

TWO

BOUNDARIES, TAXES, AND PROPERTY RIGHTS

IN THE MID-TWELFTH CENTURY, LI CHUNNIAN (1096–1164), A VICE minister at the Song Board of Revenue, made a deceptively simple change to land survey regulations, a change that caused a revolution in the administrative landscape of South China. The 1182 *Sanshan Gazetteer* from Fuzhou describes this reform in characteristically bland terms: “In 1149, the boundary surveys were conducted. Fields were assigned [new] categories, although each county’s tax was still collected according to the old quotas.”¹ Later in the passage, however, the record emerges from this insipid language to note the radical outcomes of Li’s policy: “Now the acreage of cultivated landholdings is nearly ten times the acreage at the beginning of the dynasty, *especially in the categories of gardens, forests, and mountain lands*.”² Even allowing for the poetic exaggeration typical in these accounts, the effect of the surveys was substantial. Through a seemingly minor shift in land accounting, Li’s reforms brought an enormous swath of new acreage—much of it forest—under official taxation and oversight for the first time.

Li’s survey methods were themselves revolutionary, substantially increasing both the quality and the content of cadastral records, but their effects went far beyond improvements in documenting the fiscal—and physical—landscape. They began the process of transforming woodlands

from open, common-access landscapes into exclusive property. Over the following centuries other bureaucrats made their own seemingly pedestrian changes to the land survey regulations. In the 1310s, Yuan manager of state affairs Zhang Lü ordered tax officials in South China to standardize the categories used for land survey. Starting in the late 1360s, and culminating in the empire-wide cadastres of 1391, Ming surveyors further streamlined and extended these regulations to new regions of the south. Collectively, these shifts made forests fiscally legible to the state; in the process, they effectively rendered them a form of private property. It took centuries to realize these full effects, but the fundamental premise of private forest ownership was ingrained in Li's 1149 regulations. This shift in land oversight was the first aspect of the silvicultural revolution to be institutionalized. Li's reforms were among the greatest shifts in Chinese land policy in the past millennium. Yet, somehow, they have passed largely under the historian's radar.

Li Chunnian's land surveys responded to both the specific context of mid-twelfth-century Song politics and the more persistent characteristics of the South Chinese environment. As seen in chapter 1, eleventh-century China faced a wood crisis the likes of which had not been seen in more than a millennium. Given time to mature, a number of different policies could have led the Song into a new era of forest governance. Instead, external events interfered. In 1127, armies of the Jurchen Jin dynasty occupied the Song capital at Kaifeng and posed a very real threat to end Song rule entirely. While much of the Song bureaucracy escaped south of the Yangzi River to enthrone a new emperor at a new court in Hangzhou (Lin'an), the loss of North China prematurely ended state-centric paths of forest governance. It was in this environment that Li Chunnian proposed his boundary surveys. Having lost much of its tax base in North China, and with landlords expanding their power in the south, the Southern Song, he argued, needed to improve documentation of the landholdings that it could still tax, including the forests with nascent investments in tree planting.

This accident of history set the course for forest oversight for the next eight centuries. By the time the Southern Song fell to the Mongols in 1279, its bureaucrats had established the institutional frameworks necessary to support commercial timber plantations. When landlords began planting timber in the early twelfth century, they did so without a legal bulwark for their investments. Li's policies provided precisely this support. For the first time in Chinese history, the government surveyed, registered, and taxed forests much the same as farmland. While it took another 250 years before

the state formalized the legal status of forests as exclusive property, Li's policies implicitly acknowledged forest ownership in exchange for tax revenue.

This simple act of granting land title to forest cultivators was enough to resolve the Song wood crisis. Empowered by long-term land rights, and incentivized by secular inflation in wood prices, forest owners planted timber across a broad swath of South China, replacing naturally seeded trees with human-seeded trees in both the landscape and the market. This enabled Chinese states to meet their strategic timber needs without active participation in territorial forest management. But while registration was key to forest proprietors, forest taxes were only a small piece of the state's revenue puzzle, never more than a single-digit percentage of the land tax. Facing few wood shortages, and receiving little direct tax revenue, China's administrators worked to streamline forest management rather than expanding it. The result of this equation was a forest system that combined minimal state documentation with widely distributed ownership. This basic arrangement lasted until land reform in the 1950s.

While forest title was the product of compromises forged during Li Chunnian's lifetime, it also responded to more general conditions that prevailed in South China in the long term. Unlike North China, much of which is an astonishingly flat, sedimented plain, South China is reticulated with hills, mountains, rivers, and lakes and the resulting diversity of biomes. Warmer and wetter than the north, South China boasts a wide variety of subtropical trees and bamboos. The region is also endowed with extensive waterways, both natural and man-made. In stark contrast to northern rivers, which are prone to both sedimentation and flooding, these southern rivers are almost ideal for floating timber rafts. These were ideal conditions for the emergence of commercial silviculture.

South China also featured a distinct institutional legacy, the outgrowth of its highly varied environment and long history of independent regimes. In contrast to the predominantly yeoman society of the north, South China had long featured a complex suite of landholding practices and multiple strata of landlords and tenants. When bureaucrats first allowed the private circulation of farmland in the eighth century, they were responding specifically to the irregularity of landholding in South China. When the Song court moved south in the twelfth century, it allowed the enclosure of the south's other domesticated biomes, including forests, orchards, ponds, and fishing grounds. As later bureaucrats elaborated these policies over the next several centuries, they remained a unique feature of South China. North of the Yangzi

and west of the river's famous gorges, the state generally did not bother to register or tax forests or ponds.

Even after the reforms, not all woodland was taxable forest, nor were all forests planted with timber trees. Few landowners chose to register woodlands of low commercial value, including those at high elevation or distant from navigable waterways that would permit timber rafting. Large swaths of woodland therefore remained outside of official purview except when they came under dispute. There were also other uses for taxpaying forests (*shan*), including growing bamboo, fuel, fiber crops, oil seeds, tea, and dye-stuffs and housing graves. Nonetheless, in the core provinces of the south, most timber forests were registered with the state, and most registered forests were planted with timber.³ I therefore use the forest registration as a convenient—if incomplete—proxy for the spread of timber planting itself. To trace the spread of forest registration, I have compiled tax records from local gazetteers (*difang zhi*), a distinct genre of Chinese text that lies between local history and geography.⁴ The data in these gazetteers are highly problematic, often copying earlier figures verbatim or with extensive simplifications and outright falsehoods.⁵ They also reproduce problems inherent in the surveys themselves.⁶ Yet despite their flaws, these data present a remarkable picture of forest registration, showing the spread of a fundamentally new form of forest management and, by extension, a fundamentally new form of forest biome. From its nascence in the mid-twelfth century, forest registration—and, by extension, tree planting—spread across much of South China, stopping only at physical or climatic barriers to the growth of the principal tree species.

BOUNDARY SURVEYS

To understand the significance of the forest surveys, it is important to grasp the distinct features of the Chinese property system. What we understand as landownership is not a single right; it represents a bundling of several distinct claims, including the rights to access, to use or harvest products of the land, and to sell land or transfer it to heirs; it also includes responsibilities for rents and tax payments. The modern bundle of claims assigns most of these rights and responsibilities to a single entity. But historically, states recognized very different bundles of claims.

Until the mid-eighth century, Chinese peasant households only claimed the *use* of their farmland, which was parceled out in equal plots. With the

exception of small plots of mulberry land (*sangtian*), their farms were not heritable or transferable. Instead, the state claimed long-term ownership; once a peasant passed out of working age, the government reclaimed his land and transferred it to another worker.⁷ Gradually this system became untenable, as nobles and monasteries acquired large swaths of land tax-free and as peasants in the south wrote private deeds to buy and sell land against the wishes of the government. To shore up its finances in the wake of a major rebellion, the Tang dynasty recognized this state of affairs, changing the bundle of rights by allowing land to circulate on the private market. Officials instituted surveys to document landownership, taxing each household on its actual acreage rather than an assumed equitable distribution of farmland.⁸ Over the next several centuries, the Tang and its successors gradually acknowledged private deeds as evidence of landownership as well.⁹ Under this compromise, the state's cadastres functioned as a central record of land title, backing the private, registered contracts that allowed more flexible circulation of ownership and tenancy rights, creating a system that persisted until the twentieth century.

Even as farmland circulated on private land markets, woodlands, wetlands, and other non-agrarian landscapes were initially kept separate from the system of private ownership. Instead, the state retained the underlying claims to all of the "mountains and marshes" (*shanze*), permitting *use*, but forbidding individuals from *owning* the land. Because woodlands and wetlands were open-access, there was no need to survey them, although woodlots in heavily populated areas did have informal boundaries. Even under Wang Anshi's land reforms in the mid-eleventh century, official policy reinforced the principle that woodlands were open-access, communal areas and could not be enclosed, rented, or sold.¹⁰ This changed only with the retreat of the Song court to the south in 1127, which took it into the epicenter of the area that was just then undergoing a silvicultural revolution.

As forest users began planting trees for profit, they prompted a complete rethinking of the relationship between land, value, and ownership. When timber was cut from natural growth, the wood-use rights ingrained in Song law were sufficient. But laws that based ownership on the *felling* of timber did little to protect upfront investments in *planting* trees. As Jiangnan landowners began to plant trees commercially, they began to shift these norms, recognizing that the upfront investment of labor granted logging rights to the people who planted them. This was a logical extension of the principle that work established ownership of natural goods. But regardless of local

practice, claims to own standing timber were not backed by formal regulations. This changed with Li Chunnian's surveys, which created a central ledger of forests for the first time.

The Southern Song's land surveys began shortly after the Treaty of Shaoxing stabilized the Song-Jin border in 1141, allowing Song officials to move from reactive infighting toward building proactive policy. In 1142, Li Chunnian, then a local official in Zhejiang, noted that many land registers had been lost during the Song-Jin war, allowing widespread tax avoidance. He suggested that new land surveys were necessary to any tax reform, both to rebuild the fiscal basis of the state and to equalize the tax burden. Li's survey methods made several substantial methodological advances, creating the first centralized records of plot boundaries. They were also the first surveys to include forests and other non-agrarian landholdings. Like most attempts to redistribute the tax burden, Li's policies faced significant opposition. Some opponents wanted to rely on landowners' self-reported acreage rather than sending out official survey teams; others sought to tank the reforms entirely. But the results of test surveys in 1142 were successful enough that Li was elevated to a ministerial post in the Board of Works. Despite substantial opposition, Emperor Gaozong ordered Li's surveys to be carried out empire-wide in 1149.¹¹

Li Chunnian's surveys offered an implicit bargain to landowners: they had to pay taxes, but registering their plots would give them substantial advantages in case of dispute. Previous registers had recorded only the owner, grade, and acreage for each plot of farmland, relying on in situ markers and local memory to resolve boundary disputes. In the flat north, this parsimonious system had saved official labor by recording only the information needed for tax collection, but it was far less effective at marking boundaries of irregularly shaped plots in the hills and watercourses that threaded the south. Unlike in these earlier surveys, Li recorded the boundaries of each plot (*jingjie*) in books of aerial plot diagrams (*dianji bu*). This centralized record keeping also extended up the administrative hierarchy: one set of registers was maintained at the county, to be updated every time land was sold or leased; copies were sent to the prefecture every three years; and the transport commissioners in charge of forwarding taxes to the capital held a final set of registers.¹²

This system of record keeping gave the government both a carrot to entice landlords to register their properties and a stick to punish them if they did not. As a carrot, the centralized record of land title offered landholders an

incentive to register their plots as proof of ownership. Legal cases from the early thirteenth century confirm that tax registration gave owners substantial advantages in court.¹³ As a stick, the government reserved the right to confiscate any cultivated land that was not entered in the registers; the heads of local self-defense organizations (*baozheng*) were responsible for inspecting the plots and attesting to the accuracy of their diagrams.¹⁴ This provided a uniform and authoritative record of land title that merged the fiscal needs of the state with the evidentiary needs of southern property owners.

Li's registers were also the first time that woodlands and wetlands were surveyed in a systematic way. Unlike earlier rules that specifically excluded non-agrarian land from surveyed acreage, new regulations held that mountains and wildlands (*shanye*), wetlands, and other "lands of popular benefit" (*li yu zhongong*) should have their boundaries clearly noted in the registers (*mingli jiezhi zhu ji*).¹⁵ This marked a major shift in the understanding of the non-agrarian landscape. Instead of unbounded, open-access wilds, forests could now have clear borders and internal divisions. Nominally the regulations reserved "lands of popular benefit" as commons, forbidding their sale. Yet demarcating the boundaries of woodlands made it possible for people to lay claim to all the produce within the declared limits. This implicitly allowed landowners to claim all the wood on their plots instead of only the logs they cut, effectively granting them exclusive title to the land they planted with trees.

Furthering the institutionalization of forest ownership, officials soon began to ignore the nominal policy of maintaining woodlands as open-access plots, treating them as *de facto* private property. In 1160, Huang Yingnan, a minor official in Jiangxi, attempted to rent out more than twenty-eight hundred *qing* of state-owned land (about eighteen thousand hectares, or forty-five thousand acres), principally "fallow fields, mountain forests, pools and marshes" (*huangtian, shanlin, poze*).¹⁶ This enormous acreage—representing either the remnants of Cai Jing's defunct county forests or lands seized from owners who failed to report them to surveyors—constituted more than 5 percent of all landholdings in the prefecture.¹⁷ By renting them out, Huang effectively treated "mountain forests, pools and marshes" as private property. By the 1190s, Yuan Cai noted that it was common practice to sell or rent forests through contracts.¹⁸ While the law still theoretically held that forest plots were common land, both officials and landlords effectively treated them as *bounded*, if not fully *private* property.

By surveying and leasing state-owned forests, the government was merely catching up to a preexisting market for private forest plots.

While ecclesiastical and noble estates had pressed claims to forests for hundreds of years, Li Chunnian's surveys marked a categorical expansion of forest ownership. Between 1149 and 1156, surveys were conducted throughout East and West Zhejiang, East and West Jiangnan, Hunan, and Guangxi and in most of Sichuan, Guangdong, and Fujian. They were never carried out along most of the northern border (in Huainan, Jingdong, or Hubei) due to its proximity to an enemy state, and most outlying islands and tribal areas were allowed to submit taxes under their former assessments.¹⁹ Finance officials continued to improve the surveys through the late twelfth century, updating boundary records. Finally, in 1189–90, officials in southern Fujian (Tingzhou and Zhangzhou) compiled their own registers, incorporating regions where rebellion had previously made surveys impossible.²⁰

Throughout these regions there was a clear pent-up demand for centralized records of land title. While scattered and incomplete, the limited records extant from the late twelfth and early thirteenth centuries all show huge increases in taxable acreage following the surveys, largely in categories like forests (*shan*), “orchards and groves” (*yuanlin*), and mountain land (*shandi*). In the 1175 *Xin'an Gazetteer* from Huizhou, recorded acreage increased more than 90 percent over earlier figures, with the greatest increase probably coming in the new category of forests (*shan*).²¹ Other areas reported similar trends toward the enclosure of forested land. In Fuzhou 福州, the surveys incorporated significant amounts of new land, principally “orchards and groves, mountain land, ponds, and reservoirs” (*yuanlin*, *shandi*, *chitang*, *poba*).²² In Taizhou, Li Chunnian's surveys yielded two new volumes of boundary records in three main categories—paddy fields (*tian*), dry fields (*di*), and forests (*shan*).²³ The sudden and substantial increase in the registered acreage of forests suggests that these plots had already been claimed as de facto private property before the boundary surveys. The records do not state exactly how these plots came to be registered, but the logic of the situation is clear: people took advantage of the surveys to shore up claims to land they had previously planted with trees, by recording their plots in centralized registers. This marked the first time that woodlands were officially surveyed and recorded as bounded, private properties, a shift representing the culmination of changes in the woodland tapestry that had been under way since the eleventh century. Regardless of their earlier history, government records now existed to support land title to forests.

TAX ACCOUNTING

The boundary maps produced in the mid- to late twelfth century formed a durable basis of forest ownership for the next hundred years of Song rule. When the Mongol Yuan dynasty conquered South China in 1279, it largely left Song tax institutions in place. Yet by 1290, when the Yuan conducted its first household surveys in the south, the tax system was in a state of confusion. Part of the problem was that there were major differences between North China, which had been ruled by the Jin dynasty for one hundred years prior to Mongol rule, and South China, which had been ruled by the Song. But on top of the understandable differences between the territories conquered from two different states, there were profound discrepancies within local jurisdictions as well. In the south, the forests and wetlands added to the tax books since 1149 had yet to be compiled into any semblance of order. To make matters worse, many local officials had created and modified tax categories as an expedient way to generate revenue. The result was an overwhelming assortment of unclear and highly circumstance-specific taxes. As one administrator wrote in the early 1300s: “There are tax categories that did not exist in the past but do now, and others that existed historically but do not anymore; none of these meet their original purposes. Some plots have fallen to ruin, while others were seized by the state; some taxes were eliminated, while others had temporary shortfalls or increases. Based on recent reports from the counties and prefectures, administration is extremely problematic.”²⁴ In response to this disordered state, Yuan officials eventually enacted a series of reforms, including a complete overhaul of the system of land tax accounting.²⁵

In 1314, recognizing that inequities in landholding were a key source of social problems, Manager of State Affairs Zhang Lü ordered a thorough reorganization of land records.²⁶ Zhang personally proceeded to Jiangzhe—the Yuan jurisdiction including portions of Jiangnan and Zhejiang—where he had previously headed the branch secretariat (*xingshu sheng*); other officials were sent to Jiangxi and Henan. Zhang required owners to report their own landholdings or face punishments or even seizure of their property, but many rich families simply bribed clerks to falsify the records. The court issued partial tax breaks on self-reported landholdings to further incentivize owners to register them, but it still took until the late 1320s before substantial new acreage was added to the records.²⁷ Even these updates did little to curtail the growth of magnate power, and the reorganization of 1314 is

generally considered a failure, falling far short of Zhang Lü's professed goals.²⁸

Despite failing to stem growing inequities, Zhang Lü's reforms did succeed in overhauling the system of land tax accounting, creating a standard format that was used throughout Jiangnan. Under Zhang's direction, the Jiangzhe Finance Commission (Caifu Fu) ordered subordinate jurisdictions to record acreage in cadastral charts (*bantu*) according to six standard categories: paddy fields (*tian*), dry fields (*di*), forests (*shan*), pools (*dang*), ponds (*tangchi*), and miscellaneous property (*zachan*).²⁹ The reforms were immediately apparent in Zhenjiang and Huizhou, where landholdings were reported in the standard categories in 1315.³⁰ Total reported acreage in Huizhou in 1315 was 15 percent above twelfth-century figures, suggesting that some new properties had been registered.³¹ Elsewhere it took longer for reforms to proceed. Nonetheless, registers were updated in Nanjing and Ningbo no later than 1344.³² Categories for reclaimed wetlands continued to vary by jurisdiction, but the six main categories of farmland, forests, and ponds were now consistent throughout the region.³³

In a striking continuation of earlier trends, this overhaul of land tax accounting was only effective on a regional basis, emerging from Jiangnan, where a combination of punishments for avoidance and tax breaks for self-reporting helped incentivize landowners to update their registration. Even here, Zhang's reforms did not represent a fundamental shift in policy. They were accompanied by a small increase in general acreage, nothing like the sudden increase in forest registration that had accompanied Li Chunnian's surveys in 1149. Their more important effect was to standardize land accounting, allowing officials at the branch secretariat to sum revenues across six uniform categories of landholding used throughout the region.³⁴

In further retrospect, Zhang Lü's reforms were products of a short-lived interim of effective government, soon undercut by infighting at the Yuan court and unrest in the provinces. Starting in 1351, the Yuan faced a spate of overlapping disasters, including the outbreak of the Red Turban Rebellion—a major uprising of believers in the millenarian Maitreya Buddha. Despite effective initial responses, much of the empire fell out of court control by 1355.³⁵ In 1368, one of the Red Turban generals declared victory over his rivals, including other rebel leaders and the rump of the Yuan state. Zhu Yuanzhang and his Ming dynasty imposed a radical vision for reforming society, including a renewed desire to order the countryside.

The consolidation of Ming authority in the 1360s and 1370s marked a return to effective centralized rule after decades of unrest and enabled the further consolidation of land records. Even before founding the Ming, Zhu Yuanzhang made moves to reestablish an organized tax base by conducting a new set of land surveys of the region of Jiangnan he controlled. Starting in 1368, the official beginning of Zhu's reign as the Hongwu emperor, some localities around his capital at Nanjing compiled registers to enable collection of the land tax.³⁶ Two years later, edicts ordered officials to compile receipts (*hutie*) recording the members and property of each household. Gradually these piecemeal acts gave way to a more comprehensive land policy, as surveys were conducted throughout the empire by 1391.

The Hongwu surveys produced the most comprehensive landholding records in centuries, yet these data were nonetheless flawed. The acreage figures were an administrative fiction that allowed finance officials to readily combine figures from vastly different areas. Rather than imposing a uniform aerial *mu* (about one-seventh of an acre), localities reported *fiscal mu* that varied from one aerial *mu* to as many ten.³⁷ Other highly localized measuring standards continued to persist well into the sixteenth century.³⁸ Nor were the surveys carried out with uniform attention in all localities. In the most densely populated regions of the south, officials were able to conduct surveys quickly and generally produced records of high quality.³⁹ But further afield the survey process was far more onerous, only gradually producing records that were often of questionable veracity.

In the densely populated prefectures of Jiangnan, a long tradition of property registration contributed to both the speed and the quality of surveys in the region, now split between the Ming's Southern Metropolitan Region and parts of Jiangxi. In Huizhou, local self-defense organizations had compiled their own land registers during the interregnum of the 1350s and 1360s to ensure continued enforcement of land title.⁴⁰ As a result, officials had to do little more than update the existing figures, a task they were able to complete by 1369. Yet in three of six counties, *less* land was recorded in the early Ming than in the Yuan—two lost all records of forests—and the remaining three saw essentially no change in registered acreage.⁴¹ In other words, the Hongwu surveys may have actually been *less* effective at registering land than the less famous efforts of the Southern Song and Yuan. Neighboring parts of Zhejiang and Jiangxi were likewise able to complete new registers within a few years of the Ming founding, also by copying and

updating existing cadastres.⁴² They were further aided both by familiarity with the process and by substantial local resources. For example, in 1386 more than a thousand National University students were sent to help with the land surveys in Zhejiang Province.⁴³ Similar patterns were likely observed in other regions with good records from the Yuan.⁴⁴

This was in stark contrast to regions where record keeping had lapsed in the Yuan, where officials took decades to complete the new land surveys. In these jurisdictions, the Hongwu cadastres were the first updated registers in over a century and may have been the first time that landholdings had ever been surveyed. In Jiangxi, the more peripheral southern and western prefectures took more than three times as long to survey than the more metropolitan northeastern regions.⁴⁵ It was only in 1391 that acreage figures were available from all of Jiangxi's prefectures.⁴⁶ Southeastern Zhejiang likewise took far longer to complete its surveys than its more prosperous northern and western prefectures.⁴⁷ Land records were even worse in the southeastern province of Fujian, and the new surveys were both more arduous and more productive. As of 1381, recorded acreage in Fuzhou 福州 increased more than five times over the nominal figures in the Yuan cadastres.⁴⁸ In Quanzhou, officials had to compile the new registers based on 200-year-old records from the late Song.⁴⁹ In these regions, the Hongwu surveys appear to have had a fairly large effect, bringing central Jiangxi, southern Zhejiang, and coastal Fujian into the more normative cadastral regime of Jiangnan.

Still further afield, the Hongwu surveys may have been the first time that landholdings were ever recorded by the central government, but the records were also of correspondingly lower quality. In Guangdong, Song and Yuan officials had had almost no success in registering land. Eight separate attempts to survey the region had all failed to account for its landholdings, and even these limited records had quickly fallen into disuse. The Hongwu surveys added acreage to official cadastres, yet progress remained uneven. As late as 1531, five counties in Guangzhou and Chaozhou still had minimal records of landholding.⁵⁰ In Huguang, in the Yangzi River interior, the Hongwu surveys were little more than an administrative fiction. Figures reported in the early Ming cadastres were largely estimates of the amount of land available to reclaim rather than reports of actual landownership.⁵¹ In the far southwest, in Guangxi and Guizhou, most land fell outside the cadastral regime entirely. Ming statutes allowed these "vulgar border places ruled by chieftains" to record land in their own ways, or not at all.⁵²

In the parts of Jiangnan where they were most effective, the Hongwu surveys reaffirmed the accounting categories used in the mid-Yuan, making forest (*shan*) the standard category applying to all taxable forests. The 1397 *Great Ming Code* further formalized this by designating forests a category of landed property (*tianzhai*), a development explored further in chapter 4. By the late 1400s, “paddy fields, dry fields, forests, and ponds” (*tian, di, shan, tang*) became a fixed expression, designating the four main categories of taxable land (and discarding the other two categories used in the mid-Yuan). Yet the use of these accounting categories did not result from a clear act of policy. Indeed, none of the hundreds of surviving edicts from the Hongwu period specifically mention either this system of land classification or a desire to register and tax forests. While high-level bureaucrats now used the term *forest* in official documents, the surveys and registers that governed them remained specific to South China. The Ming’s taxable forests were a continuation of Song and Yuan policies rather than the product of novel ambition on the part of Zhu Yuanzhang.

If the Hongwu surveys did little to overhaul land tax accounting, they were nonetheless critical to Zhu Yuanzhang’s program to centralize the tax system. In 1391, he ordered these data compiled into a new form of register that gathered together each household’s property under a single heading.⁵³ The new tables of household property supplemented the spatially organized registers already in use. They responded to the problem of accounting for families with landholdings dispersed across multiple jurisdictions, making it easier for county bureaucrats to calculate the total tax responsibilities of each family. Their offices now maintained two sets of cadastres: the spatially organized books of “fish-scale registers” (*yulin ce*), named after the resemblance of cadastral maps to fish scales, and the new tables of household property, called “yellow registers” (*huang ce*) for their yellow covers.⁵⁴ These two sets of registers formed the “warp and woof” of tax oversight: the fish-scale diagrams innovated by Li Chunnian made it easy to locate properties in the landscape; the Hongwu yellow registers functioned as a general reference on household wealth.⁵⁵

The yellow registers were the first complete set of tax books since the eleventh century and allowed far more fiscal oversight of landholdings than the limited and broken systems of the late Song and the Yuan. Yet any potential for fiscal centralization was undercut by Zhu Yuanzhang’s personal philosophies and proclivities. Zhu was highly suspicious of finance, both state

and private, and sought to impose a radical vision of self-sufficiency. He was also suspicious—perhaps paranoid—of threats to his power and eliminated nearly all of the top positions in the central bureaucracy to elevate the emperor as the sole seat of judgment. This meant that while Ming landholding records were potentially far superior to those of the Song and Yuan, the Ming court had no administrators with authority to set new fiscal policy. Instead, it was largely local officials—generalists, rather than tax specialists—who used the registers to set quotas within their local jurisdictions.⁵⁶ Rather than attempting to maximize revenue, they used these quotas to anticipate local expenditures across a wide range of highly specific products.

Despite the paradoxes of the Ming tax system, the local quotas generated based on the yellow registers made it easy for officials to make substitutions. Almost immediately after the yellow registers were completed in 1391, policies allowed taxpayers in some southern provinces to submit cash instead of grain.⁵⁷ Officials could also use the standard categories of landholding to fine-tune taxes based on different forms of land use. In many counties, forests were not only taxed at a different *rate* than farmland; they were also taxed in different *goods*, often paying cash rather than grain or cloth. Household-based landholding records also made it easy to determine the most prosperous families in a village or district, a standard used to designate the intermediaries responsible for ensuring collection of the land tax.⁵⁸ Nonetheless, tax accounting standards soon declined in the face of contradictions intrinsic to the tax system and widespread tax avoidance. As chapter 3 details, local and regional officials eventually worked to change the tax system to bring property owners' incentives more in line with state needs. Yet property registration depended as much on the initiative of the property owner as on the state.

While flawed and limited by modern standards, the land surveys of the Southern Song, Yuan, and early Ming were nonetheless transformative. They established a distinctly southern form of taxable property, a category that now encompassed forests. In core timber-producing prefectures like Huizhou, the forest plots depicted in these cadastres formed a continuous chain of documentation stretching across hundreds of years. Elsewhere forest records were more erratic, reflecting a more tenuous investment in timber production and limited state interest or capacity to conduct surveys. But where it worked well, official registration was the cornerstone of a productive forest economy. For landowners, centralized title records allowed them to invest in planting trees with confidence that they or their heirs would still

hold the rights to harvest the timber thirty years later. For the state, the surveys gradually integrated forests into the fiscal regime at ever-higher levels of administration: Li Chunnian's revolutionary "fish-scale" diagrams in an ad hoc and highly localized way, Zhang Lü's standardized account books at the provincial level, and the Hongwu cadastres throughout the south and nominally across the entire empire. This gave officials more and more license to treat forests as a generic form of property. But because forests generated little tax revenue, standardization also gave officials license to ignore the ground-level complications of silvicultural management.

THE SPREAD OF FOREST REGISTRATION

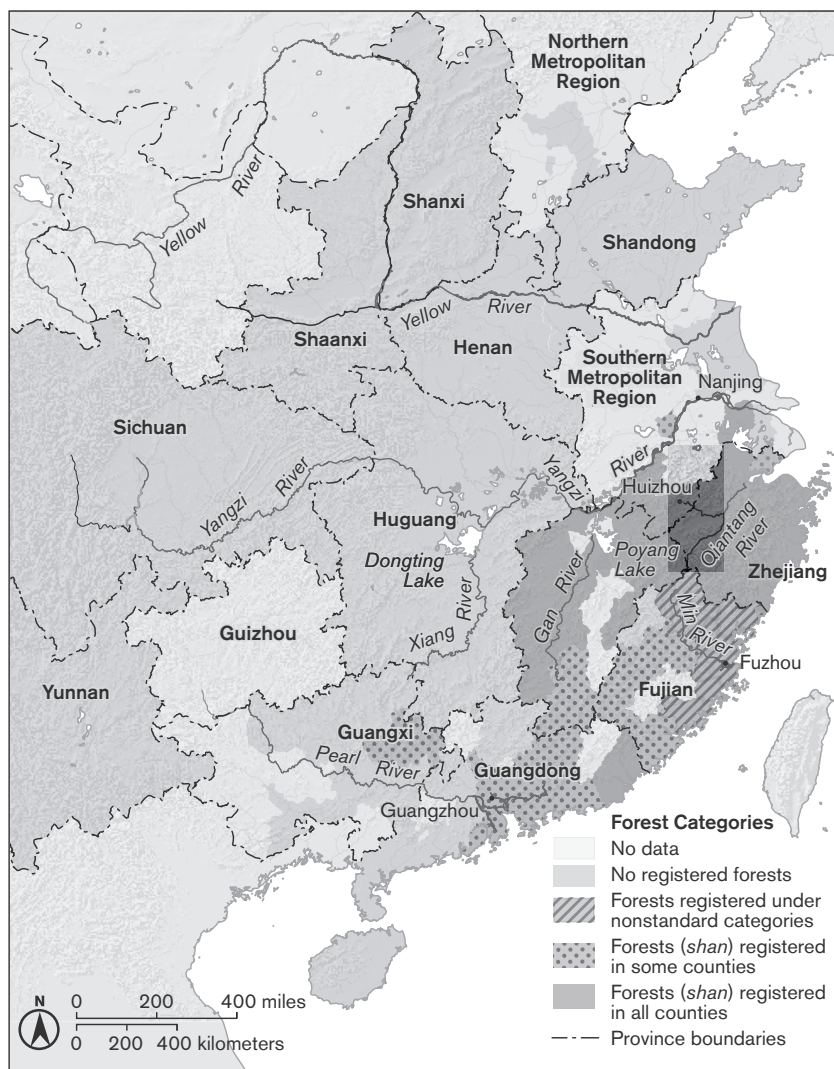
After 1391, there was little further change in the regulations that established forests as bounded, exclusive, alienable property. Yet over the course of the next two and a half centuries, far more woodlands were integrated into the official regime, largely as landowners registered their own plots. Forest registration, and by extension forest planting, spread in two ways. First, silviculture moved uphill, as landowners registered and planted ever-higher slopes. Second, silviculture followed the ax to new frontiers. After loggers cut the primary woodlands in the south and west, locals gradually replanted the areas with trees, registering their plots to ensure ownership of the timber harvest. In this way, forest registration moved from its nursery in western Jiangnan and Zhejiang into Jiangxi and Fujian, and eventually into Guangdong, Guangxi, and Hunan. Throughout these two processes, forest registration spread almost entirely through private initiative, not state action. Finally, in 1581, Grand Secretary Zhang Juzheng carried out another major land survey, the first in nearly two centuries. The effects of this survey varied widely: in some regions, registered acreage increased by 30–40 percent; in one prefecture, it tripled; but in others acreage remained about the same. Overall, surveyors added perhaps 25 percent more land to the tax books, most of it newly claimed from lakeshores and mountain slopes.⁵⁹ Yet total tax returns did not increase, suggesting that landowners were offered lower tax rates as an incentive to report their properties to the state.⁶⁰ The surveys may have had the effect of registering commercial forests in new regions, especially in the south and west; the data are too coarse to be sure.

If summary tax figures are inconclusive, local sources provide a more demonstrative record of changes in forest registration. Cadastral maps from

Huizhou show the expansion of farms at the expense of forests in densely settled areas and of forests at the expense of unclaimed land in more peripheral places. In relatively dense, long-settled areas, many maps show ladder-like terraces of paddies extending up a col, bounded by steeper slopes on both sides. Yet even as clearance and terracing removed some forests from timber production, landowners enclosed new forests at the margins of settled areas. Maps of more peripheral areas in Huizhou depict large forest plots with incomplete boundaries, often partly defined by mountain ridges. For private forests to have extended into this rugged landscape, more accessible areas must have already been claimed.

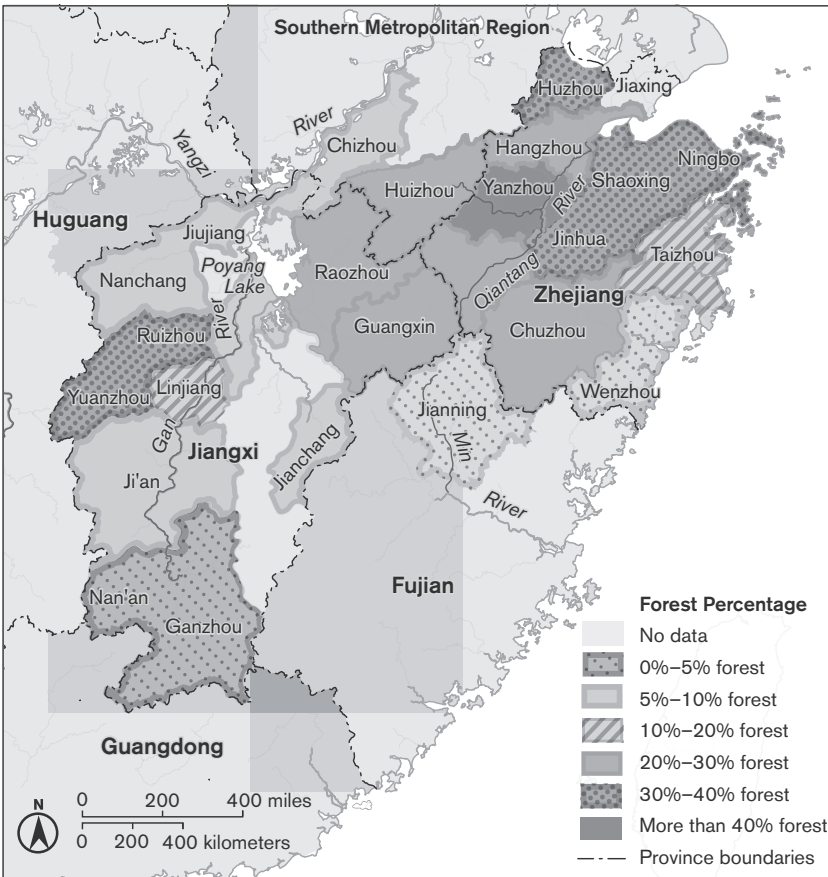
In addition to the spread of forest enclosure to the peripheries of old timber-producing prefectures, forests were also registered in new parts of the empire. By the late fifteenth and sixteenth centuries, the incorporation of woodlands into the land regime can be seen through the patterns of forest registration. In Zhejiang, Jiangxi, and the Southern Metropolitan Region, forests were uniformly incorporated into the cadastral regime. Other distinct patterns of forest registration document the spread of timber planting to regions further south (map 2.1). In coastal Fujian, mid-Ming land records retained a distinctive array of land types including categories like “grove” (*lin*) and “garden/orchard” (*yuan*) in addition to the standard term for forests (*shan*).⁶¹ These nonstandard accounting categories were artifacts of the initial wave of forest surveys in the 1140s; their persistence into the Ming shows that Fujian fell outside of regular administration during the Yuan, when land categories were standardized. Proceeding further down the southeast coast, a second region stretches from western Fujian to northeastern Guangdong and a single prefecture in Guangxi. In the mid-Ming, these regions had erratic patterns of forest registration, generally only in the most metropolitan counties in each prefecture. Nonetheless, given the sorry state of land registration in Guangdong and western Fujian prior to the Ming, these few forests must have been newly registered property.

In parts of Jiangxi and Zhejiang, more detailed landholding figures allow us to track the relative importance of forests to the taxpaying landscape. Across the Yangzi River highlands—the belt of prefectures stretching from Raozhou and Guangxin to Shaoxing and Ningbo—forests were reported in every county and accounted for at least 20 percent of fiscal acreage (map 2.2).⁶² Not only does this region include the uplands closest to the cities of Jiangnan, but it also corresponds with the administrative regions with the longest histories of forest registration. This zone of extensive forest



MAP 2.1 Patterns of forest registration, early to mid-1500s. Data from prefecture and province-level gazetteers. Map layers from China Historical GIS version 6.

registration traces the administrative boundaries of the Jiangnan forest belt—a unique biome of anthropogenic forests that emerged as the product of similar climate and topography, similar market access, and a shared institutional history. The data also show forest registration spread westward, crossing Poyang Lake and extending into central and western Jiangxi, where



MAP 2.2 Forests as a percentage of taxable acreage, early to mid-1500s. Data from prefecture and province-level gazetteers. Map layers from China Historical GIS version 6.

forests made up a smaller proportion of registered acreage than in the Jiangnan core. In Jiangxi’s southernmost prefectures, forest holdings were reported in only a handful of counties, representing a very small fraction of total acreage.

Other anecdotes from across the south give life to the contours painted by the administrative data and demonstrate the further spread of tree planting. By the mid-Ming, scattered records document extensive timber production in western Jiangxi. In Pingxiang County, there was a stony marsh (*shize*) where loggers “cut tall trees during the dry season and left them to await the rain; when the rains ended, they would float the logs out.”⁶³

Yuanzhou also had a booming tung and tea oil industry, probably based in trees planted on purpose-driven plantations.⁶⁴ Further south in Taihe County, several lineages pioneered the local planting of fir trees in the fifteenth century, by which time there was already “long established planting of pine, camphor, and three species of oak used for fuel and building materials.”⁶⁵ By the early seventeenth century, Jiangxi’s southernmost prefecture, Ganzhou, exported timber cut from the natural growth as well as purpose-grown on fir plantations.⁶⁶

Planting practices soon began to spread out of Jiangxi into neighboring regions. In the sixteenth century, officials in Guangdong promoted plantation forestry to support local livelihoods. They recommended that locals grow pines, specifically referencing Su Shi’s planting techniques from the eleventh century and suggesting tenancy contracts of ten to twenty years.⁶⁷ Within a century, firs began to cross the Nanling Mountains into Guangdong. *New Comments on Guangdong*, from 1678, describes the process by which fir planting spread: “There is not much fir in Guangdong. The saplings come mostly from Jiangxi, and the majority of those buying them are landowners who have clear-cut their plantations and are planting replacements. They therefore take a number of seedlings that equals the number of stumps. Guangdong and Guangxi have plenty of timber trees and only forty or fifty percent use fir. For this reason the species is not often planted.”⁶⁸

This passage makes quite clear that trees were only planted *where forests had been clear-cut*. In the late seventeenth century, there were still plentiful natural woodlands south of the Nanling, and more than half of the region’s timber was cut from the wild growth. Plantation forestry was specifically associated with nonnative fir, imported as saplings from north of the Nanling Mountains.

Planting spread west from Jiangxi as well, probably reaching Hunan in the early eighteenth century. By the mid-eighteenth century, elders in Hengyang County in central Hunan claimed that fir had been planted there “for generations” and that plantations, formerly few in number, now spread across the landscape.⁶⁹ Further west, in Qiyang County, the transition was still under way. While landlords planted some timber in the early 1700s, locals did not respect property boundaries and felled so many trees that landlords stopped planting them. There was even a local saying that “stealing trees was not theft” (*tou shumu bu wei dao*), reflecting the persistent understanding of timber as a natural product available to whomever cut it. It was only with firmer enforcement of property rights that fir planting

spread across the landscape, “turning every district green with fir” by the 1760s.⁷⁰ These anecdotes further demonstrate the importance of land title. Without adequate demand, the right trees, knowledge of planting techniques, *and* the right legal regime, the novel community of pines and firs would fail to spread, die off, or be destroyed by rampant logging. When people tried to force the spread of ideas or practices without meeting other conditions, their attempts invariably failed.

The timber species of South China’s tree-planting revolution are now grown across the region. A recent survey of China’s tree species shows *Cunninghamia lanceolata* (China fir) and *Pinus massoniana* (horsetail pine) extending from the Yangzi River to the southern slopes of the Nanling Mountains and from the seacoast to the Yun-Gui Plateau.⁷¹ Connecting the dots, the snapshot of mid-Ming forest registration shown on maps 2.1 and 2.2 marked a midpoint in the spread of timber planting. First developed in Jiangnan in the eleventh and twelfth centuries, this array of practices spread throughout the subtropical highlands of South China by the late eighteenth century.

FORESTRY AND ADMINISTRATION

By nearly any measure, the institutional and ecological shifts in South China’s forest system were both early and extensive. Li Chunnian compiled South China’s first systematic land registers—including forest maps—in 1149. Chosŏn Korea, another comparative prodigy, did not conduct its first major forest surveys until 1448.⁷² Systematic forest cadastres were not seen in most of Europe or Japan until at least the seventeenth century.⁷³ Jiangnan landowners began to invest in timber plantations in the twelfth and thirteenth centuries; the practice was widespread in South China by 1600. Korea was also an early adopter of artificial plantations; relying in part on Chinese precedent, the Chosŏn court introduced and elaborated a pine-planting regime in the fifteenth century.⁷⁴ Japan and Europe were again comparative latecomers. In Japan, conifer plantations were largely a product of the eighteenth century.⁷⁵ And while Nuremberg planted firs and pines as early as the fourteenth century, artificial plantations only became widespread in Europe in the early 1800s.⁷⁶

Yet to the Chinese state, forests were simply another category of land-holding: officials surveyed, registered, and taxed forests the same way they surveyed, registered, and taxed farms. Because tree plantations generated

little tax revenue, forest oversight was simply not a major official concern. Yet without the state conducting surveys, centralizing record keeping, and formalizing the laws of property, landowners would have had limited incentive to plant trees on a commercial scale. Despite the almost total disinterest of the Southern Song, Yuan, and Ming states in territorial forestry, their subtle changes in law and procedure formed the basis of forest ownership, which was key to landowners' confidence in planting trees. With title records in place, landowners gradually spread intensive timber planting across much of four provinces by 1600. By rough estimate, perhaps twenty million acres that had been natural woodlands in 1100 were planted with fir and pine five centuries later. Between 1600 and 1800, this figure may have doubled. Without the state, there would still have been tree planting in South China, but landowners would not have been enabled to transform biomes on such a scale.

Unlike in Europe—or in neighboring countries like Korea and Japan—South China's forest surveys did not come from a specialized forestry bureau, nor did they lead to the creation of one. Instead of an official forest bureaucracy, South China's system of forest registration promoted an extensive private stratum of forest owners. This meant that silvicultural expertise, and the proximate behaviors that promoted the growth and spread of timber trees, was the product of private groups and not the state. As long as their land title was secure, forest owners had no reason to demand greater regulation; as long as wood supplies were sufficient, officials had no reason to force it upon them. In contrast to Europe and Northeast Asia, where forest surveys reinforced trends toward centralization, in China they produced precisely the opposite tendency. To better understand this divergence between the centralization of forest registration and the decentralization of forest management, we must understand the non-state groups most responsible for managing forests on the ground. The following two chapters therefore turn from the rules governing forest land to those governing forest labor.