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## **Spatial transformation and water infrastructure in coastal Jiangsu: the role of land reclamation companies during the early twentieth century**

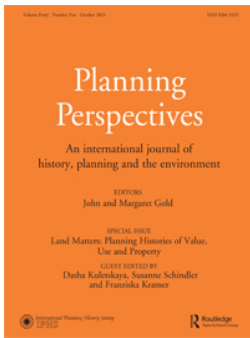
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# Spatial transformation and water infrastructure in coastal Jiangsu: the role of land reclamation companies during the early twentieth century

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## ABSTRACT

This article examines the role of land reclamation companies in early twentieth-century coastal Jiangsu, China, as key drivers of spatial transformation. Amid retreating state capacity during the late Qing and Republican eras, Chinese entrepreneurs, most notably Zhang Jian, established shareholding companies that reclaimed coastal mudflats and declining salt fields, and transformed them into cotton plantations. Engaging with global flows of knowledge and technology, including Japanese agricultural planning and Dutch hydraulic engineering, these companies integrated new techniques with native practices to build modern water infrastructure and reshape rural landscapes. By focusing on non-state actors in regional planning, this study argues that land reclamation companies represented a critical alternative model of spatial development that reshaped local communities and laid foundations for later state-led collectivized rural economy. This study challenges dominant narratives of state roles, and highlights how entrepreneurial initiatives mediated global and local forces to reshape space, economy, and environment. It also contributes to broader discussions on water infrastructure, rural development, and China's modern economic transformation.

## KEYWORDS

Company; regional planning; land reclamation; spatial transformation; global history; modern China; Jiangsu

## Introduction

Scholars of Chinese history have long emphasized the role of the state, as evidenced by numerous studies on late imperial (1368–1911) and modern China, as the primary driver and organizer of spatial transformations, particularly through infrastructure construction and urban development.<sup>1</sup> In popular imaginations, both within China and abroad, the Chinese state has always been conceived as abundant in financial and human resources, and in the past as much as in the present.<sup>2</sup> That wealth, it has been imagined, is what enables the state to undertake massive infrastructure projects, ranging from ancient endeavours such as the Great Wall and the Grand Canal to contemporary mega projects such as high-speed rail networks, urban subway systems, and large-scale water infrastructures. In Imperial China, the construction of large-scale infrastructural projects was

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<sup>1</sup>Esherick, "Modernity and the Nation in the Chinese City," 1–16; Randall, *Controlling the Dragon*; Musgrove, *China's Contested Capital*.

<sup>2</sup>Such popular imaginations could be seen in news reporting, see "Top 10 Mega-projects of China's Central SOEs in 2023 Selected." <https://www.chinadaily.com.cn/a/202401/03/WS659519b5a3105f21a507a5d4.html>; "China's Megaprojects and Their Significance." <https://www.scmp.com/news/china/science/series/3311045/chinas-megaprojects-and-their-significance>.

one means of facilitating economic development and territorial control. This occurred because the state had both enough funding to do so and a mandate to build large-scale infrastructural projects. This was exemplified by monumental projects such as the Imperial Capitals, the Great Wall, and the Grand Canal. Imperial Capitals include cities such as Beijing which served as political and cultural centres of the Yuan (1271–1368), Ming (1368–1644), and Qing (1644–1911) dynasties. The Great Wall is a vast defensive fortification system stretching across northern China to protect against invasions of nomadic peoples from Mongolian Plateau. The Grand Canal is an extensive waterway system connecting northern and southern China that facilitated economic integration and imperial control. In the present, it is demonstrated by the high-speed railway network linking Chinese cities and the Three Gorges Dam providing hydroelectricity for Chinese households. This narrative rests on a particular assumption about the state's enduring financial and organizational capacity to execute large-scale regional planning, whether for territorial control, economic development, or symbolic power. However, there was an equally significant, yet understudied, phenomenon in the early twentieth century. These comprised privately-owned joint stock companies which were drivers of spatial transformations. Such companies arose in the contexts of decentralized and fragmented state power during the late Qing and Republican periods.<sup>3</sup>

In coastal Jiangsu, land reclamation companies and their activities operated as privately-owned joint stock companies. By constructing hydraulic systems, including dykes to block sea tides, drainage networks to desalinate soil, and irrigation channels to support cultivation, these firms transformed coastal wetlands into vast cotton plantations. Their projects mobilized global flows of knowledge and technology, integrating foreign engineering techniques with native practices of planning and labour mobilization. The reclaimed land not only improved agricultural output but also redefined rural land ownership and economic organization. This study argues that land reclamation companies in early-twentieth-century coastal Jiangsu represented a critical, non-state model of spatial transformation that reshaped local communities and laid foundations for later state-led collectivized rural economy. It also contends that these non-state actors played key roles in mobilizing global flows of knowledge and technology to facilitate the spatial transformation.

## Literature review

Scholars have extensively investigated the role of the state in China and its relationship with urban and regional planning from the late-nineteenth to the mid-twentieth century. In doing so scholars have emphasized how the state used the power of planning to construct national identity, reclaim state sovereignty, promote command economy, strengthen political control, enforce hygienic regime, and shape urban-rural relations.<sup>4</sup> Yet the role of non-state actors requires further investigation. Private companies actively participated in urban and regional planning during the 1910s and 1920s, a period in China that was marked by state fragmentation and decentralization. Their activities were as consequential as those of the state because they served as key agents of spatial transformation, particularly in regions such as coastal Jiangsu. The incorporation of these companies symbolized new strategies employed by the Chinese elites. They not only envisioned new organizational forms for land reclamation enterprise to advance the national economic interests, but also exercised the power to plan the rural spaces in former salt-production zones.

<sup>3</sup>Kuhn, *Rebellion and Its Enemies in Late Imperial China*; Rankin, "State and Society in Early Republican Politics, 1912-18," 260–81; McCord, *The Power of the Gun*; Deng, *A History of Decentralization*.

<sup>4</sup>Esherick, "Modernity and the Nation in the Chinese City"; Rogaski, *Hygienic Modernity*; Yeh, *Shanghai Splendor*; Musgrove, *China's Contested Capital*; Merkel-Hess, *The Rural Modern*; Baker, *Pivot of China*.

Existing literature has examined the integration of, as well as the tensions between, native and foreign practices in twentieth-century Chinese planning history. However, the existing scholarship focuses disproportionately on urban spaces, where European, American, Japanese, and Soviet influences shaped planning practices during the late Qing, Republican and People's Republic eras.<sup>5</sup> Rural planning, by contrast, is often framed through the lens of the Rural Reconstruction Movement (1920s–1940s) or Maoist rural-urban rebalancing (1950s–1970s).<sup>6</sup> Recent studies have strived to understand the long-term advantage of urban centres in rural-urban relations throughout the twentieth century. One notable example of this is Mark Baker's study of Zhengzhou.<sup>7</sup> Missing from this dichotomy is an analysis of how global flows of knowledge and technology interacted with rural spatial transformations. Discussing the land reclamation projects in coastal Jiangsu can offer new perspectives: these enterprises collaborated with transnational engineering expertise, creating new forms of spatial change that shaped the rural landscape.

The history of regional transformation in coastal Jiangsu during the late-nineteenth century to mid-twentieth century has been described as an integral component of China's economic modernization. The land reclamation companies founded by Zhang Jian (1853–1926), a scholar-official turned entrepreneur, and his associates have fulfilled roles of socio-economic control, mobilizing labour, capital, and production in coastal Jiangsu during the 1890s to 1930s.<sup>8</sup> Of the more than fifty companies established in the region during this period, Zhang and his associates founded eighteen firms, which accounted for 68.6% of total corporate capital (13,425,000 *yuan*) and 80% of all reclaimed land.<sup>9</sup> Scholarship in Chinese language has attributed the companies' successes to managerial innovations, yet existing studies have prioritized the companies' socio-economic roles over their spatial interventions.<sup>10</sup> This study complements these accounts by examining how the companies actively shaped rural space, including by centralizing land ownership, constructing hydraulic infrastructure, and systematizing cotton cultivation, in which prefigured the collectivized rural economy of the early People's Republic.

## The region

Before delving into the history of water infrastructure and spatial transformation, it is essential to provide a brief overview of the geographical conditions of coastal Jiangsu. Situated within the Shanghai Port City region, it comprises modern-day Nantong, Yancheng, and Lianyungang. This area lies north of the Yangtze River Delta in Jiangsu province and constitutes the eastern part of northern Jiangsu. Historically, this region served as the economic and cultural periphery of Shanghai, a vital economic hub throughout the late Qing and Republican eras (Figure 1).

Coastal Jiangsu holds significant geographical importance as it witnessed a profound economic transformation from state-directed salt production to privately-owned cotton

<sup>5</sup>The Late Qing era refers to the period from the mid-nineteenth century to 1911; the Republican era, from 1912 to 1949; and the People's Republic era, from 1949 to the present. For studies on European, American, Japanese, and Soviet influences on Chinese urban planning, see Rowe, *Hankow*; Shi, *Beijing Transforms*; Esherick, "Modernity and the Nation in the Chinese City"; Kristin, Shi, and McIsaac, "The City in Modern China," 50–3; Lu, "Travelling Urban Form," 369–92; Wang, *Beijing Record*.

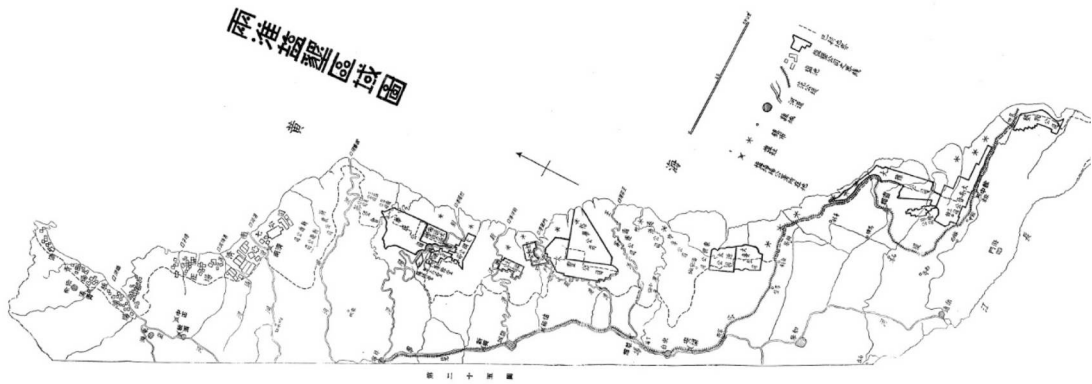
<sup>6</sup>Barry, "The Third Front," 351–86; Salter, "Dazhai Village, Shanxi," 193–210; Wu and Tong, "Liang Shuming's Rural Reconstruction Experiment," 39–51; Merkel-Hess, *The Rural Modern*.

<sup>7</sup>Baker, *Pivot of China*.

<sup>8</sup>Chu, *Reformer in Modern China*; Kaiyuan, *Zhang Jian Zhuan (A Biography of Zhang Jian)*; Köll, *From Cotton Mill to Business Empire*; Shao, *Culturing Modernity*.

<sup>9</sup>Wang, "Jiangsu Huainan Yanke Gongsi de Kenzhishiye, 1901–1937" [Cultivation under Land Reclamation Companies in Huainan of Jiangsu, 1901–1937], 211.

<sup>10</sup>Sun, *Subei Yankenshi Chugao* [Draft History of Salt Reclamation in Northern Jiangsu]; Dasheng xitong qiyeshi bianxiezhu, *Dasheng Xitong Qiyeshi (History of the Enterprises in the Dasheng System)*.



**Figure 1.** Map of Liang-Huai Salt Reclamation Region. This map demarcates the land of land reclamation companies in coastal Jiangsu. [Map created by Hu Huanyong, in *Lianghuai shuili yanken shilu* 两淮水利盐垦实录 (Records of Liang-Huai Water Conservancy and Salt Reclamation), Nanjing: Zhongyang daxue chubanshe faxingbu, 1934].



**Figure 2.** Chuanchang River (Salt Fields Connection Canal) in Dafeng. [Image by Mingran Cao, May 2025].

industry. Prior to the mid-nineteenth century, salt production dominated the regional economy. The decline of the salt industry created opportunities for developing cotton plantations, as these areas consisted of vast muddy fields that were occupied by a sparse population. This, combined with the flourishing local handicraft production of cotton in Nantong, provided the necessary endowment for the subsequent cultivation of cotton in the region (Figure 2).<sup>11</sup>

<sup>11</sup>Köll, *From Cotton Mill to Business Empire*, 43.

The land reclamation project in coastal Jiangsu formed part of a broader initiative aimed at transforming the regional economic landscape. Cotton produced on the reclaimed land would be transported directly from coastal ports and inland canals to cotton mills in manufacturing centres such as Nantong and Shanghai. The declining Qing state supported the project because it mobilized private investors to expand cotton production, which would be able to compete with the growing intrusion of foreign businesses into the Chinese hinterland. Mobilizing private investors proved both fiscally efficient and politically feasible for the state. Following China's defeat in the first Sino-Japanese War (1894–1895), Zhang Jian and his fellow investors initiated entrepreneurial projects near Shanghai. Initially a scholar-official who excelled in the imperial examination, Zhang later reoriented his career towards business.<sup>12</sup> Zhang received a traditional education during the late Qing period, with Confucian classics forming the core of his studies. Before 1895, he spent most of his political career serving as a secretary to officials, including General Wu Changqing (1829–1884), who led the military expedition to Korea to suppress a rebellion (1882–1884). During the expedition, Zhang played a role equivalent to that of a chief of staff in General Wu's secretariat, overseeing administrative tasks and military planning.<sup>13</sup>

In 1895, Zhang left his government post, and founded the Dasheng cotton mill in Nantong, Jiangsu, a city located on the north bank of the Yangtze River across from Shanghai, marking one of the earliest cotton mills outside the treaty ports in China. By 1901, aiming to provide raw materials for the cotton mill, Zhang and his peers established the first modern land reclamation company in China, the Tonghai Land Reclamation Company. By forming shareholding companies, Zhang aimed to develop large-scale cotton plantations by mobilizing capital from the business community. The Qing government endorsed Zhang's cotton cultivation scheme and granted him permission to reclaim saline land in coastal Jiangsu. During the four decades spanning the 1890s and the 1930s, more than 50 land reclamation companies were incorporated in coastal Jiangsu, across an area running from modern-day Nantong to Lianyungang. It is important to note that after the founding of the Republic in 1912 Zhang held several important government positions. From 1913 to 1914, he served as the national minister for industry, commerce, and agriculture, promoting policies to support land reclamation enterprises nationwide.<sup>14</sup> Overtime, cotton replaced salt as the primary commodity of economic activity in this region. Contingently, this marked a significant shift in the relationship between the state and businesses.

## The company

Zhang Jian's vision of space-making played a crucial role in shaping the development of the Tonghai Company. Of particular significance was his integration of local practices with his interpretation of Confucian ideology. The Tonghai company set a precedent for later enterprises in the region across several domains, including community planning, managerial structure, and social control. Nearly all large land reclamation companies established between the 1900s and 1920s in the region adopted Tonghai's approach, organizing geometric layouts for entire communities and constructing irrigation ditches, drainage systems, dikes, and roads to form structured sections (Figure 3).

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<sup>12</sup>Chu, *Reformer in Modern China: Chang Chien*, 17.

<sup>13</sup>*Ibid.*, 12–3.

<sup>14</sup>Zhongguo di'er lishi dang'an guan and Shen Jiawu, eds., "Guoyou Huangdi Chengken Tiaoli" 国有荒地承垦条例 [Regulations on the Reclamation of State-Owned Wasteland], 305–9.



**Figure 3.** View of the Entrance of Museum of Tonghai Land Reclamation Company, A Replica of the Gate of the Tonghai Land Reclamation Company Headquarters. [Image by Mingran Cao, July 2023].

The original planning of Tonghai's reclaimed land was largely based on Zhang Jian's vision of a harmonious rural society rooted in Confucian ideology, combined with the practical need to transform saline land into arable fields. At first, the company acquired land from local landowners. According to its plan, the land was divided into seven sections by north-south running dikes, with each section bordered by the sea to the east and extending inland.<sup>15</sup> Reclamation efforts began with the construction of irrigation ditches, drainage systems, dikes, and roads.<sup>16</sup> The coastal

<sup>15</sup>Tong-Hai Land Reclamation Company 通海垦牧公司, ed., *Tonghai Kenmu Gongsi Kaiban Shinian Zhi Lishi* 通海垦牧公司开办十年之历史 [The Ten-Year History of the Tong-Hai Land Reclamation Company].

<sup>16</sup>Qiu, "Tonghai Kenmu Sishinian 通海垦牧四十年 [Fourty Years for Tonghai Land Reclamation]," 51-4.

land, initially sandy and saline, required several years of treatment to improve soil quality. To address this challenge, Zhang Jian and his associates planned dikes and sluice gates to prevent seawater intrusion and regulate drainage.<sup>17</sup> In the first years, salt-resistant reeds were planted to reduce soil salinity. Once these measures took effect, the land was ready for agricultural use.

The company's meticulous planning was reflected in its geometric land organization, where straight dikes, roads, and drainage canals divided the area into structured sections. Zhang justified this geometric planning by linking it to the well-field (*jing tian*) system of Confucian agrarian ideals, which dated back to the Zhou dynasty.<sup>18</sup> Each section was connected to an administrative office of the company, ensuring efficient organization and oversight of the reclamation process. The company was also responsible for establishing schools, granaries, and social services within the community, as well as maintaining bridges, roads, and dikes.<sup>19</sup> After the company had constructed these forms of infrastructure, it recruited tenants to cultivate the subdivided sections of the land.<sup>20</sup>

The formation of regional planning in coastal Jiangsu was in close dialogue with land reclamation practices in Japan. Zhang's 1903 visit to Hokkaido, Japan was a significant source of inspiration for his founding of Tonghai company. Zhang's trip to Japan's northern island Hokkaido was primarily aimed at studying the experiences and practices of Japan's rural development. During his visit, he toured various sites including family farms, agricultural schools, stallion stations, fishery experiment stations, and port infrastructure.<sup>21</sup> These agricultural innovations in Hokkaido were the result of the efforts made by Japan to foster rural development since 1869. In Zhang's diaries, he drew comparisons between Japan's land reclamation projects in Hokkaido and his own evolving scheme in coastal Jiangsu.<sup>22</sup> Zhang emphasized that the land reclamation projects in Hokkaido shared similar characteristics with his own Tonghai company, especially at the planning stage before execution. However, he noted that the Hokkaido reclamation work was not organized into blocks due to the region's dense forests. In contrast, the Tonghai project was able to implement a block-based layout because it was situated on abandoned mudflats.<sup>23</sup>

The Western model of forming a non-lineage-based shareholding company to attract investment was a relatively new business practice in China. Zhang adopted this model and incorporated Tonghai company into the first-ever shareholding company owned by private investors in the agricultural sector. By 1935, Tonghai had cultivated 91,700 *mu* of land – a traditional Chinese unit of area, with one *mu* approximately equal to 666.67 square meters – amounting to about 61 square kilometers in total.<sup>24</sup> Each year, the company produced 60,000 *dan* of cotton – a traditional Chinese unit of weight, with one *dan* roughly equal to 50 kilograms – equivalent to approximately 3600 tons annually. It also attracted more than 23,000 peasants to work in the cotton plantations.<sup>25</sup> Similarly to the Japanese project in Hokkaido, Tonghai company provided public welfare for the local residents. It set up schools and healthcare facilities and formed its own patrol force to enforce social order (Figure 4).<sup>26</sup>

<sup>17</sup>Qiu, "Tonghai Kenmu Sishinian," 54.

<sup>18</sup>Zhang, "Kenmu Xiangzhi 垦牧乡志 [Village Gazetteer of Kenmu] (1921)," 257–73.

<sup>19</sup>Zhang jian quanji bianweihui, ed., "Tonghai Kenmu Gongsu Zhaodian Zhangcheng 通海垦牧公司招佃章程 [Regulations of the Tonghai Land Reclamation Company on Recruiting Tenants] (1902)," 34–8.

<sup>20</sup>Ibid.

<sup>21</sup>Zhang, *Liuxi Caotang Riji* 柳西草堂日记 [Dairy of Liuxi Thatched Cottage], 556–61.

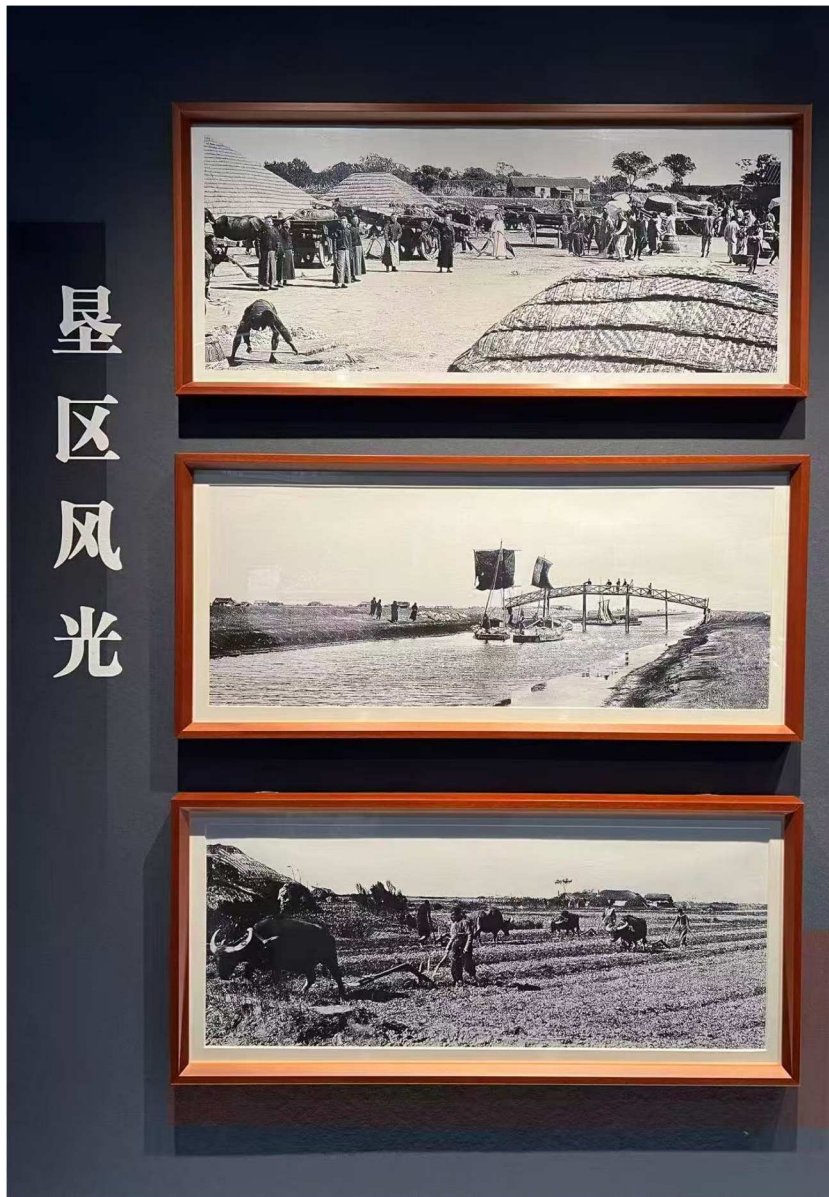
<sup>22</sup>Ibid., 540.

<sup>23</sup>Ibid.

<sup>24</sup>Jiangsu sheng difangzhi bianzuan weiyuanhui, *Jiangsu Shengzhi Haitu Kaifa Zhi* 江苏省志·海涂开发志 [Gazeteer of Mudflat Development - Gazeteer of Jiangsu Province], 50.

<sup>25</sup>Ibid.

<sup>26</sup>Dasheng xitong qiyesi bianxiezhu, *Dasheng xitong qiyesi*, 105.



**Figure 4.** Scenes of the Land Reclamation Zone, Photographed at the Museum of Tonghai Land Reclamation Company. [Image by Mingran Cao, July 2023].

Following the model provided by Tonghai, more than fifty land reclamation companies were established between the 1910s and 1930s in coastal Jiangsu. Among them, the eighteen large companies founded by Zhang Jian and his associates had more structured managerial systems and carried out comparatively comprehensive infrastructure development, paralleling that of the Tonghai Company.<sup>27</sup> For example, the Dayoujin Land Reclamation Company was founded in 1913. By 1918,

<sup>27</sup>Wang, "Jiangsu Huainan Yanken Gongsi de Kenzhishiye, 1901-1937," 211.

it had reclaimed more than 80,000 *mu* of land, approximately fifty-three square kilometers.<sup>28</sup> By the same year, 70–80% of the dikes had been completed.<sup>29</sup> Due to the vastness of the amount of reclaimed land, Dayoujin divided its cultivation zones into twelve districts.<sup>30</sup> Within each district, communities were constructed with a geometric layout separated by dikes, as Tonghai had done. This is just one example of the many land reclamation companies in coastal Jiangsu, many of which adopted similar regional planning strategies within their boundaries.

## The infrastructure

The global network of knowledge and technology contributed to the infrastructural transformation in coastal Jiangsu as well. The company-owners hired foreign engineers to facilitate infrastructural transformation. In 1916, the Shore Protection Institute of Nantong, under the influence of Zhang Jian, appointed the Dutch engineer Hendrik de Rijke (1890–1919) as the resident engineer responsible for constructing modern dykes in Nantong city and in the cotton plantations close to the city.<sup>31</sup> Hendrik de Rijke was born in Japan during his father Johannes de Rijke's tenure as a hydraulic engineer and foreign advisor to the Japanese government.<sup>32</sup> Although there is no clear evidence that Hendrik received formal training in hydraulic engineering, he gained substantial experience working alongside his father. In the early years of his career, Hendrik assisted Johannes in various water infrastructure projects, where he developed expertise in hydraulic engineering. During Johannes de Rijke's Huangpu River project, Hendrik served as his father's private secretary. Later, he became an engineer for the Shanghai Municipal Council and a member of the Municipal Fire Department.<sup>33</sup> Much like the home country of both Hendrik and Johannes de Rijke, the Netherlands, coastal Jiangsu heavily relied on dykes to protect its farmlands from sea tides and canals to enhance agricultural and transportation conditions.

Hendrik de Rijke employed modern hydraulic technology to transform the infrastructural landscape in Nantong city and the cotton plantations in coastal Jiangsu. During his three-year tenure, de Rijke designed and constructed numerous dams, dykes, sluices, and bridges. De Rijke inspected the renowned Tonghai company, and proposed building what would become the Songzhi Sluice to improve the company's water infrastructure. However, the plan was never realized due to financial difficulties.<sup>34</sup> Hendrik de Rijke designed the region's first sluice built in concrete, the Yaowang Harbor Sluice, to prevent saline tide intrusion through the waterway between the Dayoujin and Dayu Land Reclamation Companies.<sup>35</sup> This project was among the earliest concrete water infrastructure developments in China. De Rijke regularly inspected its construction, but tragedy struck in August 1919 when de Rijke contracted cholera while inspecting the Yaowang Harbor Sluice project. Whilst seeking out medical treatment, he succumbed to the illness (Figure 5).

<sup>28</sup>Nantong Shi Dang'anguan [Nantong Municipal Archives]: B417-111-41. Dayoujin Gongsi Gaikuang 大有晋公司概况 (General Situation of Dayoujin Company). 1918.

<sup>29</sup>Ibid.

<sup>30</sup>Nantong Shi Dang'anguan and Zhangjian Yanjiu Zhongxin, eds., *Dasheng Jituan Dangan Ziliao Xuanbian Yankenbian IV* 大生集团档案资料选编 盐垦编(IV).

<sup>31</sup>Zhangjian yanjiu zhongxin and Nantong shi gangzhaqu dang'anguan, eds., "Nanton Baotanhui Huizhang Zhang Cha Yu Telaik Qiangding de Pinrenshu" 南通保坍会长张警与特来克签订的聘任书 [Appointment Letter Signed by Zhang Cha, President of Nantong Hydraulic Association, and Hendrik de Rijke], 32.

<sup>32</sup>Zhangjian yanjiu zhongxin and Nantong shi gangzhaqu dang'anguan, eds., "Helan Telaik Gongchengshi Zai Tong Zhi Shilue" 荷兰特来克工程师在通之事略 [A Brief History of Dutch Engineer Hendrik de Rijke in Nantong], 53.

<sup>33</sup>Sizoo, *Johannis and Hendrik De Rijke: Two Dutch Engineers in the Yangtze Delta, 1875-1919*, 32.

<sup>34</sup>Qiu, "Tonghai Kenmu Sishinian," 72.

<sup>35</sup>Song, *Zhide Huiyi de Shi* 值得回忆的事 [Something Worth Remembering], 13.



**Figure 5.** Yaowang Harbor Sluice during Construction. [Nantongshi gangzhaqu danganguan 南通市港闸区档案馆, and Zhangjian yanjiu zhongxin 张謇研究中心, eds., *Telaike yu nantong baotan shiliao 特来克与南通保坍史料* (Historical Materials about Hendrik De Rijke and the Prevention of the Yangtze River Embankment Collapse in Nantong). Nantong, 2009].

Following de Rijke's untimely demise, his deputy, Song Xishang (1896–1982), took over his unfinished projects and subsequently became a prominent hydraulic expert in China. Before becoming the assistant engineer on the Yaowang Harbor Sluice project, Song studied hydraulic engineering at the Hohai Civil Engineering School, which was founded by Zhang Jian, then served as President of the National Conservancy Bureau.<sup>36</sup> Established as the first hydraulic engineering school in China, Hohai aimed to train experts in modern hydraulic science which had been introduced from Europe and America. After graduating from Hohai, Song began his internship at the Shore Protection Institute of Nantong and later served as de Rijke's deputy on projects related to Nantong's embankment system and coastal Jiangsu's cotton plantations.<sup>37</sup>

The construction of the Yaowang Harbor Sluice played a crucial role in controlling the intrusion of saline tides, thereby fostering the reclamation activities of both the Dayoujin company and the Dayu company. Construction officially commenced in the autumn of 1918 and was completed in December 1919. According to estimates published by Nantong County Water Conservancy Commission, approximately 36,000 *mu* of land owned by the Dayoujin company and 15,000 *mu* of land owned by the Dayu company, totalling around thirty-four square kilometers, benefited from the construction of the Yaowang Harbor Sluice.<sup>38</sup> Modern hydraulic technology helped materialize such an achievement in reclaiming land for cotton cultivation, showcasing a vivid example how global flows of knowledge and technology contributed to the construction of water infrastructure during the 1910s in coastal Jiangsu.

<sup>36</sup>*Ibid.*, 5.

<sup>37</sup>*Ibid.*, 5–6.

<sup>38</sup>Nantong Shi Dang'anguan [Nantong Municipal Archives]: B417-111-42. Nantong Xian Shuilihui Gonghan 南通县水利会公函 [Official Letter from Nantong County Water Conservancy Commission]. 1921.

## Conclusion

Land reclamation companies in early twentieth-century coastal Jiangsu exemplify how non-state actors mediated global and local forces to drive spatial transformation. The Chinese entrepreneurs were in dialogue with Japanese rural development in Hokkaido and hired a Dutch engineer to construct modern hydraulic projects in the region. Moreover, the cotton plantations established by these companies supplied raw materials for cotton production in Nantong and Shanghai, both port cities within the greater Shanghai Port City region. The underlying background story is: a process that integrated coastal Jiangsu into global capitalist network via raw material supply chains to Nantong and Shanghai.

The legacy of the land reclamation companies extends beyond their immediate economic impact. Firstly, the water infrastructure built by the Dutch engineers helped the shift of regional economy from salt to cotton. While this reflects broader global patterns of agricultural and spatial transformations, when viewed from a local perspective, it also illustrates China's own economic transition and its evolving relationship with the environment. Secondly, the former location of the Tonghai Land Reclamation Company now houses a newly constructed Museum of Tonghai Land Reclamation Company dedicated to its history, serving as a heritage site for reconstructing historical memories of private entrepreneurship. This transformation is also part of the state's broader narrative that promotes private entrepreneurship as essential to revitalizing the local economy. It helps to uncover a story often overshadowed by state-led infrastructural development in China. Third, the history in this area sheds light on how human activity, for the sake of economic development, fostered the construction of water infrastructure that reshaped the environment and landscape.

The spatial transformation facilitated by the land reclamation companies laid foundations for the collectivized rural economy in the early People's Republic. During the Second World War (1937–1945) and Chinese Civil War after WWII (1945–1950), the socio-economic control of the land reclamation companies eroded under persistent violence driven by the competing political and military forces in coastal Jiangsu, including the Chinese Communists, Chinese Nationalists, Japanese army, Chinese collaborationists, and militias organized by local gentry, merchants, and bandits. In 1946, land reforms initiated by the Chinese Communists formally dissolved the corporate control over reclaimed land.<sup>39</sup> By the 1950s, state-owned farms founded by the People's Republic, succeeded the legacy of centralized land ownership pioneered by the companies.

Future research might explore how similar entrepreneurial ventures in other regions mediated global-local conditions or influenced post-1949 regional landscapes. By situating land reclamation companies of coastal Jiangsu within broader debates, this study invites scholars to reconsider the pluralistic origins of China's spatial transformations.

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<sup>39</sup>Jiangsu sheng difangzhi bianzuan weiyuanhui, *Jiangsu Shengzhi Haitu Kaifa Zhi*, 48–55.

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## Bibliography

- Baker, Mark. *Pivot of China: Spatial Politics and Inequality in Modern Zhengzhou*. Cambridge, MA: Harvard University Asia Center, 2024.
- “China’s Megaprojects and Their Significance.” *South China Morning Post*. Updated on June 2, 2025. Accessed June 2, 2025. <https://www.scmp.com/news/china/science/series/3311045/chinas-megaprojects-and-their-significance>.
- Chu, Samuel C. *Reformer in Modern China: Chang Chien, 1853–1926*. Studies of the East Asian Institute. New York: Columbia University Press, 1965.
- Dasheng xitong qiyeshi bianxiezu. *Dasheng xitong qiyeshi* [The Business History of Dasheng System]. Nanjing: Jiangsu guji chubanshe, 1990.
- Deng, Hanzhi. “A History of Decentralization: Fiscal Transitions in Late Imperial China, 1850–1911.” PhD diss., London School of Economics, 2021.
- Dodgen, Randall A. *Controlling the Dragon: Confucian Engineers and the Yellow River in Late Imperial China*. Honolulu: University of Hawai’i Press, 2001.
- Esherick, Joseph W. “Modernity and the Nation in the Chinese City.” In *Remaking the Chinese City: Modernity and National Identity, 1900–1950*, edited by Joseph W. Esherick, 1–16. Honolulu: University of Hawaii Press, 2000.
- Guoyou huangdi chenken tiaoli 国有荒地承垦条例 [Regulations of Reclamation of Abandoned Land Owned by the State], (1914). Reprinted in Zhongguo di’er lishi dang’anguan 中国第二历史档案馆, and Shen Jiawu 沈家五, eds. *Zhang jian nongshang zongzhang renqi jingji ziliao xuanbian* 张謇农商总长任期经济资料选编 [Selected Documents on Economics from Zhang Jian’s Tenure as Minister of Agriculture and Commerce]. Zhongguo Jindai Jingjishi Ziliao Congkan 中国近代经济史资料丛刊. Nanjing: Nanjing daxue chubanshe, 1987: 305–309.
- Helan telaike gongchengshi zai tong zhi shilue 荷兰特来克工程师在通之事略 [Short History of Dutch Engineer Hendrik de Rijke in Nantong], (1919). Reprinted in Nantongshi gangzhaqu danganguan 南通市港闸区档案馆, and Zhangjian yanjiu zhongxin 张謇研究中心, eds., *Telaike yu nantong baotan shiliao* 特来克与南通保坍史料 [Historical Materials about Hendrik De Rijke and the Preventing Yangtze River Embankment Collapse in Nantong]. Nantong, 2009: 53–54.
- Hess, Christian. “Sino-Soviet City: Dalian between Socialist Worlds, 1945–1955.” *Journal of Urban History* 44, no. 1 (2018): 9–25.
- Jiangsusheng difangzhi bianzuan weiyuanhui 江苏省地方志编纂委员会 [Local Gazetteer Compilation Committee of Jiangsu Province]. *Jiangsu shengzhi haitu kaifazhi* 江苏省志·海涂开发志 [Jiangsu Province Gazetteer: Coastal Reclamation Development Gazetteer]. Nanjing: Jiangsu kexue sishu chubanshe 江苏科学技术出版社, 1995.

- Köll, Elisabeth. *From Cotton Mill to Business Empire: The Emergence of Regional Enterprises in Modern China*. Harvard East Asian Monographs 229. Cambridge, MA: Harvard University Asia Center, 2003.
- Kuhn, Philip A. *Rebellion and Its Enemies in Late Imperial China: Militarization and Social Structure, 1796-1864*. Harvard East Asian Series 49. Cambridge, MA: Harvard University Press, 1970.
- Lu, Duanfang. "Travelling Urban Form: The Neighbourhood Unit in China." *Planning Perspectives* 21, no. 4 (2006): 369-392.
- McCord, Edward A. *The Power of the Gun: The Emergence of Modern Chinese Warlordism*. Berkeley: University of California Press, 1993.
- Merkel-Hess, Kate. *The Rural Modern: Reconstructing the Self and State in Republican China*. Chicago: University of Chicago Press, 2016.
- Musgrove, Charles D. *China's Contested Capital: Architecture, Ritual, and Response in Nanjing*. Honolulu: University of Hawai'i Press, 2013.
- Nantong baotanhui huizhang zhangcha yu telaiké qianding de pinrenshu 南通保坍会会长张警与特来克签订的聘任书 [Appointment Letter of Hendrik de Rijke from President of Shore Protection Institute of Nantong Zhang Cha], (1916). Reprinted in Nantongshi gangzhaqu danganguan 南通市港闸区档案馆, and Zhangjian yanjiu zhongxin 张謇研究中心, eds., *Telaiké yu nantong baotan shiliao* 特来克与南通保坍史料 (Historical Materials about Hendrik De Rijke and the Preventing Yangtze River Embankment Collapse in Nantong). Nantong, 2009: 32.
- Nantong shi dang'anguan [Nantong Municipal Archives]: B417-111-41. Dayoujin gongsi gaikuang 大有晋公司概况 (General Situation of Dayoujin Company). 1918.
- Nantong shi dang'anguan [Nantong Municipal Archives]: B417-111-42. Nantong xian shuilihui gonghan 南通县水利会公函 [Official Letter from Nantong County Water Conservancy Commission]. 1921.
- Nantongshi danganguan 南通市档案馆, and Zhangjian yanjiu zhongxin 张謇研究中心, eds., *Dasheng jituan dangan ziliao xuanbian yankenbian IV* 大生集团档案资料选编 盐垦编 [Selected Collection of Archival Materials of Dasheng Group: Salt Reclamation Compilation IV]. Beijing: Fangzhi chubanshe 方志出版社, 2015.
- Naughton, Barry. "The Third Front: Defence Industrialization in the Chinese Interior." *The China Quarterly* 115 (1988): 351-386.
- Qiu, Yunzhang. "Tonghai kenmu sishinian 通海垦牧四十年 [Fourty Years for Tonghai Land Reclamation]." In *Nantong Yanken Shimo* 南通盐垦始末 [The Story of Salt Reclamation in Nantong], edited by Yao Qian 姚谦, 49-96. *Nantong wenshi ziliao xuanji* 南通文史资料选辑 [Selected Materials on the History of Nantong] 11. Nantong: Zhengxie nantongshi wenshiziliao bianjibu 政协南通市文史资料编辑部, 1991.
- Rankin, Mary Backus. "State and Society in Early Republican Politics, 1912-18." *The China Quarterly*, no. 150 (1997): 260-281.
- Rogaski, Ruth. *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China*. Berkeley: University of California Press, 2004.
- Rowe, William T. *Hankow: Commerce and Society in a Chinese City, 1796-1889*. Stanford, CA: Stanford University Press, 1984.
- Salter, Christopher L. "Dazhai Village, Shanxi: A Model Landscape." In *Chinese Landscapes: The Village as Place*, edited by R. G. Knapp, 193-210. Honolulu: University of Hawaii Press, 1992.
- Shao, Qin. *Culturing Modernity: The Nantong Model, 1890-1930*. Stanford, CA: Stanford University Press, 2004.
- Sizoo, Koen. *Johannis and Hendrik De Rijke: Two Dutch Engineers in the Yangtze Delta, 1875-1919*. Translated by Li Xian Sheng. Beijing: Royal Netherlands Embassy, 2005.
- Song, Xishang. *Zhide huiyi deshi* 值得回忆的事 [The Things Worth Remembering]. Taipei: Sanmin shuju, 1970.
- Stapleton, Kristin, Mingzheng Shi, and Mary Lee McIsaac. "The City in Modern China." *Journal of Urban History* 27, no. 1 (2000): 50-53.
- Sun, Jiashan. *Subei yankenshi chugao* 苏北盐垦史初稿 [Draft History of Salt Reclamation in Northern Jiangsu]. Beijing: Nongye chubanshe 农业出版社, 1984.
- Shi, Mingzheng. "Beijing Transforms: Urban Infrastructure, Public Works, and Social Change in the Chinese Capital, 1900-1928." Doctoral diss., Columbia University, New York, 1993.
- Tonghai kenmu gongsi kaiban shinian zhi lishi* 通海垦牧公司开办十年之历史 [The History of Ten-year Since the Founding of Tonghai Land Reclamation Company], edited by Tonghai kenmu gongsi 通海垦牧公司 [Tonghai Land Reclamation Company]. Nantong: Hanmolin bianyi yinshuju, 1911.

- “Tonghai kenmu gongsi zhaodian zhangcheng” 通海垦牧公司招佃章程 [Regulations of the Tonghai Land Reclamation Company on Recruiting Tenants] (1902). In *Zhang jian quanji* 张謇全集 [Complete Works of Zhang Jian], edited by Zhang jian quanji bianweihui 张謇全集编委会 vol. 5, 34–38. Shanghai: Shanghai cishu chubanshe, 2012.
- “Top 10 Mega-projects of China’s Central Soes in 2023 Selected.” *Chinadaily.com.cn*. Updated on January 3, 2024. Accessed June 2, 2025. <https://www.chinadaily.com.cn/a/202401/03/WS659519b5a3105f21a507a5d4.html>.
- Wang, Jun. *Beijing Record: A Physical and Political History of Planning Modern Beijing*. Singapore: World Scientific, 2011.
- Wang, Shuhuai. “Jiangsu huainan yanken gongsi de kenzhi shiye” [Cultivation under Land-reclamation Companies in Huainan of Jiangsu, 1901-1937]. *Zhongyang yanjiuyuan, Jindaishi yanjiusuo jikan* 14 (1985): 191–266.
- Wu, Shugang, and Binchang Tong. “Liang Shuming’s Rural Reconstruction Experiment and Its Relevance for Building the New Socialist Countryside.” *Contemporary Chinese Thought* 40, no. 3 (2009): 39–51.
- Yeh, Wen-hsin. *Shanghai Splendor: Economic Sentiments and the Making of Modern China, 1843-1949*. Berkeley: University of California Press, 2007.
- Zhang, Jian. “Kenmu xiangzhi” 垦牧乡志 [Village Gazetteer of Kenmu] (1921). In *Zhang se-an shiye Wenchao* 张謇庵(謇)实业文钞 [Zhang Jian’s Writings on Industry], edited by Cao Wenlin, pp. 257–273. Taipei: Wenhai chubanshe, 1969.
- Zhang, Jian. “Riji” 日记 (Diary). In *Zhang jian quanji* 张謇全集 [Complete works of Zhang Jian], edited by Zhang jian quanji bianweihui 张謇全集编委会 Vol. 8. Shanghai: Shanghai cishu chubanshe, 2012.
- Zhang, Kaiyuan. *Zhang Jian Zhuan* [A Biography of Zhang Jian]. Beijing: Zhongguo gongshang lianhe chubanshe, 2000.