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ENVIRONMENT, MODERNIZATION  
AND DEVELOPMENT IN EAST ASIA

Edited by Ts'ui-jung Liu  
and James Beattie



Palgrave Studies in  
World Environmental History

# ENVIRONMENT, MODERNIZATION AND DEVELOPMENT IN EAST ASIA

*Perspectives from Environmental History*



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# Environment, Modernization and Development in East Asia

## Perspectives from Environmental History

Edited by

Ts'ui-jung Liu

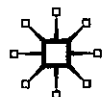
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## 4

## Waterscape and Social Transformation in Southern Taiwan: The Damming of Mudan Creek

Shao-hua Liu and Shu-min Huang

This chapter highlights how topographical and environmental factors have shaped the trajectory of social change among Taiwan's southern Paiwan people since the late nineteenth century. Taiwan's history from the late Qing dynasty (1644–1911) through the Japanese colonial period (1895–1945) has been commonly examined through the framework of modernization. This framework uses the dichotomy of 'core' and 'periphery', which claims the centrality and radiating aspects of modernization. Although those concepts are certainly useful for examining Taiwan's modern transformation, they cannot account for historical developments in which unique local variations deviated from that norm. For instance, why did certain ethnic groups at the margins encounter the forces of modernization earlier and assimilate more readily than peoples geographically closer to the so-called centre?

This question is the point of departure for our examination of the complex processes by which the indigenous Mudan communities in Hengchun Peninsula have participated in Taiwan's social transformation over the last 150 years, a much longer and 'thicker' experience than that of other indigenous tribal communities in the hill area. Social change in Mudan since the late nineteenth century has closely paralleled greater Taiwan's modernization drive. However, the early and intense social change that took place in these communities also has a particular history, which was clearly driven by factors unique to the local environment, namely, its water landscape or waterscape.

Taking the concept of waterscape as the vantage point for our analysis, we discuss how history and geography combined made the peripheral Mudan tribesmen famous and made this locality suitable for a dam-building project. The case of Mudan vividly illustrates how

environmental practices played a greater role in shaping modernization than historians of East Asia have usually recognized.

'Waterscape', by analogy with the word 'landscape', refers to works of art that delineate scenery containing bodies of water.<sup>1</sup> Examining the importance of waterscape in history is a perspective that has gained attention in environmental studies in recent years. Taking the presence of bodies of water as instrumental in civilizational development was an approach pioneered by Fernand Braudel in his studies of the Mediterranean.<sup>2</sup> Braudel's critical study revealed a geographic dynamic that connected diverse regions and localities even beyond the national borders around the Mediterranean. Recent scholars have further stressed waterscape's centrality by examining how people's relations to water have helped structure social continuity. For example, Terje Tvedt argues that previous research overemphasized human forces over water systems by overlooking the critical role of nature in shaping human history. He asks how and to what extent the structures of a particular physical body of water have contributed to the possibilities and constraints of a society's productive activity, including its efforts to modify that waterscape.<sup>3</sup> Many scholars have also used 'waterscape' to refocus their consideration of how culture and political economy have shaped the construction of irrigated rice fields, dams, canals, and so forth.<sup>4</sup>

This line of research has inspired us to reconsider extant accounts of the drive for modernity experienced among the southern Paiwan. Past research on Taiwanese indigenous peoples has for long treated the human forces of colonialism, capitalism, and state governance as the key agents of change. But what role did the environment play and how did the combined forces of nature and humans change local communities? This approach obviously limits the presentation of details in this chapter because of the long span of 150 years that it considers. Still, the concept of waterscape provides many interesting insights into the historical factors critical to local social transformation in Paiwan. Local communities were driven to change as much by factors related to bodies of water as by waves of diverse modernization projects. Critical among the former were proximity to the Pacific Ocean's western fringes, and the presence of steady year-round water flows on land.

The Paiwan locals along Mudan Creek in today's Pingdong County changed from reclusive head-hunting tribes to peasants following early encounters with outsiders from overseas over a century ago. The local ecosystem went from a marginal landscape first to a subsistence-oriented agricultural landscape and then to a politico-moral landscape, as the modern state investigated the area's water sources and recognized the potential for a dam-building project that would benefit the broader

region. Even today, the social implications of changes to the Mudan waterscape continue to unfold.

The waterscape in question is a particular section of Mudan Creek that became Mudan Reservoir in 1995. This reservoir represents the last major dam built in Taiwan to meet water shortage problems. In the face of grass-roots anti-dam movements across Taiwan in the 1990s, under the influence of global environmentalism, the construction of the Mudan Reservoir demonstrated the state's efforts and constraints in shaping its subject waterscapes. Mudan Creek's damming also highlights the state's taming of the local indigenous communities. Our interpretive account of the local community is based on key historical narratives about the local waterscape from the late nineteenth century onward. This examination of local history through the perspective of humans-in-nature may explain why Mudan experienced rapid social change in contrast to Taiwan's historical transformation in general.

### **Narrative one: Mudan as a maritime frontier**

Despite its proximity to the mainland—the narrowest point of the hazardous Taiwan Strait is a mere 130 kilometres wide—Taiwan had had very little direct contact with China before the maritime explorations of the sixteenth century. Some historians suggest that medieval China had an active maritime trade with Southeast Asia and South Asia that relied on the Taiwan Strait as its passageway, but most of the cargo ships sailed close to mainland shores for safety reasons, and hence barely registered this outlying island.<sup>5</sup>

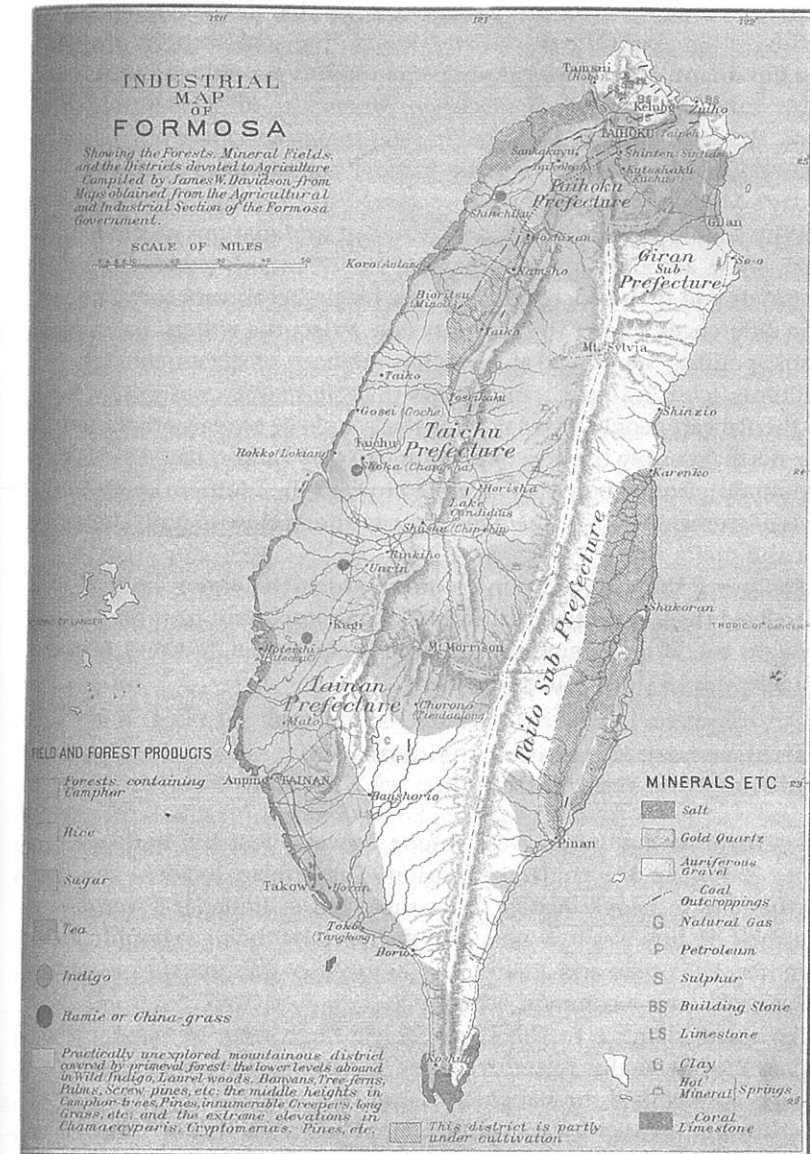
When trans-Pacific sea voyages were established, along with missionary work and colonial expansion after the sixteenth century, Taiwan's location on routes that served southeast China, northeast Asia, Southeast Asia, and the Pacific became important. The uncharted waters around the island seem to have offered both easy and dangerous passages. The competing sea powers of Spain, Portugal, and Holland, as well as the Ming (1368–1644), all fought to gain footholds on the island through the construction of harbours and fortresses during the seventeenth century. In the nineteenth century, Western and Japanese colonial powers competed in the region commercially. They all watched helplessly as their ships were wrecked by rogue currents, typhoons, underwater rocks and reefs, and local pirates.

With year-round subtropical temperatures and a strong tropical current called Kuroshio that splits into two around the island's southern cape, plus shallow coastal waters fringed with submerged reefs,<sup>6</sup> the region was

particularly hazardous to ocean-going vessels trying to round Taiwan's southern tip to reach the capital city of Tainan.<sup>7</sup> Historically, southern Taiwan's sea-coast was famous for countless misfortunes: ships wrecked in superficially calm waters, massacres of castaways who made their way to shore, military expeditions sent in pursuit of the culprits, and diplomatic disputes among competing colonial powers (see Map 4.1).<sup>8</sup>

The Mudan indigenes lived near Taiwan's southern cape, where the rugged tertiary Central Mountain Range, averaging 3,000 metres above sea level, gradually descends into gentle slopes, valleys, and plains, and disappears into the Pacific Ocean. The local inhabitants, who relied primarily on slash-and-burn agriculture and hunting for their livelihood, were distributed thinly along the hills and valleys of the Mudan and Nunai Creeks, close to where a dam would later be built. This location made the Mudan Paiwan among the first hill indigenes in Taiwan to encounter the outside world in the 1800s, a century marked by tussles between old empires and new colonial powers. Their frequent engagement with ethnic others, as sea traffic boomed despite increasing shipwrecks in the Western Pacific, won the Paiwan international notoriety for their ferocity.

The name Mudan, which was known early in Taiwan's history, signalled the position of these communities at the forefront of cultural and political encounters. Mudan, after all, is not an indigenous Austronesian name, but is the Chinese word for peony. Based on available sources, we find three possible explanations for the origin of the name. The first suggests that it was given by Han Chinese sometime in the early contact period. The earliest mention of the *Mudan she* (the Mudan group) in 1723 describes them as one of the 18 'naturalized raw barbarian' groups in the Langjiao region.<sup>9</sup> The local indigenous name for the *Mudan she* was *Sinivaudjan*, which means 'clearing up rattans'. The word *vaudjan* was probably mispronounced by neighbouring Han Chinese as *mudan*, and *sinivaudjan* was accordingly transliterated as *sinraomudan she* in some records.<sup>10</sup> The second explanation relates the name to the Japanese during the colonial period. One archivist claimed that the Japanese used the indigenous term because its pronunciation resembled *mudan*;<sup>11</sup> another, that the Japanese government simply used an already established place-name to set up a new administrative unit.<sup>12</sup> Third, the township's official website implies that this name was officially applied to the administrative village *Mudan cun* under Taiwan's local autonomy policy after 1945.<sup>13</sup> It is worth mentioning that the traditional Mudan communities extended beyond the present-day boundary of that village.



Map 4.1 Industrial map of Formosa

Source: James W. Davidson, *Island of Formosa, Past and Present* (1903), 370.

Note: This map shows in dark shading the coral reefs surrounding the southern tip of Taiwan in the late nineteenth century.



Despite these differences, there is one point that historiographers and archivists agree on: the place-name Mudan has something to do with the dominant indigenous Paiwan people in this region, who were variously called *Sinivaudjan*, *Shinivaudjan*, *Sinvaudjan*, or *Shinbauzan*. Over time, the term 'Mudan' was used to refer to one specific group (that is, *Sinivaudjan* or *Mudan she*), or the broader communities equivalent to today's Mudan Township.

Why should we care about these different explanations of the name? First, these accounts indicate that the local Paiwan's encounters with outsiders and their consequences in the region began very early indeed. The differences among the accounts may reflect the writers' interpretations, political standings, and varying methods of documentation. In addition, 'clearing up rattans' shows that *Sinivaudjan* was a new land to the Paiwan people. It is said that the people in Mudan originated in the north, possibly the area of Kavulungan (the Paiwan name for Dawu Mountain), from where they migrated toward the southern lowlands.<sup>14</sup> This movement brought them into new territory, close to both the open sea and major rivers.

Following the early encounters from which the region and people who lived there came to be called Mudan, an important historical event brought the Mudan communities to the forefront of Taiwan's history, namely, the 1871–74 Mudan Incident.

### **Narrative two: the Mudan incident and the Stone Gate battlefield**

The Mudan communities were among Taiwan's first hill indigenes to face serious outside political intrusion. The Mudan Incident resulted in the Paiwan people finally being subjected to imperial governance, but their destiny was to a great extent shaped by their geographic location near the ocean and adjacent to Taiwan's southernmost cape where shipwrecks were a common occurrence.

As noted, damage to ships and stolen cargo were frequent occurrences and generally tolerated in the maritime era, but Western sea powers condemned the slaughter of innocent sailors and passengers as beneath human dignity and intolerable. The Paiwan tribes' practice of taking human heads as trophies to demonstrate a warrior's maturity and manhood ran directly counter to the rising tide of Western modernity. James W. Davidson, an American diplomat stationed in Taiwan for a short time in the late nineteenth century, wryly commented: 'The wild seas surging around the island coasts are extraordinarily violent, and

many a ship-wrecked crew reached land only to meet with a torturing death, more cruel, more brutal than even the sea would inflict'.<sup>15</sup> Rumours circulated that unruly barbarian tribes had taken European castaways as slaves. Further investigations by Davidson proved those rumours unfounded; however, clashes between the industrializing colonial powers and Paiwan head-hunters soon took place in southern Taiwan's shallow waters.

The Mudan Incident was preceded in 1867 by the killing of the captain and crew of an American merchant ship, the *Rover*, which had drifted onto the Hengchun Peninsula. American troops landed to launch a punitive attack on the local Paiwan, but had no success because of their unfamiliarity with the local terrain.<sup>16</sup> Charles W. Le Gendre (1830–99),<sup>17</sup> the US Consul in Xiamen, eventually reached an accord with the local Paiwan chief Tauketok. The pact required local people to rescue white shipwreck victims rather than attacking them.<sup>18</sup> This event forced the Qing court, under pressure from the US Consul, to pay attention to security in relation to the indigenous communities on the Hengchun Peninsula. But it was not until the Mudan Incident that the Qing finally realized the critical importance of this region as a maritime frontier of China, Taiwan, and the rest of the world.

The usual account of the Mudan Incident goes like this: on 6 November of the tenth year of the Tongzhi reign (1871), two ships from Miyako Island of Naha in the kingdom of Okinawa were blown off course by a typhoon and landed in southeast Taiwan's Padriyur Bay. Among the 69 sailors, three had drowned and the rest ventured inland for help. They mistakenly entered indigenous Mudan territory and 54 of the men were killed. The 12 survivors were saved by Yang Youwang and his son, Han Chinese who lived in the region and had befriended the Paiwan people. The survivors were eventually assisted by the Qing government and transferred from Donggang through Fengshan, Tainan, to Fuzhou, and ultimately dispatched to Naha in Okinawa.<sup>19</sup>

The Mudan Incident's implications have been thoroughly reviewed by historians, but interpretations of it have diverged along the lines of the local Mudan indigenes, the Japanese government, and the Qing court. For instance, the killing of shipwreck victims who were not white was recorded and remembered differently: the Qing Court considered it an accident, something carried out by unruly 'raw barbarians' beyond its jurisdiction.<sup>20</sup> The newly westernized Japan legitimized its retaliation against the Paiwan by claiming that Okinawa was its sovereign territory, and so the killing of the sailors became its pretext to pull Taiwan into its colonial empire. The local indigenes considered it a justified defence

against dangerous non-white intruders who were not protected by the agreement established between Tauketok and Le Gendre.<sup>21</sup>

Japan's initiatives on behalf of Okinawa in this incident ran counter to established norms and show that it was well prepared to pursue its colonial ambitions. Among the 400-odd ships that drifted from Okinawa to Qing territories during the period from the Kangxi (1662–1722) to Guangxu (1875–1908) reigns, one seventh drifted to Taiwan.<sup>22</sup> Although there are many records of those shipwreck victims who were robbed by local residents, Han or non-Han, there is no surviving official record of Japan's protest or appeal to the Qing court for compensation on their behalf.<sup>23</sup> The Mudan Incident would change among competing powers relations with Taiwan's indigenous groups.

The Japanese government initially dispatched diplomats to the Qing court in 1872 to demand the punishment of the culprits and payment of monetary compensation to victims' families. The Qing government rejected Japan's requests on two grounds: the incident was a matter between the Qing and its tributary kingdom of Okinawa, and the local indigenes lived beyond Qing jurisdiction.

Qing inaction gave Japan a perfect excuse to launch a punitive expedition two years later. In April 1874, Major General Saigo Judo (1843–1902) led a force consisting of five gunboats and 3,658 soldiers which landed on Hengchun Peninsula with the intention of establishing a permanent base there. On 17 May, General Saigo ordered his initial military operations. Most of the 18 Langjiao communities surrendered, but Mudan and Kuskus, the two groups most responsible for the massacre of the Okinawans, held out.<sup>24</sup>

The most brutal fighting was at the Battle at Stone Gate. This was Japan's key access point to the indigenous area, while for the local tribesmen it was their crucial front line of defence.<sup>25</sup> Paiwan tribesmen from Mudan and Kuskus organized a defence force of around 300 warriors along the Stone Gate's ridges to stop the Japanese as they tried to pass through the narrow gorge. With their clear geographic advantage, the indigenous forces kept the Japanese in check for a few days.<sup>26</sup> To further punish the Mudan tribesmen, General Saigo ordered his men to attack the tribal bases with a force of 1,300 soldiers.<sup>27</sup> After three days of fighting, the Japanese retreated from the tribal areas and camped near Stone Gate. During the stand-off, the tribesmen hid in the woods around the waterway and continued to launch guerrilla attacks against the intruders. Both parties suffered losses. Paiwan people were handicapped by their lack of high-quality modern weapons; Japanese losses occurred mainly because of their maladaptation to the local climate and

topography. Of the 3,658 invading Japanese, 573 died, but only 12 as a result of combat. Most died from tropical diseases such as malaria.<sup>28</sup> Faced with such massive casualties, the Japanese negotiated and claimed victory,<sup>29</sup> withdrawing in November 1874, a mere six months after they had been sent.<sup>30</sup>

Once Japan declared victory, the Qing court finally took action; formally declaring the Hengchun Peninsula to be part of its administrative unit, Hengchun County, and all resident 'raw barbarians' to be Qing subjects. The new administration issued 'pacification flags' to the indigenous communities willing to be absorbed into the Chinese Empire. However, the indigenes may well have considered their surrender to Japan as merely a ceasefire agreement, rather than submission.<sup>31</sup>

Whatever the meaning of this 'pacification', the Mudan Incident ushered the Paiwan people into a long, conflicted, and complex relationship with state sovereignty that would take various forms in subsequent decades. Furthermore, under pressure from the United States and Japan, in 1883 the Qing built a Western-style lighthouse at Eluanbi, the very first on the island, to help prevent shipwrecks.<sup>32</sup> The lighthouse was, unusually, fortified to resist attacks by local tribesmen who resented its presence in their territory.<sup>33</sup> All in all, the Eluanbi lighthouse not only signalled the arrival of the modern maritime era in Taiwan, it also demonstrated the Qing state's claim of sovereignty over the region to the world.

### Narrative three: using the old to serve the new

Although Japan's initial attempt at colonizing Taiwan had failed, it reasserted this ambition a mere two decades later. In 1895, Taiwan became part of Japan's colonial empire. With such dramatic change, the old battlefield marked by the two opposing mountain chains and a narrow water passage began to acquire new meanings. The features of this waterscape attracted the era's movers of modernizing social change.

The major transformation came with a common farming strategy that imperial and colonial powers worldwide used to 'civilize primitives' in tropical or sub-tropical zones—the introduction of paddy rice and the infrastructure to grow it. The cultivation of wet rice in inundated terraces had long been the benchmark of advanced civilization in East and Southeast Asia thanks to its high yields, effective topsoil conservation, and sustainable regime, not to mention the easy taxation of farmers who were fixed to the land by the ruling sovereignty.<sup>34</sup> In contrast, the slash-and-burn agriculture practised by Taiwanese indigenous peoples was



associated with low yields, deforestation, and semi-permanent mobility following growth cycles, all of which directly challenged the state's urge to make its administrative landscape 'legible' and sedenterized.<sup>35</sup>

Japan's colonial government was no exception in this regard, and it tried to adapt the local waterscape to its agricultural, civilizing, and governing purposes. Colonialists soon began to refashion Taiwan as a supplier of raw materials—including agricultural products—to feed the industrializing 'Motherland', which had entered a frenetic stage of modernization. Among the small streams on the Hengchun Peninsula, Mudan Creek appeared to be one of the very few with a steady year-round flow. The official colonial archive states: 'The Mudan *she* is located on the right bank of Mudan Creek, about 300 metres above sea level. It has a gentle slope with flat lands along the catchment. Because of its high soil fertility, it has been converted into rice terraces'.<sup>36</sup>

In the early colonial years, the Japanese strove to turn the former fighting tribes into settled farmers and 'civilized' peasants. Rice farming in irrigated terraces was a clear marker of being civilized in Japanese thinking, and the Mudan people were early and successful guinea-pigs in the Japanese colonial experiment. The building of rice terraces along the Mudan Creek began in earnest in the early twentieth century, gradually transforming Mudan tribesmen into Mudan peasants. The shift from a livelihood based on slash-and-burn agriculture and hunting to sedentary farming did not happen overnight. The Japanese colonialists first forced indigenes to move *en masse* from the high mountains to the lowlands for the sake of convenient governance, acculturation, and education. Between 1903 and 1941, over half of Taiwan's indigenes, a total of 43,112 people, were forced to move to the lowlands, and this resettlement policy was carried out in tandem with a policy aimed at changing livelihoods that was imposed throughout indigenous society. Resettlement created drastic social change.<sup>37</sup>

In 1909, Japanese police introduced rice to Mudan and educated the local people in its farming.<sup>38</sup> The current Mudan Village was a brand-new settlement built during this period. However, since the rice fields were distributed along both shores of Mudan Creek, some people decided to move further down to live near their fields and to form today's Stone Gate Village. It stood right by the old battlefield and the future reservoir, and hence became the gateway to non-indigenous Hengchun.

Local elites played a critical role in this transformation. For many years, local indigenes had resisted paddy rice farming because it was not

their traditional means of livelihood. Some even considered it inauspicious.<sup>39</sup> It is widely recorded that one local man, Liuliu Pinevar, was key in persuading his fellow tribesmen to try wet rice cultivation through his own example of successfully farming the new crop. His son Zhou Yixiong followed his path and moved from his mountainside residence to the ideal lowlands of today's Stone Gate Village around 1945.<sup>40</sup> This pioneering family has been economically and politically powerful in the Mudan communities ever since.<sup>41</sup>

Public schools, newly established by the Japanese, offered agricultural classes to teach local students modern farming knowledge. Local Japanese police worked as farming instructors. Thanks to the abundant water supply and the fertile paddy fields along the waterfront, the new Mudan farmers came to enjoy good harvests and long-term prosperity. The quantity of rice produced in the Mudan communities, with two harvests per year, was the most plentiful among the indigenous communities in Pingdong County.<sup>42</sup>

The success of rice agriculture in Mudan signalled the local people's early and fundamental transformation, compared to many other indigenous hill tribes. Along with the shift to farming, the colonial government also revised property rights through various land reform policies. In the wake of a settled rice-based livelihood, land rights were moved from indigenous headmen to individual peasants. Among all the Taiwanese hill tribes, the Mudan communities were the first to embrace private land rights.<sup>43</sup> At the collective level, the traditional millet festival (*masalut*) was replaced with a rice festival (*masupadat*) for the first time on 23 November 1938.<sup>44</sup>

After the introduction of wet rice farming and its related social regimen, Mudan communities paralleled the experience of other rural villages in Taiwan during Japanese rule, first through their adoption of modern farming practices, including the use of chemical fertilizers and pesticides. This was followed by the Republican era's capitalist trends, which have swirled through Taiwan's rural villages since the late 1960s. Several factors jointly contributed to subsequent social transformations. Urban industrialization pulled manpower from the villages, and the adoption of high-efficiency machines to cope with the lack of rural labour has caused additional rural unemployment and further pushed many out to the cities in search of jobs. The implementation of six-year compulsory education also moved children out of minor farm work. In addition, increased globalization has brought changes in diet among urbanites, who have gradually come to prefer Western-style

wheat-based foods to rice as staples. All these changes began to take place in the late 1960s and early 1970s and, in combination, nearly brought Taiwan's rural villages to extinction.<sup>45</sup>

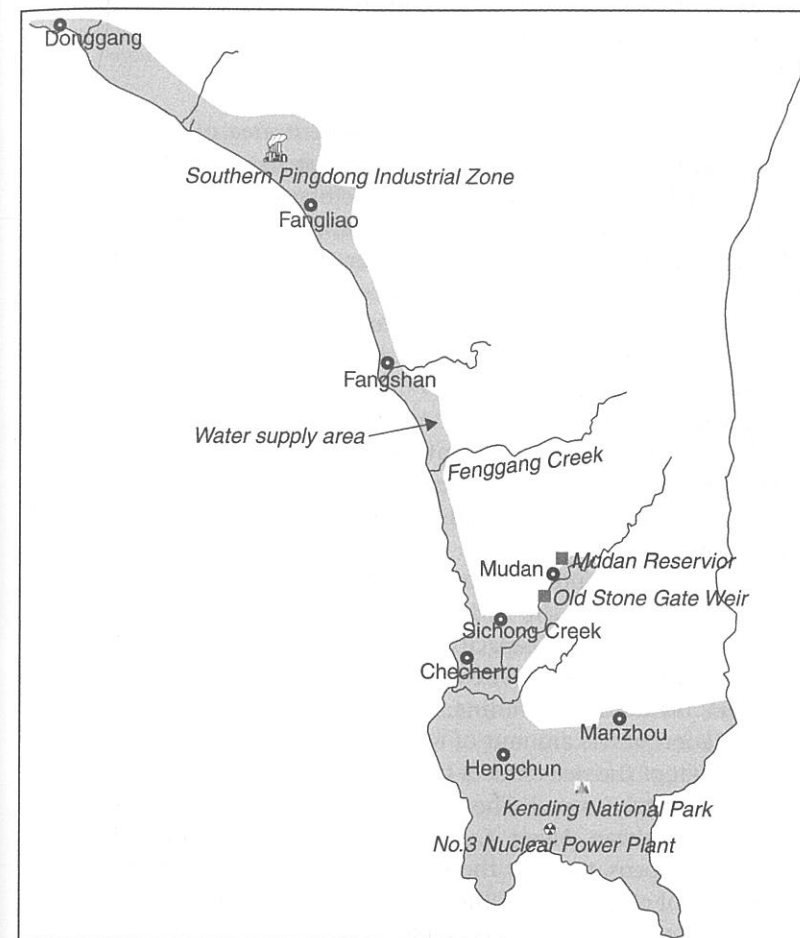
Taiwan's industrialization and urbanization since the 1960s have also brought about a structural transition in waterscape and water management. Water once used for farming was gradually transferred to industries and household uses. The Mudan communities were no exception. As young people moved out of their home villages to cities and towns in search of jobs and education, the waterscape of the Mudan communities lost its significance in sustaining and improving people's lives through agriculture. Our fieldwork in Mudan Township in 2011 and 2012 and interviews with the first cohorts of immigrants from Mudan to metropolitan Taipei in 2013 and 2014 describe the decline of paddy farming in local communities in the 1970s. In the meantime, in the shadow of the out-migration phenomenon, a dam project for Mudan Township was hurriedly conceived by the government as a way of coping with increasing water demands in the urban and industrial Pingdong and Kaohsiung areas. Ironically, this new project brought a timely solution to local communities that were facing a livelihood crisis. But there are two sides to every coin. The other impact of this timely solution was to radically change Mudan's waterscape and its future.

#### Narrative four: a thirsty nation

In spite of its bountiful rainfall during the wet season, Taiwan's mountainous topography and many steep torrents that rush precipitation to the open sea present real challenges to storing fresh surface water. In response to insufficient rainfall during the dry season, October to April, in addition to the fact that ground water is in short supply for extraction, the solution has been to locate stable water sources and feasible sites for reservoirs so that surplus water gathered during the rainy season can be conserved for the rest of the year. To counter its environmental constraints, Taiwan has built 21 major dams in an island of about 36,000 square kilometres.<sup>46</sup> The timing of each dam's construction reveals the developmental trajectory of Taiwan's population and economic growth. When southern Taiwan expanded its development projects, it became necessary for Pingdong to have a reservoir. Once again, Mudan's particular waterscape attracted that moment's movers of social change.

The Hengchun Peninsula is a relatively flat region potentially suitable for agricultural expansion or industrialization in support of Taiwan's growing population and economy. The Mudan Reservoir is Taiwan's

southernmost dam that supplies water for, in order of urgency, the Number 3 Nuclear Power Plant, regional population use, and increasing tourism to Kenting National Park.<sup>47</sup> Since its completion, the Mudan Reservoir has been systematically tapped to supply an expanding region, from the original target area of four rural townships on Hengchun Peninsula (see Map 4.2) to areas farther away, including rural townships beyond the peninsula.



Map 4.2 Planned water supply area (dark shading) of the Mudan Reservoir  
Source: Redrawn by the author from Taiwan Provincial Government, *Mudan Reservoir Construction Plan* (1988), 26.

The opening remarks of the first report produced by the Provincial Hydraulic Bureau in 1981 on how to tap the water supply from Mudan Creek state:

For many years, our province has witnessed a burgeoning population, rapidly expanding economy, and increasing water demands. In light of these, our government has been scouting sites for reservoirs in order to conserve surface water. However, many of the completed reservoirs have faced the problem of silting that has resulted largely from random cultivation and forest destruction above the catchment areas.<sup>48</sup>

According to this report, the entire catchment area of the proposed Mudan Reservoir was 69.2 square kilometres, or about 6,920 hectares.<sup>49</sup> The affected lands fell under different sectors: national forest (57.82 per cent), and roads and buildings (3.94 per cent), with the remaining 38.24 per cent including: forest (84.05 per cent, mostly owned by the government's Taiwan Sugar Corporation), rice terraces (12.93 per cent, also mostly owned by Taiwan Sugar Corporation), dry farming (1.51 per cent, largely privately owned), and special green plants (1.51 per cent, also largely privately owned).<sup>50</sup> In other words, because the indigenes have, since the Japanese colonial era, gradually lost most of their forest land to the state, the current government's tasks in preparation for building the reservoir, such as acquiring private farmland or resettling current residents, presented few challenges. And the cost would be quite low.

A follow-up study prepared by the Hydraulic Bureau in 1984 confirmed the findings of the earlier overview. It estimated that Mudan Reservoir had a storage capacity of 31,400,000 cubic metres and a life expectancy of 67 years. The report laid out more detailed plans for the project, including fine tuning. For instance, it proposed a more precise calculation of the amount of farmland to be inundated. The study indicated that of the rice terraces to be submerged, only around 50 hectares were privately owned. The remaining 90 hectares of forests mostly belonged to Taiwan Sugar Corporation—thus involving minimum monetary compensation for the requisitioned land.<sup>51</sup> Another change was the careful calculation of the total amount of water resources to be distributed among all end-users (Table 4.1).

The provincial government declared that the five-year Mudan Reservoir building project would be launched in July 1988 with a targeted completion date of June 1993. The most immediate challenge was

Table 4.1 Mudan Reservoir and its estimated water distribution

Total Annual Supply (Cubic Metres)	Agriculture	Drinking Water (five townships)*	Kenting National Park	No. 3 Nuclear Power Plant	Proposed Industrial Park	Airport & Harbour
48,760,000	22,240,000	10,840,000	5,400,000	5,160,000	4,440,000	680,000
100%	45.61%	22.23%	11.08%	10.58%	9.11%	1.39%

Note: \*The five townships were Hengchun, Checheng, Manzhou, Fangshan, and Fangliao, with an estimated population of 121,900 people, all on the Hengchun Peninsula.

Source: Taiwan Provincial Hydraulic Bureau (1984), 7–8.

the requisitioning of private lands, to be completed by the end of 1989, with compensation payments to be made to all private landowners in the first four months of 1990.<sup>52</sup>

The standard compensation to landowners was based on the government's registered land prices, plus a 40 per cent mark-up as an incentive. Farmers would receive a subsidy based on the area of their land to help them find a new livelihood.<sup>53</sup> They might also receive other sundry payments to compensate for having to move their houses, crops and trees, graves, and so on. On average, a farmer with one hectare of land should have received about NT\$600,000 for the land and other related compensation combined.

By November 1989, the government had successfully negotiated with all the landowners in the planned catchment areas of the Mudan Reservoir, their holdings totalling 58.29 hectares of land shared among 198 titles. The total compensation, NT\$747,443,055 (about US\$25,000,000), was duly paid out to all the property owners—almost exclusively residents of Stone Gate Village. Two results of this process were surprising. First, compared to other dam-building projects, the real cost far exceeded the government's earlier estimation. Second, the compensation process was completed six months ahead of the original target date of April 1990,<sup>54</sup> an unusual success considering the resistance more commonly seen with public construction projects.

### Narrative five: winners and losers in a transformed waterscape

'Why was the government successful in acquiring the land to build the Mudan Reservoir?', was the question we asked Stone Gate villagers during our fieldwork there in 2011 and 2012. Informants often responded



that they had simply followed the government's rules and accepted the compensation without complaint or protest. This common answer aroused our curiosity since it is usually uncommon for farmers, who usually have a strong sentimental attachment to their land as a source of livelihood and identity, to give it up so willingly. After some probing, we came to understand that at work here was a particular kind of social transformation, one shaped by the local waterscape, the ideology about development and livelihood change in Taiwan generally, and an emerging strategy for collectively plundering public funds at the grass-roots level. All these hidden factors have contributed to Taiwan's most recent trajectory of modernity.

As mentioned above, Taiwan's industrial development began to take off in the 1960s and early 1970s (see also Chapter 9). Rapid economic growth was accompanied by urbanization that siphoned off rural youth who sought better jobs, higher wages, education, and amusement in the cities. Even in this remote corner at Taiwan's southern tip, Stone Gate Village experienced the exodus of its youth like any other rural community. By the late 1970s, rice farming in Mudan Township faced a serious labour shortage.

When rumours began to spread that the government planned to build a dam above Stone Gate Village and large swathes of the rice terraces along the creek would be requisitioned, local farmers welcomed the construction project as providing much-needed relief. Mr. Zhou, a descendant of the pioneer paddy farmer in Mudan, explained to us in an interview as follows: Before the reservoir was built, many young people had already moved out to find jobs in the cities. Their families took part in the government's farmland fallowing project that paid a subsidy for letting land go idle. When they heard about the dam project, some of them returned, hoping to find work at home.

Given the broad societal mandate of unidirectional economic development and urbanization, many local residents decided that selling neglected lands in the peripheral hills—seen as hardly useful for tangible monetary gains—was a good idea. It was a move that could immediately improve their family's living standards, which lagged behind those of the neighbouring, urban Han people. Some interviewees who lived in Mudan Township, but did not have a share in the compensation, or had only a minor share, expressed jealousy at the opportunity given to those engaged in this lucrative transaction. It seems to us, according to discussions with informants from diverse family backgrounds, that some people also worried about the loss of farm lands inherited from their ancestors, just as farmers anywhere in the world would be likely

to react. Still, most villagers focussed on how to get more money out of the project and how to spend that money immediately to improve their living standards. In those years, the transformation of the local waterscape was seen as an opportunity more than a threat.

Most of our interviewees relayed bitter-sweet memories of the community at that time. Everyone knew who or which families were the main beneficiaries of the requisitioning programme. Discussions of how to distribute the money received for the land among family members or how to use the compensation caused many violent disputes in the families involved. One of the saddest stories we collected was that of a woman who became so enraged over the distribution of the money that she was said to have died of a stroke as she argued with her mother and brother.

For a while, most villagers were obsessed with the dam project, and their main focus was how to maximize the potential windfall by whatever chicanery or expediency they had at their disposal. This ambition on the part of the local people was the reason behind the government's smooth and successful requisition of land—at a sky-rocketing cost—in the Mudan Reservoir case.

Local people quickly learned, from other dam-building and public works projects elsewhere in Taiwan, how to ramp up requisition payments. Local political elites provided the information to kin and fellow villagers, and other locals then collectively followed suit. For instance, since compensation for farm land was set according to area, the 58.29 hectares held by Stone Gate villagers and now submerged under the reservoir should have cost NT\$34,974,000 (at NT\$600,000 per hectare), not the NT\$747,443,055 the government likely paid out in late 1989 and early 1990. How did the villagers get 21 times more money out of government coffers than the land was likely worth? There were tricks to milking the cash cow, as Table 4.2 demonstrates.

It is clear that the principal gains came from compensation for plants and crops in the field. More than 90 per cent of the cash payment, NT\$675,180,495 (about US\$22,500,000), combining the two rows under Farm Crops—fine and Farm Crops—crude) was actually paid for 'crops' grown on the 58.29 hectares, with the farmer receiving for each hectare on average NT\$11,583,127 (about US\$386,000) for those crops. If we assume that each hectare of the best rice terrace could produce an unimaginably high yield of 10,000 kilos of crude rice in a year, each kilo of the rice would be worth NT\$1,158.32, more than 100 times the market price of about NT\$10 per kilo. But rice was not the real cash cow in this case.

Table 4.2 Itemized monetary compensation to land-requisitioned villagers

Payment Category	Number of cases	Values (NT\$)	Percentage of Total
Farmland plus 40% Markup	198 titles (58.29 Ha.)	33,391,916	4.47%
Land Improvements	198	5,829,330	0.78%
Special Allowances	198	3,437,265	0.46%
New Job Training	76	19,300,000	2.58%
House Reconstruction	68	2,034,049	0.27%
Grave Moving	318	8,270,000	1.11%
Farm Crops—fine	250	410,035,815	54.86%
Farm Crops—crude	593	265,144,680	35.47%
Total	1,899	747,443,055	100%

Source: The 7th Engineering Section of Hydraulic Bureau (1990), 16–17.

The so-called 'fine' farm crops category included mainly fruit trees. Some of our interviewees recollected how they and others had been obsessed with planting fruit trees and later uprooting them for another kind of tree that they believed would be more profitable. This frequent swapping of fruit trees not only took a lot of labour, it also required cash investment. According to many, one of the most valuable fruit trees was *lianwu* (*syzygium samarangense*), also called wax apple, a tropical fruit introduced by the Dutch from Southeast Asia to Taiwan in the seventeenth century. The compensation scheme for *lianwu* trees was based on the requisition programme of another government project in 1980. The compensation rate for a fully mature tree more than 11 years old was set at NT\$8,640, a big tree of about seven to ten years was NT\$7,380, and one of medium size at four to six years was NT\$5,040.<sup>55</sup>

In 1981, when the first proposal to build the Mudan Reservoir was made public, most people in Stone Gate Village and beyond quickly set about preparations to cash in. According to our informants, villagers who had the means purchased *lianwu* saplings and planted them—either themselves or using hired workers—on their idle farm land. Those without the means or labour to convert their land into orchards would sign up speculators or venture capitalists, most of them Han people from nearby cities, to get the work done. A contract would be signed between landowner and speculator—who would provide the capital to purchase saplings, hire workers to plant the trees, and manage the orchard to ensure that the trees grew well until the land was appropriated by the government. When payment for the extant fruit trees was made (but not for the land itself, since that went to the landowner

exclusively), the landowners and speculators would split the windfall according to an agreed ratio, generally 4:6 or 3:7, depending on the land's accessibility to transportation and irrigation.

For those who planted *lianwu* early, by the time land requisition started in 1989, there were already plenty of fully mature trees that could command exorbitant level of compensation. The sudden windfall to Stone Gate villagers in 1990 generated general euphoria, though not everyone could claim a large sum because of their limited capital investment or failure to grow healthy fruit trees. And some who borrowed in anticipation of a good return wound up with only debts.

Villagers today have bitter-sweet memories of the new houses purchased in cities like Kaohsiung or Pingdong, or new modern-style houses built in Stone Gate Village itself. Conspicuous consumption led many villagers to buy new automobiles and spend freely at high-end entertainment establishments in the cities. Some entrepreneurial villagers worked on longer-term investments, for example by starting restaurants or building dormitories to cater for the workers who would be arriving for the actual construction work. And they did manage to build rows of restaurants and makeshift housing for the construction workers. Some village youths also returned home either to find jobs related to the reservoir construction or to share in the largesse of their parents or grandparents.

Euphoria, by definition, cannot last, and the Stone Gate villagers' transition from peasantry to post-peasantry, just as in other rural communities in Taiwan, was marked by frustrations and failures. The prosperity mirage in Stone Gate Village finally faded when the dam project was completed in early 1995, 18 months behind schedule. The departure of the construction workers meant the immediate closure of the roadside restaurants and dormitories. Villagers who had purchased apartments in the city could not continue paying the instalments once the cash they had received for their land was spent. Unable to make monthly payments, the villagers defaulted on their loans, and the banks foreclosed on their possessions. Only a few who managed their money with care have been able to continue living in the modern-style villas that still dot the village landscape. Otherwise, all that remains of this boom-bust cycle are the roadside tin-roofed former restaurants and housing left from the golden days, along with a number of unemployed, drunken, middle-aged male villagers reminiscing about the once-happy past.

In recent years, to make ends meet or to try to gain some peace of mind, the aging local farmers have reverted to the means of livelihood they knew best: growing food from the land. But to do so they faced

daunting challenges. For one thing, their best rice terraces along the creek are gone—requisitioned by the government and submerged. Some still have plots around the reservoir, but they are now inaccessible, and besides, their lands lie within the catchment area where, to protect the water source, the government has banned the use of all chemicals.

In 2006, to revive Taiwan's dying agricultural sector, the Council of Agriculture announced a programme called 'Small Land Holders, Large Tenants'. Under this programme, a managing farmer could organize a number of small landowners to form a cooperative with two hectares of idle farm land, and the government would pay NT\$50,000 per hectare per year to encourage mainly rice or maize cultivation. Farmers can also grow *shansu* (*Asplenium nidus* L.), wild vegetables that require no chemical fertilizers or pesticides, in the fallowed woods, and raise mushrooms on logs, and then sell the harvest in the name of the cooperative. This sounded like an ideal option for aging farmers, and many villagers began actively organizing cooperatives with their kinsmen and neighbours. In 2012, four such cooperatives had already formed in Mudan Township.<sup>56</sup>

However, developing an alternative and viable farming system to replace the old family farming way of life appears difficult, if not impossible, at present. The most obvious challenge is a lack of participation by young people. Currently Mudan's agricultural cooperative members are all over 50 years of age, and many of them are even older. With hired labour unaffordable, labour shortage will always be a critical problem. Furthermore, selling produce as organically farmed requires a complex certification process, and so does its marketing. All these schemes seem beyond the aging farmers. At the time of writing, all four of the cooperatives formed in 2012 have become inactive, and uncertainty again befalls Mudan's farmers.

## Conclusion

Social science research on landscape usually defines it as 'a symbolic environment' created by human acts conferring cultural meaning on nature.<sup>57</sup> This perspective has definitely provided useful insights into the links between humans and nature, but this chapter has tried to turn that reasoning around to show how a unique environment has actually influenced human interactions through a dynamic human-nature relationship. Without falling into environmental determinism, we do want to stress the role of environment in tandem with human agency in shaping history.

Over the 150-year history of the Mudan communities, the local Paiwan people have lived close to the open sea and so were party to the disputes over shipwrecks during the colonial maritime era. Later, their fertile habitation along Mudan Creek encouraged Japanese colonialists to utilize the stable water supply for economic and social development and to turn their communities into an ideal place to pursue a peasant livelihood. Most recently, the natural bounty of Mudan Creek's water supply and Old Stone Gate battlefield's unique topographic features permitted the successful construction of a reservoir to meet water demands on the Hengchun Peninsula and beyond. The social changes that took place in this locality all evolved around this local waterscape. We can also see how human forces emanating from the state—whether imperial, colonial, or republican—have transformed the waterscape and shaped the lives of local people.

But the local people were never totally passive, as can be seen from their hearty participation in robbing or killing castaways, ferocious fighting to defend their territory against intruders, initial resistance then gradual uptake of rice farming, which made good use of the local waterscape, and ultimate willingness to profit in the face of an inevitable dam construction project. Their resistance to each wave of social and environmental change, followed by active adaptation, is particularly impressive given the presentation of modernization as unidirectional.

As a result, at first sight, today's Mudan communities do not resemble other Paiwan hill tribes because of their ethnic and cultural mixing with sub-groups of Han people through marriage, religion, and lifestyle. This situation may also reflect their earlier and more sustained experience of acculturation compared to other hill tribe communities. The successes and losses in which the local indigenous people have shared have been significantly shaped by the particular topography of their habitation. Their lives have moved *en masse* along with the changes to a local landscape in which bodies of water have continuously taken on their own evolving shapes and meanings.

The latest development of the local waterscape, the dam project of the 1990s, gave the local people a one-off windfall. But, as in other farming societies, the villagers' transition from peasant to post-peasant has been full of frustrations and stresses. Now dependent largely on government subsidies, the aging farmers can only muddle along and do their best to make ends meet, just like other marginal groups in Taiwan. Along the transformation path from tribesmen to state peasants to organic farmers, the local community has lost the vitality of its youth, who have taken to the cities to look for jobs. They are unable to see the



viability of life at home given the speed of social change. This has been a stubborn problem over the long process of global modernization.

The reefs surrounding the Hengchun Peninsula, dangerous to foreign ships a century ago, have today become a tourist attraction where visitors snorkel to explore the beauty of the coral reef in Kenting National Park. The topographical guardian of Stone Gate first became a focus of colonial civilization and now marks a dam that supports regional industrialization and urbanization. Mudan Township, in its outlook, is still a typical rural village, but agriculture no longer provides a viable livelihood in this once-legendary locality.

Water is always on the move, and history's clock never stops ticking. Regardless of how the drivers of modernity projects apply cultural meanings to the waterscape, people's dread of, need for, and use of water keep shaping the landscape surrounding it. The nature of water remains unchanged, but the human condition and its meanings continue to be transformed.

### Acknowledgements

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29. Punanang, *Mudan Communities*, 43.
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