to overhaul or replace it would be a significant loss on investment, so to speak. The modern time period has afforded new technological pathways, though “the magnificent but onerous heritage of the past remains” (Elvin, 2004, 124). The primary reasons for how this phenomenon gradually atrophied the Chinese hydraulic system has explanations based in both government ideology and economic structural realities.

The ideological foundations of the Chinese hydraulic system are demonstrated in the myths and records. The Confucian majority held sway over not only politics and governance, but also sectors of engineering and hydraulic works. As an agricultural economy, water control and allocation was central to state interest. Various regions received alternating state attention based

on fertility and output potential, control over which was often entrenched in political and socioeconomic debates. Hydraulic structure and design was also subject to competing ideologies in China, such as Confucian and Daoist engineers who maintained separate opinions of the nature of water. The various schools of thought argued over things such as placement of dykes and levees, based on an overall perception of how best to manage flows of water.

There was dispute between Daoists and Confucians over the overall hydraulic structure for flood control, wherein some engineers favored high dykes, and others preferred deep channels. Deeper than that, "it took the form of a conflict between two systems of morality, one in [favor] of confining and repressing Nature, the other in [favor] of letting Nature take her course, or even assisting her to return to it if necessary" (Needham & Wang, 1971, 249). The Confucians referred to dykes and levees as extensions of law and order, methods to force the river to conform to flow patterns that would complement human society. Daoist thought favored methods that would not obstruct existing natural sequence like excavating deeper river beds. In terms of water systems governance, the Confucian side generally won.

Following the Iron Age (circa 510 B.C. and onward), the various Chinese states, and later its unified nation, had the sheer numbers required to create major hydraulic feats accompanied by private land ownership. Additionally, the "geo-climatic conditions of China exerted an irresistible influence upon Chinese society in the direction of strengthening [centralized] government" (Needham, 1971, 264). Especially in terms of the major projects, Chinese civic engineers had to plan for river systems that transcended feudal boundaries. Joseph Needham (1971) uses an excerpt from an imperial edict to illustrate this point, in which agriculture is designated as "the basis of the whole world," from which people can obtain food and over which

only the central government can oversee in its entirety (264). Coupled with Confucian authority, the state would frequently play a dominant role in hydraulic projects of increasing scale.

The economic basis for maintaining water systems can now be explored while keeping in mind the ideological basis for both stringent, state oriented control of water resources, coupled with a focus on agricultural production. The economic order followed Confucian tradition of social order, ideally prioritizing the people over the wealth of the state. Records from the statesman Chao Cuo (178 B.C.) during the Han period demonstrate a reverence for maintaining this tradition:

The reason people never suffered from cold or famine under the rule of the sage kinds was...that they opened up for the people the way to wealth... Provisions had been stored up in plenty and all precaution taken beforehand... An enlightened ruler, realizing this, will encourage his people in agriculture and sericulture, lighten the poll tax and other levies, increase his store of supplies and fill his granaries in preparation for flood and drought. Thereby he can keep and care for his people. The people may then be led by the ruler, for they will follow after profit in any direction like water flowing downward.

(Watson, 1999)

Giving agricultural products and essential objects higher value than nonessentials would reflect good state behavior, in this case. Up until the Han period, this was the economic standard in Chinese policy. At this point the balance between government spending and allowing private behavior shifted, and expansion was the cause. During the agricultural crisis of Emperor Wu's administration, the state was faced with internal crisis, and at the same time was conducting a

campaign of imperial expansion. In order to increase state revenue and refund the costs of imperial expansion, Emperor Wu targeted the traders and industrialists with amassed fortunes, exploiting them with any excuse in order to divert their wealth back to the state. He created "government monopolies in iron, salt, liquor, and coinage of money..." (Watson, 1999, 359) in order to grow the imperial treasury. These measures strengthened government revenues but spread poverty to the people. Following his demise, the famous *Discourses on Salt and Iron* (盐铁论 *Yantie lun*) occurred between top Legalist officials and Confucian advocates to either continue or end these policies.

The Legalists were a rival faction to the Confucians, originating around a similar time period. The Legalists flourished during the -3rd Century (a tumultuous Qin dynasty just before the Han). Their position held that the Confucian style of a paternalistic government was not sufficient for an authoritarian state. Confucian administration relied on *li*, a combination of "customs, usages, ceremonies and compromises...administered according to Confucian ideals" (Needham, 1956, 205). The Legalists instead promoted *fa*, positive law that were already fixed for the people to follow. To some extent, positive law separated the law from the ruler; with the former set in place without requiring perpetual morality checks, the ruler would be less actively involved with daily legal processes. As opposed to Mencius' assertion of the direct connection between the people and Heaven, Legalist theory supposed that "Law is the authoritative principle for the people, and is the basis of government; it is what shapes the people" (Needham, 1956, 206). A strong juridical backbone would guarantee an orderly society, so long as people were kept well in check through a system of tough discipline. The Legalist doctrine is indicative of a more severe totalitarian method than Confucianism; a despotic ruler combined with harsh

punishment for disobedience, while traditions and artistic or scholarly pursuits represent "Parasitic" (Needham, 1956, 208) functions that weaken the State. According to Needham,

The phenomenon of the Legalists was part of that great revolution during which Chinese society passed out of its classical stage. When the wave receded, the intermediate feudal lords were no longer there, but nor was authoritarian positive law unrelated to ethics; only the bureaucracy, administered by Confucians rooted in custom and compromise, remained as the permanent network of government in a society based on agriculture and hydraulic engineering" (1956, 215).

However, this bureaucracy also no longer adhered to classical Confucian tradition. During the *Discourses on Salt and Iron*, some Legalist advisors of the Emperor invited a small group of Confucian scholars to attempt to advocate against state monopolies. The government argued that fiscal policies were necessary to maintain defensive warfare in expanded areas, and protect the people from exploitation for private gain. The Confucians responded that expansion was unnecessary, and China should retain its traditional boundaries. Government monopolies were harming the people by impoverishing them and forcing them to use goods of lower quality, and created new competition between the government and its own people (the private sector). Increased foreign trade brought with it unnecessary luxuries. (Watson, 1999, 360). Officially, the debates ended without a definite conclusion, and the monopolies held. The *Discourses* would repeatedly crop up in the form of either peasant revolts or challenges to this Legalist stronghold of economic order throughout the rest of history.

The nature of these debates concerning the economic priorities of the state should be considered in the forthcoming discussion of Chinese hydraulic systems. Governance of these systems involves multiple administrative levels, even within a state that idealizes authority over water control. In this way, “hydraulic despotism is not a total myth, but, as should be apparent from the above, an inadequate description of a more complex system that also changed over time (Elvin, 2004, 118). Over time, however, rising population pressures and atrophy caused by pollution and growing scarcity of water systems prompted the formation of new socio-political organization toward hydraulic systems - that being increased state involvement.

Given that hydraulic systems are already a massive source of resource consumption, the Chinese state has increasingly spent additional resources alternating between new irrigation, transport and water control projects, or trying to reverse and commandeer deviant sections of the river. Elvin (2004) calls this behavior paradoxical; he writes,

The same skill in water control that had contributed so greatly to the development of the Chinese economy in ancient, medieval, and even in the early part of late-imperial times, slowly fashioned a straitjacket that in the end hindered any easy reinvention of the economic structure... Hydrological systems kept twisting free from the grip of human would-be mastery, drying out, silting up, flooding over, or changing their channels. By doing so they devoured the resources needed to keep them under control or serviceable. And made these resources unavailable for other purposes...No other society reshaped its hydraulic landscape with such sustained energy as did the Chinese, nor on such a scale, but the dialectic of long-term interaction with the environment transformed what had been a one-time strength into a source of weakness. (164)

At the same time, maintaining the vestiges of a premodern hydraulic system faces pressures from natural changes in flow patterns, sediment deposits and ecological systems changes. The Chinese methodology for complete control over water systems conflicts with the inherent changing of an ecological system. Economically, this results in “far more [being] spent over the long run on maintaining a system that is ever expended on its creation... Once the opportunities that are profitable given a particular level of skill have been used up, trying to go further is a waste of resources.” (Elvin, 2004, 120). Even with this conclusion, the modern Chinese system is, in a sense, stuck. A complete overhaul of the existing hydraulic system would require not only a complete reshaping of societal structure, but it would require even greater amounts of energy and resources to achieve. Thus, the state must find new solutions to confront a crisis of identity, authority, and water governance.

Flood Taming in Modern China

“Mencius said, ‘The trees of the Niu mountain were once beautiful. Being situated, however, in the borders of a large State, they were hewn down with axes and bills - and could they retain their beauty? Still through the activity of the vegetative life day and night, and the nourishing influence of the rain and dew, they were not without buds and sprouts springing forth, but then came the cattle and goats and browsed upon them. To these things is owing the bare and stripped appearance of the mountain, and when people now see it, they think it was never finely wooded. But is this the nature of the mountain? And so also of what properly belongs to man; shall it be said that the mind of any man was without benevolence and righteousness?’”

- Taken from Gaozi I (J. Legge, trans.)

Based in the myths and passed down through historical records has been the longstanding establishment of the Chinese state as flood tamer. Water control has been central to state authority as the integral resource needed for an agricultural economy. With a recent shift from agriculture to manufacturing as the dominant sector of China’s economy, the role of water is no longer as cut and dry as the myths suggest, and demands new and complex forms of governance that challenge longstanding ideologies. New floods manifest in the form of environmental and social pressures which place the stability of the state and its interaction with the people at a crossroads. A series of identity crises have emerged within the past century for the Chinese government, in terms of how much influence it should exert over both social livelihoods and industry, in the wake of a rapidly globalizing and modernizing world. As a governance structure stabilized by deep ties with both philosophical ideologies and valuing highly structured kinship networks, China faces new outside pressures which compromise the legitimacy of these longstanding institutions. Water itself plays an even more perilous role in modern Chinese society, wherein a hydraulic structure with two thousand-year-old roots is strained with a new crisis of scarcity.

Brief Overview of the Modern Era

Deng Xiaoping's decades-long "Reform and Opening" (gaige kaifang 改革开放) period of development involved comprehensive economic reform and political modernization intended to launch China's economy out of its stagnation from the Mao Zedong era. Deng's administration allowed development of a semi-capitalist economy, incorporating market forces and designating special economic zones to create incentives for increased production output. No one was prepared for the breakneck industrialization that ensued; the prospect of new wealth enticed every family household to produce steel out of backyard furnaces to escape the abject poverty that Mao's legacy left behind. A state-owned enterprise system faced new competition from lessened restrictions on privatization, and factory bosses sought ways to cut production corners to generate maximum output at minimal cost. The weak environmental policy in place at the time did little to prevent the ensuing widespread deforestation, pollution of waterways, landscape destruction and severe air pollution, because there were so few enforcement mechanisms for environmental policy in place at the local and provincial levels.

This pace of growth was unsustainable; it generated massive amounts of pollution and allocated a disproportionate amount of resources towards heavy machinery and energy production. China now faces a gradual deceleration of growth due to increased international pressures for sustainability, as well as a new need to rebalance its energy and resource consumption away from industrial production. The Communist Party is seeking to consolidate its authoritative control once again at the state level, to make production more efficient and exert greater control over resource allocation. This extends to environmental policymaking as well; the state is gradually shifting from a decentralized approach to the state applying top-down control to reign in local activities (Kostka and Nahm 2017). This pivot is accompanied by the concurrent

horizontal expansion of a civil society composed of associations formed by grassroots movements, individual activists, domestic and foreign non-governmental organizations (NGO) responding in turn to the many perceived social, environmental and political issues arisen from the reform era. This movement is both characterized and complicated by the advent of social media and reporting technology, and increased foreign interest by external organizations seeking to interact within China.

Factoring Water Scarcity into State Governance

China is separated geographically into water-scarce and water-secure regions based on processes of desertification reducing water capacity in aquifers that serve as water sources for major cities. Water scarcity entails the lack of access to clean drinking water, as well as water used for hydration purposes, and is divided into subcategories including economic scarcity and physical scarcity (“Water Scarcity” 2014). Rapid industrialization and urbanization in the modern period motivated the state to concentrate its scarce clean and accessible water resources in urban centers, resulting in mass migration of citizens from rural provinces (Dalin et al. 2015). The government attempted to restrict these outflows of migrants with residency laws in cities, resulting in illegal groups of people in cities, and even more displaced migrants in transit (Shapiro 2012, 48).

Policy-wise, some provinces are designated as “water exporting” (Zhao et al. 2015), or are made to transfer their water via dams or man-made channels to drought-stricken areas like Beijing and its surrounding territory. They are then left lacking substantial resources. Growing urban populations also consume the majority of what is known as virtual water, or the embodied water capacity of all manufactured and traded goods and products consumed (Zhao et al. 2015).

Studies have mapped virtual water flows to reveal disproportionately high concentrations in both water-scarce and water-secure urban centers (i.e. both Beijing and Shanghai, respectively), contributing not only physical data, but also data on metaphysical resource flows, to an overall perception of water scarcity in China (Feng et al. 2014).

North China especially faces physical scarcity from desertification so severe that policymakers have initiated a megaproject to divert water from the southern Yangzi to the Yellow River (Shapiro 2012, 48), named the South-North Water Transfer Project. This endeavor follows other major attempts at manmade restructuring of the landscape like the Three Gorges Dam, completed in 2006. Scholars use the term “technocratic” to explain modern Chinese policy, of using scientific and technological advances as a means to control resource flows; this control extends over all who rely on those resources (Moore 2014). Massive projects consume resources and pose costs to all sectors of society, not to mention environmental reparations such as pollution and disenfranchised populations.

The Chinese state has a longstanding legacy of water control to justify such colossal and often detrimental feats of technocratic engineering. This can be demonstrated using the South-North Water Transfer Project as a case example. The project is designed to improve urban water supply in cities including Beijing, by physically redirecting 45 billion m³ of water annually from southern regions with little to spare, into a drought-stricken northern region trying to sustain the nation’s capital and industry centers (TheStructuralEngineer.info, 2018). On surficial review, the energy and resources required to physically redirect an already limited supply of clean water does not reveal a substantial payoff in the long term. Furthermore, intentionally reducing the water resources of one province at the benefit of another runs the risk of disenfranchising communities in the losing province. With all of these things considered, the Chinese government

still appears to depend upon physical reshaping of the water systems as a solution to scarcity.

The conclusion to be drawn from this is that the Chinese government still relies on authoritarian control of water systems, like the sages did, in order to create state stability. However, historical patterns show that this method is inherently unsustainable.

Water control systems are historically integral to China's societal function. Early developments in hydraulic infrastructure contributed greatly to the country's early economic development and success; reworking the landscape to such a vast capacity, sustained over a long period of time, has left a water system with foundations in ancient infrastructure left exposed to the changing nature of water patterns over time (Elvin, 2004) – in short, an inevitably unstable hydraulic system. In addition to this phenomenon, the post-reform era has brought with it unequally distributed water scarcity, affecting major portions of China. It is for this reason that administration cannot simply return to the 'Way of the Sages' like Emperor Wu did (see page 12). Resource scarcity in any form was obviously not a contentious issue in ancient history, nor was there global competition for resources. Significant, however, are the lasting patterns in China's hydraulic infrastructure that now pose a threat for excessive resource consumption.

Elvin explains this phenomenon well, in his documentation of lasting hydraulic patterns. Water and hydraulic systems are inherently violent, subject to power structures associated with control and distribution of resources. Water systems are regionally affected both by the landscape and climate; these include factors such as clean water availability, changes in the landscape, and geophysical characteristics. Over time, humans responded to these changes with new technologies of control, often accompanied by side effects such as pollution, droughts, low water channels, and sediment deposits. Socially, increasing competition for water resources resulted in individual socioeconomic standing being "inversely correlated" with clean or dirty

water (Elvin, 2004, 116). With advancing water use in industry, especially during the Deng administration, water allocation also became subject to conflicting resource needs, like drinking and washing water versus the need for strong currents for generating energy.

Elvin (2004) identifies a slow atrophy effect of premodern hydraulic techniques over time that contributed to lasting infrastructure problems. He uses historical examples of Lake Enlai, continued divisions and merges of the Yellow River, and ceaseless efforts to control and dredge human-contributed silt and sediment deposits from the river systems (140). In another example, there are specific accounts of the geometrical shapes of various enclosures of the Qiantang River system obstructed its flow in various ways over time, causing repeated damage to dikes, levees and other protective structures (Elvin, 2004, 152). He writes,

The present-day course of the lower Qiantang River is thus only a little more than two hundred years old. That its earlier pattern is wrongly shown in almost every published Western historical map, and all but a handful of Chinese ones, is a minor matter. What is important is, that in spite of serious efforts at engineering in the eighteenth century, the changes that have been described above were predominantly the work of natural forces outside human control. (Elvin, 2004, 152)

Humans were indeed to blame for abnormally large sediment deposits in rivers over time. This was primarily due to irrigation efforts redirecting changing the force of the river, so that the sediment flowing from the river would not so easily be swept away by the ebbing tides, and instead would collect in the river basins and points of opening (Elvin, 2004, 153).

If technological lock-in of hydraulic systems began by the late Qing period as Elvin suggests, then it is concerning that the choice method of responding to climatic changes would be to physically redirect river systems. The Chinese government has framed the South-North Water Transfer as only a placeholder for future solutions, yet this placeholder mirrors two-thousand years of water control. However, alternative solutions are becoming more relevant through budding external modes of governance in China.

Emergence of Civil Society

Modern China is the contemporary product of thousands of years of civilization, and as such civic discourse has been around equally as long. Only since the end of the Mao era has horizontal civil development been allowed and encouraged to occur; political reform, modernization and development of a market economy have further enabled its development (Kluver and Powers 1999).

The assumption that China has been hesitant to allow horizontal development stems from Western connotations of civil society. Modern civil society expansion facilitates more citizen participation in governance, which presents a challenge to any regime if mismanaged. At its base civil society indicates an intermediary space between society and state, wherein associations and civic groups utilize resources to advocate for various causes (Unger 2008, Ming 2014). Western frameworks assume that civil society acts as a conduit for increased government transparency and accountability by facilitating citizen participation (Teets 2014), implicitly democratic in nature, posing an automatic threat to an authoritarian regime. Some authors cite this threat of democracy as an inevitable conflict to any non-democratic state. They consider civil society as a catalyst for too much public debate and thus lessened government control (Yuen 2015), offering

contentious rivalry to states that rely on information controls and propaganda to contain citizens. This is itself a skewed notion of propaganda, assuming it is confined to non-democratic states (on the contrary, it is well known that propaganda is a ubiquitous societal tool used by governments and politicians alike to promote any sort of agenda). In some literature, China is said to have “borrowed” civil society theory from the West to restructure its new market influenced state-society relations and construct a framework for modernization (Jirong 2014). This does not necessarily assume democratization, but can be problematic if the ensuing discussion disregards the long history of Chinese civilization.

Classical Chinese intellectual traditions had no vocabulary for *civil society*, until the Chinese equivalent was adapted from the Western translation during the modern era (Madsen, 2002, 190). Because there is a relative dissonance between the Western orientations of the term *civil society* and the existence of a Chinese civic sphere, “civil society and new ways of developing such a society, even if they are not completely sure what to call it and how to link it – if it can be linked at all – with their cultural traditions” (Madsen, 2002, 190). This initial distinction between civic discourse and formal civil society helps to separate a growing understanding of contemporary Chinese civil society from China’s long civic history.

Scholars like Richard Madsen present alternative theories of developing civil society in China that originate from a non-Western context. In Madsen’s case, this involves a neo-Confucian interpretation of civic associational life. While some of his content is more aspirational than established, he does reflect well upon the lasting effects of Confucianism on modern Chinese associational life. He notes that a framework for civil society that originated out of Western enlightenment thinking is fundamentally different in structure than its Chinese counterpart. Where Western social units have clear demarcations based on various

classifications, Chinese society is more fluid, wherein social influence stems from an individual and ripples into larger social circles (Madsen, 2002, 192). In other words, Chinese social affiliations are produced on a more holistic, less rigid condition. Within this configuration, it becomes more difficult to create rigid boundaries between public and private institutions, and categorize forms of association. It also forms a lack of a coherent distinction of a civil sphere. In this case, kinship values including these ripples of social affiliation must be taken into account in an analysis of any association in the civic sphere, in order to fully understand its role and effect.

Given the longevity of Confucianism in governance of civic systems, namely in the case of hydraulics, it is unlikely that those values would be completely disregarded in any endemic Chinese civic associations. Given that associational life in China is based on a community scale and influenced by kinship networks, there are certain organizational factors associated with Confucian and neo-Confucian social orientation that can impact civic participation. For instance, many agricultural communities in rural provinces rely on village organizations to direct associational life. These organizations rely on a series of community interfaces that integrate Chinese kinship networks into the organizational structure of the village association (Plummer and Taylor, 2004, 69). These relationships and cultural nuances dictate member participation and roles, and are often directly integrated with the community structure. This is why modern organizational civic life in China has stemmed from the grassroots, as opposed to external interference.

Instead of using just the term for *society* (*shehui* 社会), Madsen suggests using the term *minjian shehui* (民间社会) which means people-based society (Madsen, 2002, 193). This changes the terminology to a phrase that mirrors the ripple effect of Chinese associational life. It also has the important effect of reducing the urge to "assume that people-based groups cannot

properly exist without the general permission, guidance, and supervision of the government" (Madsen, 2002, 193). This idea also encourages an outlook of the government not as interfering with private life in a top-down manner, but ideally as an entity able to recognize autonomy where it is due. In fact, Madsen cites a reluctance of Chinese and Taiwanese associations to declare full autonomy from the security and benefits of government support (193). Madsen is keen to note that the Confucianism taught by Mencius does not include additional Legalist notions of strict hierarchies; rather, it is a system of reciprocity between family members and other relationships focused on correcting immoral behavior (Madsen, 2002, 195). Nevertheless, he writes "there is less principled support for moral pluralism and more of a tendency to equate civility with social consensus than there would be in the classic liberal or the liberal egalitarian visions" (Madsen, 2002, 198).

Madsen's pure Confucian vision contrasted with the reality of form that civil society is taking in China reveals the clash of Legalist and Confucian thought, even in the modern time. The state's desire to exercise authority over horizontal development that is already susceptible to Madsen's suggestions of social consensus reveals the clash of Legalist advocacy of full state authority, and Confucian advocacy of leading through the people. Allowing civic development to infiltrate the hydraulic sector that the state has been struggling to control is a perfect demonstration of these ideological challenges. Where efforts like the South-North Water Transfer Project implemented by the state appear to be so unstable, allowing civic associations to slowly develop might signify more long-term, sustainable solutions.

Cases for Sustainability of Chinese Hydraulic Systems

Overview of Civic Associational Development

Modern ecological crises and disasters affect larger and denser populations, and relief aid distribution can no longer be confined to the responsibilities of the state. Initially, the majority of NGOs endemic to China originated in the grassroots. For instance, the Sichuan earthquake of 2008 required more responding power than the government could lend, and multiple volunteer groups interested in distributing aid and relief for the victims emerged from the grassroots (Bragg, 2003). Crisis lends a context of opportunity for civic associations and services to emerge and take action external to the role of the government, creating a new sector for themselves in civil society. This space requires “a state that can provide order and create the political and regulatory framework within which civil society organizations can pursue their goals in a nonviolent manner” (Bragg 2003, 194). The widespread benefits of allowing such organizations to act in relief and take part in other humanitarian sectors spurred the Communist Party to rapidly adjust policy that would be more accommodating to increased NGO activity. The Party now grapples with creating more stringent regulatory devices against potentially destabilizing outside influences, while avoiding any policies that might stifle expansion of these groups.

The term “authoritarian environmentalism” has emerged in response to the dominant literature framework of democratic environmentalism, which does not allow for expanded understandings of developing environmental consciousness in a non-democratic state. This phenomenon is understood by some to mean a central authority wielding the ability to produce a rapid, concentrated response to a single threat, able to mobilize large forces without obstruction (Gilley 2012). The Chinese Five-Year Plan system exemplifies this type of environmentalism; it

establishes a predetermined budget for every industry area, including environmental sectors. This method of governance excludes or fragments certain social actors (Gilley 2012). In some cases, this is evident by improper community participation, or lack thereof. During the Mao Zedong period, the government exerted total control over state functions and policy, with no community or citizen activism. Later, the Deng administration initiated reform by allowing the people themselves to conduct administration of agriculture on a community level, and rewarded innovation where it was previously discouraged. No longer restrained by a quota system that determined how much they could produce, farmers were motivated to expand their output, and suddenly exerted some shaping influence over agricultural policy.

Later, the state quickly recognized the benefit of the hundreds of thousands of grassroots organizations that formed in the wake of the catastrophic damage emerging out of industrialization. These groups act on a community level, in response to welfare challenges, disaster relief and other social challenges. Citizen participation on the provincial and individual levels is now a key asset in adapting to water shortages. Farmers are able to make decisions towards water saving techniques in irrigation and agriculture, waste management, maintenance and flooding (Taylor, 2004). The government relies on feedback at these levels as a means to inform overarching policy decisions at an administrative level. Sequentially beginning with the 1982 12th CCP National Conference, the Party endorsed grassroots development, then specified grassroots democracy, and later included more policies to enhance social development and self-governance strategies at a community level (Jirong 2014). This demonstrates the fact that initial expansion of the civil society space was initiated by official government policy, a sign of at least some state endorsement.

Chinese Characteristics of Civic Associations

Most environmental NGOs are not directly affiliated with the government other than their compliance with its regulations (Schwartz 2004), and thus can access channels of governance without direct control by the state. They are private institutions and thus have some difficulty obtaining funding within a system that dislikes foreign aid, yet they are not able to utilize state assets (Schwartz 2004, 37). They perhaps face the most obstacles within China based on the government's aversion to the Western interpretation of NGOs as democratizing elements. They end up lacking in human capital, and they tread the line between affiliating too closely with any one region and maintaining the good graces of the government (Schwartz 2004).

Environmental Government Organized Non-Governmental Organizations (GONGO's), on the other hand, avoid many of these shortcomings because they have the explicit approval of the government branches funding them. They employ skilled bureaucrats who are used to Chinese politics and, as a result, have more room to operate. Nevertheless, they can be prone to corruption and are criticized for lacking enough autonomy from the state (Schwartz 2004). Semi-NGO's are most capable of policy influence due to the higher quality of their work, their affiliation with and funding from the Chinese university system, and the wider range of independence they enjoy from the other two. This is because they often originate as GONGO's or government bodies, or they incorporate members from said positions who work well within the Chinese system.

These developments are not without constant policy adjustment by the Party; policymakers are constantly trying to achieve a balance between 'harmonious society' and social autonomy, and sustained authority of party branches in these localities (Jirong 2014, 209). Trying to predict the direction of these policy changes is a blurry area. Researchers perform

studies to uncover hints of a potential new democracy in China in various ways, such as assessing student interest in environmental activism or protest (Stalley et al. 2006), observing media activism and other art forms for radical tendencies (Margherita 2014), environmental artists (Schell 2014), or through more traditional case studies of public awareness and environmental social activism (Wu 2009).

Searching for an emerging Western-style of democracy out of this grassroots phenomenon might be misdirected at best; in recent years, the Party has developed strengthening policy initiatives to envelop civil society into a larger governance framework. Mencius mandated that "Heaven sees according as the People see, Heaven hears according as the People hear", incorporating some more democratic aspects to Confucian thought that previously focused less on government administration and more on individual and social knowledge (Needham & Wang, 1956, 16). Wherein these thinkers sought to not only indoctrinate their pupils with social theory and philosophy, they also wanted the government to privilege the welfare of the people over state wealth. Revolutionary movements, even those contentious as that which brought Mao to power, present a critique or discord toward the relationship of the state to its people, maintaining a central focus on the people.¹ The legacy of the *Discourses on Salt and Iron* demonstrate conflicts in opinion of how best to wield state power and authority. Political scientist Ming Wan writes,

The managers of the empire argued for practical solutions such as state monopolies of salt and iron to centralize the state and conquer the nomadic Xiongnu and touted policy successes they achieved from this. Their scholar critics wanted moral principles rather

¹ This is not to condone biases of class, socioeconomic status, gender, and other statuses/identities that have been perpetuated and even violently enforced in history, especially during the Mao era. These revolutions are not always beneficial or successful, and do not always achieve the desired quality of life.

than material calculations to guide policy and asserted that human suffering caused by monopolies and expansionary war would doom the empire. This tension between ideals and political necessities created an ideational foundation for the successful Chinese empire, which then lasted for two millennia... China has had its own imperial overreach and understands the cost of extensive adventures beyond its borders and how excessive reliance on force abroad might threaten their domestic political order, which is what the current Chinese government is most concerned about. (Wan, 2012, 1)

Creating aspects of a harmonious society while keeping the state in service to the people have historically been central to maintaining the Chinese domestic political order Wan mentions. During the Mao period, citizen education and the role of civic life was curated with the intention to indoctrinate the people according to Maoist thought, an exercise in state dominance of social order. Further onward into the modern period, the private sector and the state still struggle over issues brought up by the *Discourses* including monopolies of industry and agriculture. For instance, recent allowances (as of 2017) have been made for salt producers to sell directly to the market – a recent change to a two-thousand-year-old monopoly on salt (Hancock, 2017).

From Ideological Changes, to Substantive Cases

A brief analysis of cases of policy, and the new levels of organization incorporated into associational life will serve to illuminate the changes taking place. Given the water scarcity afflicting the mainland, state policy is intended to allocate clean and potable water resources as it sees fit. However, water usage is divided in China between sectors, stretched between industries and human consumption. Still more is lost to pollution from factories and mismanagement.

While there are some NGO's and organizations dedicated towards increasing water quality and access for individual communities, there are others organized toward a more holistic approach of water allocation in general. After a brief overview of recent changes to NGO policy, a few cases specific to the water sector will be addressed to demonstrate such efforts.

The post-reform period of environmental policymaking demonstrated a shift from loose local restrictions, to the state applying a top-down approach to reign in local activities (Kostka and Nahm, 2017). The Party system has within the past decade advanced its regulations on NGO registration and activity, especially on foreign NGOs (Yuen 2015). As it stands, a foreign NGO cannot prescribe to an aspect of the Chinese system and expect to integrate flawlessly, though most active NGOs are either partnered with an external funding source or have a parent organization outside of the Party state. The government uses NGO registration to exert authority over an organization as it sees fit, and thus registration is a highly politicized activity. A major portion of social organizations remain unregistered and rely on external sources of funding and resources to function, whether due to scale or political motivations, and in some cases, are even encouraged by provincial level governments for economic or political reasons (Hildebrandt 2011). However, the government is showing an increased willingness to encourage harmony between foreign and external NGO's and local organizations.

As of 2017, three laws have stood out in the foreign NGO sector of Chinese policy. These are the Charity Law, the FNGO Law, and the Reform Opinion, which apply directly to foreign NGO's seeking to register in China (Policy Analysis, 2017). They officially legalize state monitoring of domestic and foreign NGO's, effectively ending the chance for shady political suppression of some NGO's. Laws such as these extend the security net of the state over external NGO's as well as grassroots. In other words, they legitimize the role of these associations have in

shaping state policy. There are still extensive shortcomings to the flexibility, breadth and privileges of associations in China, especially with those addressing contentious areas like human rights and acting within certain regions. Additionally, it is a highly complicated procedure for some external organizations to register with the state, although these vetting processes are consistently being alleviated (Policy Analysis, 2017).

The role of external organizations in enhancing community participation is growing, especially in areas such as rural development. Many of these organizations serve as educational tools, working with local village organizations to improve efficacy and outreach (Plummer & Taylor, 2004, 82). These interactions require a substantial learning curve on either end, wherein mediation between organizations is necessary to transcend cultural boundaries, most essential for the external organization to become accustomed with the networks of social organization and interaction in the area. With these caveats, often the primary benefit to involving external organizations revolves around an influx of funding. In terms of water, this is especially beneficial for poor rural communities suffering from dilapidated hydraulic infrastructure and little state financing.

A case study of one such community demonstrates the specific intersections of external with community life:

Researchers Li Ou, Tim Zachernuk and Han Yong document the Piyuan Canal Rehabilitation Project (PCRP), initiated in 1998 by the Dutch government in partnership with local organizations. Funded US \$10 million from Dutch sources and US \$5 million from the Chinese government, the project sought community relief through the rehabilitation of the Piyuan Canal. Construction for the canal began during the Great

Leap period (1958-61), but was never fully completed and thus did not efficiently contribute to irrigation. They write, “This is a result of low design standards, poor construction quality and, especially, the lack of operation and maintenance mechanisms” (231). The key feature of the rehabilitation project was to introduce Water User Associations (WUA) as a key component for maintaining the project. The second key component to success for the project was the money provided by the international donors toward the project. The authors note, “At a national level, it has been recognized that the existing management system of the large and medium-sized irrigation districts can no longer meet the demand for the development – and the [maintenance] – of irrigation systems” (233).

The authors also note the presence of “institutional problems” concerning the lack of appropriate governance structure at the community level for maintenance of canal and irrigation systems (235). These include old compulsory labor practices, which resulted in poor management, as well as a lack of efficient tax measures. The primary measures for reform and maintenance of the canal system was a direct participatory role for the water users, including farmers, on a structured planning basis. The key components of the user base consisted of stakeholders for the project, at every level from individual to township, to commercial and government officials. This ensured a system of checks at every level of management, at a level of inclusiveness not previously achieved. (Ou et al., in Plummer & Taylor eds., 2004, 230-268).

The primary takeaway from a case study like this one is the role the external organization plays in alleviating water-based strain on the community, enhancing the government but

mobilizing the people. It also demonstrates an essential lack of dominant state authority in an area of water governance. External organizations are for various reasons recognizing the dormant resource potential of an area, and through facilitation of developing NGO laws in China are able to access the area to create sustained change. They are demonstrating the revival of a community that was suffering from instability due to state negligence. Through the aid of an external entity, the community is reclaiming governance of a hydraulic system on a local scale, without affecting regime stability of the Chinese government thanks to its participation. Here lies one pathway for local implementation of hydraulic rehabilitation. It shucks the Legalist assumption of full authoritarian control of a resource, while promoting Confucian methods for giving prominence to the welfare of the people as a resource for state power. It reveals an avenue for the state to remain legitimate by adhering to Confucian tradition, while allowing the aid of external organizations to supplement the longtime atrophy of hydraulic systems.

Analysis and Conclusion

Through massive infrastructural projects intended to reallocate water, the Chinese government is attempting a short-term, unsustainable solution to a crisis of water scarcity. Internally, the Chinese state has little experience dealing with such a crisis that cannot be solved with better control of water; rather than scarcity, the country has always feared floods. However, the new flood presented to the Chinese state is one that has been gradually building throughout time, manifesting in the form of recurring conflicts in social order and governance structure. Returning to the story of Emperor Wu clarifies this point:

Upon surveying a break in the Yellow River at Hu-tzu, the emperor realized that there were few trees left to form barriers, as the people had deforested the area for agricultural purposes. He was distraught because there was no immediate way to close the river breach in the traditional way. Rather than thinking of an alternative solution to the problem, like allowing the river to stay its new course and resettling the people, the Emperor blamed the people for using up the available resources to dam the breach. He sang,

Let us return to the old channel,
And we will truly bless the gods...
The river rages on...
But there is not enough brushwood –
The fault of the people of Wei.
They have wasted the land with fire...

After Wu successfully gathered enough resources to close the breach, he was convinced that the people were given too much authority over their resources and technology. He later initiated the monopolies on salt and iron, setting the stage for the government of China to exert more and more control over the resources of the land. (Watson, 1961, 76-77)

As this story demonstrates, and repeated with each recurrence of debates similar to the *Discourses on Salt and Iron*, the Chinese state has demonstrated a paradoxical unwillingness to allocate too much resource authority to the people while refusing to modernize its governance strategies. Like the Emperor Wu who lamented the people and the river from straying away from the Way of the sages, the Chinese state has demonstrated a reluctance to seek non-traditional modes of water governance. Instead, replacing premodern river control technologies with even more advanced and grand technologies has been the state's placeholder, instead of moving away from authoritarian river control methods altogether. However, the trends indicated in this paper reveal a very gradual, reluctant exploration toward permitting lessened state authority over resources, at least in the case of water. Man-made redirecting of water is not a sustainable solution so long as water is scarce, and will not contribute to lasting regime stability, no matter how grand the canal project. The way of the sages for water control is no longer a feasible solution for water governance in China.

Methods

For this thesis project, I performed a classical exegesis of translated early Chinese texts, conducted electronic database research, and reviewed periodicals as well as applied literary materials. This paper is an attempt of a Foucauldian genealogy of ideas presenting an intellectual history of Chinese hydraulic thinking and associated governance methods. My intention in doing so was to pose a challenge to the existing perception of modernism in Chinese sustainable thinking, by presenting historical evidence of longstanding patterns of unsustainable governance methods contributing to the persistence of ecological damage.

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