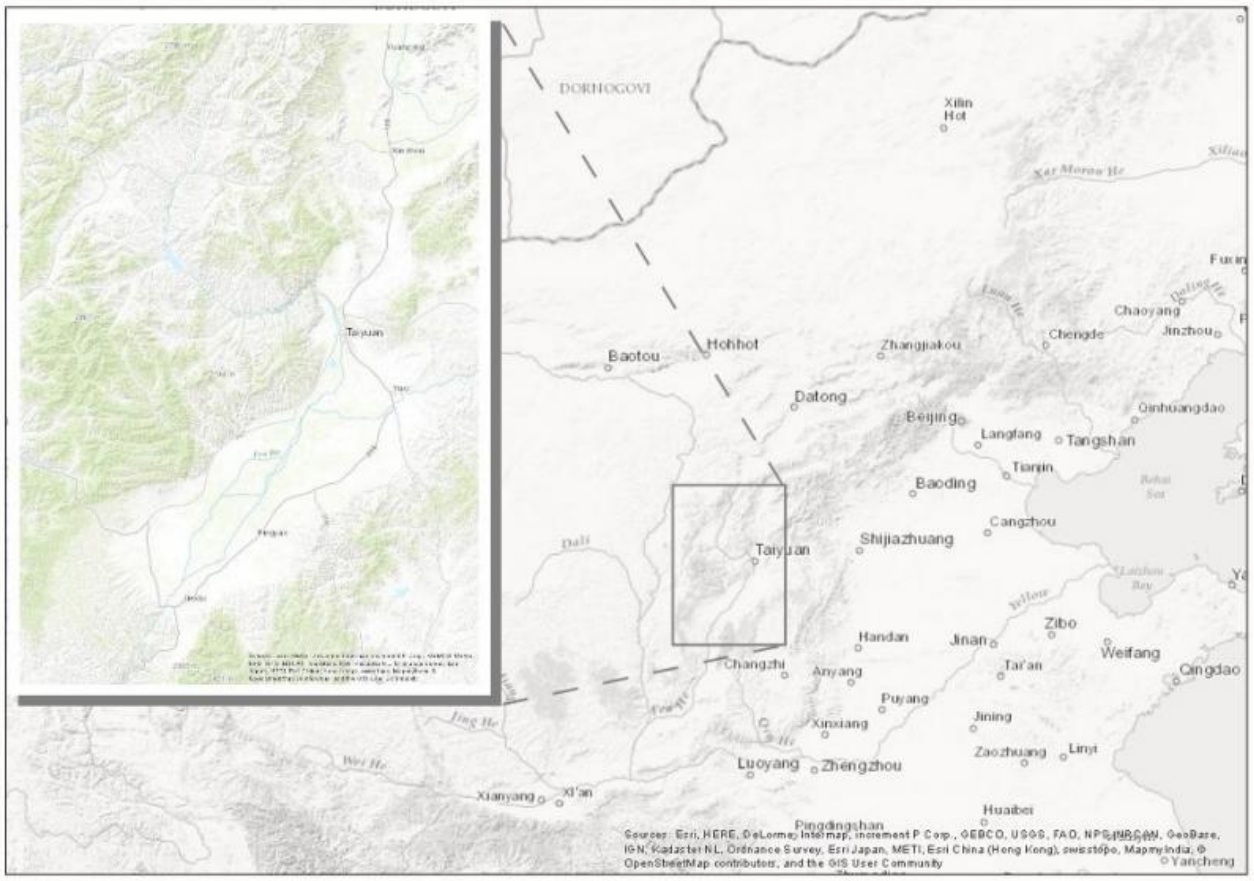
The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture

Matthias Falke

Summary

This case study of the Fen River in China's Shanxi Province explores the interrelationship between urban society and its surrounding ecosystem. From a geographical viewpoint, the article illustrates how, over time, urban society experiences sociocultural change that can be divided into three stages. Starting from a stage of environmental determinism in which cultural behavior is predominantly characterized by adaption to local environment, China's industrialization of the late 1950s reflects the stage of geographical possibilism accompanied by severe challenges to the ecosystem. Recent political actions, however, suggest that urban China, amidst competing and vested interests, is entering a stage of government-led environmentalism.



Location of Taiyuan, Shanxi province, and the Fen River Basin

This map was created by Matthias Falke in 2016, using Arc Map and the basemap layer World Topographic Map; map materials are from Openstreetmap contributors.

This work is licensed under a Creative Commons Attribution-ShareAlike 2.0 Generic License .

Falke, Matthias. "The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture." Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679.
Print date: 13 November 2026 17:22:03

Shanxi (山西) and its fertile loess-covered landscapes are also known as the cradle of China's civilization. The 716-km-long Fen River (汾河) or Mother River (母亲河) drains most of the province via the basin of Taiyuan. The river's stunning scenery, once the subject of poetry during the Jin (金朝, 1125–1234) and Yuan (元朝, 1279–1368) dynasties, quickly deteriorated after industrialization in the late 1950s. The construction of dams, extensive irrigation of farmland, and wastewater discharge severely impacted the river's ecosystem. From 1956 to 2013, the average surface runoff fell from 2.65 billion m^3 to 1.33 m^3. Moreover, overexploitation of groundwater dropped the groundwater level in the Fen River basin by 81.4 meters.



View of four cokeries in the Gujiao area with an annual capacity of 3.8 million metric tons per year before their integration into a combined coke processing facility

Photo taken by Harald Zepp, 2010.

This work is used by permission of the copyright holder.

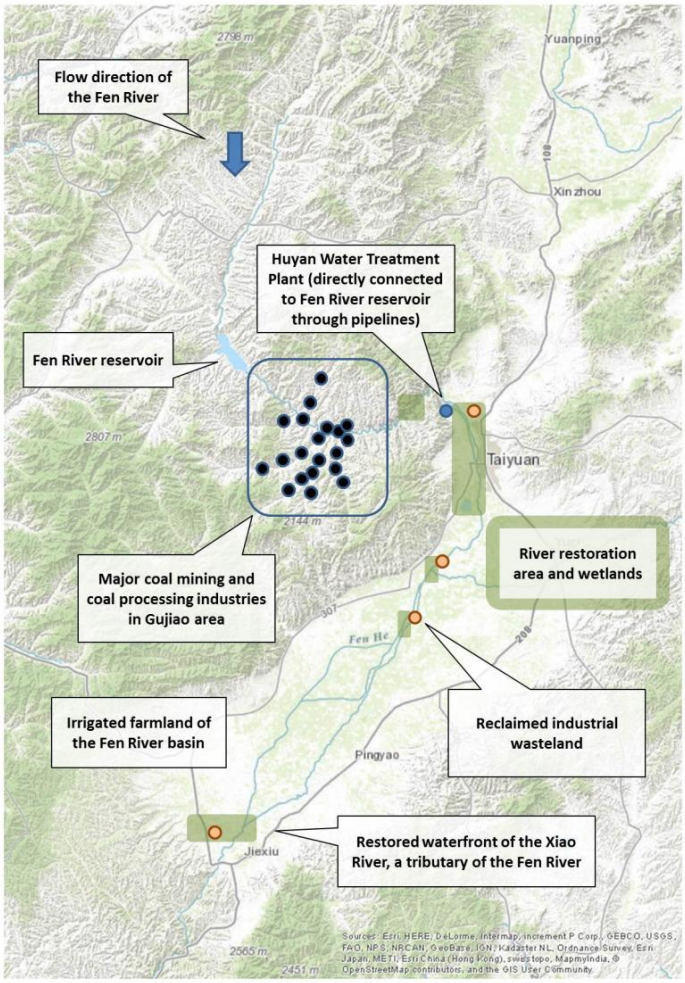


Traditional dwelling in the rural part of Gujiao

Photo taken by Harald Zepp, 2010.

This work is used by permission of the copyright holder.

Falke, Matthias. "The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture." Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679.
Print date: 13 November 2026 17:22:03



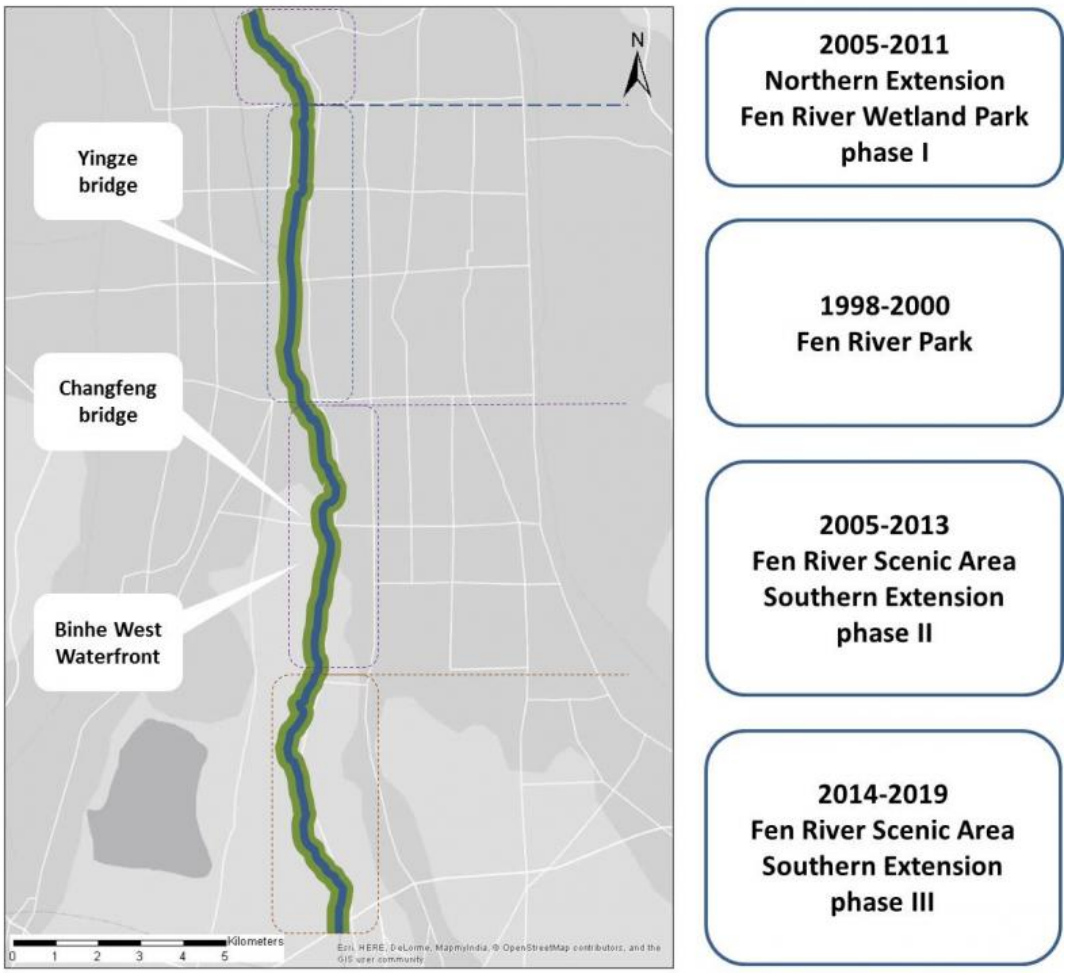
Overview of selected restoration efforts and challenges in the Fen River basin, Shanxi Province, China

This map was created by Matthias Falke in 2016, using Arc Map and the basemap layer "World Topographic Map", map materials are from Openstreetmap contributors.

This work is licensed under a Creative Commons Attribution-ShareAlike 2.0 Generic License .

Today, Taiyuan (太原), the prospering capital of the Shanxi province, is home to almost three million people. However, only about 15 years ago, the city's mother river was nothing more than a dry riverbed. It was not until the late 1990s that the municipal government issued the construction of four rubber dams to achieve a step-by-step artificial replenishment of the city's major body of water accompanied by landscape greening along the urban riverbed. Further park and wetland constructions extended Taiyuan's waterfront landscape to its current length of 20 km. Though environmental beautification boosted both Taiyuan's national appearance and its real-estate business, in most of the rest of the province, the Fen River still remained an ecologically dead and nearly dried-up waterway.

Falke, Matthias. "The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture." Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679.
Print date: 13 November 2026 17:22:03



Development stages of the Fen River restoration in Taiyuan

This map was created by Matthias Falke in 2016, using Arc Map and the basemap layer World Topographic Map; map materials are from Openstreetmap contributors.

(cc) BY-SA This work is licensed under a Creative Commons Attribution-ShareAlike 2.0 Generic License .

Since 2007, the Fen River Governance (汾河治理), led by the provincial government, has pursued an integrated, inter-municipal, and multi-objective approach to restoring the river's ecosystem: The Yellow River Diversion Project slowly replenishes its body of water; massive afforestation programs increase water retention and mitigate soil erosion, whilst water conservation policies and the modernization of Shanxi's irrigation network actively curtail extensive water use. Groundwater levels have increased by up to nine meters since the project started, but it will still take decades to restore the river's natural water flow. Moreover, six wetland parks have been created along the Fen River, including the reclamation of industrial wasteland. Latter projects are backed by an annual budget of 1.8 billion yuan from the Coal Sustainable Development Fund (煤炭可持续发展基金, CSDF), which levied a surcharge averaging 3.5 yuan per metric ton of coal mined.

Nevertheless, water pollution remains serious. Though according to Chinese national standards the Fen River Reservoir features good quality water equivalent to grade II (good; suitable for drinking water), the overall water

quality of the Fen River and its tributaries only matches the lowest grade of V (very bad, unfit for human contact). Major pollutants monitored in 2014 include sulfate, chloride, and volatile phenol, as well as nitrate and petroleum, with ammonia nitrate and petroleum exceeding national limit values by 4 times and 5 times respectively. Though water policies and corresponding laws for environmental protection have been actively promulgated and a lot of polluting industries and coal mines have been modernized, consolidated, or closed according to province-level politicians, reports still reveal numerous cases of non-compliance and shirking by local officials.



Northbound view of Fen River Park near Yingze Street, Taiyuan, Shanxi Province, China

Photo taken by Till Kasielke, 2010.

This work is used by permission of the copyright holder.



Southbound view of Fen River Park near Yingze Street, Taiyuan, Shanxi Province, China

Photo taken by Andreas Redecker, 2010.

This work is used by permission of the copyright holder.

These polluting coal mining cities are often located in the mountainous upper reaches of the Fen River and its tributaries. Until China's reform and opening up in the 1990s, they were among China's most deprived areas. Rich in coal resources, however, they flourished when China encouraged artisanal mining to fuel its growing economy, often accounting for up to 80% of the local GDP. Thus, when coal prices plummeted starting in 2011, it not only led to a drastic shortage of local fiscal revenue in Shanxi and heavily constrained ongoing environmental efforts, but also intensified industrial lock-ins. Furthermore, the CSDF was no longer feasible and was ultimately disbanded in 2014.

Falke, Matthias. "The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture." Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679.
Print date: 13 November 2026 17:22:03



View from Grace Court overlooking the Fen River and the blue rubber dams below Changfeng Bridge in Taiyuan, Shanxi Province, China

Photo taken by Matthias Falke, 2013.

This work is licensed under a Creative Commons Attribution 4.0 International License .

Consequently, in 2014 the provincial government issued the Fen River Watershed Ecological Restoration Plan (汾河流域生态修复规划纲要, 2015–2030). As the long time horizon indicates, there is still a long march ahead. Investments total 130 billion yuan in six fields of action: water conservation; restoration of groundwater and surface water; modernization of water systems; control of groundwater exploitation; protection of spring water areas; and control of water pollution and sewage treatment. At the same time, vocational training centers and reemployment projects financed by the national and implemented by the provincial government are to facilitate Shanxi's socioeconomic transformation.

Falke, Matthias. "The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture." Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679.
Print date: 13 November 2026 17:22:03



View of the Fen River near the Binhe West Waterfront during the Dragon Boat Festival in Taiyuan, Shanxi Province, China

Photo taken by Matthias Falke, 2013.

This work is licensed under a Creative Commons Attribution 4.0 International License .

Falke, Matthias. “The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture.” Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679.
Print date: 13 November 2026 17:22:03



Daily evening light show on the Binhe West Waterfront near Changfeng West Street, Taiyuan, Shanxi Province, China

Photo taken by Matthias Falke, 2013.

This work is licensed under a Creative Commons Attribution 4.0 International License .

Falke, Matthias. “The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture.” Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679.
Print date: 13 November 2026 17:22:03



Restored waterfront of the Xiaohe, a tributary of the Fen River, in the city of Xiaoyi

Photo taken by Matthias Falke, 2014.

This work is licensed under a Creative Commons Attribution 4.0 International License .

This case study depicts the difficulties and obstacles for regional environmental governance caused by industrial development paths, vested interests among different economic stakeholders, and the lack of compliance from local political leaders. Contrary to concepts of environmental consciousness and civil society movements encountered in the West, it can be noted that in China environmental remediation efforts are mainly promulgated and carried out by provincial government leaders. Though there is a growingly emancipated and environmentally aware urban Chinese population, their influence and role still remains a passive and indirect one. US economist Eric Heikkila describes this phenomenon as "environmentalism with Chinese characteristics." Nevertheless, the Fen River has again regained its constitutive status as a symbol for human well-being, as the Mother River of Shanxi.

Arcadia Collection:
Water Histories

Further readings:

Falke, Matthias. "The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture." Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679.
Print date: 13 November 2026 17:22:03

- Eaton, Sarah, and Genia Kostka. "Authoritarian Environmentalism Undermined? Local Leaders' Time Horizons and Environmental Policy Implementation in China." *The China Quarterly* 218 (2014): 359–80.
- Heikkila, Eric. "Environmentalism with Chinese Characteristics? Urban River Revitalization in Foshan." *Planning Theory & Practice* 12, no. 1 (2011): 33–55.
- Li, Fang. "Chongxiandahefengguan. Woshengkaiqifenheliuyushengtaixiufuxinshidai" 重现大河旖旎风光. 我省开启汾河流域生态修复新时代 [A Large River's Charming Scenery Reappears: Our Province Starts a New Era of Ecological Restoration of the Fen River Basin]. *Shanxi Water Resources*, Special Report 9 (2015): 6–13
- Martin, Richard. *Coal Wars: The Future of Energy and the Fate of the Planet.* New York: Palgrave Macmillan, 2015.
- Wang, Guoqing, Jianyun Zhang, and Ruimin He. "Impacts of Environmental Change on Runoff in Fenhe River Basin of the Middle Yellow River." *Advances in Water Science* 17, no. 6 (2006): 853–58. (in Chinese)
- Yang, Guoyi, Qiusheng He, and Zhijun Yang. "Ecological Risk and Control of Cr Pollution of Fenhe River in Taiyuan Section." In *Science for Environmental Engineering and EcoInformatics*, edited by Yuanxu Yu, Zhengtao Yu, and Zhao Jingying, 206–13. Berlin and Heidelberg: Springer, 2011.

Related links:

- Holmes, Damian. "AECOM realised design for Taiyuan Fen River Waterfront." *World Landscape Architecture,* 21 May 2014. http://worldlandscapearchitect.com/taiyuan-fen-river-waterfront-landscape-design-tiayuan-china-aecom/

How to cite:

Falke, Matthias. "The Fen River in Taiyuan, China: Ecology, Revitalization, and Urban Culture." Environment & Society Portal, *Arcadia* (Autumn 2016), no. 17. Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/7679 .

 This work is licensed under a Creative Commons Attribution 4.0 International License .
2016 Matthias Falke
This refers only to the text and does not include any image rights.
Please click on an image to view its individual rights status.

ISSN 2199-3408
Environment & Society Portal, Arcadia

About the author:

Matthias Falke
Matthias Falke is a PhD student at the Institute of Geography, Ruhr University Bochum. He conducts research on the urban transformation of Chinese coal cities in Shanxi province from a governance perspective. Over the last five years, he has lived in Taiyuan for up to three months a year, closely observing waterfront redevelopment along the Fen River. This research draws on interviews with representatives from business and academia as well as provincial government, as well as internal documents from NGOs and planning bureaus.