

CROSS-CURRENTS



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Irrigation Society in China's Northern Frontier, 1860s–1920s

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Abstract

In this article, the authors examine the social and spacial organization of irrigation systems in the Hetao region (in current-day western Inner Mongolia Autonomous Region) during the late Qing and early Republican periods. Counter to Karl Wittfogel's thesis on the inevitability of centralized state bureaucracy in the formation and management of a "hydraulic civilization," the authors suggest that non-state actors played a decisive role in the construction of irrigation systems in this region on the northern periphery of the Chinese empire and the frontier of agricultural expansion. Their findings are more closely in line with Clifford Geertz's work in Bali and other more recent studies of irrigation societies, in that they demonstrate that the land-owning Mongol aristocracy, Han Chinese immigrant cultivators and traders, as well as the Catholic Church formed a network of land conversion agents, labor supply, construction management, and finance. These networks of non-state actors were decisive in building extensive hydraulic projects and shaping a multinucleated territorial politics in the northern frontier of the empire.

Introducing Hetao

The Hetao Plain is surrounded on four sides by the Alashan Mountains to the west, the Lüliangshan Mountains to the east, the Yinshan Mountains to the north, and the Great Wall to the south. Included in the territory are the Yinchuan Plain, the Ordos Highlands, and a portion of the Loess Plateau, an area that includes all or part of current-day Ningxia, Inner Mongolia, and Shaanxi. Typically, the Hetao Plain is divided geographically into two zones: the Yinchuan Plain, also called West Tao (Xitao), which sits between Qingtong Gorge (Qingtong xia) and the Shizui Mountain in Ningxia, and East Tao (Dongtao), which forms the Inner Mongolian portion of the region. At times, the term Hetao Plain referred simply to East Tao as distinct from the Yinchuan Plain. East Tao is also divided geographically into two areas: the Bayan Nur Plain, also called

Back Tao (Houtao), which is situated between Bayan Gol and Xishanzui, and Front Tao (Qiantao), which is situated in the Tumed River Plain (also called the Chille River and Hohhot River Plain) between Baotou, Hohhot, and Lamawan. At other times, the Hetao Plain has also been called the Hetao-Tumed River Plain. This study looks strictly at historical developments in the area just delineated as the Back Tao, or Houtao, region.

The Hetao region's geographical location is remarkable for its situation in a contact zone where sedentary agricultural and pastoral peoples have historically overlapped and interrelated. This region has also been severely drought-ridden for centuries, since changes in climate and human modifications to the land surface have reduced flora cover and abetted the expansion of the desert. In much of the region, cultivation is simply not possible without intensive irrigation, and dry farming in the region produces unstable yields, at best. These harsh environmental conditions, which exist in varying degrees throughout northern China from Hetao to the Hinggan Mountains, set significant limits upon the development of sedentary agriculture in the region.

In addition, this transitional zone experienced substantial social flux through the Ming (1376 to 1644) and Qing (1644 to 1911) dynasties, such that the shifting spatial division between sedentary and pastoral agriculture created an ever-broadening zone of overlapping land-use systems. Changes between pastoral and sedentary agricultural land uses in this frontier region signified important shifts in local production systems, as well as in relations between the state and society.

The Hetao region was first settled during Qin Shihuang's reign (246 to 221 BCE). Irrigation works in the region can be traced to the reign of Han Wudi (140 to 87 BCE), and evidence shows that the waterworks were maintained throughout a five-hundred-year period spanning the Northern Wei, Sui, and Tang dynasties, albeit never on a large scale. As a result of the limited penetration of sedentary agriculture in the region through the late Qing, the region continued to be a shifting contact zone of cultivators and pastoralists.

Studies of Hetao waterworks were first conducted in 1934 and 1936 by Gu Jiegang and other scholars, who examined the establishment in the late Qing of the region's eight large canals.¹ These canals formed a fairly complete and complex regional irrigation system. Water resource exploitation expanded along with wasteland reclamation, which itself was spurred by increases in the local settler population. As these scholars showed, these mutually reinforcing

processes of settlement and cultivation aided the region's final transition at the turn of the twentieth century from pastoralism to sedentary agriculture. Gradually Hetao became a stable agricultural area and a migration destination for Han people from many different regions, eventually becoming known as a "breadbasket beyond the Great Wall" (*saiwai miliang cang*).

This study poses the following questions: How did agricultural expansion take place in a frontier region at that particular historical moment? What were the key mechanisms, and who were the main actors that facilitated the transition from pastoralism to sedentary agriculture supported by irrigation works? If we consider the contentious process of agricultural expansion as a process of territorialization in which resources are redistributed, how exactly does such territorialization work at the physical and organizational levels in a frontier region where the reach of the state is limited?

Hydraulic Civilization Versus Irrigation Society

This study argues that water resource development in Hetao was driven primarily by non-state actors and thus points to a complex picture of local power relations on China's borderlands. It provides further evidence counter to Karl Wittfogel's thesis of the "hydraulic civilization" elaborated in his seminal work *Oriental Despotism: A Comparative Study of Total Power* (1957), in which he posits that large-scale irrigation requires and begets centralized and autocratic state power, which serves to explain the durability of large feudal empires such as Russia, Egypt, and China. Central to the idea of the hydraulic civilization is that such polities stymie the formation of all non-state institutions in order to suppress societal counterweights to the centralized state.

It should be noted that we raise Wittfogel's thesis here as a reference point in the historiography of Chinese state power, one with particular relevance to a discussion of Hetao for its treatment of irrigation and agriculture. Wittfogel's model has long been critiqued for its many shortcomings, among them its level of generalization and incomplete or selective empirical backing, and it can be characterized as a latter-day expression of highly durable misperceptions of Chinese development in Western treatments of the topic. Specifically, Wittfogel's thesis marked a last gasp in the line of thinking on China linked more or less directly to Marx's idea of the "Asiatic mode of production," and yet it came before a new phase of more critical historical work began to bear fruit. Like other Eurocentric theorizations of Chinese feudalism, the attempt

to explain China's perceived failure to replicate the West's alleged triumphs in democracy, science, and capitalism was central to Wittfogel's thesis.

Thanks to more recent studies, we have a better picture of historical management of irrigation, showing that flood control and irrigation in Qing-era China were mostly small scale and locally controlled (Perdue 1987; Finnane 2004; Zhang, Sun, and Zhang 2009). In line with these studies, we find that the organization and delivery of irrigation and water resources is, indeed, a relevant vector of analysis in understanding territorial power, as Wittfogel suggested. But the evidence we present below, derived from primary and secondary sources pertaining to a previously overlooked region, demonstrates that local power articulated through water management on the frontier was very much a negotiation among a wide range of actors and that the Qing state played a limited role in local events. As a consequence, the story we offer from the Hetao region shows that the frontier context was host to a changing constellation of ethnic power bases, migrant communities, merchants, Qing officials, and Catholic Church representatives. In other words, a variety of non-state actors particular to the geographical context of the Chinese frontier played determining roles in setting up and maintaining vital irrigation networks. The centrality of water management to survival in the challenging environmental conditions of the Hetao region present an occasion to rethink the nature of state power and Chinese territory in a moment of rapid and historic transformation, specifically the final decades of the Qing and the first decades of the Republic.

Helpful in rethinking the link between water management and social structures is work by the anthropologist Clifford Geertz, who delivers a powerful rebuttal of Wittfogel's hydraulic civilization thesis in *Negara: The Theatre State in 19th Century Bali* (1981). In this important work, Geertz shows that large-scale agricultural irrigation projects do not lead inexorably to the formation of despotic state power. In a richly empirical study, he illustrates how the Tabanan state, rather than assuming a leading position as an autocratic state actor, actually played a secondary support role in agricultural irrigation. Tabanan's water system was regulated within a ceremonial framework that did not necessitate centralized state power. When regular operations of local waterworks encountered obstacles that proved insurmountable through the existing ceremonial channels, local customary law would be applied to implement an appropriate solution.

This study conclusively showed that, in the Tabanan case, the state did not control agricultural production through centralized power.

In more recent ethnographic research on Balinese social organization, John Walter Schoenfelder suggests that pluralistic collectivism, which consists of many function-specific corporate actor groups, helps explain the complex structure of Balinese society (2003). Specifically, he finds that Balinese society exhibits a concentric integration of village, state, and irrigation management groups that form separate nested hierarchies. Further studies by Stephen Lansing (1996, 2000) and Stephen Lansing and James Kremer (1993) in Bali analyze the need to balance multiple agroecological concerns in a crowded landscape of terraced rice fields. Their research suggests that self-organizing temple networks are intrinsically capable of doing a better job of water management than either autonomous Balinese irrigation systems (*subaks*) or centralized hierarchical control.

In common with these studies, our focus here is on the interactions between social actor groups and the state in the process of constructing an irrigation system. In the different temporal and spatial setting of turn-of-the-twentieth-century Hetao, this study, like Geertz's work, highlights the development of water resource projects in the absence of centralized state leadership. But in contrast to Geertz's *Negara*, the Hetao region featured a high level of migration and fluidity. It lacked a solid framework for customary law, and its minority Mongolian population lived alongside a burgeoning majority Han Chinese population of agricultural settlers from different regions. No unified organizational structure held complete sway in this complex and shifting social setting. What emerged in this interaction was not a Wittfogelian "hydraulic civilization," but rather what we term an "irrigation society." The notion of the irrigation society serves as a conceptual frame to consider how settlers and original inhabitants determined relations of production and social relations in an emergent immigrant society.

Hetao as a Frontier

A second point of conceptual clarification concerns our description of Hetao as a frontier region. By electing to deploy the term *frontier*, we link this study to a growing body of historical and anthropological research focused on China's edge territories (Barfield 1989; Harrell 1996;

Schein 2000; Gladney 2004; Giersch 2006; Lary 2007; Leibold 2007; Dai 2009; Bovingdon 2010). These accounts point to the fringes of Chinese state space and cultural space as particularly fertile ground to examine the complexity of Chinese rule beyond the myth of the monolithic and homogenous “Sinic” core. But despite the recent interest in China’s peripheral regions, definitions of the frontier are multifarious, leading to an absence of clarity in this important spatial category. Indeed, as Lary points out, the frontier can have multiple meanings, depending on who is using the term (2007, 5). It also carries the taint of Frederick Jackson Turner’s original theorization of the frontier as “the meeting point between savagery and civilization” (1893). With this kind of culturalist baggage and the specter of the frontier being what one might call a “chaotic category,” some specification is needed, though it is rarely forthcoming in the literature.

For example, in his study of Qing-era attempts at pacification of Yunnan’s border regions, Giersch defines the frontier as “a territory or zone in which multiple peoples meet; at least one group is intrusive, the other indigenous” (2006, 3). For Dai, the frontier, while never explicitly defined, is a volatile edge space or staging ground where the pacification of peoples on the fringes of the Qing’s territorial rule was organized (2009). In contrast, Leibold traces the half-lives of Chinese policy directed at the *bianjiang*, translated as “frontier,” in the project to compose the modern Chinese nation (*minzu*) and state (*guojia*) in a way that encompassed its many ethnicities (2007). The frontier in this case refers to the geographically peripheral spaces that are home to the modern Chinese nation’s constitutive and internal Other, those peoples who are integral to the self-definition of a multiethnic polity. These are merely a sample of the various uses to which the term *frontier* has been put in recent scholarship.

Despite the slipperiness of the term, we find it useful to retain the idea of the frontier as a unique type of space defined by more than simply its location at a particular edge of sovereign power. A more dynamic perspective of space that we wish to propose, following Massey (1994), specifies the frontier in relational terms, meaning that it is defined by a set of social-spatial relations—not just static, physical locations—that produce the frontier as a unique liminal zone in social and environmental flux. In other words, a frontier bears certain traits not because of where it is located, as is frequently implied in the literature, but because of the social relations that obtain in that space and that characterize it as merely one part of a broader spatial field. The

main point here is that geographical marginality does not produce a frontier per se, for to claim such is merely to reify center-periphery power relations. We seek to avoid implying that the frontier is a geographically marginal and static place, a container for social processes involving dominant and subordinate groups. We see the space of the frontier as serving a more active role in the unfolding of social processes. Thus, in discussing Hetao as a frontier, we have in mind a unique space with inconsistent state surveillance, ethnic intermixing, a vulnerable economy, and a clear role for ecology in social processes. The production and management of irrigation works is informed in Hetao by all these aspects.

Han Agricultural Settlers in Hetao

Han migrants to Hetao were known as people who “exited the west gate” (*zou xi kou*). These migrants ventured into a region that encompassed current-day Ulan Chabu, Hohhot, Baotou, Ordos, and parts of Bayan Nur and Wuhai. Most “west-gate” migrants moved seasonally, arriving in spring and leaving in autumn in advance of the region’s harsh winter. It is worth asking what factors prompted migration. Aside from a mutiny in Datong in the fifth year of Shunzhi’s reign (1648), Shanxi, where many migrants originated, was generally calm for the dynasty’s first two hundred years. Especially during the reigns of the Kangxi, Yonghe, and Qianlong emperors, the empire was stable and the population increased steadily. However, the rise in population eventually led to land distribution problems in many regions, including Shanxi. As a result, migrants from Shanxi—in particular from the Jinbei and Jinzhong regions—began to expand their trade and agricultural activities into Inner Mongolia with and without permission from local Mongol authorities. Severe drought and flooding during the reign of the Daoguang emperor also forced the migration of peasants from current-day Hebei, Shanxi, Shaanxi, and Gansu in search of food and new homes. The Hetao region was an attractive migration destination for dislocated peasants, as local Mongols did not practice sedentary agriculture, which made abundant land seemingly empty and available. Land prices were very low. The population influx during this period also provided an infusion of cheap migrant labor, which was put to work in the construction of the region’s irrigation systems.

But Han-Chinese settlement in Inner Mongolia was not a bottom-up process initiated by the migrants alone. Their settlement in the region also reflected changes in Qing migration policy.

At the establishment of the Qing in 1644, the new regime delineated the pastoral boundaries of the Mongolian banners across which herding was forbidden. Most importantly, to prevent an alliance between Han and Mongol populations against the Manchus, the Qing court sealed off Mongol regions. In the twelfth year of Shunzhi's reign (1655), the emperor issued a decree stating: "The land within the wall is vast and broad, and can be cultivated only by soldiers. It is henceforth forbidden to issue forth beyond the Great Wall to claim land for field or pasture."²

Gradually, and with the realm generally pacified through the Kangxi reign, the Qing court began to encourage wasteland reclamation. Nevertheless, still hedging against an anti-Manchu insurrection, the court saw fit to issue a decree in Kangxi's twenty-second year (1683) that read as follows: "All subjects within the realm who travel to Mongolian lands for trade or agriculture are hereby forbidden to take Mongol women as wives." The Qing court therefore recognized the legitimacy of agricultural settlements north of the Great Wall but maintained a cautious stance toward this development, guarding against a panethnic alliance against the Manchus.

Major change came during the Yonghe and Qianlong reigns, when the population rose rapidly, causing land scarcity and producing a mass of restive, landless peasants. In response, the Qing court initiated a new policy actively advocating migration and settlement north of the Great Wall.

By this time, large areas of the region were already in use for pastoral agriculture, and thus encroachments upon pastures severely impacted the livelihoods of many local Mongols. Fearing unrest, the Qing court responded in the fourteenth year of the Qianlong reign (1749) by instituting the regime's most stringent restrictions on settlement in the area. The order read: "It is henceforth forbidden to settle and cultivate land in Harqin, Tumed, Aohan, Ongniud banners and in the eight banners of Chahar." The court also demanded the requisition of reclaimed land. "All agricultural settlers who claimed and cultivated land in Mongolian areas outside the Great Wall in violation of standing law must return to their original place of residence; all land under cultivation must be abandoned or returned to their original owners; failure to abide by this regulation may result in public pillorying, caning, and forcible relocation" (*Da qing huidian shili* 1899). This restriction was upheld through the Jiaqing and Daoguang reigns.

A second major step in dismantling settlement restrictions in Hetao was taken in Daoguang's reign, a period noted for its corruption and severe problems of land annexation. In its revised approach to the question of Inner Mongolian settlement, the court amended the existing, highly restrictive ban, opening up areas north and west of the Linhe River to trade and agriculture. This move also legitimized merchants' leaseholds over reclaimed land.

Finally, in 1902, amid severe crisis in its border regions, the Qing court fully abandoned its two-hundred-year-old settlement ban, opening large areas of Inner Mongolia to inward migration. All limits on Han migration were lifted, marking the total dismantlement of control over settlement in the Hetao region. As settlers poured in, they initiated waterworks projects, expanded the cultivated area, and gradually formed an immigrant society. Authoritative Han migrant population figures do not exist, but the number is believed to have approximated one hundred thousand by the last years of the Qing.

Shifts in the Qing court's settlement policy in border areas reflected contemporary political and economic considerations. It should be recalled, however, that official policy posed little effective restraint on the actual movements of migrants. Famine and crop failure in provinces bordering Inner Mongolia, as well as low land rents in the frontier, provided the necessary push and pull factors for refugees and traders to try their luck in the Hetao region. Hence, before the lifting of the settlement ban there were already significant numbers of settlers cultivating land in Hetao, and land reclamation was already well under way. Central control over border regions was never absolute, and local Mongol rulers were not uniformly strict in implementing the settlement ban.

As the number of migrants grew, some settled permanently, creating Han villages scattered among the Mongol banners. The presence of Han villages was especially prevalent in areas with relatively favorable environmental conditions, such as the Tumed River Plain, the southern part of Right Chahar, portions of the Yekeju League, and Qiantao.

Han Merchants as Land Brokers

How did settlers gain access to land in Hetao? During the Qing dynasty, the vast majority of land in Hetao was claimed by the Mongol nobility. But, as the number of migrants in Inner Mongolia increased, the Qing court instituted a parallel administrative agency to the Mongol

banner and league system to oversee Han immigration. These separate ethnic administration systems had overlapping territorial jurisdictions, causing ambiguity in local administrative power relations. The Hetao region was administered under the Salaqi Prefecture, which encompassed an area between current-day Baotou and Hohhot, but the prefectural administration seat was too distant to effectively exercise control over the region. Within the league and banner system, Hetao fell under the control of the Alxa nobility, from whom settlers would need to lease land in order to open canals and reclaim land. But individual Han cultivators did not negotiate directly with Mongol aristocrats for land-use rights. Instead, their access to land was mediated through local Han merchants (*di shang*).

Han merchants were active in Hetao beginning in the late Qing, developing familiarity with local rulers and customs and becoming skilled in local trade. Merchants would first obtain management authority over land parcels and then pay a percentage of collected rents to the local Mongol nobility. In this way, the merchants maintained complex networks of personal relations with Mongol rulers as a necessary aspect of their business. Their mediating role was important in this setting. For example, in Wuyuan County, in current-day Bayan Nur, conflict broke out during the Guangxu reign within the high ranks of the local Mongol leadership before the commencement of work on the Shahe Canal. A Mongol-speaking Han land merchant, Wang Tongchun, intervened in the conflict, brokering a truce between the opposing factions at a personal cost of 2,000 taels. In gratitude for his intervention, the Dalad banner court leased to Wang all its land to the west of Longxingchang, which opened the way for the canal construction to proceed.

Access to land was only a first step in agricultural expansion and cultivation. The viability of agriculture in the region required an adequate irrigation system. But neither the pastoral Mongols nor the prefectural governments on the frontier had the motivation and capacity to undertake sufficiently robust waterworks projects to support sustained cultivation. Han merchants in Inner Mongolia filled that role by bringing money as well as negotiation and management skills that could be applied to large-scale engineering projects. Among them were some, including Wang Tongchun, with specialized skills in canal design, as well as soil and labor management. But with the full title to land held by the Mongol nobility, merchants' subleasing rights were unstable, raising the risks and costs of investment in large-scale irrigation.

By the end of the nineteenth century, as their power grew, merchants began to demand long-term land-use rights and gradually came to occupy a dominant position over the disposition of land in the area. Land merchants also armed themselves, in some cases gaining the upper hand locally after open and bloody conflict over land with Mongols. In one instance, the Mongol noble Qinsi responded to Han encroachments on pastoral lands by leading a small-scale armed resistance, expelling Han settlers from the region and occasionally killing peasants. Militia assembled by Han merchants, led by Wang Tongchun, retaliated and ultimately defeated Qinsi. Thus the rising power of the merchants signaled that Mongolian supremacy over land disposition began to fade by the end of the Qing, and in some places land merchants usurped local authority. Wang Tongchun, for instance, went from struggling to obtain any land leases to securing land-use contracts for ten-thousand-year terms (Gu 1935, 9). In this contentious frontier setting of collaboration and competition between the Mongol aristocracy and Han traders, the latter gradually managed to expand the cultivated area by securing greater control over land and building irrigation channels and canals.

An additional decisive factor that affected agricultural settlement and canal building in Hetao was a change in course of the Yellow River. Tan Qixiang has shown that, since publication of the *Shuijingzhu* in the sixth century and through the Ming, the northern branch of the river had been the main branch and the southern branch a minor branch (1965). The Yellow River then shifted course in the thirtieth year of Daoguang's reign (1850), diverting flow to the southern branch in its great northern loop through Inner Mongolia, making the southern branch the main branch of the river. The historic change in the river's flow had advantageous effects for the development of water resources in Hetao. Topography in Hetao shows a general tilt, with western parts at higher elevation than eastern parts, and with southern parts at higher elevation than northern parts. A consequence of diversion of the main flow of the river to the southern branch was that Hetao irrigation works, which would need to flow from south to north, became possible. This was a historic opportunity that aided in the draining of marshes in Hetao and enabled south-north canals to use the local topography for irrigation.

The Catholic Church as Financier

With the river on the right course and land relatively accessible, Han traders still faced another hurdle in their expansion projects: financing of the irrigation system. An important source of funding came from traders' own substantial private accumulations gained by plying their trade in Hohhot, Baotou, and other places, acting as capitalist farmers. However, Hetao merchants' capacity to self-finance projects was curtailed in 1900, when, facing financial pressure from the Boxer indemnity, the Qing government expropriated most of the merchants' land holdings and became a new landlord in the region in the hopes of expanding its revenue base. Yet the Qing government had limited capacity to manage and maintain the expansive agricultural land and irrigation systems on its periphery, causing cultivation in Hetao to decline rapidly. By 1910, a new generation of Han traders appeared in the area seeking to revive local agriculture. But without sufficient private capital, they turned to the Catholic Church for funding.

In 1864, the Vatican put the Mongolian diocese under the Belgian and Dutch Catholic Church Congregation of the Immaculate Heart of Mary. The order's primary objective in Inner Mongolia was to seek new converts. Its success in this realm was unimpressive. To begin with, the obligation to attend mass each Sunday did not suit the mobile, pastoral Mongol population. Missionaries' lack of success in recruiting converts was also attributable to the direct challenge they posed to the interests of the banners and Lamaist authorities. Under the feudal system of leagues and banners, common people had strong fealty to the Mongol nobility, needing to deliver tribute, perform corvée labor, serve in conscription military forces, and oversee outposts. Commoners were not permitted to leave their lords' land in search of pasture and faced severe punishment for doing so. Lords also faced severe penalties for accommodating or sheltering Mongols not from their realms on their lands. Commoners were also required to make charitable donations to Lama temples and to perform free labor. Hence, missionaries' proselytizing posed a direct threat to Mongol lords' control over their subjects and stood to impinge upon the collection of alms at temples. Missionaries thus switched the focus of their work to trying to convert Han immigrants instead, and conducted their work in settler areas. In the latter half of the nineteenth century, as large numbers of migrants flowed into Hetao, the Congregation of the Immaculate Heart of Mary rented or bought large tracts of land from Mongol authorities and subleased parcels to newly arrived Han migrants as a way to draw new converts. Land purchases

in Inner Mongolia by the Congregation of the Immaculate Heart of Mary, according to records published by Monseigneur Carlo van Melckebeke, are as follows:

Congregation of the Immaculate Heart of Mary Land Acquisitions

Date	Place	Total Purchased Area
1869	Nanhaoqian	102 qing
1875	Halahushao	102 qing
1880	Ershisiqingdi	100 qing
1885	Xianghuodi	150 qing
1888	Xiaonao'er	360 qing
1888	Sanshenggong	60 qing
1888	Pingdingbao	150 qing
1890	Xiaoqiaoban	50 qing
1890	Shanwanzi	40 qing
1895	Dayangwan	100 qing
1895	Dafagong	50 qing
1896	Meiguiying	600 qing
1903	Qianjinbao	500 qing
1908	Balin Banner	100 qing

Based on the compiled records shown here, the Congregation of the Immaculate Heart of Mary purchased over 2,500 qing (1 qing equals 6.6 hectares) between 1869 and 1908 in different places throughout Inner Mongolia. It is likely, too, that these figures underrepresent the actual scale of land controlled by the Catholic Church in Inner Mongolia.

Before 1900, local records show that the Catholic Church controlled 2,000 qing of land in Houtao alone (Bayannur League Gazetteer Editorial Board 1983, 238). Other sources show that in Dalad banner, 2,090 qing were handed to the Church as indemnity in the wake of the Boxer uprising, while several thousand qing were extorted by the Church in Hanggin banner. Added together, the Church likely had land possessions of over 10,000 qing after 1900 (Feng 1971, 171–174). This sum is further alluded to in a report from 1919 by the Hetao area canal administration, which noted that “the Church seized opportunities to penetrate Houtao, occupy

land, and demand compensation in land from the Mongol banners for any incident sparked by their missionary work. The Church has thus accumulated land parcels of over 2,000 qing in the western Houtao and may, in fact, hold over 10,000 qing” (Suiyuan Gazetteer Archive Editorial Board 2007).

In the eighteenth and nineteenth years of the Guangxu reign (1892 to 1893), the Hetao region was hit by a series of natural catastrophes, forcing many landholders to sell land to the Church at rock-bottom prices. In Sandaohezi, for example, a missionary was able to purchase 39 qing of cultivable land for 800 strings of copper coin from a Han landlord, equaling about two coins per mu (one mu equals 666m²). In a 1950 memoir, a missionary wrote: “In 1930 it was possible to buy undeveloped land at one yuan per mu. One can imagine then how cheap land was fifty years ago” (S. Wang 1950, 11).

As a result of constant acquisitions, the Congregation of the Immaculate Heart of Mary’s possessions of cultivable land increased from 4 percent to 20 percent of the total cultivable land in Hetao, or from 4,942 acres to 24,710 acres. The increase in the Church’s land possessions helped to expand its power in the region by transforming it into a key provider of land to Han migrants. By the 1920s, sixteen large villages had formed in areas under the control of the Church in Hetao with over one hundred thousand residents, half of whom had converted to Catholicism (S. Wang 1950, 29).

By the late Qing, the Church had also organized the digging of several irrigation canals in Hetao. However, most of these were in the Dengkou area of Bayan Nur and were fairly short. The Church’s most substantial contribution to waterworks in Hetao was through its financial assistance, which made the Church a second major non-state force in the area along with local merchants.

Before 1900, Our Lady of the Sacred Heart rented much of its nearly 5,000 acres at very low prices, or even for free, as a way to attract converts from among Han settlers. Income derived from land rents was fairly limited, covering only basic daily operations. This situation changed after 1900, when the Church boosted its land holdings within a short time frame to over 10,000 qing. From its increased land possessions, the Church was able to supplement its income by lending out portions of its accumulated land rents as high-interest loans to local merchants. Having already suffered expropriations from the Qing government as part of the regime’s efforts

to pay the Boxer indemnity, Hetao merchants lacked financial means to undertake local improvements, such as canals, and thus had little choice but to cooperate with the Church.

The development of Yangjiahe Canal illuminates the relations between the Church and local merchants in the wake of the Boxer indemnity. The Yangjiahe Canal is located in the western part of the Hetao irrigation zone. Construction began in 1917 and was basically completed in 1927. It was the last of the major canals to be built in Hetao and fell under Suiyuan Province in Back Hanggin banner in current-day Bayan Nur Municipality, Inner Mongolia.

Three generations of the clan surnamed Yang managed the canal, starting with two brothers, Yang Manzang and Yang Mizang. Originally from Hequ in Shanxi, they settled in Houtao with their parents, as refugees from natural disasters, in 1901. Yang Manzang had three sons: Maolin, Wenlin, and Yunlin. Yang Mizang had six sons, the most capable of whom was named Chunlin. Yang Maolin took on a three-year contract for the management of the Yongji Canal, which helped spur an initial process of accumulation. Yang Chunlin's two sons, Yang Yi and Yang Xiao, formed the third generation involved in managing the canal.

By 1906, the Yang clan had already begun to survey the area and collect information pertinent to construction of a canal in the area. The Yangs also enlisted the help of Wang Tongchun in these endeavors. Most of the land irrigated by the Yangjiahe Canal was in an area under Church control. Yang Chunlin negotiated an agreement with the Belgian priest Jan Terstappen, stipulating that the Church would hand over land to the merchants upon completion of the canal under the condition that 30 percent of the irrigated land would be provided to the Church and that the merchants would not simply annex the land.

Funding for the Yangjiahe Canal likely came from three sources: loans from land merchants, loans from Church officials, and the Yang clan's private funds. The Yang clan at the time had 10,000 dan (1 dan equals 10 hectoliters) for workers' food provisions. It was able to borrow from Wang Tongchun, though, having recently been released from jail, Wang had limited funds to contribute to the endeavor. As a consequence, most funding came from the Church. Yang Maolin borrowed a total of 50,000 taels from local parish authorities in the villages of Shaanbei, Shengjiayingzi, Huangyangmutou, Wulan Nur, Xintang, Manhui, and Dengkou with which to commence work on the canal. The project faced financial difficulties in its third year, and the Yang family decided to break up the canal into several sections, delivering

water to some at an annual price of 12 yuan per qing of irrigated land. Collected funds were used to continue the project but proved insufficient to maintain construction on the canal. The Yangs were thus forced to borrow money again from local landlords to keep the project under way and the workers paid. The Yangs also drew high-interest loans from local parishes, notably 10,000 yuan from Father Terstappen, who demanded 200 qing of irrigable land as collateral (Zhang 1990). The project was halted again in 1920 due to insufficient funds, forcing the Yangs to borrow again, this time 80,000 taels from Shaanbei parish, to keep the project moving forward. Along with the interest it derived from loans, the Church also demanded most of the land east of the canal. The Yangs ultimately had to accept these conditions on the loans.

The case of the Yangjiahe Canal project demonstrates that, despite the clan's leading role in the construction of the canal, the growing power of Church authorities in the area undermined the clan's capacity to complete the project. It also highlights the receding power of local merchants during this period. The Yangs' efforts to build the canal analogize the shifting power dynamic between the rising strength of the Church in the region and that of the declining merchants. These two coexisted in the region as occasional partners and long-term competitors.

The above passages illustrate the organization of labor, technology, and finance for waterworks projects as a process led by non-state actors in a context of lacking or absent state authority. Below, we analyze the management of waterworks.

Land Merchants as Project Managers and Labor Coordinators

After securing land from the Mongol court, merchants would begin to assemble funding to build irrigation works. The most significant hurdle in any irrigation project was assembling the necessary labor from among new settlers. Workers were normally housed at the work site, which led gradually to the formation of worker-settler villages headed by local merchants.

Most merchants were grain merchants, skilled at marketing grain products. Wang Tongchun, for example, after opening the Yihe Canal and overseeing the steady growth of its irrigated area, went on to open the Longxingchang Merchant House, which specialized in leather and wool as well as grain, in about 1890. Merchants also collected rents in coin and grain, which ensured that peasants would not be caught short if grain prices fell. This system helped to

stimulate production and insured merchants against excessive losses due to fluctuations in grain prices (Yao 1986, 64).

Merchants' management abilities were most evident in the handling of waterworks. As landlords and merchants, they had particularly flexible management methods. They were assiduous in devising means to keep settlers on the land and in finding ways to establish a rural social order, which led to the formation of a local immigrant society. They were keenly aware of their tenuous position and thus sought to concentrate land and water rights in order to see water projects through and bringing their advantages into full play. Some of the unique features of merchants' management strategies are outlined below.

First, merchants assembled rights over land and water. The social networks created through development of canals by local merchants were substantially different from similar networks in northern China. In the latter areas, most canals were collectively managed by several villages with relevant water rights distributed among landholders. Land titles and water rights were usually held by households as a single bundle of partial ownership rights. In contrast, water rights in Hetao were concentrated in few hands, with leases over land and water held in perpetuity and with landlords collecting land rents and water-use fees. Having collected rents and fees, a portion of landlords' income was then handed over to the local Mongol nobility.

Land users rented cultivable land directly from local merchants and were divided into four types: wealthy peasants, middle peasants, sharecroppers, and hired farmhands. Collectively, land users and merchants formed communities centered on the merchants, who were simultaneously landlords and lessees, commercial merchants, and debtors. Merchants' power grew with the scope of cultivated land—some eventually had retainers and private militia. Communities of this sort would often run afoul of local Mongol authority, which then brought irrigation works led by merchant-centered communities to the center of local affairs.

Secondly, merchants initiated a system of labor management in the latter half of the nineteenth century that combined two spatial-administrative units called the *gongzhong* and *niuju*. These would be established along the length of a canal under construction, with the *gongzhong* as the larger unit, under which would be numerous *niuju*. Many *gongzhong* would be established along a single canal. This spatial-administrative system was initially very simple: every *gongzhong* had a person in charge of management of the canal and a lower-level manager at the

niuju level. These managers took charge of the daily canal operation tasks, such as ditch digging, surveying and verifying canal robustness, building dikes, distributing water, and collecting fees. By the Republican era, managers were in place at the gongzhong level to handle all canal affairs, and foremen were in charge of work sites. Horizontal management over the canal formed a spatial mode of organization that kept peasants tied to a particular place and assisted in the establishment of permanent villages.

Land merchants also had a flexible approach to managing settler peasants. Many peasants arrived in Hetao with little more than the clothes on their backs. Land merchants would provide materials, money, food, and tools. Most peasants under land merchants' control were small-scale farmers, who were relatively easy to control through the irrigation system as well as through the issuance of high-interest loans. Sharecropping arrangements designed by land merchants also helped tie tenant farmers to merchants and to the land (Yao 1986, 61).

Merchants also instituted forms of self-management workable within the frontier irrigation society. Free riders were a constant problem in irrigated areas that the government could not handle. In economic terms, this problem was attributable to the difficulty in establishing formal rights for this particular public good. Canal managers, however, devised an elegant solution to this problem. First, land merchants gave canal managers substantial power over canal affairs. Canal managers were people of high standing in their settler communities, and they would track down and punish peasants who were behind on water payments. The managers could also trust neighbors to carry out punishments. In this way, peasants in good standing would observe water distribution closely so that households that had not paid up did not receive water through the irrigation system. This form of neighbor oversight provided low-cost insurance against free riders. This kind of solution echoes what Geertz identified in Bali; namely, following local customary law rather than appealing to higher state authorities for resolution to problems emerging over questions of water rights. Similarly, in Hetao, conflicts over land and water among settlers did not find resolution through direct appeal to state authorities; rather, they were solved through social institutions at the niuju or village level.

By the end of the Qing, merchants were leaders in developing waterworks in Hetao. They were central to the completion of the area's eight major canals, two of which (Chanjin and Gangji) were completed in the reigns of Daoguang and Xianfeng (1821 to 1861) and the rest of

which were completed between 1864 and 1903. In total, local merchants completed 1,543 li of canals (one li is about 500m), with 316 branches irrigating around 40,000 qing of land. But the merchants' power to direct the construction of irrigation projects was weakened in the Republican era by shifting local power relations, in particular by the rise of the Catholic Church as a major landowner in the region.

Conclusion

In this article, we have outlined the relationship among local Mongol rulers, Han Chinese immigrant cultivators and traders, and the Catholic Church in the process of agricultural expansion through the building of irrigation system in the Hetao area. While none of these actors represented the power of the central state, they all played roles as land brokers, labor coordinators and suppliers, construction managers, and financiers. This networked non-state group of actors organized irrigation projects and consolidated agriculture production in the frontier of the empire. But a networked society is not necessarily a frictionless society. The relationship between actors in the network was constantly negotiated and recalibrated by individuals and groups, based on their interests and leverage over resources. For instance, the dominance of the cash-rich Catholic Church over cash-poor merchants set limits on the latter's capability to expand cultivation. Also, the merchants employed both formal and informal mechanisms of labor management through the hierarchy of canal management. The brokering role of the merchants between the landowning Mongol princes and cultivators proved to be crucial in the formation and working of the social networks behind irrigation. We find, then, that power develops and is sustained through the construction and management of vital infrastructure—something Wittfogel might recognize—but that this power is dispersed and tenuous.

The transition in Hetao from pastoralism to sedentary agriculture was heavily reliant on a network of irrigation works. In the late Qing, locally based Han merchants were central to the organization and construction of irrigation works and the preparation of arable land from a few hundred qing to tens of thousands of qing. According to Wittfogel, irrigated land need only occupy 50 percent of cultivated land to have a decisive influence over the formation of local economic power. In Hetao, irrigated land was well over 50 percent of cultivated land, and the

expansion of agriculture was heavily reliant on the implementation of irrigation works. Hence, this irrigation society was formed through specific relations among merchants, Mongol nobles, and the Catholic Church, without significant decisive input from the Qing administration.

These findings open the path to exploring the transformation of the irrigation society in the Hetao region during the collective era under Mao and during the reform era. What have been the roles of the central state, local cadres, and peasants in the organization of irrigation under agricultural collectivism, and what has changed since the reform started? How did the relationship between the state and society change over different periods of time? These questions are highly relevant to the problematic of civic territoriality, as they complicate the internal dynamics of the society by acknowledging the contention between different non-state actors in the process of territorializing a place.

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Notes

1. Gu Jiegang conducted his first study of the Hetao region in the spring of 1934, producing the report titled “Wang Tongchun Opens the Hetao” (1935). The report sparked interest in the region. The Yugong Society subsequently organized a study group to look into Back Tao irrigation in 1936. A series of reports were published that year in *Yugong*, volumes 5 and 7, on the historical geography of the region and the production of irrigation. Among these reports were works by Wang Zhe (1936) and Meng Siming (1936). Other works on the region include Hou Renzhi’s *Travel Diary* (1936) and Wang Riwei *Suiyuan Travels* (1936). These publications offer useful accounts of the construction and management of irrigation works in the area.
2. The decree was worded as such, specifying that only soldiers were to cultivate land. In practice, this limitation was never fully followed. Commoners continued to practice agriculture.

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