

WHY DID THIS HAPPEN?

The Yellow River's Course Shift in 1048

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I sincerely thank the Program in Agrarian Studies for sponsoring my research.

And I must apologize for presenting you a very rough draft of the paper. The sections in this paper were written separately, and are supposed to be placed in different chapters of a book manuscript (or, perhaps two different manuscripts).

I have left out the notes for pages 2-17 because they are not neatly edited yet.

Introduction

In 1048, the lower reaches of the Yellow River shifted its course northward into Hebei. This incident dramatically reshaped the landscape of north China and caused catastrophic damage to the human society in that region. My original attempt to reconstruct the occurrence of this incident, while being coloured by the sense of horror and sorrow that comes from reading literary texts about the disaster, has become overshadowed by two questions: ‘why did this happen?’ ‘Why did this happen to Hebei rather than to somewhere else?’ These questions are what I shall argue about in the present paper.

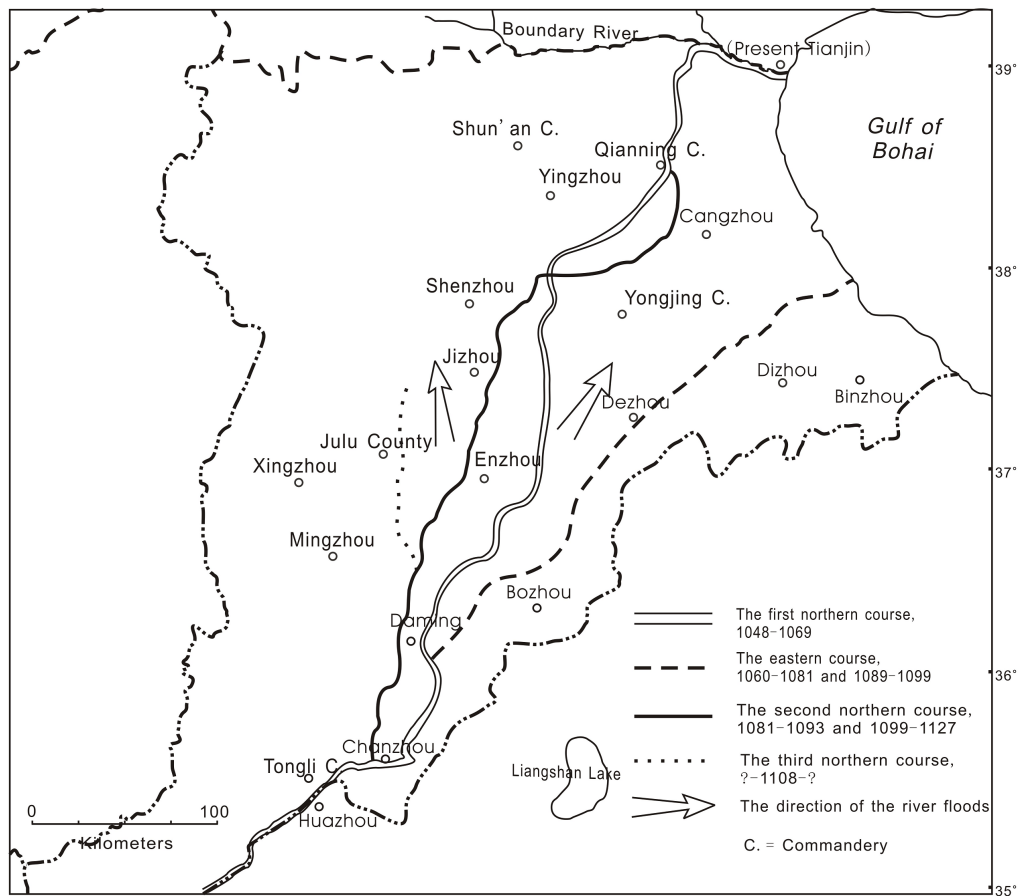
Through examining the river’s 1048 disaster within different time ranges and spatial contexts, I offer two types of answers to these questions. The first, from an environmental perspective, regards the 1048 disaster as a consequence of the interactions between the millennia-long environmental changes on the Loess Plateau and the river’s hydrological dynamics. This fundamental cause determines that a disaster as serious as the one in 1048 would invariably happen in the eleventh century. Its occurrence could have been predicted, but was not avoidable. Had the disaster not taken place at the exact location or in the year of 1048, it would invariably happen somewhere nearby around the similar time in that century. The second type of answers focuses on the lower reaches of the river during the eight decades before this incident. From a political perspective, these answers reveal the state’s intentions to protect its core interests by scarifying Hebei as the river’s flooding ground. A thorough examination of hydraulic ideas, policies and practices suggests that the river’s shifting northward in 1048 was not a natural event, but a consequence of the deliberate political choice. From the state’s point of view, this choice might be a rational one, or even a beneficial one. But from the perspective of Hebei and its people, their suffering from the disaster was not necessary and could have been avoided, had the political circumstances changed or been interpreted in different ways.

The Yellow River's Course Shift in 1048

On the sixth day of the sixth lunar month in the eighth year of the Qingli (庆历) reign era, in 1048, the lower reaches of the Yellow River overflowed. Before this happened, the North China Plain received extensive rainfall through the spring and the early summer. The rain filled in the river channel and formed strong torrents, which surged at high speeds toward the downstream where the river ran above the ground and was protected by high dykes. But these dykes were not all sturdy enough to hold the torrents. Made of pounded chunks of a mixture of wood, grass, stone, and earth, the dykes at various locations were not of uniform sizes and strength. Some were particularly fragile, for example, in places where the river course meandered, where the hydrologic mechanism of water was complex and hard to predict, or where earth was loose and unable to support strong dykes. One of these was the fascine site of Shanghu (商胡).

Located in Chan Prefecture where the Yellow River's previous bank ruptures and floods most frequently occurred, fascine dykes at Shanghu protected a small section of the river course, perhaps on both sides of the riverbanks. When the 1048 overflow occurred, the torrents hit Shanghu most heavily. On the sixth day, they broke Shanghu's northern dykes. Within a day, the river water soared and escaped from the river channel, and through this bank rupture it surged northward into the Hebei Plain. The flooding water first spread into the course of the Yu Canal and caused the latter to overflow, and then drowned suburbs of Daming, the Northern Capital of the dynasty. It then extended into northern prefectures like En, Ji, and Shen, where the floods captured parts of the course of the Yu Canal. When it reached Ying Prefecture and various military districts (commandaries) along the Song-Liao border, the water swept over this low-lying, swampy ground, where the Yellow River's muddy water filled up natural lakes and man-made ponds in this area and inflicted extensive flooding and waterlogging problems. The floods eventually converged in the lower reaches of the Juma River – the borderline between the Northern Song and the Liao, and entered the Gulf of Bohai near modern Tianjin. At this change, the Yellow River moved its river mouth more than one degree of latitude northward; its lower reaches, about eight hundred kilometers long,

shifted to central Hebei (see Map 1). This new river course was called the river's first 'northern course' in the Song time.



Map 1 Northern Courses of the Yellow River

This flooding event opened a new phase of the relationship between the Yellow River and the Hebei Plain. In most of the early history of this relationship, the river flowed along the southern border of the plain and separated the plain from the land in the south, thus granting the plain its name, Hebei (literally, north of the river, 河北), in contrast to the land in the south, Henan (literally, south of the river, 河南). In the seventh century BCE as well as between the second and first century BC, the river flowed inside the southern part of Hebei. But since the early first century AD, the river returned to a more eastward course between Hebei and Henan, which was geographically close to the route of the Yellow River nowadays. For about a thousand years, this eastern course carried the river's mainstream. Overflows and

bank ruptures occurred from time to time, but extant historical records indicate that they were neither frequent, nor of large scales, and did not provoke course shifts as dramatic as the one in 1048. This ten-centuries-long peace and stability of the Yellow River, regarded as a special ‘tranquil period’ in the river’s history by Chinese historical geographers, confirmed the territorial separation between Hebei and Henan, and endowed each of them with distinct historical and cultural identities. Hebei, in particular, was known for its martial tradition, multicultural connections with non-Han Chinese ethnic groups, and independent tendency from the political core in the south of the river. The river’s course shift in 1048 cut the territory of Hebei into two halves, thereby dramatically changing the geographical, political, and economic relationship between Hebei and the rest of China in its south.

The shift of the river’s course and floods it inflicted devastated central Hebei. For ten centuries, people living north of Daming rarely heard of and never experienced any flooding disaster of the Yellow River. Their most recent memories about the river might be a course shift in the mid-second century BC, when the river ran through southern Hebei. Such memories must were remote and vague. Unfamiliarity with the river and lack of knowledge of disaster management left a great number of Hebei people unprepared for the sudden coming of the floods in 1048. We have no explicit statistics of population that was affected by this disaster. Official accounts to appraise merits of regional governors for their dealing with the disaster tend to exaggerate the terror and the hard work officials committed to. It is often quoted by the contemporaries that several million of people from central Hebei fled to Ding Prefecture in northwestern Hebei, where the land terrain was high and free from the flooding water. Nearly a million Hebei refugees crossed the river and migrated southeastward into Qing Prefecture in Shandong Peninsula. Countless people moved southward into Henan, where the capital city Kaifeng feared the influx of too many refugees and sought to guide their migration toward other directions.

The government issued tax exemptions, provided disaster relieves, transported a bulky sum of grain from south China to Hebei, and even allowed selling people privately as an emergent means of coping with the dearth. We have no idea about exactly how many people were killed, injured, and starved during the floods and ensuing famine and hardship. According to Jia Changchao, the governor of Daming in southern Hebei where the shifting course of the

river hit first, Hebei people were flushed away by the torrents like fish and turtles in water. In Hebei's southern prefectures alone people affected were counted to several hundreds of thousand. I suppose it is not too arbitrary to assume that for entire Hebei at least a million people were affected by this flooding disaster.

This 1048 disaster did not terminate the Yellow River's flooding issues, and the newly created course was unable to accommodate the entire river and pacify its soaring torrents for a long time. From 1048 to 1128, the northern course overflowed frequently, and in the years of 1060, 1077-78, 1081, 1099 and 1108 bank ruptures occurred and forced the river to shift its course in and out Hebei. But for most time during these eight decades, the river stayed inside Hebei and flowed in one or multiple courses. Hebei, instead of Henan in the south, became the major flooding ground of the Yellow River until the end of the Northern Song dynasty. Hebei people, instead of people living elsewhere, became the main victim of the river's frequent disasters.

Why did the 1048 disaster happen?

Looking so closely at the river's flooding disaster and the tremendous human costs it inflicted makes one's heart sadden. But apart from lamenting the overwhelming power of nature that medieval Chinese could hardly compete with, I wonder if it is nature that we should totally blame for the disaster. My research agenda that places Hebei and Hebei people at the center of my concern also makes me wonder why Hebei, a land free of the Yellow River's major attacks for a thousand years, deserved such catastrophe, if nature was willful and responsible for designing the way how things took place.

Try to imagine oneself as someone living in central Hebei in 1048. What would be his first reaction from instincts when suddenly being struck and swept away by the flood? He might be screaming: ‘what happened? What am I to do?’ After climbing up to a higher, safer place (hanging on the crown of a tree for instance), after watching the torrents sweeping away everything underneath, including houses, crops, tombs and even his own children and parents, and after waiting desperately for days for rescue and relief, which might have never arrived at all, his mind might very likely be obsessed by next questions: ‘why did this happen? Why did this happen to me?’

We cannot really share the sense of horror and despair Hebei people experienced in 1048, but we do ask similar questions: ‘why did this happen? And why Hebei?’ Questions may even extend to the specific year and location in which the disaster occurred. Scrutiny is needed to prove if this 1048 disaster was a random incident, or something predictable or even avoidable. This search for answers to these ‘whys’ is highly significant not only because it explains how a disaster like this one is remembered throughout centuries and why it deserves being remembered even today. At the end of the search, we shall see the intricate interactions between nature’s power and human desires that caused the river’s dramatic change in 1048. Most importantly, this disaster was not purely a natural one, but one manufactured intentionally by human politics.

This search looks for three types of answers. First, the immediate triggers of the bank rupture and course shift at Shanghu on that particular day. This search, however, cannot be achieved. We certainly know it had been raining heavily prior to the occurrence of the disaster. But based on scant sources, this excessive water that the river received is not measurable; how it changed the hydrologic mechanism of the water flow remains unknown. It is also impossible to simulate the dynamics, as modern technology does for present disasters, with which the intensified flow stroke certain parts of river dykes, or to calculate in quantitative terms how various sections of the dykes reacted to the surging water and concentrated the majority of hydropower on the particular spot at Shanghu. Furthermore, early that year, as in several previous years in the 1040s, the northeastern part of China, including central Hebei, suffered extensive, high-intensity earthquakes. These quakes suggest that north China was in a tectonic active period; geological movements were reshaping the landform. Paleogeologists

maintain that in the past few millennia the mountain ranges along the northern and western border of Hebei keep rising, while the low-lying central Hebei Plain keeps sinking. There is no way to find out if the first half of the eleventh century was a particularly important period for such geological movements. No evidence allows us to ponder whether frequent earthquakes created favourable conditions to attract the river to shift and flow northward. I admit that this paper is unable to examine these random, immediate triggers, in spite of the fact that they might have determined the occurrence of the disaster in the particular year and at the particular location.

We can nevertheless try to comprehend the second and third types of answers. The second, which I consider as the fundamental one, is the hydrological features of the river, especially the feature of the river's high silt-water ratio. These features are formed and confined by environmental conditions in the river's entire drainage area, which far exceeds the river's lower reaches where the 1048 disaster occurred. The deteriorating environmental conditions in the middle reaches of the Yellow River in the previous centuries had led to the deposit of tremendous silt. This silt contributed to the rapid building of sediments in the riverbed and led water to overflow frequently. Both nature (topography, geography, and the composition of landmass) and human activities over a very long historical time contribute to form and change these environmental conditions. The river's fundamental hydrological features determine the river to overflow along its lower reaches often, and the eleventh century to see serious disasters like the kind in 1048. Had the disaster not occurred in 1048, it would invariably take place soon or later. Because of these hydrological features, the Yellow River disasters seemed unavoidable and were neither new nor unique in the Northern Song time, although the Northern Song time was in particular bound with the serious disasters.

The third type of answers to the river's 1048 disaster lies in the Northern Song government's political decisions and hydraulic practices, which the present paper pays great attention to. These decisions and practices sought to protect the state's political core Henan by means of sacrificing the frontier region Hebei to the floods. This deliberate choice answers the question "why the river shifted to Hebei," and suggests that the river's course shift in 1048 was a human induced incident. To Hebei and Hebei people, had they lived in different socio-

political circumstances or held more political power, they could have avoided the flooding disaster in 1048, and resisted the river's penetrating their land for the next eighty years.

I shall articulate these two types of answers, one from a more environmental perspective and the other from a more political perspective, in the following two sections. I shall first offer a brief, panoramic view of the river's vast drainage area and explain the causal relation between silt generation in the river's middle reaches and flooding problems in its lower reaches. Fragmentary historical sources allow us to catch a glimpse of the environmental changes in north China over a long period of time. I would like to argue that the environment complex based in such space and time determines the unique features of the Yellow River and provides the fundamental cause to the river's flooding issues in the eleventh century.

In the second section, I shall interpret political rhetoric Song emperors and officials adopted to conceptualize the state's geopolitical landscape as well as the physical landscape of north China that was defined by the Yellow River and its frequent flooding disasters. I would like to argue that in its pursuit of reconciling these two overlapping, but contrastive landscapes, the state chose to maximize its geopolitical benefits by yielding and modifying the physical landscape. The concrete way of doing so was to highlight the state's core interests that were geographically associated with Henan and to downplay significance and wellbeing of Hebei. This deliberate choice and the intricate, delicate way in which politicians expressed their ideas formulated different hydraulic policies and practices that the state applied to two sides of the river. I tend to suggest that these policies and practices resulted in the better protection along the river's southern bank and the neglect of the river's northern bank, and left the northern bank particularly vulnerable to a fierce flood like the one in 1048.

Silt, Loess and Floods

Every river sees overflows of water. When there is excessive rainfall and a river channel cannot accommodate extra water, overflows and floods follow immediately. The Yellow River is not particularly known for heavy water discharges. Despite its remarkable length

(5360 kms, sixth longest in the world), the river's annual water discharge is merely $\frac{1}{4}$ of the volume of the Yangtze River and $\frac{1}{3}$ of the Mississippi. Even at the peak of summer rainfall, the rise in the river's water volume should be quickly absorbed by and transmitted through its long, broad channel without inflicting floods and course shifts as serious and frequent as what happened throughout the history.

To the Yellow River, a large water volume is not the prime cause to its floods. Instead, it is the high ratio between the river's silt load and the relatively small amount of water that often fails to carry such silt that makes flooding issues the river's perennial pain. In the past few decades, the Yellow River carries 1.6 billion tons of silt annually, 320 times the annual sediments the present Mississippi River transmits to the Mexico Gulf. Sixty per cent of this amount enters the sea, pushing the coastline around the river mouth to grow three metres into water every year. The rest forty per cent deposit in the riverbed along the lower reaches (the last thousand kilometres of the river course) where the terrain is low and flat or, when a flood happens, accumulates on the nearby land surface.

These sediments silt up the riverbed and elevate the body of the river above its surrounding ground. In as early as the first century BC the lower reaches of the river were already observed to be meters high above the normal ground. During the Warring States period in the seventh century BC, kingdoms located along the river's lower reaches had to protect themselves against floods by erecting lengthy, high dykes. In deed, we have no quantitative evidence to specify the details of the river's silt load and water volume in most historical times. In a literary way, official accounts in the first century BC say that in a bowl of Yellow River water a half of the volume was in fact silt. This suggests that the river's siltation problem at that time was almost as serious as in the eleventh and the twentieth century. It was from that time the river began to be known by the colour of its muddy water, 'Yellow', replacing its ancient name, which was coined according to its size, the 'Great River'.

In a simplistic way of understanding the river's unique hydrology, we find that the relatively small water flow is unable to flush away the massive amount of sediments; as a result, the ever-rising riverbed can easily push water to spill out of its channel. Since the Warring States period, the predominant approach to deal with these problems was to construct dykes to

restrain the river. Dyking, however, tends to fasten silts inside the river channel, and thereby accelerates the building and elevating of the riverbed and exacerbates the river's difficulty in discharging silt. Dyking also tends to confine the water flow within a limited space and thereby boosts its hydropower. The past three millennia have seen infinite competition between human efforts to build more dykes and the river's desire to crash them and to run freely. When such competition became intense, it would provoke more destructive disasters than ordinary overflows, for a rupture in dykes would cause the river water to pour down from the above. This is exactly the reason why the 1048 flood was particularly serious and powerful enough to generate a new course.

Due to these hydrological features, the Yellow River is always prone to floods through China's historical times, prompting many to call the river as 'China's sorrow'. Floods and course shifts are the river's norms. It is generally understood that the river's lower reaches shifted six times in historic times: shifting into southern Hebei in the seventh century BC, into southern Hebei in the second century BC, shifting out Hebei and into an eastern course in the first century AD, into central Hebei between 1048 and 1128, shifting southward to connect with the Huai and Yangtze rivers in 1128, and shifting back to the eastern course between Hebei and Henan-Shandong in 1895. These course shifts in toto have swept over an area as large as 1,500,000 km², and moved the river estuary back and forth between latitudes 39°N-35°N. A statistic shows that, over the past 2500 years, the river overflowed and flooded nearly 3000 times. A large portion of these events seem to have occurred in the recent few centuries, partly because recent records are more available and tend to preserve more details than their ancient counterparts do. Nevertheless, we find that as early as in the tenth and eleventh centuries the river disasters had already been reported once every three-four years, which means very frequent.

Against this millennia-long historical background, the flooding disaster in 1048 seems to belong to the river's norms. It is not surprising that such a disaster happened. But within a time range of a thousand years, this disaster can be considered as an exceptional case. Ever since the river shifted to a more eastern course in the early first century and remained in a tranquil state for more than eight hundred years, we see very few records about the river's flooding disasters. So, what caused the river to become more and more chaotic in the tenth

century, and eventually to shift its course dramatically in 1048? Why couldn't the river sustain its long-term tranquillity for another two or more centuries? What were the specific reasons to explain the river's deterioration in the middle period of China?

My answers to these questions come from the centuries-long process of soil erosion in the river's middle reaches. There lies the Loess Plateau, the world's largest, deepest loess deposits. The Loess Plateau was the main supplier of the Yellow River's silt, and between the first and the eleventh century it fed into the river a sufficient amount of sediments. It is the gradual accumulation of these sediments that had over multiple centuries jammed the river's channel and eventually caused the river to breach its dykes and search for a new course.

The loess consists of soil grains of very fine, loose and porous textures. It barely reserves moisture because water can easily penetrate this earth vertically. Lack of surface water, the general shortage of rainfall, and rain's uneven seasonal distribution keep this part of China in an arid state. Maintaining trees and planting crops are not easy jobs here. When being depleted of vegetation coverage and exposed to the air, the loess is easily carried away by wind or water. Today, a considerable part of the plateau appears barren and in a brown colour all year around. On the northern edge of the plateau, in the Ordos area where the Yellow River runs through a 'Great Bend' is an extensive stretch of deserts and sandy groves; the Maowusu Desert being the most famous one of them. After the Yellow River enters the Loess Plateau, its currents cut through the massive chunks of the loess, and wind through the desert area. Here it also accepts its main tributaries like the Wuding River and the Wei River, which are extremely muddy due to heavy silt loads. When the river leaves the Loess Plateau and is about to turn eastward to the low-lying North China Plain, it has already collected all of its 1.6 billion tons of silt; 90 per cent of this amount comes from the Loess Plateau area. Obviously, the causes of the frequent floods in the river's lower reaches must be found in this upper streams area.

This modern image of the Loess Plateau and its causal links with the Yellow River's floods were not constantly so in historical times; they did not come into being until the medieval period. To change its environmental conditions into the unpleasant way that we see today, it took the Loess Plateau the entire first millennium. According to Ping-ti He's study on the

Songs of Odes and other ancient literature, the Loess Plateau was far more humid before the tenth century BC; the temperature might have been two degrees centigrade higher than in modern days. Under the cover of bushes and broad-leaf trees, animals lived in an affluent life. Tigers, elephants and rhinoceros that appear only in tropical areas today seem to have widely existed in this region. Historical geographer Shi Nianhai echoes He's opinion. Shi maintains that the Loess Plateau had kept rich vegetation (both forests and grasslands) before sedentary agriculture was heavily carried out since the third century BC. Blessed by benign natural conditions, the loess was fastened by vegetation and scarcely mobile. Soil erosion had not yet become a notable problem, and the Yellow River's water ran clear.

According to Shi Nianhai and many other Chinese historians, it is the migration of agricultural population and the colonization in this environmentally sensitive zone that gradually changed the image of the Loess Plateau. Han Chinese began to settle in this area when the Qin (221-202BC) and Han (202BC-220AD) dynasties tried to compete with nomads for land and incorporate this frontier area into their empires. In 119 BC, for instance, Emperor Wu of the Western Han dynasty migrated 720,000 people from the eastern part of the North China Plain to the Great Bend of the Yellow. These Han Chinese farmers introduced to this area the sedentary lifestyle and an agricultural economy, which provided material benefits to support a stable growth in human reproduction. Despite their constant wars with the nomads, the farmers' population continued thriving on the Loess Plateau. This gradual change in human inhabitants and the way in which they dealt with the surrounding environment led to irreversible environmental consequences. Chinese scholars generally agree that, in comparison with the nomadic style of animal husbandry, agricultural cultivation cleared the land more thoroughly; the steady growth in population also required putting more and more land under ploughs, thus causing forests and grasslands to disappear. Losing its vegetation cover, the once moist and fertile soil on the Loess Plateau became dry and mobile, and began to influence the Yellow River and turned its water into a yellow colour. The frequent river floods and course shifts along the river's lower reaches between the second century BC and the first century AD must have been a consequence of the environmental deterioration in the Loess Plateau area.

It is not clear why the river remained peaceful for many centuries after the first one. Perhaps the fall of strong imperial powers in China put an end to the mass migration of farming population, and the return of nomads to the Loess Plateau in the early medieval times discouraged the advancement of agricultural activities. The land gained a sufficient amount of time to recover its natural vegetation. As a result, the Yellow River might have run clear due to the reduction of its silt load. Evidence comes from the early fifth century. In 407, Helian Bobo, a chieftain of the Huns, established the Xia Kingdom and built his capital, the City of Ruling the Myriad, in the Ordos area inside the river's Great Bend. Today, this part of the Ordos Plateau is covered by sheer sand and known as the Maowusu desert. Back in the fifth century, however, the land was verdant with natural streams and lush grass.

Archaeological works also suggest that the earth stratum in this period consists of dark, moist, and quite fertile soil. As Helian remarked, 'I have travelled to many places, but none of them are as beautiful as here.' Apparently, to him, the northern part of the Loess Plateau was able to offer rich natural resources for the 'myriad' of people in his kingdom, including 400,000 Han Chinese slaves forced to migrate there, to carry out all sorts of economic activities. The environmental conditions by then seemed quite benign, and deserts had not come into shape.

Between the fifth century and the ninth century, environmental conditions deteriorated again on the Loess Plateau. The establishment of centralized empires and the unification of Chinese territories in the Sui (598-617) and Tang (618-907) dynasties once again encouraged the expansion of Han population and agriculture into the northern Loess Plateau. State-organized migrations also led to the establishment of military colonies in this area. Nomadic Turks and Uighurs were driven away into the deep Mongolian Steppe, leaving the Great Bend area of the river to Han Chinese occupation. The revival of agriculture and the population boom once again challenged the environmental capacity of this land. By the mid-ninth century, excessive cultivation had already depleted vegetation and nutrients in the land; temporary settlers migrated from one place to another and abandoned behind them the desolate earth. Helian Bobo's City of Ruling the Myriad had already been seriously eroded by sand and wind, and disappeared from records of the Tang period. Travellers came here to search for this past spectacle could only find a pile of white construction remnants in the midst of a vast stretch of yellow sand. Soil erosion became so serious that the Yellow River's tributaries were heavily affected and silted up. The Wuding River flooded and shifted its course many times,

and became known by the name as the 'Unsettled River'. The Wei River ran through the suburb of Tang's capital Chang'an; from the late eighth century, its water overflowed frequently and put the capital city in great danger.

The tranquil state of the Yellow River was about to end. According to geographical surveys conducted by Shi Nianhai and his colleagues, the river's middle reaches became so unstable that flooding events occurred often in the Tang period. The river's sections along the Great Bend changed their course often; towns and military garrisons originally 'inside the river' turned out to become 'outside the river', or vis-à-vis. These changes in the river's middle reaches were rarely recorded in the Tang history, because since the late eighth century the state lost control of this area, and any flooding disaster in this thinly populated area would easily be neglected. Therefore, without being observed by contemporary people, the Yellow River quietly underwent changes and gradually passed on its siltation and flooding problems to the downstream.

It probably took several decades or a century or so for the impact of soil erosion on the Loess Plateau to move eastward and to be experienced by the river's lower reaches. The first notable river flood in the lower reaches happened in 845. The river's section in Huazhou area was prone to provoke a big flood. This threat motivated collaboration in flood control between two warlords whose territories were located on both sides of the river. They opened a ten-kms-long canal to straightjacket the river's winding course and to speed up the flow of silt toward the downstream. Such local solutions, however, could only cope with small-scale problems and keep the river in peace for a short period of time. They could not fundamentally stop the Loess Plateau from feeding into the stream immense silt or reverse the sedimentation process in the river's lower reaches. In twenty-four years of the tenth century, the river was reported to overflow or breach its dykes. Most of these disasters occurred in the area of Hua and Chan prefectures, where the water flow first entered the great plain and its velocity slowed down, and where the river channel meandered and silt deposited most easily.

It was until the beginning of the eleventh century that the siltation problem started to heavily affect the final section of the river, near its estuary. Here, the river's flow became even slower, and its capacity of transmitting silt reduced drastically. Enormous sediments

deposited in this area and caused the river to overflow. In the prefecture of Di, where the river reached the sea, the river was seen to have risen to nearly ten meters above its surrounding ground. Between 1007 and 1014, floods stroke the prefecture seat every year. In 1014, a flood nearly submerged the entire city, forcing local officials to petition to the court in order to give up the city and remove its residents. Soon after people evacuated to a safer place, the city of Di was completely drowned by another flood.

Bearing in mind the river's hydrological features, we may draw a rough pattern of the river's sedimentation process and its impact on the river's flooding issues. This sedimentation process initiated in the river's middle reaches in the eighth and ninth centuries and caused this part of the Yellow River to overflow. It then moved downstream to the western sections in the river's lower reaches, jammed this part of the river channel, and inflicted frequent flooding disasters in the Hua-Chan area in the tenth century. Next, as more and more silt accumulated in the river's final section, sedimentation was magnified close to the river mouth, so causing troubles to places like Di in the early eleventh century. This entire eastward movement of silt and floods, however, was even complicated by the river's hydro-dynamics. The sediments' blockage at the river mouth forced both water and silt to flow backward; here, we may expect a counter-directional sedimentation process initiating from the coast area. In the meantime, the Loess Plateau continued supplying water and sandy matters that pushed forward to the east. Where these two hydrological forces encountered and clashed would be the location that suffered the strongest hydropower. Obviously, the area between Huazhou and Chanzhou, where the terrain was low and flat and the earth was loose and fragile, became the victim of such dual attacks coming from both the west and the east. It is in this area that the river provoked most serious bank ruptures and floods, as in 1019-21, in 1034, and eventually, as a flooding disaster in its worst form, in 1048.

Comparing the Yellow River's hydrological facts in modern days with the historical narratives of the river's activities in the past, the above survey is able to sketch the environmental changes and their impacts on the river's situation over different geographic units in the river's drainage area over a very long term. This spatial and temporal complexity about the river's history places the 1048 disaster in a unique position. On the one hand, as the culminated form of the Yellow River disasters, what happened in 1048 distinguished itself

from the river's history in the previous ten centuries. It opened an era in which environmental issues, including the river issues, became so salient that without recognizing them the medieval history of north China cannot be illuminated. On the other hand, the 1048 disaster was a result of the long-term continuity in terms of soil erosion, sedimentation, and the steady development of the river's flooding issues. It could find causes and clues from many previous flooding events, and was not a completely random, unpredictable incident. Determined by these hydrological features, a disaster as serious as the 1048 one might have come sooner or later, but would invariably occur in the eleventh century. Therefore, the fundamental cause of this disaster lies in the river's hydrological features and in its relationship with the changing environment.

Why did the river shift north?

What analysed above does not tackle the question why the river shifted northward into Hebei. The conclusion that a serious flood like the 1048 one would invariably occur in the eleventh century does not suggest in which way the flood would take place. As to be shown below, most flooding events in the late tenth and early eleventh centuries tended to spread southward and victimized Henan. How did this flooding tendency toward the south end up in a dramatic course shift to the north in 1048?

In this section, I shall investigate the river's floods and Song politicians' ideological talks about the Yellow River before 1048, and compare their hydraulic proposals with flood-control practices the government applied to the river as well as with actual outcomes such practices produced in the field. From the perspective of the Northern Song state (because most of my sources is about the state), I try to distinguish two types of landscape of north China the state faced in the early Song time: a geopolitical landscape that, to maximize the state's interests, demanded to protect the Henan area; a physical landscape that, due to the Yellow River's tendency to flood southward, actually harmed the Henan area. I argue that, in order to guard the state's core interests and reconcile the conflict between the two landscapes, members of the state envisioned a third, more ideal landscape, which saw the Yellow River

shift out Henan and northward into Hebei. These politicians ran cost-benefit calculations to rationalize that the river's shift into Hebei was not only idealistically beneficial, but also practically doable. The actual hydraulic activities the government organized echoed such ideas, meaning, to better protect the river's southern bank and to leave the northern bank to flooding attacks. I suggest, the river's course shift and floods in 1048 were by no means a natural event; it was caused to happen by the deliberate and delicate political planning.

Floods and Flood Control before 972

After eight hundred years of remaining in a 'tranquil (*anliu*)' state,¹ in the ninth century the Yellow River began to report small-scale overflows and bank ruptures. It was not until the tenth century that flooding problems became more common. In 918, a general of the Late Liang dynasty commanded his army to breach the Yellow River's dykes to cause a flood in order to halt the march of the Late Tang army from the north.² The flood resulted in the extensive inundation of land on both the southern and northern sides of the river. A similar action was taken for the same purpose by another Late Liang general in 923.³ The resulting flood inflicted many years of serious disasters on the land south of the river. These two human-caused floods were supposed to submerge the land in the north, but the actual outcomes were that the water surged southward to plague Henan, the core area of the Late Liang. The years of 931, 932, 939, 941, 944 and 954 all saw major flooding events.⁴ Without knowing what caused these floods, we are certain that most of the flood water spread southward into Henan as well.

The flood of 954 marked the beginning of a political intention to harness the Yellow River floods. Immediately after this flood occurred, Emperor Shizong of the Late Zhou dynasty

¹ Chinese historical geographers, like Tan Qixiang and Shi Nianhai, offer extensive discussion on the river's tranquil state between the Eastern Han and the later Tang. See various articles in: Tan Qixiang 譚其驥, *Huanghe shi luncong* 黃河史論叢 [Essays on the Yellow River History] (Shanghai: Fudan daxue chubanshe, 1986); Shi Nianhai 史念海, *Heshan ji* 河山集 [Collection of Rivers and Mountains], vol. 2 (Beijing: Renmin chubanshe, 1981) and vol. 3 (Beijing: Renmin chubanshe, 1988).

² Cf. *Zizhi tongjian*, 270.8824.

³ Loc. cit., 272.8890. Judging by the direction of the resulting floods, it seems the military function of such river destruction is very questionable. Instead of flooding northward to submerge the enemy coming from the north, the floods extended southward and eastward to strike the territory of the Later Liang.

⁴ Cf. Xue, Juzheng 薛居正, *Jiu Wudai shi* 旧五代史 [Old History of the Five Dynasties] (Beijing: Zhonghua shuju, 1976), 141.1882-83. Cf. also *Songshi*, 91.2256-57.

ordered the recruitment of corvée labourers to repair the bank ruptures in order to stop the flood from extending farther south.⁵ This prompt action was in contrast to the action of the previous dynasty in 918 and 923, which deliberately damaged the riverbanks to cause floods and never tried to fix the consequential disasters. On these occasions, apparently, the military tactic of employing river floods as a weapon outweighed the wellbeing of common people. In 954, Emperor Shizong, young, ambitious and capable, at the dawn of the surrender of most northern warlords, for the first time since the mid-eighth century saw hope of unifying much of north China and restoring a centralised state. It is understandable that he considered it important to prevent the Yellow River from flooding southwards to the state's core area, and believed his government, unlike earlier ones, capable of achieving this task.

One practical result of the 954 flood-control effort was that the newly fixed dykes blocked the southward flooding water, and pushed it northward into southern Hebei, where the water created a long stretch of swampy, waterlogged landscape.⁶ This unrestrained water inundated the southern part of Hebei and, year by year, ravaged the local land, its agriculture and the livelihood of the local people. Even ten years later in 964, four years after the Northern Song state was established, the problem still existed. It prompted the local people and officials to petition the court in order to have the water and its troubles removed or fixed. According to historical records, throughout all these years such requests from the locals of Hebei did not win any substantial attention from the central government. The government claimed it could not afford the immense financial and labour costs for such work.⁷ Meanwhile, it noted that the stagnant water in southern Hebei needed to be accommodated somewhere, but the old channel of the Yellow River was not functioning well at that time. This consideration suggests that, rather than seeing the river flood to the south, allowing the water to ravage southern Hebei was an acceptable alternative choice.

No historical information indicates whether this protecting-the-south-and-drowning-the-north situation was an unpredictable result of the Late Zhou government's short-sighted response in

⁵ Cf. *Songshi*, 91.2256–57.

⁶ *Loc. cit.*, 91.256–2257. The text reads: ‘The flooding river [likely meaning “flood water”] does not return to its old river course, but diverges to become a *chi* river.’ Here, the term *chi* is best interpreted as ‘being naked/exposed’, suggesting the water remaining in a vagrant state, rather than forming a deep, configured river course.

⁷ Cf. *Songshi*, 91.2257.

the emergent situation, or whether it came from a deliberate hydraulic design. Obviously, the southern side of the river, Henan, was the heartland of the Late Zhou dynasty and almost the only region under the state's solid control. By contrast, Hebei still remained semi-autonomous in the hands of powerful regional warlords. In hindsight, we may hypothesise that in the view of the state at the time, the river plaguing Hebei would protect the core interests of the state, and might even weaken the regional, decentralised powers there. This might be the main reason why the central government ignored the local plea to fix the water problems in southern Hebei.

As for the Northern Song government, its refusal to deal with the water problems in southern Hebei in 964 suggested a similar emphasis on protecting the south rather than the north. This biased attitude can also be found in its many ensuing hydraulic policies and projects. In 965, for instance, there was a series of bank ruptures and floods along the river's course in the metropolitan area of Kaifeng, as well as in Mengzhou (about 150 kilometres upstream from Kaifeng), Chanzhou (110 kilometres northeast of Kaifeng) and Yunzhou (about 200 kilometres northeast of Kaifeng).⁸ Most territories of these prefectures were located south of the river, and the capital Kaifeng experienced phenomenal threats. The central government responded to these disasters in a manner opposite to that in 964. It immediately manoeuvred both civilian and military corvée labourers to fix the bank ruptures, without any hesitation about the heavy costs. Equally prompt were the actions taken to combat the floods (most likely tending southward) in Huazhou in 966 and 967, in Chanzhou in 971, and in Chanzhou, Puzhou and Kaifeng in 972.⁹ All these places abutted the metropolitan area of Kaifeng, thus magnifying the danger posed to the capital city. These flood-control activities demonstrate the Song government's neglect of the river's northern side and its obvious great care for the area south of the river.

Based on historical records of the river's flooding problems in the tenth century, we may summarise four main observations. Firstly, the Yellow River's bank ruptures and floods became increasingly frequent. Secondly, more floods and particularly serious floods occurred on the southern side of the river, suggesting that the river was more prone to flood southward

⁸ Loc. cit., 91.2257.

⁹ Cf. *Songshi*, 91.2257–58.

and victimise Henan. Thirdly, the government's prompt reactions to the southward floods and its resort to embankment repair and construction very likely forced the river water to surge northward, as in 954, and thereby increased the number of northward floods. This means that the statistical increase in the number of northward floods might in fact be due to the flood-control efforts themselves, and that the northward floods happened as part of the aftermath of the southward floods. Fourthly, one may argue that historical records of the southward floods were better constructed and preserved; there might have been more northward floods than were recorded. This doubt lends credence to my argument, as it suggests a substantial neglect of the land north of the river, Hebei, which left Hebei poorly protected and vulnerable to future disasters.

To the young Northern Song state, after a decade of painstaking efforts to combat the floods, it failed to put the Yellow River under its control. Quite the contrary, it saw the onset of a dreadful disaster in 972. During the fifth and sixth lunar months of this year, north China suffered extended rain, which drove the river water to rise and breach the river banks at several different locations.¹⁰ 'There are serious floods in various prefectures on both the southern side and the northern side of the river.'¹¹ Agriculture was decimated, refugees began to migrate, various supplies ran short, and even the food supplies in the capital city could barely sustain the population for half a year. The demand for food necessitated long-distance grain transport from the lower Yangzi valley to the north. The flooding disasters, the failure of the crops, and the difficulty of transporting food made 972 a year of 'great hunger (*daji*)'.¹²

The disaster of such massive scale stimulated a deep reflection, at least at the top level of the rulership, on the existing flood-control strategies. From the very beginning of the dynasty, the Song government had set up institutions to protect river dykes, planted trees along the river banks, supplied financial support, and maintained regular corvée services to conduct routine works.¹³ It also took prompt action to cope with many emergent floods and bank ruptures. It

¹⁰ Cf. *Xu zizhitongjian changbian*, 13.283–85.

¹¹ *Loc. cit.*, 13.284.

¹² Cf. *Xu zizhitongjian changbian*, 13.293.

¹³ For detailed studies on the water management institutions in the Northern Song, see: Yoshioka Yoshinobu 吉岡義信, *Sōdai Kōgashi kenkyū* 宋代黄河史研究 [Studies on the Yellow River History in the Song Dynasty]

seems, however, that the more it strove—much more than the previous dynasties did—the more hopelessly the Yellow River problems exacerbated: flooding events became more frequent and more severe. To the Northern Song state, in facing the critical circumstances in 972, it found that more than a decade of combating the river problems only gave them a deep sense of frustration and insecurity.

The dreadful situation demanded the Yellow River issues no longer to be treated as regional, random incidents, but as something so grand and crucial as to influence the fate of the state, or, to borrow an overly used modern term, a matter of ‘national security’. The previous disaster management model – individual technical solutions taken on contingency of individual disaster occurrences – needed be replaced by a systematic, multi-dimensional agenda. The new hydraulic agenda needed to contextualise the Yellow River within the state’s political cost-benefit rationales, and within the state’s geopolitical concerns that involved most of north China.

Geopolitical landscape in the early Northern Song

Let’s sketch a geopolitical map of the early Northern Song. The comparison between this map and the physical landscape in which the Yellow River and its infinite flooding disasters took strong presence reveals sharp contradictions between the two. It suggests that the river’s being turbulent meant not only socio-economic disasters to the society and people; it caused great harms to the political interests of the Song state.

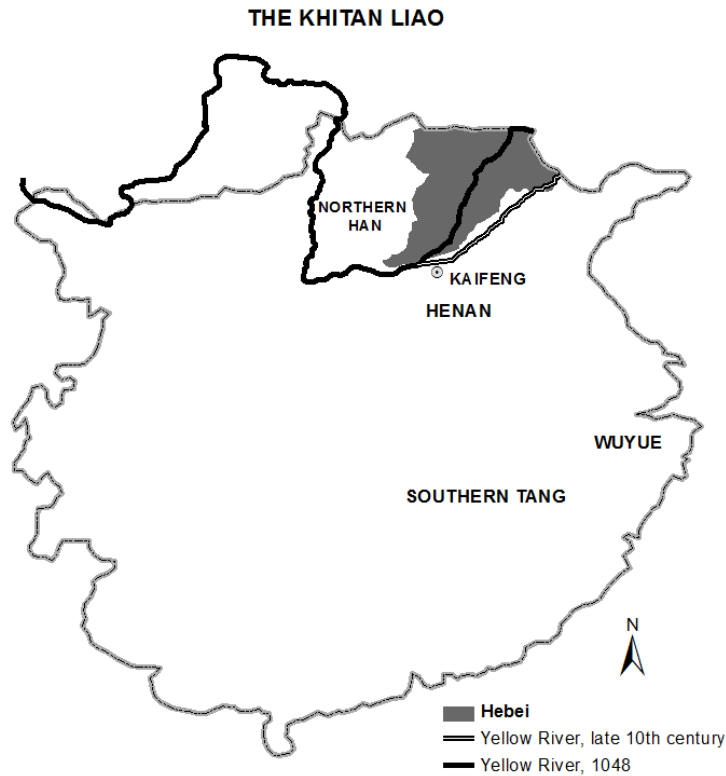
In comparison with its predecessor Tang, the Northern Song possessed a smaller territory. It lost a considerable amount of land in the north and the northwest to nomads, and had to situate its political core in the more eastern part of north China. Beginning in the tenth century, the city of Kaifeng was appointed the capital of various dynasties, including the Northern Song. It was located less than a hundred kilometres south of the Yellow River (see Map 2). The Bian Canal ran through the city. Through its connection with the Huai River at

(Tōkyō: Ochanomizu shobō, 1978); Nagase, Mamoru, 長瀬守. *Sōgen suirishi kenkyū* 宋元水利史研究 [Studies on the Song-Yuan Hydraulic History] (Tōkyō: Kokusho kankōkai, 1983).

its southern end, the canal shipped wealth and goods from the lower Yangzi to supply the heavily populated capital. Its northern end was connected to the Yellow River to receive water from it and its tributaries; this meant that the canal's navigational function was influenced and sometimes determined by the circumstances of the Yellow River. The vast plain surrounding Kaifeng, Henan, was the economic, political and military foundation of the states, including the Northern Song.

By the early 970s in south China, the Wuyue and Southern Tang kingdoms in the Yangzi valley were still independent from the Northern Song, while the Sichuan area had just surrendered and was not yet fully cooperated into the Song's rule. In the north, Shanxi remained in the hands of the Northern Han kingdom, whose ruler relied on the overlordship of the nomadic regime of the Khitan. Emperor Taizu's military attempt to conquer Shanxi in 969 could only end for naught. Since the Late Tang dynasty, the central governments had better control of Hebei, for its warlords had gradually submitted to the state. Yet, Hebei's autonomous tradition still remained strong, and its warlords could easily swing to the side of the Khitan nomads. The Khitan built up their powerful empire, the Liao, over the Eurasian steppe, and nearly in every year up to 972 its cavalry marched southwards to plunder northern Hebei and pose a constant threat to the frontier security of the Chinese regimes.¹⁴

¹⁴ A detailed account of how the early Song confronted its rivalries and created its imperial landscape can be found in: Mostern, Ruth, *Dividing the Realm in Order to Govern: The Spatial Organization of the Song State (960-1276 CE)* (Cambridge and London: Harvard University Asia Center, 2011), 103–65.



Map 2. A Geopolitical Map of Early Song

Situated in this geopolitical context, the region under the solid control of the young Northern Song state and the one supplying the regime with various resources was solely Henan, the plain south to the Yellow River. This region happened to be the land that suffered most from the floods. Hence, river problems would most likely weaken the state power, endanger security and sustainability of the newly established regime, and disadvantage the Northern Song in its political and military wrestling with its rivals. Stopping the river from flooding southwards and ravaging Henan thus bore not only social and hydraulic meanings but also political significance. It is clear to contemporary politicians, as quite understandable to us, to maintain the state's geopolitical stability and benefits must demand for dramatic changes in the geophysical realities, meaning, to create a new, ideal physical landscape in which the Yellow River would no longer affect Henan. To put in a simple way, it demanded the river,

together with its floods, to move out Henan and to somewhere else. This idea was initiated by Emperor Taizu, and further developed by officials in later periods.

972: Emperor Taizu's Reflection on the Flood Control

Frustrated by the failure in all the attempts to curb the river floods, and stressed by the severe famine that the disaster plagued north China was facing in 972, Emperor Taizu issued an edict about the river issues. In this edict, the founder of the dynasty expressed his regret over the river's endless damage, and criticized the uselessness of traditional approaches in dealing with the floods. He urged his subjects to find ultimate solutions of the flooding problems from ancient times, in the era when China's sage kings managed floods not to serve private interests, but to preserve the public good. He especially emphasized the point that the floods were pacified only in the condition that the river was directed to flow northward in Hebei. This point was soon recognized and further elaborated by officials in the following decades. The identification of Hebei as a desirable region to accept a shifting course of the Yellow River seems to have availed the idea of moving the river out of Henan.

As for the records of the Xia period, they mention only diverting the river to the sea, and smoothing its stream in accord with the mountainous terrain. It is never heard [in those records] that [people] managed the torrent by force and construct high embankments extensively. Ever since the states in the Warring States period pursued their own interests by clogging the old river courses [meaning, the courses in Hebei], the small interests obstructed the large affairs, and the private harmed the public. Therefore, the system of the 'Nine Rivers' [i.e., various branches of the river's lower reaches on the Hebei Plain that were said to be dredged by the legendary Yu] was eliminated; river destructions continued without an end throughout later dynasties.¹⁵

¹⁵ Cf. *Songshi*, 91.2258.

In this edict lay the legend of Great Yu, a sage king and the forefather of the Xia dynasty in antiquity. In China's myth of ancient floods, Great Yu abandoned the old flood-control method of blocking flooding torrents. Instead, he chose to dredge side channels, the so-called 'Nine Rivers', to share water from the mainstream and direct it into the sea. Mythological and historical literature in early China attributed Yu's success in pacifying the floods to his wise decision to open the water channels north to the river and use the vast low-lying plain of Hebei as a flood ground.

Setting the conducts and achievement of Great Yu as a parameter to assess contemporary flood-control activities, Emperor Taizu conveyed three key messages in his edict. First, there was a contrast between the method of blocking water by erecting dykes, as often done in the tenth century, and Great Yu's method of diverting water into various channels. This is a contrast between the artificial and the natural—the latter yielding to the geographical form of the land. Second, the success of the ancient sage justified the idea that the Yellow River should flow northward into Hebei, in accord with the pattern of the legendary 'Nine Rivers'—the only recorded and 'proven' (albeit in mythology) victory in the river's flood-control history.

Third, the territorial and political segregation in early China resembled the unstable socio-political situation in the tenth century. This situation, on the one hand, was caused by private and regional political interests, which extended to disrupt any holistic planning and sophisticated engineering work to the river on the state level, and thereby triggered more river disasters. On the other hand, the socio-political chaos was perhaps doomed by wrong choices and the seemingly unavoidable failure of hydraulic practices. Hence, the circumstances of the Yellow River and the fate of a Chinese regime were bound together, forming a vicious cycle. Following this line of the logics, it is sensible to consider that any attempt to achieve political unity in China could not succeed without satisfactorily managing the Yellow River. To further understand this situation, we must highlight the contrasts between the 'public' (*gong*) and the 'private' (*si*), and between the 'large affairs' (*da*) and the 'small interests' (*xiao*), terms Emperor Taizu formulated to refer to the conflicts between the young state and decentralising regional powers.

Given the context of politics and river problems in the second half of the tenth century, Taizu's edict must have intended to have profound implications. Ideally, the river should flow northward, a situation not just predetermined by nature ('Heaven' might be a hidden word in this text) and proved its validity most convincingly by Great Yu's experience. Apparently, the contemporary political situation would best benefit from it as well. In the meantime, both political and hydraulic failures from the Warring States period to the emperor's own time provided counterexamples to further prove the correctness of diverting the river to the north.

Here, Emperor Taizu lays down a basic ideology toward the Yellow River's flood-control works. It considered the river problems no longer as technical problems; instead, it elevated them to the level of the fate of the state. The promotion of the legendary figure of Great Yu seems to have set up a moral standard for Emperor Taizu himself and his successors. A ruler hoping to be as virtuous as Yu should adopt Yu's way of managing the Yellow River. The message conveyed to his subjects was that to successfully curb the river disasters was the same as to successfully rule the country; both required people to give up private interests and selfishness, and to prioritise the state's interests.

Moreover, people in the tenth century, especially the upper classes who had concerns about the legitimacy of their rulers, might have wondered why, if the royal family of the Northern Song was chosen to receive the Mandate of Heaven and was virtuous enough to keep it, its rule over north China was so frequently and severely challenged by river disasters. It must have been hard for the early Song government to ignore the cosmological links between river disasters, messages and punishments from Heaven, and the ruler's sense of insecurity about his rule. After all, by 972 the Northern Song dynasty had just entered its second decade, and the memories about frequent failures and dynastic successions of its predecessors were still fresh. There was no evidence that the Song would last longer than any previous rule, and Emperor Taizu's usurpation of the throne from the Late Zhou dynasty through a mutiny did not lend him much moral superiority.

In my opinion, bringing the ancient Great Yu into the on-going history of the early Song helped moderate this cosmological crisis. It reminded the people that even under the rule of

ancient sages like Great Yu, the Yellow River floods occurred and people suffered. Despite this, Yu still became one of the most virtuous and successful rulers in Chinese records. This hidden message implied that the ‘natural’ disasters as such were not simply Heaven’s punishment for poor governance; rather, they were tests that Heaven set up to evaluate its chosen candidate. The Mandate of Heaven, or the cosmological power in general underlying this edict, was not a static object, whose selection of a ruler was predetermined and unchanged. Rather, it was something to be acquired through efforts, and demanded reflection and corrections of any wrong deeds. By following the model of Great Yu, the Song rulers were able to extract moral strength and, through the link with sagehood, to consolidate their cosmological connection with the supreme power above.

In practical terms, bringing Great Yu’s achievement into the political and hydraulic agenda demonstrated a workable model for the Song government to follow. The validity and the success of this model (even if only in the historical discourse and not in reality), diverting the Yellow River’s water to flow northward, glorified itself in contrast with the hydraulic failures of the tenth century. Moreover, this model justified any future attempts to sacrifice Hebei in favour of Henan, the core area of the Song’s territory. It would thus free the Song rulers from any future indictments for transferring the disasters in the south to their innocent subjects in the north.

Li Chui’s Proposals to Shift the River Northward

Echoing the ideological tone set by Emperor Taizu, officials of later times used their flood-control proposals to more explicitly elaborate the idea of moving the Yellow River out of Henan and into Hebei, with the hope of politicising this idea as the ultimate solution to the river floods. Li Chui, an eighth-rank assistant staff author and revising editor of the Institutes and Archives, was a major advocate of this idea.

In 1015, after many serious river disasters had hit Henan, Li Chui handed in a lengthy memorial, *Essay on the Geographic Advantages of the Diversion of the Yellow River (Daohe xingsheng shu)*, which included three chapters and various map illustrations. In the memorial

he argued that, to prevent the river from pouring into Huazhou and Chanzhou prefectures where the vulnerable spots along the river course were most prone to bank ruptures, the hydraulic work ought to engage in diverting the river to flow northward into western Hebei. By doing so, the river would converge with various local rivers of western Hebei and yet-to-be-built canals, then run through the central plain of Hebei, and finally enter the Bohai Gulf. This was a route that Great Yu's water works were said to have taken.¹⁶ The fundamental belief underlining this proposal was that, in its state in the 1010s, the Yellow River's course 'overflowed and inundated Yan and Qi [generally referring to Henan and Shandong], and cast its harms over the Central Kingdom (*zhongtu*)'. By contrast, 'it leaves out the flat, fertile land over thousands of *li* in Hebei, allowing the frontier gangs [meaning, the Khitan] to plunder it'. Obviously, Li positioned the Yellow River hydraulic work in a broader geopolitical concern and applied cost-benefit rationales to assess the relationship between Hebei and Henan, the core of the Central Kingdom. Furthering Emperor Taizu's view, Li believed that to divert the river northward would not only relieve the river disasters to 'benefit the common people'. It would also use the northern flow of the river as a defensive barrier inside Hebei, so 'the Khitan could not invade southward'.¹⁷

The court did not accept Li's proposal in 1015, due to its technical complexity and its immense demand on financial and labour supplies.¹⁸ Li, however, aligning with Emperor Taizu's view, proved to be at least politically correct at the time, and when another huge flood occurred in 1019, he captured this event to present his idea again. An unprecedented catastrophe, the 1019 flood was so powerful as to wreak havoc on thirty-two districts south of the river. To repair its rupture would cost 16 million units of raw materials and 90 thousand labourers. It even forced the emperor to compose an essay in person to memorialize the dramatic event.¹⁹ The crisis drove the government to consider various hydraulic solutions, among which Li's four year old proposal was now recalled at the court. Li himself, now

¹⁶ Cf. *Songshi*, 91.2261–62.

¹⁷ *Loc. cit.*, 91.2261.

¹⁸ According to Christian Lamouroux, one explanation of why Li's proposal was rejected is that Li's hydraulic plan would potentially disrupt the frontier water systems in Hebei and thereby disturb the status quo of Hebei's strategic geography—an unstable situation the government would least want to see. Cf. Lamouroux, Christian, 'From the Yellow River to the Huai: New Representations of a River Network and the Hydraulic Crisis of 1128', in *Sediments of Time: Environment and Society in Chinese History*, edited by Mark Elvin and Liu Ts'ui-jung (Cambridge: Cambridge University Press, 1998), 554. This explanation is plausible, but still it is only one of many possibilities leading to the dismissal of Li's proposal.

¹⁹ Cf. *Songshi*, 91.2263.

promoted to a lower sixth-rank court official, was even granted the opportunity to travel to Hebei to inspect the landscape, and to discuss his proposal with regional officials there. All the attention Li Chui received indicates the government's seriousness about the idea of diverting the river to the north.

Li came back from Hebei with a better understanding of the conflict between the two hydraulic strategies—strengthening the southern banks and diverting the river northward—behind which most likely lay a conflict between the central government and the regional power of Hebei. In his new memorial about river issues, Li pointed out the cruel reality that ‘now the river has burst and gone southward, and it has done great harm’. Due to various technical reasons, ‘those who talk about blocking the bank ruptures [mainly of the river's southern banks] consider their project very difficult’. It was his belief that ‘the river will cause less harm if we breach it and allow it to go northward’.²⁰ Of course, any project to divert the river to the north was not easy either, partly because there was the opposite voice preaching the danger that a changed river course might pose to Hebei's frontier military landscape. Realising the difficulty in carrying out his original bold plan, after 1019, Li no longer proposed to shift the entire river to the central plain of Hebei. He instead proposed to divert only a short section of the river on a small scale to make the river course bypass the Huazhou prefecture, the most vulnerable place where the 1019 flood and many other serious bank ruptures had occurred.

As four years before, Li's second proposal was not accepted. The decision, based on debates at the court, regarded Li's hydraulic plan ‘troublesome’. No detailed accounts are left that explain its dismissal. Christian Lamouroux considers the rejection of Li's proposal as a result of the state's pursuit for stability (*anjing*), the status quo in which people ought not intend to stir things up.²¹ This explanation is sound, but it reveals only part of the truth.²² My own hypothesis is that this proposal, and perhaps the bolder proposal in 1015 as well, met

²⁰ Loc. cit., 91.2263.

²¹ Cf. Lamouroux, ‘From the Yellow River to the Huai’, 554–55.

²² Lamouroux' opinion may well explain the rejection of Li Chui's first proposal. But he fails to notice Li's second proposal and the changing circumstances during the four years from 1015 to 1019. This oversight may produce the impression that the state's attitude toward the Yellow River issues remained unchanged. As I demonstrate above, the government's view toward Li's proposal in 1019 became more positive than four years before. Certainly, a study is needed to show what exactly the concept of ‘stability’ (*anjing*) meant and how its meaning evolved throughout this time, given the constantly changing context of the Yellow River and its impact on the Song state.

resistance from the politicians in Hebei and those from Hebei who served at the court. It is these Hebei natives who largely dominated the high official positions, including the position of the chief chancellor in the early decades of the dynasty. These people might well represent the group who, as hinted at in Emperor Taizu's 972 edict, rated their regional interests and benefits of their homelands and lineages over the interests of the state. They might well have boycotted any possibility of the Yellow River flowing into Hebei and causing trouble there.

Hydraulic Practices between 972 and 1048

I must emphasise here that the dismissal of Li Chui's two proposals does not suggest a complete reversal of the state's attitude toward the Yellow River issues that was established in the time of Emperor Taizu. The central government did not accept and carry out Li's proposals due to their technical complexity and radicalness, financial demands, and very likely the conflicts between the state and regional authorities. The state did, however, follow the same line of thinking, namely to take better care of the river's southern bank and the land adjacent to it, while in the meantime directing part of the river water, together with its flooding problems, northward to Hebei on a moderate scale. These 'two handles' on the Yellow River problems, although not expressed officially by any state-level political rhetoric, were nevertheless undertaken in reality. A scrutiny of the Northern Song government's hydraulic policies and practices shows different attitudes and different technical solutions applied to both sides of the riverbanks.

As clearly indicated in the sources, at least in the years of 982, 983, 984, 1000, 1004, and 1019–21²³ when the river threatened its southern banks and Henan, the court promptly acted to repair bank ruptures and build new dykes. Twice it ordered its ministers to perform the highest level of state rituals, offering the *Tailao* sacrifice and jade plates to the river god at the sites of the bank ruptures.²⁴ These actions imitated the ritual that Emperor Wu of the

²³ Cf. *Songshi*, 91.2264.

²⁴ Loc. cit., 91.2259. Based on Sima Qian's writings, Emperor Wu of the Western Han dynasty visited the site of the bank rupture and paid the sacrifice of a white jade plate to the river. He himself composed a prose piece to lament the difficulty of the work to repair the bank rupture. It is said that the rupture was finally blocked, and the river was diverted to flow in two northward channels which 'recovered the old traces of Yu's channels'. With this, the southern side of the river was freed from the river's flooding problems. Cf. *Shiji*, 29.1412–13.

Western Han Dynasty dedicated to the Yellow River at the end of the second century BCE, aiming not only to pacify the violent torrent but also to consolidate the newly built embankments. Such ritual performances echoed the ideas of Emperor Taizu in 972, suggesting that the Yellow River issues were categorised as state affairs and bore cosmological significance. On the river's northern bank, by contrast, the hydraulic efforts focused on opening diversionary channels: the first one in 993, the second in 994, the third in 1012, the fourth in 1015, and several more during 1019–21.

Apparently, blocking the water to prevent it from spreading farther south, and diverting the water to the north—such dual techniques applied respectively to the two opposite riverbanks—indicate the government's vision of a big geographic context, which went beyond the actual victimised land (Henan) by involving the potentially to-be-sacrificed land (Hebei). The dual techniques complimented each other and formed a systematic strategy toward Yellow River flood-control. In accord with them, we begin to see the rise of a pair of technical terms in our sources of this period—*sai* (to block), on the other hand, and *fen* (to divert) or *kai* (to open), on the other. These terms are almost fixedly applied to hydraulic work along the southern bank and that along the northern bank respectively.

The outcome of the application of these dual techniques is that, as one contemporary commented on the completion of a diversionary channel in 1021, 'the river's flow gradually returned toward its northern bank'.²⁵ It is not entirely arbitrary to believe that the consequential concentration of hydraulic pressure on the northern bank placed it in a vulnerable position, especially given the fact that much less levee infrastructures were put in place along the northern bank to prevent any future bank ruptures. When summer storms brought excess water to raise the water table, a flood tending northward could be anticipated, which is just what happened in 1034.²⁶

The 1034 rupture on the river's northern bank and the subsequent flood caused the river to run northward into southern Hebei. Submerging much of the southeastern corner of the Hebei

²⁵ Cf. *Xu zizhitongjian changbian*, 97.2247.

²⁶ Loc. cit., 114.2682, 115.2691.

Plain, the water formed several small, unstable streams and caused local disasters.²⁷ In contrast to its immediate reactions to all serious southward floods in the past, the Song government did not fix this bank rupture quickly, but left it to extensive court debates from 1034 through 1041.²⁸ It is quite clear that the political discourse at this time did not prioritise the welfare of the Hebei people. The result of the debates was that there would be no attempt to block the bank rupture and return the river water to its previous, more southerly, course. There were various reasons for this decision. One reason, as Wang Guo remarked in 1036, was that the old river course could hardly accommodate the roaring torrent.²⁹

More important reasons were provided by Yao Zhongsun in 1041, when he spoke against another proposal to fix the rupture and recover the old river course.³⁰ Yao, who was just completing his position as the Chief Commissioner of Transport in Hebei and returning to the court, perhaps had acquired a better knowledge of Hebei's geography and the river situation than his colleagues at the court. He suggested not repairing the rupture. Instead, he pleaded with the court to construct set-back dykes, widen old dykes, and straightjacket some winding sections of the river's course in southern Hebei, and by so doing allow adequate space between the dykes for the water to flow smoothly. The basic idea of his plan was to keep the river course flowing through southern Hebei rather than to bring it back to its old, southerly course. He stressed eight advantages of his plan: first, the river water would not press upon the city of Daming, a metropolis in southern Hebei; second, the river water would not shift around to plague prefectures in central and eastern Hebei; third, granted a widened riverbed, the water would not jam the river course and raise its hydropower, thus the possibility of future flooding would be reduced; fourth, the tremendous hydraulic work to fix the bank rupture would become unnecessary and could be avoided; fifth, leaving the bank rupture open and unfixed would keep the river in the north and not turn it back southward to endanger the cities along the river's southern bank; sixth, leaving the bank rupture open and unfixed would release the hydraulic pressure upon the fascine levees, which were mostly

²⁷ Loc. cit., 115.2703. A detailed discussion on this bank rupture and the course created is given in: Zou, Yilin 鄒逸麟, 'Songdai Huanghe xiayou Henglong beiliu zhudao kao 宋代黃河下游橫隴北流諸道考 [An Investigation into Various Northern Courses on the Lower Reaches of the Yellow River from Henglong in the Song period]', in *Huanghe shi luncong* 黃河史論叢 [Essays on the Yellow River History], ed. Tan Qixiang 譚其驤 (Shanghai: Fudan daxue chubanshe, 1986), 132–33.

²⁸ Cf. *Xu zizhitongjian changbian*, 115.2703, 116.2724, 118.2785, 118.2787, 122.2887, 131.3109.

²⁹ Loc. cit., 118.2785.

³⁰ Cf. *Xu zizhitongjian changbian*, 131.3109.

built to protect the southern bank; seventh, giving up any plan to fix the rupture and recover the old river course would save immense human costs; and eighth, the Yellow River's course through southern Hebei, as it was around 1041, formed a strategic shield, a sort of natural barrier, to protect the capital city Kaifeng against an invasion from the nomads.

The anticipated benefits of Yao's proposal can be summarised in three basic points. First, although the river ran through southern Hebei, it was Yao's optimistic belief and cost-benefit rationale that the river would not impose much of a negative impact on Hebei. This sounds similar to Li Chui's opinion in 1019 that the river's potential harm was lighter to the north than to the south. Second, the financial and labour burdens on the government could be substantially reduced. This point is particularly important in the late 1030s and the entire 1040s, when fiscal strain stung every nerve in the government and forced them to see things more economically—a crucial incentive to the initiation of the unsuccessful 'Reforms in the Qingli reign era (1041–48)'. Third, (which I consider most important,) Kaifeng and the entire Henan area—the prime area of interest of the state implied in Emperor Taizu's and Li Chui's words—would be forever set free from the Yellow River floods.

With no intention to over-interpret the minds of these Song people, I would like to raise a hypothesis: the government must have been pleased to see the river and its floods move northward after 1034. The court surely understood the implications of Yao Zhongsun's idea about the advantages of keeping the river in southern Hebei, so it approved Yao's proposal. In this year, it re-approved the decision not to repair the bank rupture created in 1034, and celebrated the opening of another divisionary channel, most likely toward the north, to reduce the hydraulic pressure in the mainstream—a further action to direct more water to the north.³¹ The next year, the government even wished to take a further step, when Guo Zi, a commissioner in charge of inspecting various Yellow River embankments, proposed to shift the river course completely into the central part of Hebei—a design very similar to Li Chui's proposal in 1015.³² With more elaboration on the military advantage a shifted river course could bring, Guo's proposal was timely, as the territorial dispute between the Song and the Khitan of the Liao dynasty developed into serious military tensions. The proposal was not

³¹ Cf. *Xu zizhitongjian changbian*, 133.3160.

³² Loc. cit., 136.3247–48.

carried out in the end, but in comparison with the fate of Li Chui's proposals, it won the court's acceptance for a while, since at one point the court decided to 'store up materials to carry out the project'.³³

The River's Course Shift in 1048

There is a lack of adequate information about the river's situation between 1042 and 1047; only a few flooding events, all on a small scale, are reported. This decrease in the severity of the river problems is most likely due to a climatic turn toward dryness, which substantially reduced rainfall. The prolonged drought, associated with frequent outbreaks of locust pests and earthquakes, prevailed in both north and south China.³⁴ The lower reaches of the Yellow River in the realm of southern Hebei were said to contain little water, and by 1043 its water became so shallow that people could even cross it on foot.³⁵ The vagrant water moved about on the land surface, incapable of a strong enough hydrological force to cut through the ground to form a deep, stable channel.

Judging from the short-term effects, the Song government might have congratulated themselves on the absence of flooding problems during these years and attributed it to the river's shift to Hebei and the government's wise application of the dual techniques to protect Henan and open northward diversionary channels. Therefore, the court maintained the decision on not to repair the bank rupture generated in 1034.

This absence of serious floods, however, did not mark the end of the disastrous history of the Yellow River in the Northern Song period. Rather, it was over this time that the river built up hydropower, silted up its riverbed, and waited for the right moment to explode again. And this moment came with a heavy rainfall in the summer of 1048. After years of drought, the rain poured down in a sudden deluge on the thirsty Loess Plateau and washed down silt and mud from the middle range of the Yellow River. It quickly filled up the shallow riverbed in

³³ Loc. cit., 136.3247–48.

³⁴ Droughts, earthquakes and locusts are addressed in various edicts and official memorials, see: Loc. cit., 141.3373, 142.3397, 143.3463, 145.3518&3520, 147.3554, 149.3609, 150.3638, 155.3766, 156.3792, 157.3798, 158.3821, 3823, 3826 and 3831, 159.3844–49, 160.3864–65 and 161.3889.

³⁵ Cf. *Xu zizhitongjian changbian*, 142.3404.

the lower reaches, where the sediments were deposited and could not be carried to the sea by the weak water flow of the past several years. The combination of the massive volume of water and the elevated riverbed forced the torrent to soar and press upon both sides of the riverbanks. This time, unlike in the past when many huge floods (e.g., 1019–1021) ravaged the land in the south, a great portion of the hydropower seems to have amassed on the northern bank, in particular on the fragile sections where the river course bent, due to a better protected southern bank and a less protected northern bank with many channels to divert water from the main stream. As a result, the roaring torrents destructed the river's bank on the northern side of Shanghu, and inflicted the flooding disaster and course shift in 1048.

This dramatic event initiated eight decades of frequent floods and course shifts in the heart of Hebei, reversing the trend beginning in the tenth century that the river largely flooded to the south. This new northern course, as well as three other northerly courses in Hebei created by later bank ruptures, confined most of the river water and its flooding problems to the north and turned Hebei into the river's biggest victim. The general pattern of the routes seems to have accidentally matched those designed in the proposals of Li Chui and Guo Zi, and also found an ancient model in the legend of Great Yu. These overlaps, however, are not a coincidence. As articulated above, the river's course shift was an anticipated result of these ideas and hydraulic proposals, and was made to happen by specific policies and practices.

Conclusion

The river disaster in 1048 seems inevitable, given the deterioration of the overall environment in north China and the sharp increase in the flooding events in the river's lower reaches in the middle-period China. But the course shift to Hebei took place, because the state's intentions and choices made it to. To Hebei, it was a disaster that was designed by politics and could be predicted and even avoided. Without such strong political manipulations, it is very likely that the river would have followed its early pattern of flooding and shifting to the south, while leaving Hebei in a state as safe as in the previous ten centuries. If so, the

history of both Hebei and Henan would be rewritten, and the Northern Song state might have moved its capital or suffered a dimmer fate.

The search for causes of the flooding disaster in 1048 has mobilized us to journey from the exact location where the bank rupture occurred, to the most desolate area of the Loess Plateau, through thousands of kilometres along the river's flow, and into the depth of geological strata. It has magically expanded the temporal capacity of the single day within which the river breached its dykes and cut out a new course. Looking through this brief time we have entered a history longer than a thousand years. In this vastness of space and time, piecing together a few fragments of evidence and telling a long lost story is a task, I am afraid, too challenging to be satisfactory. What were other factors that, apart from those we mentioned, influenced the river's activities in 1048? Can we quantify the significance of each factor in causing the river's disaster, especially since modern technology has begun to be used in studies of historical geography and geology? Apart from the state, how did other social groups (regional governments, local communities, or individuals) act to fight against, tame or take advantage from the Yellow River? How do the credibility and availability issues of our source materials and their textual, literary natures limit us from appropriately assessing environmental information? All sorts of questions remain. Certainly my efforts made in this paper are unable to decode all the mysteries behind this catastrophic event.

In the midst of all this dissatisfaction, questions and doubts, what my paper truly seeks to promote are two points, which this paper itself has not done enough about. But I hope to pursue them further elsewhere in my book manuscript. It seems that both points can be applied to studies of the Yellow River's history not only in the eleventh century but also in other periods – their values to my project are far more than what this small paper exhibits. First, the paper suggests treating a river and its entire drainage area as an integrated entity, whose sectors and elements are interconnected to each other and function in an organic way (although my paper itself is unable to achieve this goal). What happens in the river's lower reaches cannot be fully comprehended without taking into account the factors existing in its upper reaches. Apparently, the river runs by its own hydrological logics and within its own geographical boundary; the latter is not confined or separated by the territorial division in the human society. Unfortunately, historical records that we rely on are often bound by territorial

divisions. For instance, in the Song time the northern part of the Loess Plateau was controlled by the Tanguts and thereby cut off from the Song's territory. The history of this area in this particular period is absent in our sources; as a result, we do not know to what degree the Tanguts' occupation of the area had a relation with the river's frequent floods in the downstream, more explicitly, with the river's disaster in 1048. Certainly, more methodological devices need be developed to help me navigate around the geography, in order for me to keep up the theoretical assumption that the river should be treated as an integrated and organically evolving entity.

The second point is about the puzzle around human intentions, rationality, their implementations in actual conducts, and practical results they achieve. This paper demonstrates the power of political intentions and the rationalization of such intentions into concrete policies. The power so generated by human desires not only dominates human affairs, but also interferes and even dramatically changes the natural sphere, just as how the southerly tendency of the Yellow River's currents was checked and reversed into a northerly flow in the eleventh century. But, I must make clear that my paper does not propose direct causal links between intentionality and its implementation in people's actual conducts, partly because such links are not revealed by our sources. I would like to clarify that in my work about the Yellow River's history, human intentions are always rationalized, negotiated, represented, and even distorted into an acceptable, legible form before being implemented in reality. As the paper shows, Emperor Taizu brought up a vague idea, Li Chui developed it into a radical plan and later compromised his plan, Yao Zhongsun and Guo Zi modified it, and hydraulic activities partially accepted this idea. This entire process shows clearly that intentions are subject to changes, and are not translated a hundred per cent into practices.

Similarly, it is unrealistic to expect the result to match exactly its intention. The river course created in 1048 was certainly not exactly same as what Li Chui and Yao Zhongsun envisioned. More importantly, the intentions to change the environment often result in unexpected consequences. Unpredictability seems to be a great feature in any environmental history. The Song state's intention to push the river to the north was justified by its rationales that a northerly river course would bring to the state more benefits. In other chapters of my manuscript, I argue that soon after the river's course shift in 1048, such rationales and

justification were proved to be false. The northerly flow of the river was soon found to endanger the state's security, exhaust the state's finance, and deplete various resources in north China. State policies immediately reversed, trying to bring the river back to its original eastern course. Apparently, the actual results can be very different from what intentions want to achieve.

The wide gap between intentionality and conducts/actual results that the intention is associated with brings my final concern about the concept of 'rationality', or 'being rational', that I use occasionally in the paper. Although I understand the conventional meaning of these concepts is obvious to all social scientists, I would nevertheless like to clarify that my use of these concepts suggests no value or moral judgment. The Song state's choice to move the river's course northward and to allow the floods to kill Hebei people instead of Henan people might be a rational one. Saying it rational is different from calling it 'right' or 'good'. What I pay great attention to in other parts of my manuscript is not the distinction between 'being rational' and 'being right or good'; rather, it is the delicate contrast and reversal between 'being rational' and 'being/becoming irrational'. It is the irony and the temporality of rationality that my other writings tend to elaborate.

The above random thoughts are brought up and inspired by my previous conversations with colleagues who kindly read and commented on parts of this paper. These thoughts are not directly related to the present paper. But I keep them here in order to broaden the discussion among fellow Colloquium audience.