cogitatio

Urban Planning (ISSN: 2183–7635)
2023, Volume 8, Issue 3, Pages 305–318
https://doi.org/10.17645/up.v8i3.6834

Article

Searching for Reconnection: Environmental Challenges and Course Changes in Spatial Development Along Shanghai's Shipping Channels

Harry den Hartog [1,2]

[1] Faculty of Architecture and the Built Environment, Delft University of Technology, The Netherlands
[2] College of Architecture and Urban Planning, Tongji University, China; harrydenhartog@urbanlanguage.org

Submitted: 14 February 2023 | Accepted: 2 June 2023 | Published: 26 September 2023

Abstract
Waterways played a crucial role in the emergence of Shanghai as a cosmopolitan city and world port. Over the years the spatial and functional relationships between the city and ports and hinterland have been changing continuously. In Shanghai, like other port cities, almost all ports and related industries are placed out beyond the urban fringes, to form decentralized regional clusters, while former docklands are quickly transformed into attractive urban waterfronts. Simultaneously there is a growing physical and socio-economic gap with the rural hinterland. During Shanghai's brutal lockdown in Spring 2022, due to China's rigid zero-Covid policy, citizens were without food and other supplies while fully loaded ships were lined up waiting in the port. Also, deliveries from surrounding rural areas were temporarily halted. This article focuses on recent developments but is based on experiences in previous centuries from a long *durée* perspective. It elaborates on how the Yangtze River Delta urbanized along shipping channels and examines changing relationships between city and port, between urban and rural, and between man and nature. What role did shipping channels play and how to rebalance various spatial claims: urban, rural, port interests, and environmental concerns?

Keywords
ecological civilization; flood risk; hydraulic engineering; lockdown; long *durée*; port city; rural hinterland; shipping channel; spatial decentralization; urban delta

Issue
This article is part of the issue "Shipping Canals in Transition: Rethinking Spatial, Economic, and Environmental Dimensions From Sea to Hinterland" edited by Carola Hein (Delft University of Technology), Sabine Luning (Leiden University), Han Meyer (Delft University of Technology), Stephen J. Ramos (University of Georgia), and Paul van de Laar (Erasmus University Rotterdam).

1. Introduction

Worldwide spatial and functional relationships between ports and their hinterland have been loosening due to globalization and containerization, resulting in the outplacement of ports and related functions beyond urban borders, and an increasing disconnection between city and port (Bird, 1973; Ducruet & Lee, 2006; Meyer, 1999; Notteboom, 2004; Rodrigue & Notteboom, 2012). Somewhat late since the beginning of this century, this is also happening in Shanghai but at an accelerated speed and large scale. Not only the spatial configuration of ports is changing, but also the "global landscape as we know it is changing fast" regarding international trade "accompanied by uncertainty" (Notteboom & Haralambides, 2020, p. 347). This article reevaluates this process of spatial decentralization and disconnection between port, city, and rural hinterland, in the context of environmental challenges. It analyzes the chronology of interactions between urban and port development along shipping channels in Shanghai and the Yangtze River Delta.

Spatial and functional relationships between Shanghai's city and port have been changing continuously over the decades under the influence of natural and human events. Nowadays Shanghai's port areas are decentralized beyond the urban fringes while former docklands along the Huangpu River (and Suzhou Creek)

are transformed into urban waterfronts (den Hartog, 2021a). In this article is argued that there is simultaneously an increasing disconnection between this metropolis and the surrounding countryside. To safeguard arable land, China has a policy that must guarantee a degree of self-sufficiency (Jacobson, 2012) in food supply, which means that agricultural land after urbanization needs to be compensated. Red lines have been introduced in Shanghai's latest master plan (Shanghai Municipal People's Government, 2016) to limit urban expansion and safeguard agricultural land.

The disconnection between city and port reached a dramatic peak with Shanghai's lockdown (den Hartog, 2023; James, 2022; Kuo et al., 2022) during Spring 2022 due to China's rigid zero-Covid policy, when more than 24 million citizens—according to some estimates even far above 30 million—were without fresh food and other basic supplies (medicines) for 10 days—and in several cases even longer, with dramatic consequences—while fully loaded ships were lined up waiting in the port and delivery from surrounding rural areas was temporarily halted. Although Shanghai's policy is geared toward urban and rural balance (Shanghai Municipal People's Government, 2016) and ecological civilization (Hansen et al., 2018) through ecological restoration and other means, this event represented—in a negative sense—an ultimate disconnection, not only between port and city but also between urban and rural, between citizens and leaders, even between man and nature. All of these themes have become even more relevant in our current post-pandemic era. What role did shipping channels play over time in the relationship between port and city, and between the port city and its deltaic hinterland with ecological and agricultural vulnerabilities? How to rebalance urban and rural spatial claims, port interests, and environmental concerns in the context of Shanghai in the Yangtze River Delta?

2. Huangpu River and Suzhou Creek as Backbones of Shanghai's Prosperity

To put things in long *durée* perspective (Braudel & Wallerstein, 2009; Hooimeijer et al., 2021), in the following sections the changing relations over time between human settlements and deltaic landscape are explained, i.e., how in the marshy low-lying vulnerable delta area, a long-term process of coastline growth and shipping channel adjustments by natural events (sedimentation in the estuary, flooding, silting along the coast, etc.) and human interventions (canalization, dredging, land reclamation, flood protection, waste disposal, irrigation, etc.) influenced urbanization, transportation, port development, agriculture, and natural values.

China's dynamic, highly urbanized Yangtze River Delta region with Shanghai as its central metropolis forms the engine of the national economy for centuries thanks to unique geographical conditions: fertile delta grounds for agriculture to feed the city (King, 1911), and a strategic location for port development (Dai, 2004) with international connections and access to remote hinterlands via the more than 6,300-km long Yangtze River. In particular, the role of shipping routes from the Tai Hu basin—with 2,250 square km, one of China's largest freshwater lakes—to the coast was crucial for the development of the city and port.

The Huangpu River and Suzhou Creek played a crucial role in the rise of the world port of Shanghai—and the wider Yangtze Delta and even China as a whole. Both contributed significantly to prosperity. Both shipping routes were created through an interplay between natural events and hydraulic engineering and dredging. Nowadays environmental concerns are a main concern since massive urban expansion (den Hartog, 2010; Hsing, 2010) conflicts with natural values while flood risk increases again due to sea level rise. Since China's economic reopening urban planning and spatial design have been characterized by a tabula rasa planning approach. Cultural-historical values (e.g., landscape, ecology, and built heritage) increasingly disappeared, though recently these values are rediscovered and partly protected. In line with this reappreciation for cultural-historical roots and natural protection—and in line with the thematic issue of this journal on the role of shipping channels and ports in the context of hinterland relations and ecological concerns—this article is grounded on a basic explanation of Shanghai's historical spatial development along shipping channels. This long *durée* perspective (Braudel & Wallerstein, 2009; Hooimeijer et al., 2021) as a frame is novel in the discourse of contemporary urban planning and spatial design in China. Data for this article is collected by review of literature and policy documents, and supplemented by interviews with local experts and field research (the author has been living and working in Shanghai for 14 years). The focus of this article is on changing relations between man and nature, between urban and rural, and between port-city and direct hinterland, in which the physical or functional distances are increasing. The conclusion calls for reconnection and strengthening of ties between the separated entities.

2.1. Emerging Metropolis and World Port in the Delta

The Huangpu River, a largely artificially dug shipping channel, was created on the basis of an ancient system of smaller creeks and streams in the tidal landscape of the Yangtze River Delta (Figure 1). For many centuries the Yangtze Delta was characterized by a network of waterways (King, 1911) that has "defined politics and ways of life for centuries" in China (Ball, 2017, p. 1). This delta area has one of the world's oldest rice cultures, inherently connected to this ingenious traditional water system here (King, 1911). Actually, Shanghai was not always the most important port in this delta. Respectively the cities of Suzhou and Songjiang had this position, and at that time Shanghai did not even exist. Looking at the map, one can see that Suzhou and Songjiang are respectively

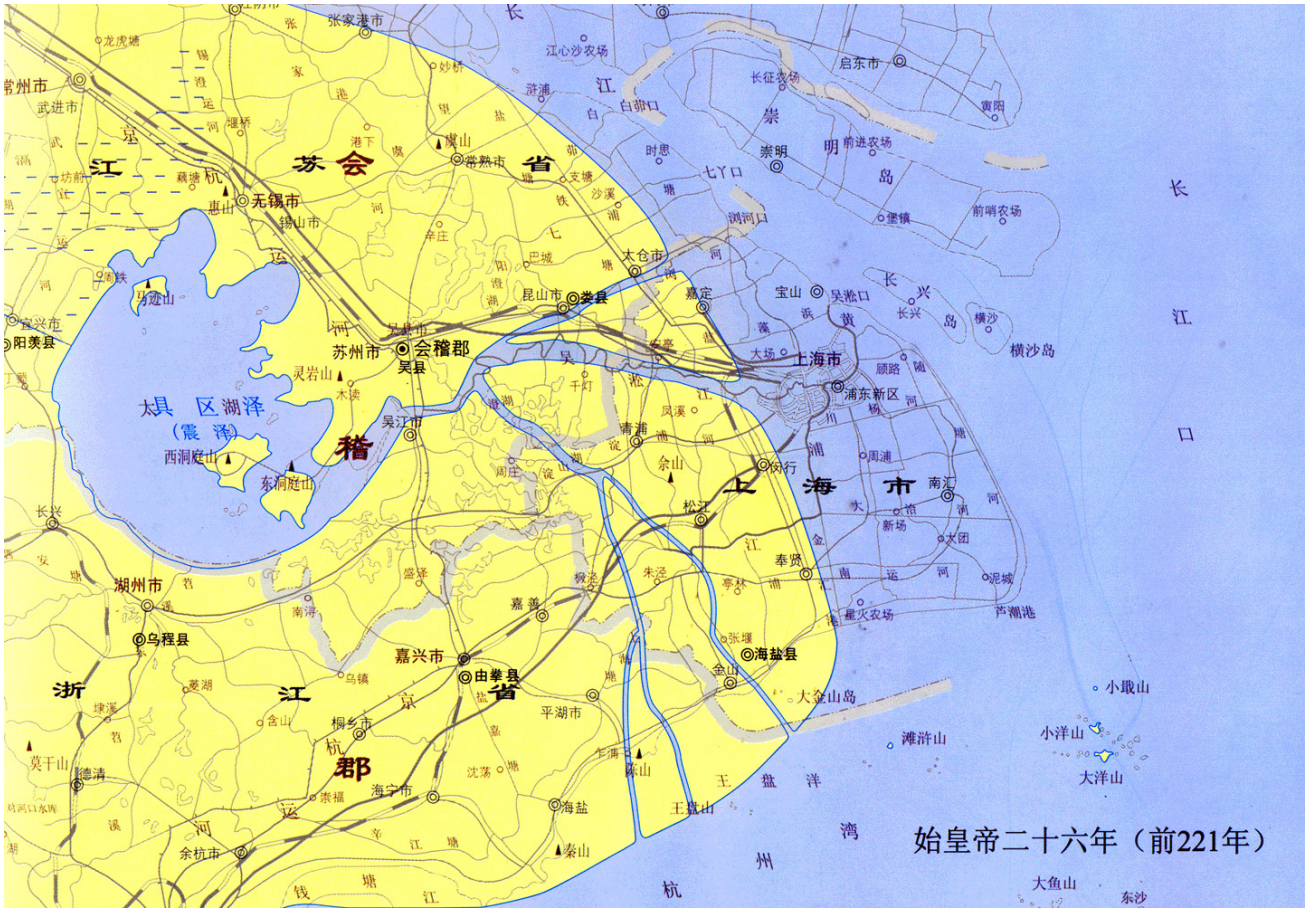


Figure 1. Main waterways and coastline in the year 221. Note: In light grey the situation in 1999. Source: Zhou (1999).

120 and 60 km away from the current coastline. Over the years the coastline shifted as a result of sedimentation processes in the estuary of the Yangtze River. When the coastline was still near Suzhou this city was the prime metropolis in the wider region as the capital of the state of Wu (12th century BCE–473 BCE). Suzhou reached a golden age during the Han Dynasty (206 BCE–220 CE) when thanks to international trade Suzhou could grow quickly and it became one of the 10 largest cities on earth (Chandler, 1987). Due to silting up of shipping channels, flooding, as well as the shifting coastline due to sedimentation—enhanced since the late Han dynasty by hydraulic interventions—Songjiang emerged as Suzhou's outer port and became the new regional center during the Tang Dynasty (618–906). At that time the Wusong River (current Suzhou Creek) was called "Song Jiang," after which the eponymous city was named, and which is now a suburban district of Shanghai. Early Yuan Dynasty (1279–1368) Shanghai was founded after the construction of the Huangpu River. Before that, during the Song dynasty (960–1279), a dike was built to keep saltwater out as much as possible so agriculture could develop. A small fishing settlement called Hudu arose. Apart from fishing, salt production was also an important source of income. In 1074 Hudu became a "market town" (*zhen* 镇), in 1159 a "market city" (*shi* 市), and in 1292 this town was given its current name Shanghai, and it became a county capital (Scheen, 2022). After this, the fishing harbor transformed gradually into a regional port with multiple functions.

In 1554, during the Ming Dynasty, a city wall with a moat was built as a fortification, with three water gates to enable ocean-going ships to dock within the urban core (Denison & Guang, 2006, p. 20). Dongjiadu, located outside the protective city walls, used to be the first urban extension outside the wall. A thriving bustling sailor's neighborhood arose here with trading houses, temples, and influences from all provinces and neighboring countries with trading posts, eateries, and culture. Each province or country was represented by a merchant guild or *huiguan*, a building that functioned as a meeting place for groups of migrants (Denison & Guang, 2006; Knyazeva, 2015; Moll-Murata, 2008). Ships moored along the Dongjiadu Canal and Huangpu River. Particularly during the late Qing Dynasty, the area started to attract international trade (communication with local historians). Due to the Opium Wars and the foundation of foreign concessions, the port function shifted north to the well-known Bund. As a result, international trade started to thrive again (after a period of border closure), with new mooring places and industries stretching in a longitudinal direction along both riverbanks (Figure 2), especially on the Puxi side. Dongjiadu quickly fell into disrepair, reinforced by wars and fires. In 1937 the Japanese bombed the area and Red Guards destroyed

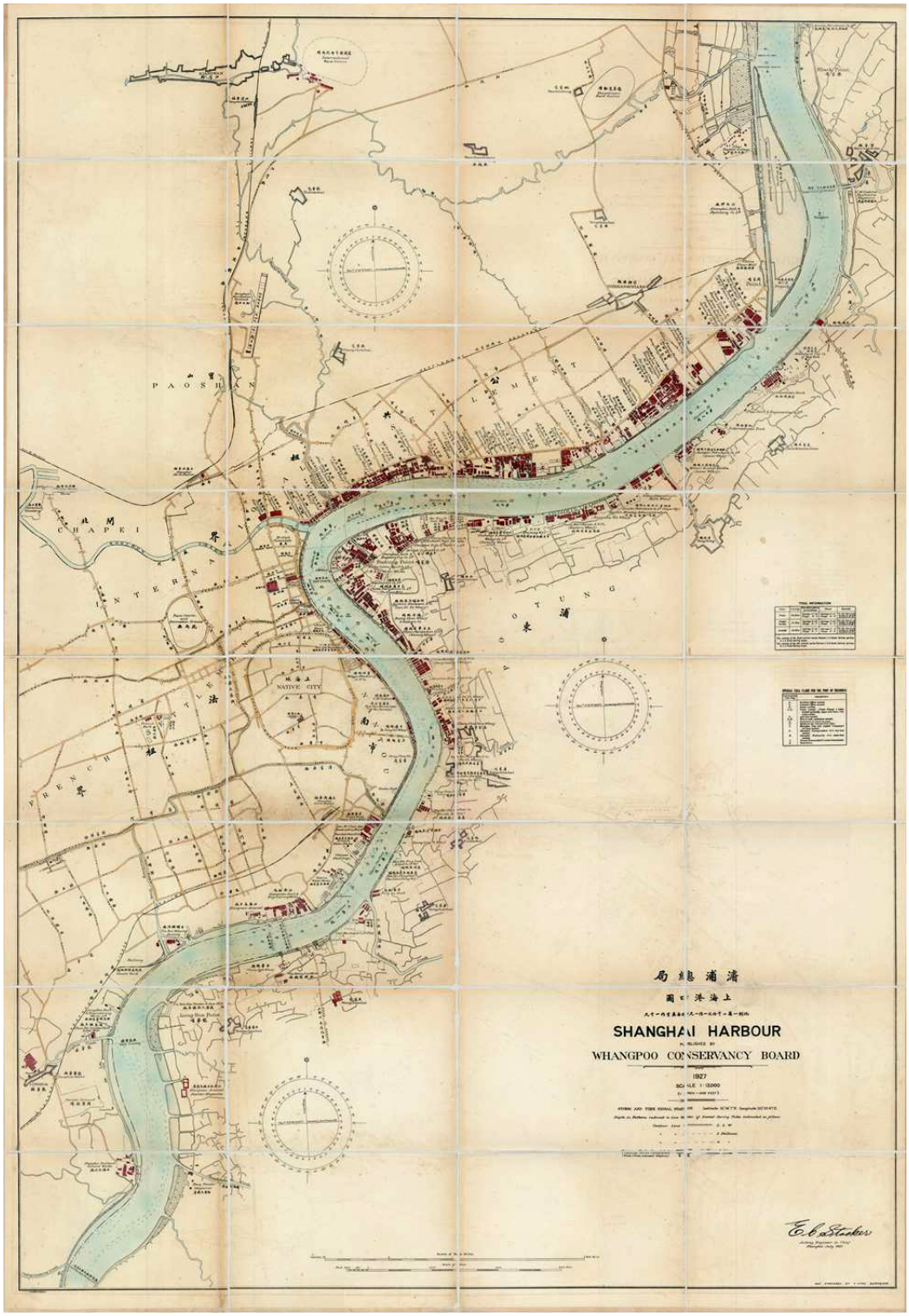


Figure 2. Huangpu River with embankments in a longitudinal direction. Source: Utne (1927).

most remaining cultural heritage during the Cultural Revolution (Denison & Guang, 2006; Knyazeva, 2015). Despite its historic and cultural relevance, Dongjiadu was not included on the municipal heritage list. This characteristic neighborhood recently has been wiped out in favor of commercial real estate with only two surviving buildings: a cathedral and a restored *huigan* (den Hartog & González Martínez, 2022).

2.2. Shifting Shipping Channels and the Birth of Shanghai

The large amount and density of water streams plus many changes over the years make it hard to identify ancient traces (Shi et al., 2022). Hence, the original course of the two main shipping channels, the Wusong River and Huangpu River, is not unambiguous.

There is even no clarity about where exactly the first inhabitants settled in this area, due to changing narratives (Scheen, 2022). Nowadays multiple streams are remembered in street naming. In the etymologically local Shanghai dialect, there was a distinction between waters in mainly north-south directions generally called Pu, Gang, and Jing, and in east-west directions Bang, He, and Tang (Lei, 2018). Many neighborhoods and street names contain these words still today. For example, the name of both city halves refers to this: *Pǔ Xi* (浦西)—in which *Xi* means west—on the west side of the Huang Pu River and *Pǔ Dōng* (浦东) on the east. The character *Pu* refers to an old creek in the north-south direction and Huang refers to the person Huang Xie (黃歇), better known as Chunshenjun (春申君), minister of state at the end of the Warring States Period (475–221 BCE) under whose leadership (according to folk tales and several historians) the river was excavated. During his reign, the river was renamed after him: Huangxiepu or Chunshenpu. Hydraulic interventions under his reign prevented floods and contributed to the prosperous development of agriculture (Lei, 2018). This fact is used as a strategy to stimulate local tourism by honoring him with a temple in Chunshen Village in the Songjiang District of Shanghai (Xinhua, 2002). From this village, the river branches from Suzhou (Jiangsu Province), Hangzhou, and Huzhou (Zhejiang Province) merge together. There is even a shrine for Chunshenjun and a Chunshen Hall with a museum on Huangpu's history. The importance of this former minister of state for Shanghai is emphasized mostly by borrowing the middle character from his name: the character *Shēn* (申) which is alternatively used as a nickname for the city of Shanghai. The city's full name Shanghai (上海) actually literally translates as (built) "upon the sea," since the coastline has been shifting eastwards (Figure 3). This naming reflects the importance of the coastal location and shipping channels.

2.3. Fighting Floods: Channeling, Dredging, and Diverting the River to Enable (International) Trade

Before the Huangpu River existed as the main drainage channel of Tai Hu Lake, the Wusong River had this function. Between 810–1042, the entire course from Tai Hu Lake to the sea was channeled to prevent silting, although dredging remains needed to enable merchant ships (coasters) to sail to Suzhou. During the Yuan Dynasty (1279–1368) the Huangpu became more important in use and was widened (Lei, 2018). It merged into the existing Wusong River at Huangpu *Kou*—"口" *kou* means river mouth—a few hundred meters northeast of the current location (Denison & Guang, 2006). During

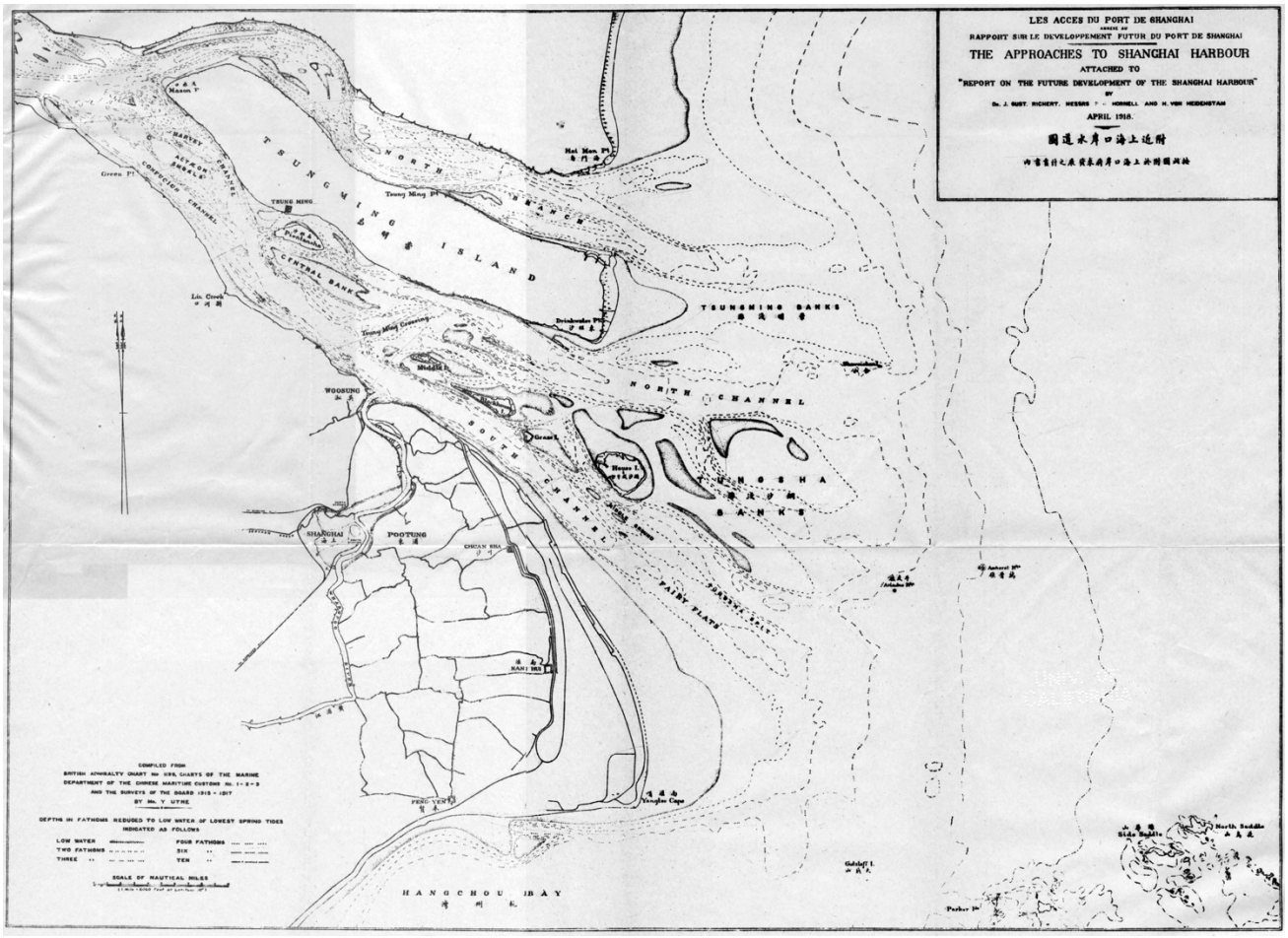


Figure 3. Yangtze River estuary with tidal landscape in 1918. Source: von Heidenstam (1920).

the Song dynasty, parts of the canalized creek system regularly silted up, leading to flooding during rainy seasons, with great damage to agriculture and the economy. This was exacerbated during the early Ming Dynasty (1368–1644)—at that time porcelain, cotton, and silk were the main export products of the region—when the lower reaches of the Wusong Creek River became silted up, and the Taihu Lake overflowed in July 1403 with a dramatic flood (Yang, 2022) resulting in the resettlement of many (Lei, 2018). Water engineer Ye Zongxing made a plan to dredge the Fanjiabang, which is the former name of the upstream Wusong River and is currently part of the Huangpu River between Waibaidu Bridge and Fuxing Island. The objective was to reduce flood risk downstream (Yang, 2022). This meant that outlet water from Tai Hu Lake was largely diverted via the new Huangpu course. As a result, the current Bund is located where it is. In addition to levees and other hydraulic works by Chunshenjun, these important engineering works by Ye Zongxing can be seen as equally essential in Shanghai's growth into a world port (according to interviewed historians). Yet only a modest memorial hall has been constructed for him in the periphery.

Another important water-control project was carried out a century afterward, resulting in the Huangpu River replacing Suzhou Creek as the prime transport artery. Due to the regular tidal waves from the East China Sea, the water level and flow of the Huangpu River changed three times a day (Yang, 2022), with still frequent flooding. To end this, Hai Rui—governor of Nanjing, then capital of the Ming Dynasty—ordered to build a dam east of the Jinhui River to redirect the Huangpu River to the north, giving the river its characteristic 90-degree angle in the southeast. This dam was replaced decades later with the excavation of the Dazhi Canal (*Dàzhì Hé*大治河) to the east and canalization of the Jinhui to the south, intended to further reduce flood risks but also to improve the saline and alkaline land conditions for agriculture east of the Huangpu River (Yang, 2022). The Dazhi Canal was dug by hand between 1977 and 1979—just after the Cultural Revolution (1966–1976)—by some 300,000 workers over a length of 39.5 km. Dazhi River makes a shortcut with the East China Sea and the same goes for the Jinhui Canal heading south, both are navigable by barges and even small coasters, but not intensively used (personal observations) and mainly serve for water management purposes.

2.4. Economic Reopening: Accelerated Industrialization, Agricultural Production, and Urbanization

After the Opium Wars, when the Treaty of Nanjing (1842) was signed and international trade was forced upon China, Shanghai grew in less than a century into the third largest financial center in the world after London and New York. After the international reopening, the Port of Shanghai began to function as a hub port and economic link for the wider Yangtze River Basin (Dai, 2019). The economic reopening also had a vast impact on the development of the direct hinterland within the delta region, especially on agriculture (with advanced irrigation systems), the rise of small and medium industries, new trends in handicraft industries, and population growth (Dai, 2019). After the Treaty of Nanjing, the city of Shanghai was subdivided into three main sections that operated under their own laws and regulations: the International Concession (before the British and American), the French Concession, and the Chinese city (Scheen, 2022). Each part had its own port or mooring places and institutions. Since the late 19th century, the Qing government expanded the port in Wusong for domestic activity (Hao & Li, 2018), while international, especially Western powers, operated from their concessions. At the beginning of the Qing Dynasty (1644–1911), Wusong was already a port town for the transshipments of goods, but it always played an important military strategic role, especially after the Opium War (Hao & Li, 2018). During the Qing government, a plan was raised to open new harbor basins for larger ships here at Wusong Town—the point where the original Wusong Creek (now Huangpu River) enters the Yangtze—to compete with the Shanghai Port that was run by foreign powers around the Bund. This was part of a larger plan—The Greater Shanghai Plan in 1927 (MacPherson, 1990)—to create a whole new city center outside of the foreign concessions. In reaction Western powers started dredging the Huangpu River in their concession areas. During the Second World War, a fierce battle with Japanese invaders took place here, memorialized with a monument and museum. Today this estuary is still called "Mouth of the Wusong" (吳淞口) with still a significant naval base.

The headwaters and middle part of the 125-km long Wusong River have been renamed Suzhou Creek since the mid-19th century by Westerners at the time of the foreign concessions since it connects to the formerly important port city of Suzhou. This channel played a crucial role in domestic trade and strongly influenced the spatial development of Shanghai, Suzhou, Songjiang, and the whole Yangtze River Delta region (Dai, 2019). The lower reaches of the Wusong River are now an integral part of the Huangpu and the name Wusong disappeared officially, although it is still the most important element of Shanghai's main shipping channel(s)—serving both the Huangpu and former Wusong River. Old Shanghainese know this and still use the original name in daily life.

After the foundation of the People's Republic in 1949 there came an end to "all kinds of sovereignty of imperialism and illegal occupation of our country, including ship diversion, navigation administration and channel dredging, which ended the chaos in the management of Wusong Port, which was caused by the imperialism for decades" (Hao & Li, 2018, p. 337). International trade was limited during Mao's rule (1949–1976). Under the communist rule of the People's Republic of China, Wusong Port gradually turned into an industrial port, in conjunction with the establishment of heavy industry-oriented

in Baoshan District. Simultaneously, several satellite cities were built under, intended to strengthen ties with the rural hinterland with decentralized industries clusters. Agricultural production was meant to realize self-sufficiency, first with rice and grain, and since the 1960s also with aquaculture, pigs, poultry, and multiple crops.

2.5. Shanghai's Unprecedented Urban Growth as Economic "Head of the Dragon"

During the recent three decades, the world's economic center of gravity has shifted eastward, accompanied by extremely fast and large-scale urbanization. In 1992, revolutionary and former statesman Deng Xiaoping named Shanghai "Head of the Dragon" (Foster et al., 1998), i.e., China's economic gateway to the world. After a period of economic decline and a shrinking of the urban population, China's urbanization (Hsing, 2010) accelerated in an unprecedented way with the opening of the economy. The service sector began to grow, as did large-scale real estate developments. New cities and economic and technological development zones were established in the region (den Hartog, 2010), in conjunction with an export-oriented economy. In 2001 China joined the WTO and became increasingly influenced by globalization. Since the mid-1990s a massive scale jump of port and city took place, resulting in the spatial decentralization of the port (Figure 4) and city and the creation of multiple new towns (den Hartog, 2010). In 1986, Shanghai's Master Plan was approved by the state council, in which the local government proposed to build the container terminal Yangshan Deepwater Port in the southeast of Pudong District, and the Shanghai Wusongkou Cruise Port in Baoshan, with the aim to become the busiest international cruise port for the Asia Pacific region. In 1998, the depth of the Huangpu went from 7.5 to 12.5 m (according to communication with the Shanghai Dredging Company). Early this century, Shanghai started to move its ports to locations far outside the urban core to accommodate the expected urban growth and allow the new ports to develop further. Port decentralization accelerated under the influence of the new Port Law of 2004 (Notteboom & Yang, 2017). In 2013, a pilot Free Trade Zone was established in the new ports along Pudong's coastline.

Early 1990s deindustrialization of the Huangpu riverbanks started with the redevelopment of parts of the Pudong New Area as a Special Economic Zone and the construction of the Lujiazui financial district. Interestingly, in most European world ports such as Hamburg, Liverpool, London, and Rotterdam, ships usually moor in docklands or basins, while in North American ports such as New York and Boston, mooring takes place at piers. In Shanghai, however, cargo ships—and cruise ships and navy ships—moor at Bunds or embankments, in a longitudinal direction in the river. Hence, Shanghai has a unique port typology. As a result, over time, the port area with related industries and transshipment with moorings for loading and unloading along the Huangpu stretched for km, over a length of 60 km on both sides of the river. The outplacement of the port and related industries created space for the renewal of the previously inaccessible and polluted riverbanks.

The revitalization of the Huangpu River and Suzhou Creek (Shanghai Municipal People's Government, 2018) are central elements in Shanghai's current master plan (Shanghai Municipal People's Government, 2016), which has the subtitle: "Striving for an Excellent Global City." Shanghai wants to compete with other world cities such as New York, London, Singapore, and Tokyo in terms of economy, appearance, quality of life, sustainability, and inclusiveness. This master plan introduces a shift in the development of Shanghai from a (sprawling) urban extension model to one of densification and urban renewal. The main reason is to save agricultural land and nature as a compact city within newly introduced red lines (Shanghai Municipal People's Government, 2016).

All polluting industries must disappear over a bank length of no less than 120 km, thereby greatly reducing CO_2 emissions (den Hartog, 2021b). To further reduce Shanghai's CO_2 emissions (Yi, 2021), emissions from shipping (Zhao et al., 2020) must also be limited. The large-scale urban regeneration accelerated after the 2010 World Expo, with a long ribbon of public urban space along the former industrial riverbanks with reused industrial heritage for cultural purposes. Simultaneously, large-scale ecological corridors have been proposed (Shanghai Municipal People's Government, 2016, 2018). A significant portion of the stated ambitions has been realized with great success within less than five years, including significant amounts of public space and urban greenery, an achievement that makes riverbank developments in other world cities pale in comparison. However, there are also serious shortcomings, such as unprecedentedly high real estate prices and increasing unaffordability, accelerated by the demolition of old neighborhoods and outplacement of lower income groups (den Hartog, 2019), and arguably environmental and social injustice by transposing polluting industries to elsewhere to please the new wealthy who can afford to live here.

Yet with its classic Bund promenade full of colonial buildings and the Lujiazui skyline with ultra-modern skyscrapers, and extensions with "new bunds" (den Hartog, 2021a), the Huangpu River remains the artery and name card of Shanghai. Shanghai became again China's most progressive and innovative city, thanks to its port. This position of China (and Shanghai) on the world stage is further strengthened by the 2013 proposed 21st Century Maritime Silk Road, under China's Belt and Road Initiative (Xinhua, 2013).

2.6. Contemporary Challenges and Course Changes: From Industrial (Production) Landscape to Urban Consumption Landscape

China's rapid urban transition (Hsing, 2010) has had a global economic impact. There are significant

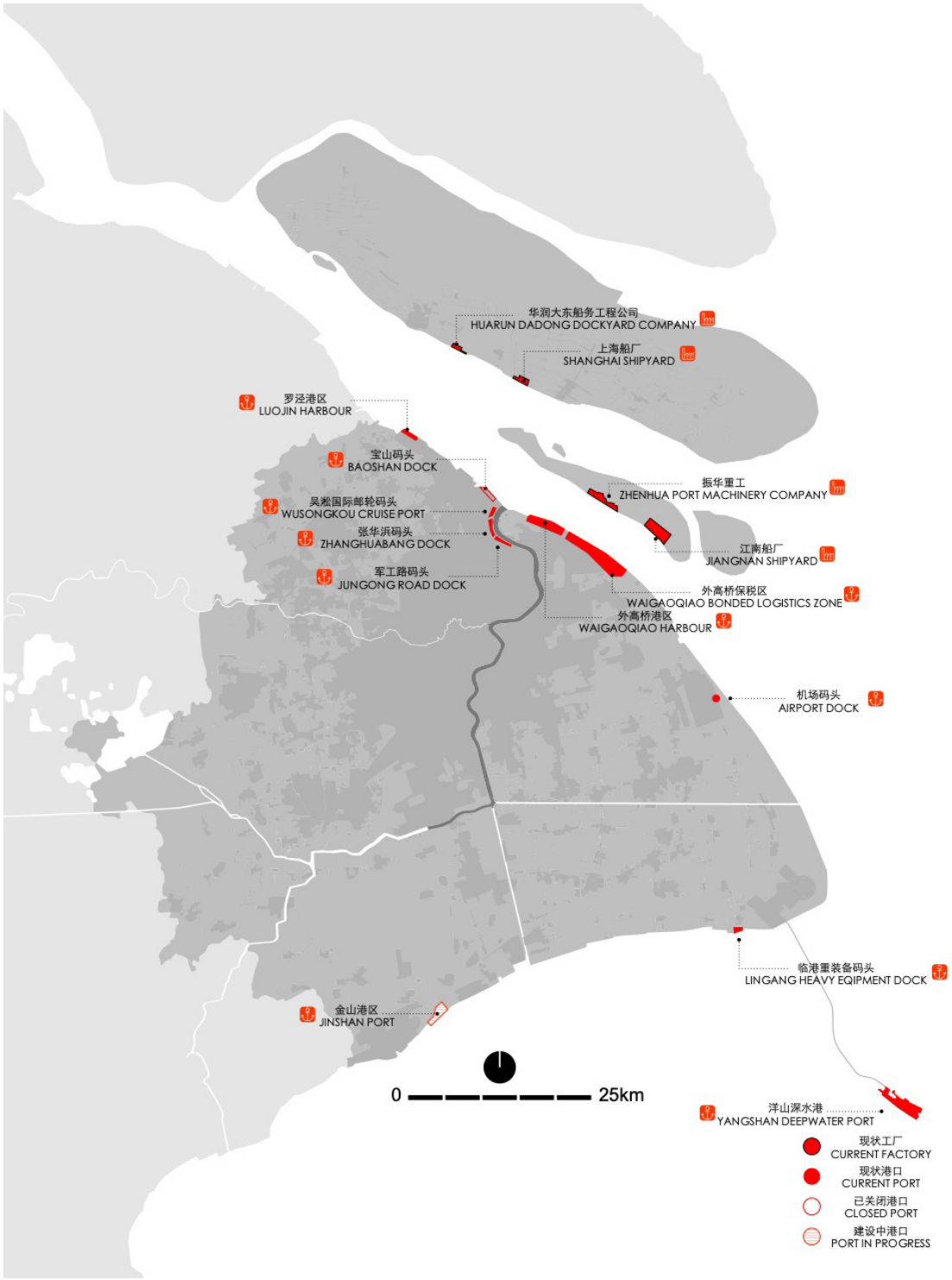


Figure 4. Ongoing decentralization of the port of Shanghai. Map by den Hartog and Hu in 2023.

improvements in the quality of life for many, but there is also serious collateral damage, both socio-economical (a growing gap between urban and rural) as well as environmentally. A range of local environmental clashes illustrates this, such as the agricultural drama with floating pigs (Jourdan, 2013). Tai Hu Lake and the upper stream of the Huangpu River are protected sources for drinking water (Wang et al., 2015), although their quality has been negatively influenced by industries (Bai et al., 2016), and nowadays most water is collected and stored in basins in the Yangtze River, though there are issues with saltwater intrusion into reservoirs ("Contamination report sparks Shanghai rush for bottled water," 2022).

Shanghai's location along the Huangpu brought prosperity, especially due to port activities, but also brought exposure to vulnerabilities due to the scarcity of fertile lands (Brown, 1995), increasing flood risk (Balica et al., 2012; Hanson et al., 2011; Ke, 2014; Ke et al., 2018;

Quan, 2014), and endangered wetlands (Li et al., 2020; Wang, 2012)—although these flood-risk related studies are based on data prior to the substantial improvements which have been made along the waterfronts since 2017 as integral part of beforementioned waterfront regeneration along the Huangpu River. In 1911, 1931, and 1935, flooding of the Yangtze River caused much damage and casualties (Carmichael, 2017). Also, during the first two decades of this century, floodwalls along the Huangpu River failed several times, most notably during typhoons in 1997, 2000, 2005, and 2013 (Ke et al., 2018). However, during the last 10 years, significant improvements have been made along the entire stretch of the Huangpu River, by combining improved retaining walls, embankments, and other civil engineering measures with large-scale urban regeneration and waterfront renewal, in addition to large-scale public spaces reconnecting city and river, ecological improvements, and real estate clusters to boost the economy and improve global competitiveness (den Hartog, 2021a, 2021b). New studies must inform us if these measures are sufficient to reduce flood risk.

Many physical references disappeared as a result of the reckless urban expansion of Shanghai over the past three decades, based on a tabula rasa planning approach, including many waterways (Shi et al., 2022). A shift in appreciation of the waterside (den Hartog, 2019) is causing tensions such as old working-class neighborhoods with cheap housing being bulldozed to make way for modern life with shopping malls, office and hotel towers, and luxury apartment complexes, which causes stress on the housing market with towering prices. The newly designed waterfront became a scene for large-scale and speculative real estate projects while affordable working-class neighborhoods are razed to the ground.

Moreover, despite green promises in the master plan and impressive amounts of new greenery, there are still environmental tensions, such as in fishery (Ning, 2020). In China "from the 1950s to 2000s, 53% of temperate coastal ecosystems, 73% of mangroves and 80% of coral reefs have been lost mostly due to economic development" (Paulson Institute, 2016). Along Shanghai's coastline, this was mainly due to massive land reclamations for urbanization, ports, agriculture, infrastructures, and a new airport. Natural wetlands are decreasing rapidly, but at the same time, new ones are being constructed. Due to sedimentation in the Yangtze estuary, several shoals began forming since the late 1940s. A Deep Navigation Waterway project through the Yangtze Estuary has been under construction since 2000: With the help of jetties and spur dikes the main navigation channel has been improved which meanwhile adds an average of 4.1 square km of newly constructed wetland yearly (Li et al., 2016). This adds to the Jiuduansha Wetland Nature Reserve in the middle of the Yangtze estuary, which geographically makes up part of the Chongming island formation of shoals but administratively belongs to Pudong District. This fast-growing new wetland has been constructed as compensation for the wetlands that were lost due to the construction of Pudong International Airport during the 1990s. Today, Jiuduansha is a nationally protected reserve and consists of four major shoals. Buildings and other constructions are not allowed here. However, there is an exception for the construction of a wetland museum here. The shoal just north of Jiuduansha contains Hengsha island—of which the part above sea level is inhabited mainly by farmers and is almost car-free; the elongated eastern part consists of constructed wetlands. This island, which administratively belongs to Chongming District, has been appointed recently by the Municipally to become a 158 square km "world-class pilot zone for ecological agriculture" (according to local officials). This will surely result in construction activities. Strict enforcement of a building-free area here, as with wetlands elsewhere along the Shanghai coastline, seems difficult to achieve even in a centrally controlled context. According to Tang et al. (2022), the channel in the south of the Yangtze Estuary—across the Jiuduansha shoals—transformed from erosive to depositional between 1983 and 2018. However, in another research by partly the same authors it is claimed that since the Three Gorges Dam was finished in 2003 and sedimentation ended, and this is resulting in serious channel erosion downstream, "potentially threatening the long-term stability of this large alluvial river and its deltaic and continental shelf development" (Zheng et al., 2018, p. 9).

The waterside in canal cities within the Yangtze River Delta used to be the dynamic backdrop for a multitude of activities, living, working, trading, washing, cooking, transportation, etc., all aspects of life took place along the water. Due to industrial development, the banks of the Suzhou Creek and Huangpu River became increasingly industrialized, and the water and the banks became so polluted that living there became unattractive. According to Wu (1979), the water quality used to be good before the 1920s, when industrialization began along the embankments of the Suzhou River. However, the water quality decreased quickly and life along the creek became nasty; the creek became like a sewer (personal conversation with local people and experts). This has all changed during the last two decades, and the waterfront is a prime real estate location now (den Hartog, 2019). Although the Huangpu is still intensively used by barges and coasters for hinterland connections, shipping no longer exists on Suzhou Creek since it is blocked at the river mouth to prevent currents.

The Huangpu River and Suzhou Creek became important demarcation lines in the collective memory of residents not only as physical but also as mental borders, with different lifestyles, and even different dialects and weather reports on either side. Both shipping channels are a symbol of Shanghai, as a cosmopolitan metropolis, culminating in the Bund and futuristic skyline of Lujiazui. The importance of the Huangpu River even goes to outer space since a small planet was officially named after this river (Schmadel, 2003).

3. Discussion and Conclusion: Changing Relationship and Priorities in Land Use

City, port, nature, and agriculture all compete for space. In previous paragraphs, it was explained how the course of shipping channels changed continuously in Shanghai. Inherently related to this is also the location of the port and Central Business District (CBD) as economic centers of gravity shifted. Port and city moved from Suzhou to Songjiang—now part of the direct-controlled Municipality of Shanghai—then within the (expanding) administrative boundaries of Shanghai itself; to the fortified old city and to Dongjiadu, then northwards along the Bund, almost to Wujiaochang (in the Greater Shanghai Plan), then to Lujiazui across the river in Pudong, and eventually dispersed in various sub-centers, and new cities (den Hartog, 2010), and even new bunds as new CBDs (den Hartog, 2021a). Most port functions are dispersed into regional clusters in the wider Yangtze Delta Region such as in neighboring Nantong (Jiangsu Province) and Ningbo (Zhejiang Province). The Port of Ningbo, a mere 100 km away from Shanghai, even is a direct competitor at the top of global port rankings and has more shipping movements than Shanghai. This regional competition and new hinterland relations bring new challenges, e.g., cooperation that crosses administrative boundaries, and also regarding integrated management of the ecological environment (Hou & Geerlings, 2016; Li et al., 2022).

In a relatively short period, the economic structure and the society of Shanghai (and China) changed from a dominant agricultural into an industrial and post-industrial phase in which the tertiary (service) sector became the leading sector. Shanghai and other Chinese cities were until recently self-sufficient in their food supply (Jacobson, 2012). In peripheral parts of Shanghai still a lot of rice fields can be found, although it is a fragment of the amount that existed two decades ago due to rapid urban expansion. However, China is still self-sufficient in rice (Deng et al., 2019), thanks to land use compensation programs.

During the brutal lockdown in the Spring of 2022, it became clear how far urban society is disconnected from the port, and also from the agricultural countryside: the urban food supply came to a standstill (den Hartog, 2023; James, 2022; Kuo et al., 2022). Opposed to official reports of sufficient food supplies (Ministry of Agricultural and Rural Affairs, 2020), the entire city of Shanghai was without food and other supplies (even medicines) for more than 10 days (den Hartog, 2023; James, 2022; Kuo et al., 2022), while there were abundant supplies in the nearby port (Ang, 2022). Even the global supply chain was disrupted considerably (Figure 5), with substantial effects on the world's major ports (Ang, 2022). In more than a few neighborhoods the supply was disturbed for a much longer time, such as in university campuses. After the lockdown, it took months to get effectively restarted. At one point, many citizens in one of the world's most modern and sophisticated cities started growing crops on their balconies.

This illustrates an extreme disconnection between city and port, and also between urban and rural. Although this was temporary, it underlines a need to reconsider connections between the city, port, and

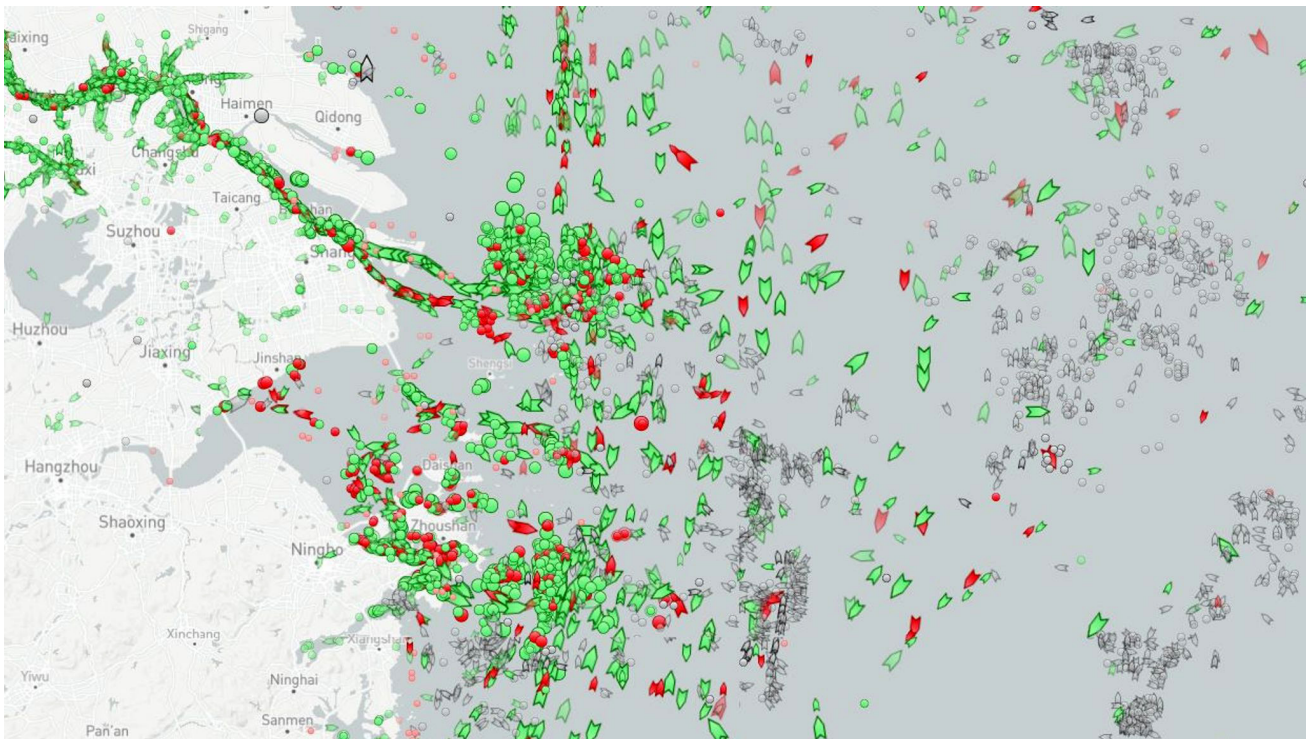


Figure 5. Vessels waiting off the coast off Shanghai during lockdown. Source: Enokido-Lineham (2022).

(rural) hinterland. Urban and rural are fundamentally interconnected, as explained by King (1911) for East Asian cases, and later notably also by Cronon (1991) for Chicago, and can be expanded for metropolitan regions in general. First of all, local, regional, and even global cooperation needs to be grounded in daily life reality, starting with the people. This is also promised in ecological civilization policies (Hansen et al., 2018), but not in practice. The lockdown shows there is a disconnection with the former advantages of Shanghai's strategic location (Dai, 2004). This is caused by a growing gap between the promises and expectations from the central government and the reality of daily life. Besides known governance priorities—the restoration of the ecosystem, water management, energy transition, and improvement of regional spatial structure (Shanghai Municipal People's Government, 2016)—a reevaluation of logistic chains is needed, especially the grocery on the streetcorner, and informal (wet) markets, all of which have been increasingly disappearing in the last few years in Shanghai. Above all, mutual communication between citizens and decision-makers is needed, as increasingly underlined and promoted by various local experts in Shanghai, but not yet practiced citywide.

Meanwhile, the construction of large-scale green structures as compensation and buffer (Shanghai Municipal People's Government, 2016) continues, as do other impressive measures in the field of quality-of-life improvement (den Hartog, 2021b). At the time of writing, a big question remains: whether major social and economic shocks caused by the pandemic—in particular the brutal lockdown—in combination with geopolitical changes (Kandhari, 2023) will change the path of globalization, especially for Shanghai and China. Long-term consequences for the port (Notteboom & Haralambides, 2020) and also for urban development remain uncertain. Yet this is in the pattern of a historical legacy, in which the closure and reopening of China and its ports are recurring (Wang & Ducruet, 2013).

Finally, in line with its ambition to become an "excellent global city" (Shanghai Municipal People's Government, 2016) Shanghai should take the lead in searching for reconnection and rebalance between urban development (city and port) and rural vulnerabilities (including agriculture, rural communities, and ecological vulnerabilities), and between global aspirations and local daily life realities.

Acknowledgments

Many thanks to Isaac Lawless for proofreading this article. Thanks to all interviewees willing to share their experiences and insights. Thanks also to the peer reviewers for their constructive remarks. The author received no financial support for the research and authorship of this article. An institutional agreement between the publisher and Delft University of Technology made this publication possible.

Conflict of Interests

The author declares no conflict of interests.

References

Ang, C. (2022, April 21). Satellite maps: Shanghai's supply chain standstill. *Visual Capitalist*. https://www.visualcapitalist.com/satellite-maps-shanghais-supply-chain-standstill

Bai, Y., Wang, M., Peng, C., & Alatalo, J. M. (2016). Impacts of urbanization on the distribution of heavy metals in soils along the Huangpu River, the drinking water source for Shanghai. *Environmental Science and Pollution Research*, *2016*(23), 5222–5231. https://doi.org/10.1007/s11356-015-5745-3

Balica, S., Wright, N. G., & van der Meulen, F. (2012). A flood vulnerability index for coastal cities and its use in assessing climate change impacts. *Natural Hazards*, *64*(1), 73–105.

Ball, P. (2017). *The water kingdom: A secret history of China*. University of Chicago Press.

Bird, J. (1973). Of central places, cities and seaports. *Geography*, *58*(2), 105–118.

Braudel, F., & Wallerstein, I. (2009). History and the social sciences: The longue durée. *Review (Fernand Braudel Center)*, *32*(2), 171–203. http://www.jstor.org/stable/40647704

Brown, L. R. (1995). *Who will feed China?: Wake-up call for a small planet* (Vol. 6). W. W. Norton.

Carmichael, R. S. (2017). *Notable natural disasters*. Salem Press.

Chandler, T. (1987). *Four thousand years of urban growth: An historical census*. St. David's University Press.

Contamination report sparks Shanghai rush for bottled water. (2022, October 12). *Bloomberg*. https://www.bloomberg.com/news/articles/2022-10-12/contamination-rumors-spark-shanghai-scramble-for-bottled-water?leadSource=uverify%20wall

Cronon, W. (1991). *Nature's metropolis: Chicago and the great West*. W. W. Norton.

Dai, A. (2004). Inland river shipping and the development of Shanghai city [translated from Chinese]. *Historical Review*, *4*, 94–98.

Dai, A. (2019). *Port, city, hinterland: A historical investigation of the economic relationship between Shanghai and the Yangtze River Basin, 1843–1937* [translated from Chinese]. Shanghai Academy of Social Sciences Press.

den Hartog, H. (2010). *Shanghai new towns: Searching for community and identity in a sprawling metropolis.* 010 Publishers.

den Hartog, H. (2019). Re-defining the appreciation and usability of urban watersides in the urban center and peri-urban fringes of Shanghai. *European Journal of Creative Practices in Cities and Landscapes*, *2*(1), 37–64. https://doi.org/10.6092/issn.2612-0496/8918

den Hartog, H. (2021a). Shanghai's regenerated industrial waterfronts: Urban lab for sustainability transitions? *Urban Planning*, *6*(3), 181–196. https://doi.org/10.17645/up.v6i3.4194

den Hartog, H. (2021b). Engineering an ecological civilization along Shanghai's main waterfront and coastline: Evaluating ongoing efforts to construct an urban eco-network. *Frontiers in Environmental Science*, *9*, Article 639739. https://doi.org/10.3389/fenvs.2021.639739

den Hartog, H. (2023). *Temporary dystopia: Shanghai in absolute lockdown to contain the omicron variant*. International Institute for Asian Studies. https://www.iias.asia/the-newsletter/article/temporary-dystopia-shanghai-absolute-lockdown-contain-omicron-variant

den Hartog, H., & González Martínez, P. (2022). Integrating heritage assets in large commercial complexes: De-contextualization and re-signification of memory in Shanghai. *Habitat International*, *126*, Article 102601. https://doi.org/10.1016/j.habitatint.2022.102601

Deng, N., Grassini, P., Yang, H., Huang, J., Cassman, K. G., & Peng, S. (2019). Closing yield gaps for rice self-sufficiency in China. *Nature Communications*, *10*, Article 1725. https://doi.org/10.1038/s41467-019-09447-9

Denison, E., & Guang, Y. R. (2006). *Building Shanghai: The story of China's gateway*. Wiley.

Ducruet, C., & Lee, S. W. (2006). Frontline soldiers of globalization: Port-city evolution and regional competition. *GeoJournal*, *67*(2), 107–122.

Enokido-Lineham, O. (2022, April 20). Covid-19: Extraordinary image shows heavy marine traffic around Shanghai amid concerns over impact of lockdown on supply chains. *Sky News*. https://news.sky.com/story/covid-19-extraordinary-image-shows-heavy-marine-traffic-around-shanghai-amid-concerns-over-impact-of-lockdown-on-supply-chains-12593848

Foster, H. D., Hoster, H., Lai, D. C., & Zhou, N. (1998). *The dragon's head: Shanghai, China's emerging megacity*. Western Geographical Press.

Hansen, M. H., Li, H., & Svarverud, R. (2018). Ecological civilization: Interpreting the Chinese past, projecting the global future. *Global Environmental Change*, *53*, 195–203. https://doi.org/10.1016/j.gloenvcha.2018.09.014

Hanson, S., Nicholls, R., Ranger, N., Hallegatte, S., Corfee-Morlot, J., Herweijer, C., & Chateau, J. (2011). A global ranking of port cities with high exposure to climate extremes. *Climatic Change*, *104*, 89–111.

Hao, J., & Li, H. (2018). Institutional changes and the shifting power network: Planning Wusong Port from 1898 to 1999. *International Planning History Society Proceedings*, *18*(1), 333–340.https://doi.org/10.7480/iphs.2018.1.2693

Hooimeijer, F., Bacchin, T. K., & Kothuis, B. (2021). Longue durée. *Journal of Delta Urbanism*, *2*, 4–11. https://doi.org/10.48438/jdu.2.2021.6222

Hou, L., & Geerlings, H. (2016). Dynamics in sustainable port and hinterland operations: A conceptual framework and simulation of sustainability measures and their effectiveness, based on an application to the Port of Shanghai. *Journal of Cleaner Production*, *135*, 449–456. https://doi.org/10.1016/j.jclepro.2016.06.134

Hsing, Y. T. (2010). *The great urban transformation: Politics of land and property in China*. Oxford University Press.

Jacobson, M. (2012). *Shanghai urban farming: Green ring generates half of city's food*. WWF. https://wwf.panda.org/wwf_news/?204455/Shanghai-urban-farming

James, G. (2022). *China: Weibo removes hashtag about food shortages in Shanghai as locked-down residents go hungry*. Business & Human Rights Resource Centre. https://www.business-humanrights.org/en/latest-news/china-weibo-removes-hashtag-about-food-shortages-in-shanghai-as-locked-down-residents-go-hungry

Jourdan, A. (2013, April 24). Overcrowding on farms behind mystery of China's floating pigs. *Reuters*. https://www.reuters.com/article/us-china-farming-pigs-idUKBRE93N1C720130424

Kandhari, J. (2023). *China's geopolitical aspirations and challenges*. Morgan Stanley. https://www.morganstanley.com/im/en-us/individual-investor/insights/articles/chinas-geopolitical-aspirations-and-challenges.html

Ke, Q. (2014). *Flood risk analysis for metropolitan areas—A case study for Shanghai* [Unpublished doctoral dissertation]. TU Delft. https://doi.org/10.4233/uuid:61986b2d-72de-45e7-8f2a-bd61c725325d

Ke, Q., Jonkman, S., Van Gelder, P., & Bricker, J. (2018). Frequency analysis of storm-surge-induced flooding for the Huangpu River in Shanghai, China. *Journal of Marine Science and Engineering*, *6*(2), Article 70. https://doi.org/10.3390/jmse6020070

King, F. H. (1911). *Farmers of forty centuries; or, permanent agriculture in China, Korea and Japan*. Published by Mrs. F. H. King.

Knyazeva, K. (2015). *Shanghai old town: Topography of a phantom city* (Volume 1: The old docks). Suzhou Creek Press.

Kuo, L., Li, L., Chiang, V., & Wu, P. L. (2022, April 15). Shanghai's Covid siege: Food shortages, talking robots, starving animals. *The Washington Post*. https://www.washingtonpost.com/world/interactive/2022/china-shanghai-covid-lockdown-food-shortage

Lei, G. (2018). *The past and present of Huangpu.* WeChat. https://www.wechat.com

Li, D., Xu, X., & Zhou, S. (2022). Integrated governance of the Yangtze River Delta port cluster using niche theory: A case study of Shanghai Port and

Ningbo-Zhoushan Port. *Ocean and Coastal Management*, *234*, Article 106474. https://doi.org/10.1016/j.ocecoaman.2022.106474

Li, X., Liu, J. P., & Tian, B. (2016). Evolution of the Jiuduansha wetland and the impact of navigation works in the Yangtze Estuary, China. *Geomorphology*, *253*, 328–339. https://doi.org/10.1016/j.geomorph.2015.10.031

Li, X., Zhang, X., Qiu, C., Duan, Y., Liu, S., Chen, D., Zhang, L., & Zhu, C. (2020). Rapid loss of tidal flats in the Yangtze River Delta since 1974. International *Journal of Environmental Research and Public Health*, *17*(5), Article 1636. https://doi.org/10.3390/ijerph17051636

MacPherson, K. L. (1990). Designing China's urban future: The greater Shanghai plan, 1927–1937. *Planning Perspectives*, *5*(1), 39–62. https://doi.org/10.1080/02665439008725694

Meyer, H. (1999). *City and port: Urban planning as a cultural venture in London, Barcelona, New York, and Rotterdam. Changing relations between public space and large-scale infrastructure*. International Books.

Ministry of Agricultural and Rural Affairs. (2020, April 20). *On China's self-sufficiency and food reserves* [Press Release]. https://www.agroberichtenbuitenland.nl/actueel/nieuws/2020/04/20/on-chinas-grain-reserves

Moll-Murata, C. (2008). Chinese guilds from the seventeenth to the twentieth centuries: An overview. *International Review of Social History*, *53*(S16), 213–247. https://doi.org/10.1017/S0020859008003672

Ning, K. (2020, November 4). Ten-year Yangtze fishing ban not enough to save migratory species. *China Dialogue*. https://chinadialogue.net/en/nature/ten-year-yangtze-fishing-ban-not-enough-to-save-migratory-species

Notteboom, T. (2004). Container shipping and ports: An overview. *Review of Network Economics*, *3*(2), 86–106.

Notteboom, T., & Haralambides, H. E. (2020). Port management and governance in a post-Covid-19 era: Quo vadis? *Maritime Economics & Logistics*, *22*, 329–352. https://doi.org/10.1057/s41278-020-00162-7

Notteboom, T., & Yang, Z. (2017). Port governance in China since 2004: Institutional layering and the growing impact of broader policies. *Research in Transportation Business and Management*, *22*, 184–200.

Paulson Institute. (2016). *Blueprint of coastal wetland conservation and management in China*. https://www.paulsoninstitute.org/conservation/wetlands-conservation/blueprint-of-coastal-wetland-conservation-and-management-in-china

Quan, R. (2014). Risk assessment of flood disaster in Shanghai based on spatial–temporal characteristics analysis from 251 to 2000. *Environmental Earth Sciences*, *72*, 4627–4638. https://doi.org/10.1007/s12665-014-3360-0

Rodrigue, J. P., & Notteboom, T. E. (2012). Port regionalization: Improving port competitiveness by reaching beyond the port perimeter. *Port Technology International*, *52*, 11–17.

Scheen, L. (2022). History of Shanghai. In *Oxford Research Encyclopedia of Asian History*. https://doi.org/10.1093/acrefore/9780190277727.013.689

Schmadel, L. D. (2003). Huangpu. In L. D. Schmadel (Ed.), *Dictionary of minor planet names* (p. 293). Springer. https://doi.org/10.1007/978-3-540-29925-7_3501

Shanghai Municipal People's Government. (2016). *Shanghai master plan 2017–2035: Striving for the excellent global city*. https://ghzyj.sh.gov.cn/ghjh/20200110/0032-811864.html

Shanghai Municipal People's Government. (2018). *Huangpu River waterfront area construction plan (2018–2035): Striving for a world-class waterfront area. Shanghai Huangpu River and Suzhou River Planning*.

Shi, Y., Yao, Y., Zhao, J., Li, X., Yu, J., & Qian, G. (2022). Changes in reticular river network under rapid urbanization: A case of Pudong new area, Shanghai. *Water*, *14*(4), Article 523. https://doi.org/10.3390/w14040523

Tang, M., Cheng, H., Xu, Y., Hu, H., Zheng, S., Wang, B., Yang, Z., Teng, L., Xu, W., Zhang, E., & Li, J. (2022). Channel bed adjustment of the lowermost Yangtze River estuary from 1983 to 2018: Causes and implications. *Water*, *14*(24), Article 4135. https://doi.org/10.3390/w14244135

Utne, Y. (1927). *Map of Shanghai harbour*. Geographicus. https://www.geographicus.com/P/ctgy&Category_Code=utney

von Heidenstam, H. (1920). *The improvement of the Huang Pu River for ocean navigation*. Permanent International Association of Navigation Congresses.

Wang, C., & Ducruet, C. (2013). Regional resilience and spatial cycles: Long-term evolution of the Chinese port system (221BC–2010AD). *Tijdschrift voor economische en sociale geografie*, *104*(5), 521–538. https://doi.org/10.1111/tesg.12033

Wang, J. (2012). *Eco-services for urban sustainability in the Yangtze River Delta of China: Strategies for physical form and planning* [Unpublished doctoral dissertation]. The University of Melbourne.

Wang, X., Wang, S., Peng, G., Katz, D. S. W., & Ling, H. (2015). Ecological restoration for river ecosystems: Comparing the Huangpu River in Shanghai and the Hudson River in New York. *Ecosystem Health and Sustainability*, *1*(7), Article 11878997. https://doi.org/10.1890/EHS15-0009.1

Wu, G. (1979). A probe of evaluation of water quality of the Huangpu River [translated from Chinese]. *Journal of Shanghai Normal University*, *1979*(1).

Xinhua. (2002). *Shanghai rebuilds Lord Chunshen temple*. Internet Archive. https://web.archive.org/web/20090809153204/http://news.xinhuanet.com/newscenter/2002-10/10/content_591571.htm

Xinhua. (2013, September 7). President Xi proposes

silk road economic belt. *China Daily*. https://www.chinadaily.com.cn/china/2013xivisitcenterasia/2013-09/07/content_16951811.htm

Yang, Y. (2022, October 18). Pujiang first bay becoming a base for smart manufacturing. *Shine*. https://www.shine.cn/feature/district/2210181626

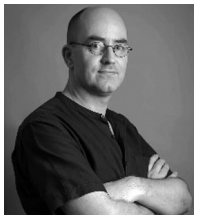
Yi, S. (2021, June 23). Shanghai leads way in China's carbon transition. *China Dialogue*. https://chinadialogue.net/en/cities/shanghai-leads-way-in-chinas-carbon-transition

Zhao, J., Zhang, Y., Patton, A. P., Ma, W., Kan, H., Wu, L., Fung, F., Wang, S., Ding, D., & Walker, K. (2020). Projection of ship emissions and their impact on air quality in 2030 in Yangtze River delta, China. *Environmental Pollution*, *263*(Part A), Article 114643. https://doi.org/10.1016/j.envpol.2020.114643

Zheng, S., Xu, Y. J., Cheng, H., Wang, B., Xu, W., & Wu, S. (2018). Riverbed erosion of the final 565 kilometers of the Yangtze River (Changjiang) following construction of the Three Gorges dam. *Nature*, *8*, Article 11917. https://doi.org/10.1038/s41598-018-30441-6

Zhou, Z. (1999). *Shanghai historical atlas* [translated from Chinese]. Shanghai Renmin Chubanshe.

About the Author



Harry den Hartog is an urban designer, researcher, and critic. In 2004 he founded the think tank-style studio Urban Language (https://www.urbanlanguage.org), which focuses on research and design solutions for urban and rural spaces. In 2012 he joined Tongji University in Shanghai as a faculty member. Since 2023 he also has a research position at Delft University of Technology, focussed on rural and urban revitalization strategies.