Asia Major (2024) 3d ser. *Vol.* 37.1: 67–109

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Borders Created by Horses: Bureaucratic Pastoralism and Environmental Governance in Northwest China under the Ming Dynasty

ABSTRACT:
This article examines how the Ming empire's need for cavalry horses gave rise to a distinctive mode of pastureland and human-animal governance in the borderland ecotones of fifteenth- and sixteenth-century northwest China. Termed "bureaucratic pastoralism," this mode involved the rationalized management of livestock, labor, and land through formal institutions, administrative oversight, and infrastructural investment. The focus is on the Shaanxi Pasturage Office in Pingliangfu and it traces the creation, transformation, and partial unraveling of horse-rearing operations within a broad context of imperial land use, labor organization, and environmental governance. These institutions provisioned horses and moreover materialized a scheme of territorial control through infrastructure, bureaucratic discipline, and regulated human-animal relations. Over time, demographic pressures and ecological constraints prompted a shift from mobile horse provisioning to sedentary agro-pastoral practices and monetized procurement. Rather than indicating institutional decline, this transformation shows the adaptive capacities of Ming governance in response to changing border conditions. By situating bureaucratic pastoralism within the trends in monetization and imperial border governance, the article contributes to a comparative understanding of state-managed pastoral regimes in premodern empires.

KEYWORDS:
bureaucratic pastoralism, border environmental governance, horse-rearing institutions, Shaanxi Pasturage Office, ecotones, Pingliangfu, Ming China

INTRODUCTION

Pingliangfu 平涼府, situated in the rugged loess hills south of the Ordos Plateau, was one part of the farming-pastoral ecotones in Ming China (1368–1644).[1] According to the Pingliangfu prefectural gazetteer

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I would like to thank Siyen Fei, Chris Atwood, Peter Lavelle, Fred Dickinson, Paul Smith, Chung-lin Chiu, Debby Chih-yen Huang, Xiaobai Hu, and Fangyi Cheng for their helpful suggestions. I am also grateful to the two anonymous reviewers of *Asia Major* for their insightful comments.

[1] An ecotone is a transition zone that is affected by different ecological characteristics. Farming-pastoral ecotones in China are situated between agricultural and pastoral areas. On the farming-pastoral ecotones in China, see Jian Zhang, Jie Wei, and Quangong Chen, "Mapping the Farming-Pastoral Ecotones in China," *Journal of Mountain Science* 6.1 (2009), pp. 78–87.

compiled in 1560, the total area of Pingliangfu was five hundred square *li* 里,[2] but the Pasturage Office and the military farmlands accounted for five- to six-tenths of this. Lands occupied by the imperial clans of Han 韓, Su 肅, and Chu 楚, princely branches of the Zhu lineage, the ruling house of the Ming empire, accounted for another two- to three-tenths of the territory. Thus, in reality, the prefecture authorities effectively exercised control over only 20 percent of the total land area, rendering their territorial administration largely nominal.[3]

When examining a historical map of the region, one might assume that all the land within a prefecture boundary fell uniformly under the jurisdiction of the local civil administration. But in making that assumption, we would be letting the map deceive us (see map 1). In reality, the Pingliangfu government did not exercise direct authority over all lands within its boundaries. Significant portions were administered by other agencies authorized by the Ming court, including the Pasturage Office and the military garrisons organized as "guards" and "battalions." In addition, certain areas remained under the control of hereditary, local noble clans, who maintained semi-autonomous authority over land and the populace.

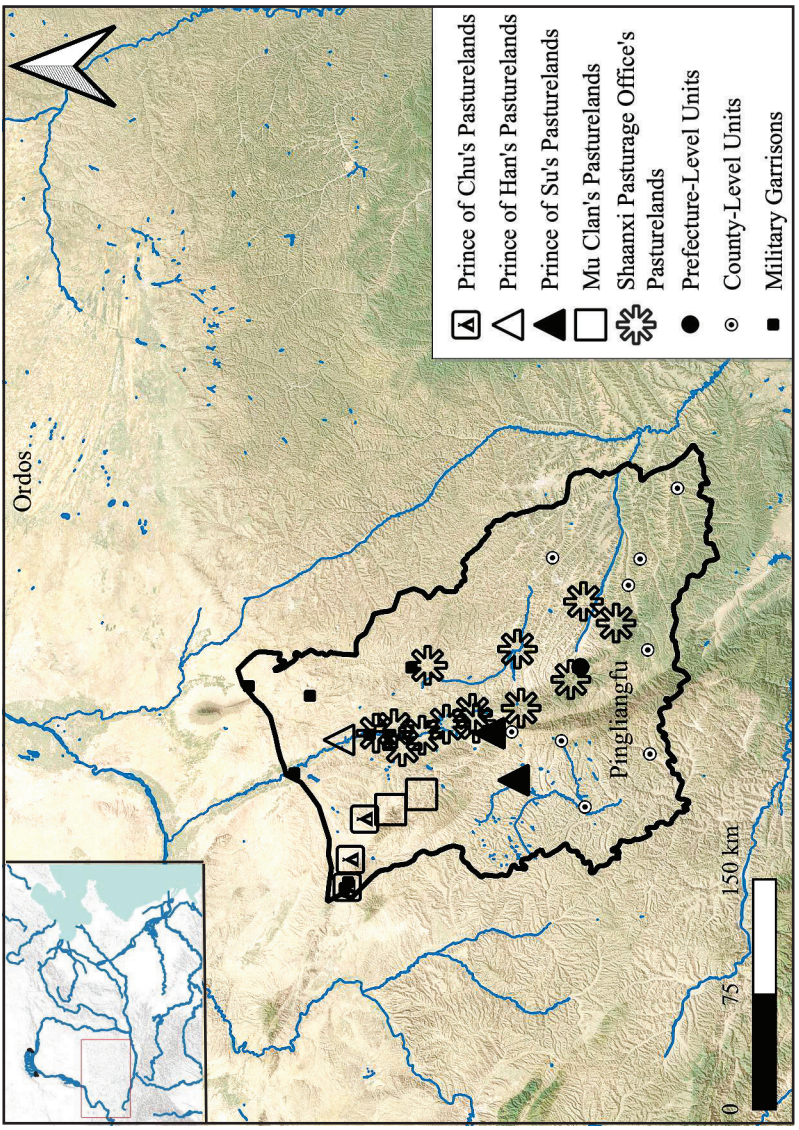
The system of military guards (*wei* 衛) and battalions (*suo* 所) constituted a foundational element of the Ming empire's defense and territorial governance. Organized as military garrisons, these formations were strategically deployed to secure key regions. Within their assigned territories, the guards and battalions functioned as administrative offices responsible for managing land, collecting resources, and overseeing local populations, which were composed primarily of hereditary military households.[4] Alongside these state agencies, local noble clans, descended either from the Zhu imperial lineage or from non-Zhu families ennobled for meritorious service, held hereditary titles and estates. These clans exercised de facto control over substantial tracts of land and local populations that were frequently beyond the effective reach of prefectural authorities.[5] The coexistence of military and aristocratic actors split up the tools of territorial governance and

[2] *Li* is a Chinese unit of length. In the Ming period, one *li* was about 1/3 mile.

[3] Zhao Shichun 趙時春, comp., *Pingliang fu zhi* 平涼府志 (rpt. *Riben cang Zhongguo hanjian difang zhi congkan xubian* 日本藏中國罕見地方志叢刊續編 [Beijing: Beijing tushuguan chubanshe, 2003; hereafter, *Pingliang*]), *j.* 1, p. 19.

[4] On the guard and battalion as Ming military garrisons, see Michael Szonyi, *The Art of Being Governed: Everyday Politics in Late Imperial China* (Princeton: Princeton U.P., 2017), pp. 53–54.

[5] For a brief introduction to the local roles assumed by Ming imperial clans, see David M. Robinson, "Princely Courts of the Ming Dynasty," *Ming Studies* 65 (2012), pp. 1–12.



Map 1. Land Use within Pingliangfu

exemplified the Ming empire's reliance on delegated and regionally differentiated mechanisms of rule.

A second critical agency was the Shaanxi Pasturage Office (*Yuanma si* 苑馬寺), established in the ecotones for horse-rearing. Officials in this bureau supervised not only the horses but also the soldiers assigned to pastureland duties. Over time, the Pasturage Office and its regional divisions evolved into quasi-administrative agencies that governed land, labor, and livestock.

This article examines how the Ming empire's need for military horses gave rise to a distinctive form of border environmental governance in fifteenth- and sixteenth-century northwest China. Centered in Pingliangfu, an ecotonal region that exhibited a give and take between sedentary agriculture and steppe pastoralism, the Ming court established a constellation of pasturelands, institutions, and soldier communities. I refer to such court local control as "bureaucratic pastoralism": the rationalized management of livestock through official institutions, infrastructure, and labor regimes.[6] Drawing on Sheila Jasanoff's concept of "sociotechnical imaginaries," collectively held visions of desirable futures realized through the coproduction of science, technology, and social order, and Francesca Bray's theorization of technology as a template that organizes social and political life beyond its immediate material function, I argue that these horse-rearing institutions did more than provision cavalry.[7] They materialized a broader vision of imperial rule in which the borders could be made governable through environmental intervention, infrastructure, and the disciplined coordination of human-animal labor. Agencies such as the Shaanxi Pasturage Office transformed ecologically volatile and politically contested territories into legible administrative spaces. Bureaucratic pastoralism, in

6 David Bello uses the term "imperial pastoralism" to highlight the Qing Manchu rulers' imperial ideology and project that aimed to sustain the livelihoods and identity of Mongol people. My term "bureaucratic pastoralism" emphasizes the promotion of pastoralism under official supervision to support border communities and maintain the empire's borders; Bello, *Across Forest, Steppe and Mountain: Environment, Identity, and Empire in Qing China's Borderlands* (Cambridge: Cambridge U.P., 2016), pp. 116–68.

7 In the works of Sheila Jasanoff and Francesca Bray, "technology" is conceptualized not as a neutral set of tools or procedures, but as a socially embedded system that links material practices to broader forms of social organization and political imagination. In these frameworks, technology encompasses objects, knowledge, labor regimes, institutional arrangements, and symbolic meanings, all of which co-produce not only technical outcomes but also normative visions of how society ought to be ordered, see Sheila Jasanoff, "Future Imperfect: Science, Technology, and the Imaginations of Modernity," in Sheila Jasanoff and Sang-Hyun Kim, eds., *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power* (Chicago: U. Chicago P., 2015), pp. 1–33; Francesca Bray, *Technology, Gender and History in Imperial China: Great Transformations Reconsidered* (London, New York: Routledge, 2013), pp. 39–56.

this sense, operated as a form of statecraft, technologically mediated, symbolically encoded, and materially embedded at the borders.

While the Ming court introduced new institutional forms to manage livestock, many of these developments built upon spatial patterns inherited from the previous Yuan Mongol empire (1206–1368). The early Ming did not simply impose a new order at the borders, but rather adapted existing pastoral landscapes, especially those once controlled by Yuan imperial princes. As David Robinson has argued, Ming rulers often reactivated Mongol institutions and territorial templates for their own strategic purposes.[8] This article builds on that insight by showing how the Ming court transformed inherited grazing zones into structured administrative units of equine production and border governance. As I show later, several official horse-rearing ranches in Pingliangfu overlapped with former Yuan pasturelands, thus facilitating reactivation with minimal resistance from local populations.

Pingliangfu exemplifies the changing role of horses in Ming China; and through it we gain a fresh view of the dynamics of land use politics. Existing scholarship has richly documented how the Ming court procured horses, whether through trade with Inner Asian polities, tribute missions, or domestic breeding campaigns. For instance, Morris Rossabi, in his study of the tea and horse trade, emphasizes the empire's reliance on external resources to meet military needs.[9] Tani Mitsutaka's 谷光隆 research on the Pasturage Offices highlights the court's substantial investment in domestic horse-raising.[10] Similarly, Noa Grass demonstrates how early-Ming emperors actively sought to cultivate self-sufficient systems of equine provisioning.[11] Chinese scholars currently have underscored the administrative challenges of managing these horse-rearing institutions.[12]

8 David M. Robinson, "The Ming Court and the Legacy of the Yuan Mongols," in idem, *Culture, Courtiers, and Competition: The Ming Court (1368–1644)* (Cambridge, Mass.: Harvard University Asia Center, 2008), pp. 365-422.

9 Morris Rossabi, "The Tea and Horse Trade with Inner Asia During the Ming," *Journal of Asian History* 4.2 (1970), pp. 136–68.

10 Tani Mitsutaka, *Mindai basei no kenkyū* 明代馬政の研究 (Kyoto: Tōyōshi kenkyūkai, 1972), pp. 143–61.

11 Noa Grass, "A Million Horses: Raising Government Horses in Early Ming China," in Rotem Kowner, Guy Bar-Oz, Michal Biran, Meir Shahar, and Gideon Shelach-Lavi, eds., *Animals and Human Society in Asia: Historical, Cultural and Ethical Perspectives* (London: Palgrave Macmillan, 2019), pp. 299–328.

12 For a review of Chinese scholarship on horse-rearing in Ming China, see Qie Haoqian 郗昊謙, "Ershi shiji yilai Ming dai mapi muyang wenti yanjiu zongshu" 二十世紀以來明代馬匹牧養問題研究綜述, *Agricultural Archaeology* 2020.3 (2020), pp. 171–78.

Much insightful research has shown how political authority, economic rationales, and epistemic frameworks were embedded in administrative systems and reflected in bureaucratic records. Yet relatively less attention has been given to the localized effects of these institutions, particularly how horse-rearing infrastructures and policies shaped border communities, transformed land-use patterns, and produced new forms of state–society interaction. The present study is builds on these foundations, but goes on to shift the analysis to the environmental and social consequences of horse-rearing at the local level, with a particular emphasis on how these processes reconfigured imperial governance in borderland ecotones such as Pingliangfu.

Another approach to the study of land use in the grasslands should be mentioned. It has focused on the interplay, and sometimes tension, between pastoralist and agricultural modes of life. Scholars have noted that the non-Chinese rulers, especially the Qing Manchu emperors, often supported pastoralist practices among non-Han communities as part of broader strategies to preserve border distinctiveness and ethnic pluralism.[13] Yet, rather than viewing pastoralism and agriculture as mutually exclusive or ethnically bounded, the case of horse-rearing at an earlier point, under the Ming's Pasturage Office, suggests a more integrated set of practices. In the farming-pastoral ecotones of Pingliangfu, sedentary populations combined stock-breeding with farming, illustrating how bureaucratic pastoralism worked across ecological and cultural boundaries. Here, animal husbandry was not the exclusive domain of nomadic peoples, but part of a broader repertoire of border livelihoods that cut across conventional agrarian-pastoral divides.

In this article, I use the terms "grassland" and "pastureland" to describe the areas where grasses dominate the vegetation. The term "grassland" denotes a type of natural landscape, in the same way we refer to forests or deserts, whereas the term "pastureland" highlights a land area and its vegetative product as being managed and used for grazing.

ESTABLISHING HORSE-REARING AGENCIES AS QUASI-ADMINISTRATIVE BUREAUS

Horses need space, both for exercise, breeding, and nutritional needs. According to modern research, two to ten acres, depending on circumstances, of intensely managed land will support the forage needs

13 Bello, *Across Forest, Steppe and Mountain*; Jonathan Schlesinger, *A World Trimmed with Fur: Wild Things, Pristine Places, and the Natural Fringes of Qing Rule* (Stanford: Stanford U.P., 2017).

of one horse. In poor pastures, however, the minimum requirement for one horse can be thirty acres or more.[14] Recognizing these ecological demands based on many centuries of northwestern horse-raising, Ming authorities established their agencies in the farming-pastoral ecotones in northwest China. Initially designed to support military logistics, these agencies soon evolved into quasi-administrative bureaus that governed not only livestock but also land and labor. This section of the present paper examines how the imperial management of grasslands through horse-breeding operations laid the groundwork for a mode of border governance in which provisioning, administration, and territorial control became increasingly intertwined.

The founder of the Ming empire, emperor Hongwu 洪武 (r. 1368–1398), started the dynasty's concern to allocate specific lands in the ecotones for official horse-rearing. In 1392, he ordered commanders and soldiers in the military garrisons to find places with grass and water in which they could rear their horses.[15] Rather than inheriting a fully formed institutional framework from the preceding Yuan Mongol empire, the early-Ming court tasked soldiers with the responsibility of locating and managing grazing lands within ecotonal zones. To facilitate oversight, Hongwu even established several offices to monitor garrison soldiers' horse-rearing activities.[16] This suggests that most garrisons in these areas had pasturelands nearby. While such policies originated in the early Ming, their implementation unfolded unevenly over the following centuries, likely subject to cycles of decline and reinforcement in response to shifting military demands and border conditions. Nevertheless, local sources suggest a degree of continuity: according to the Yulin 榆林 local gazetteer compiled in 1619, each border fort under the Yulin Guard maintained its own grazing lands.[17] This indicates that, at

[14] For general estimates, see "How much land do I need for a horse?" *Extension Horses*, July 31, 2019 <https://horses.extension.org/how-much-land-do-i-need-for-a-horse>. In Inner Mongolia, the recommended land requirement per horse on desert steppe ranges from seven to fifty acres, see Y.J. Zhang, X.Q. Zhang, X.Y. Wang, N. Liu, and H.M. Kan, "Establishing the Carrying Capacity of the Grasslands of China: A Review," *The Rangeland Journal* 36.1 (2014), pp. 1–9.

[15] Noa Grass states that the military households who raised horses were the Mongols, which is not totally correct, for many garrison soldiers who raised horses were Han-Chinese; Grass, "A Million Horses," pp. 305–6.

[16] The office was Xing Taipu si 行太僕寺 (Detached Court of the Imperial Stud). See Zhongyang yanjiu yuan lishi yuyan yanjiu suo 中央研究院歷史語言研究所, comp., *Ming shilu* 明實錄 (Taipei: Zhongyang yanjiu yuan lishi yuyan yanjiu suo, 1962–1968; hereafter, *MSL*) Taizu 249, p. 3607. Citations of *MSL* will give the reign-name vol. followed directly by the *juan* number therein (without the abbrev. "*j.*"), then pages.

[17] Zheng Rubi 鄭汝璧, comp., Shaanxi sheng Yulin shi defang zhi bangong shi 陝西省榆林市地方志辦公室, punct. and coll., *Yansui zhen zhi* 延綏鎮志 (Shanghai: Shanghai Classics Publishing House, 2011), *j.* 2, pp. 152–56.

Table 1. The Number of Official Horses in Ming China

DATE	TOTAL NO. HORSES	NO. BREEDING HORSES	INCREASE IN NO. HORSES	SOURCE
1376			2,380	MSL Taizu 111, pp. 1832–33
1377		17,385		MSL Taizu 111, p. 1849
1377		21,816		MSL Taizu 116, p. 1905
1385		25,915		MSL Taizu 176, p. 2674
1392	45,080			MSL Taizu 223, pp. 3270–71
1393			~10,700?	MSL Taizu 230, p. 3369
1395			9,407	MSL Taizu 243, p. 3534
1402	~23,700			MSL Taizong 15, p. 280
1403	37,993			MSL Taizong 26, p. 489
1404	49,213			MSL Taizong 37, p. 638
1405	58,599			MSL Taizong 49, p. 744
1406	67,455			MSL Taizong 62, p. 899
1407	73,840			MSL Taizong 74, p. 1028
1408	81,907			MSL Taizong 86, p. 1149
1409	96,431			MSL Taizong 99, p. 1301
1410	122,417			MSL Taizong 111, p. 1426
1411	152,719			MSL Taizong 123, p. 1554
1412	1181,140			MSL Taizong 135, p. 1652
1413	234,855			MSL Taizong 146, p. 1724
1414	271,961			MSL Taizong 159, p. 1813
1415	310,657			MSL Taizong 171, p. 1908
1416	368,705			MSL Taizong 183, p. 1974
1417	514,439			MSL Taizong 195, p. 2052
1418	623,020			MSL Taizong 207, p. 2117
1419	482,427?			MSL Taizong 219, p. 2182
1420	899,287			MSL Taizong 232, p. 2244
1421	1,090,912			MSL Taizong 244, p. 2301
1422	1,199,315			MSL Taizong 254, p. 2362
1423	1,585,322			MSL Taizong 266, p. 2421
1424	1,736,618			MSL Renzong 5, p. 194
1477		37,144		MSL Xianzong 167, p. 3032

least in some regions, garrison-linked pasturelands persisted into the late-Ming period, even if the system was neither uniformly applied nor consistently maintained.

Emperor Hongwu also requested that imperial princes imitate Mongol grazing methods to raise horses. He asked his sons to defend the empire's northern borders by leading troops and raising animals in the pasturelands. These troops moved among different pasturelands to graze animals and collect grass as forage for horses. According to Hongwu's instruction, in winter the soldiers were supposed to live in caves in the mountainous areas and feed horses with the grass they had already collected.[18] This plan reflected Hongwu's ideal of combining dynastic kinship loyalty with border governance. In practice, however, the military power of the border princes diminished significantly after the Hongwu reign. By the early-fifteenth century, most princely troops were dismissed, and the princes' role in border defense and animal husbandry had become largely symbolic.[19]

The establishment of official bureaucratic pastoral zones in northwest China was the result of emperor Yongle's 永樂 (r. 1403–1424) enthusiasm for increasing the empire's huge horse population and a thriving official trade in horses along the Chinese-Tibetan borderlands in the 1400s. This initiative was motivated by Yongle's ambitious expansionism, particularly in Inner Asia; he sought to secure Ming hegemony and ensure stable borders through military presence and infrastructural development.[20] Yongle's commitment to increasing the empire's horse population is evident in the detailed annual statistics on horses that are to be found in the central government's records during his reign. Notably, Yongle was the only emperor who had recorded the number of official horses for every year (see table 1).

It is reasonable to argue that Yongle established new official pasturelands and horse-breeding agencies in northwest China specifically to accommodate and manage the expanding population of military livestock generated by the empire's intensified tea and horse trade. The origins of this system lay in the reign of emperor Hongwu, who began

[18] In 1397, Hongwu ordered his sons at the empire's northern frontiers to dispatch most of their troops to graze animals. See *Ming Taizu qinlu* 明太祖欽錄, in Chang Bi-de 昌彼得, "'Taizu huangdi qinlu' xulu" 太祖皇帝欽錄序錄, *Quarterly Journal of Bibliography National Palace Museum* 1.4 (1971), pp. 71–113; see pp. 77, 105–6.

[19] On the decline in military power among the Ming princes, see Denis Twitchett and Frederick Mote, eds., *The Cambridge History of China Vol. 7.1: The Ming Dynasty, 1368–1644* (Cambridge: Cambridge U.P., 1988), pp. 243–44.

[20] On Yongle's military expansion, see Twitchett and Mote, eds., *Cambridge History of China Vol. 7.1*, pp. 221–31.

exchanging tea for horses with non-Chinese groups in the Chinese-Tibetan borderlands as early as the 1370s. In the 1390s, this practice had become institutionalized as a regular strategy to supply horses to the northwestern garrisons, whose troops frequently confronted Mongol incursions and required a stable and abundant source of cavalry horses. These initial efforts laid the institutional and logistical foundations for the broader and more systematized expansion carried out by emperor Yongle. Determined to enlarge the empire's cavalry, he consolidated state control over the tea and horse trade by deploying military personnel to transport tea from southwest China to the northwestern borders, where it was exchanged for horses acquired from the Chinese-Tibetan borderlands and other Inner Asian pastoralist groups.[21] On average, several thousand horses were introduced into the Ming empire every three years through this system. This steady influx of horses created new logistical challenges that required institutional solutions.[22] Yongle's policies thus not only increased the empire's equine capacity but also reshaped the administrative and environmental infrastructures of the northwestern borderlands.

Emperor Yongle's visionary approach to official horse-rearing was marked by its assertiveness: he created special pasturelands where dedicated soldiers raised horses through a combination of mobile horse-rearing methods and sedentary ones. In the eighth lunar month of 1406, he consulted the border commanders on horse-breeding strategies in north and northwest China and proposed two options. The first involved a seasonal pattern: horse-rearing soldiers would adopt a mobile lifestyle in spring and summer, moving herds to areas with abundant grass and water that were also naturally enclosed and thus easily defensible by a small number of troops. In winter, when temperatures dropped and vegetation withered, the horses would be gathered into fenced enclosures and fed with stored fodder. Yongle described this process as similar to the "grazing method from the northern deserts 朔漠牧養之法."[23] In early-Ming contexts, the phrase "northern deserts" denoted the Mongols who lived in such an environment. While acknowledging the resemblance, he used the word "similar to 如" to signal that his version

[21] Tani, *Mindai basei no kenkyū*, pp. 55–71; Rossabi, "Tea and Horse Trade," pp. 146–48.

[22] A retrospective essay on horse administration written in the 1550s by Zhao Shichun (mentioned n. 3, above), an official based near the pastoral zones, explicitly states that the establishment of official horse-rearing agencies in northwest China was a direct result of the expanding tea and horse trade; see Zhao, "Mazheng lun" 馬政論, in Huang Enxi 黃恩錫, comp., *Ningxia sheng Zhongwei xian zhi* 寧夏省中衛縣志 (rpt. *Zhongguo fangzhi congshu* 中國方志叢書 [Taipei: Chengwen chubanshe, 1968]), *j.* 9, p. 16.

[23] *MSL* Taizong 58, p. 847.

was a selective adaptation rather than a direct replication. As ethnologists and historians show, nomadic herders practice various seasonal migrations in the Mongolian plateau. Roughly speaking, the nomads' stock moves to warmer places in the winter and colder places in the summer. This mobility enhanced pastoral productivity while also ensuring ecological balance and resilience in the face of seasonal change.[24] Yongle's proposed method similarly kept horses on the move through spring and fall, following patterns associated with mobile grazing, while providing stable shelter and feed in winter, consistent with sedentary practices. Like his predecessor Hongwu, Yongle drew inspiration from Mongol models of pastoralism, selectively adapting them to suit the administrative and military needs of the Ming empire.

Yongle's second option for managing horses, after the mobile-sedentary method, was to create specialized horse-rearing bureaus. The establishment of these government-operated horse-rearing institutions signaled a shift in imperial strategy: in addition to authorizing the noble clans to indirectly rear horses for the empire along the borders, Yongle also intended to rear horses that were directly under bureaucratic supervision and control, which shows his unique vision with regard to creating the Ming empire's bureaucratic pastoral zones. In this sense, Yongle can be credited with inventing the Ming empire's bureaucratic pastoralism, a model that integrated livestock management with territorial administration.

To be sure, the use of specialized official agencies to raise horses had precedents in earlier Chinese empires. As early as the Western Han (202 BC–8 AD), the imperial court had established official ranches in north and northwest China for horse-rearing. Similar arrangements continued under the Tang empire (618–907) and the Northern Song (960–1127).[25] However, the horse-rearing practices institutionalized in Yongle's specialized agencies marked a significant departure from these earlier models.

[24] On the studies on pastoralism in the Mongolian plateau, see Christopher P. Atwood's summary, "Imperial Itinerance and Mobile Pastoralism," *Inner Asia* 17.2 (2015), pp. 293–349. On high mobility's producing increased pastoral productivity, see Caroline Humphrey and David Sneath, *The End of Nomadism?: Society, State and the Environment in Inner Asia* (Durham, N. Carolina: Duke U.P., 1999), p. 268.

[25] Xie Chengxia 謝成俠, *Zhongguo yangma shi* 中國養馬史 (Beijing: Kexue chubanshe, 1959), pp. 92–93, 118–26, 142-49. On the development of official ranches under the Tang empire, see Jonathan Skaff, "Tang China's Horse Power: The Borderland Breeding Ranch System," in Hyun Jin Kim, Frederik Juliaan Vervaet, and Selim Ferruh Adali, eds., *Eurasian Empires in Antiquity and the Early Middle Ages: Contact and Exchange between the Graeco-Roman World, Inner Asia and Chin*a (Cambridge: Cambridge U.P., 2017), pp. 34–59, see pp. 37–38.

First, as mentioned above, Yongle envisioned a seasonal approach to grazing that alternated between mobile and sedentary practices: horses grazing in the warmer months and sheltering with fodder during winter. As a record in the sixteenth century shows, Yongle intended horse-rearing soldiers to practice migratory grazing during the warmer seasons, even if the supporting infrastructure for winter feeding remained incomplete.[26] This indicates that like Hongwu, Yongle probably asked soldiers to rear horses in a nomadic migratory manner, at least in summer. In contrast, earlier, ranches in the Song empire supervised horse-rearing as carried out by Chinese commoners, and thus employed a largely stationary mode of animal husbandry. Second, the horse-rearing communities in the Ming period were organized specially for animal husbandry and managed independently of local civil authorities. These specialized military units were entrusted with grazing responsibilities over designated territories. In contrast, the Northern Song court had relied on existing local communities, primarily sedentary commoners, to fulfill horse-rearing tasks.[27] The Song strategy assumed, perhaps optimistically, that these civilian households could be repurposed for imperial livestock needs. Unlike the Ming case, the Song approach did not cultivate specialized expertise or infrastructure for horse-rearing. The third difference under Ming emperor Yongle was the relative durability of their specialized horse-rearing agencies. Although the longevity of Han-era ranches remains unclear, and those of the Tang and Northern Song appear to have been relatively short-lived, documentary evidence indicates that Ming horse-rearing operations, particularly those administered by the Shaanxi Pasturage Office, remained active into the late-Ming period, despite occasional disruptions from Mongol incursions (discussed below).

In the ninth lunar month of 1406, Yongle established the Pasturage Office of Shaanxi (a northwestern province) and the Pasturage Office of Gansu (a military area, also in the northwest). In theory, each Pasturage Office presided over six horse directorates (*jian* 監), which monitored four ranches (*yuan* 苑) each. The ranch officials directly monitored grazing activities on the pasturelands. These ranches were graded based on the amount of pastureland they administered. Large ranches

[26] See Yang Yiqing 楊一清, *Guanzhong zouyi* 關中奏議 (rpt. *Yingyin Wenyuan ge Siku quanshu* 景印文淵閣四庫全書 [Shanghai: Shanghai guji chubanshe, 1987]; hereafter, *Guanzhong*), *j.* 1, p. 3.

[27] On ranches in the Northern Song period, see Xie, *Zhongguo yangma shi*, p. 147; Paul J. Smith, *Taxing Heaven's Storehouse: Horses, Bureaucrats, and the Destruction of the Sichuan Tea Industry, 1074–1224* (Cambridge, Mass.: Harvard University Asia Center, 1991), pp. 17–24.

raised ten thousand horses, medium ones seven, and small ones four thousand.[28] To support this expansive equine system, Yongle formed new military communities to rear horses at the empire's borders. Ideally, each ranch had hundreds of soldiers for horse-rearing. Each ranch was administered by a ranch leader (*xingzhang* 圉長) who led fifty *fu* 夫 (meaning simply "men," but in practice, "soldiers"). Each horse-rearing soldier was responsible for tending approximately ten horses, with the obligation to produce two usable horses every three years and to compensate for any loss or death of animals under their care.[29] Unlike the ranches supervising commoners in the Northern Song, the men leading horses on the pasturelands in the Ming-government ranches were all soldiers. They were either recruited from soldiers in military garrisons or from "grace soldiers" (*enjun* 恩軍) who were granted exile to the borders as a form of penal servitude.[30]

Yongle actively sought out new grasslands and designated new pasturelands for the establishment of official horse-rearing ranches. Under the Pasturage Offices, each ranch administered a specific area of pastureland for horse-rearing. Although Yongle contrasted the ranches and the "grazing method from the northern deserts," which set horses free on grasslands, the ranching method also incorporated free-range pasturage during the spring and summer. Each spring when the grass began to grow, the men working in the ranches set horses free on the grasslands. When the grass withered in winter, these men rounded up the horses and fed them.[31] To sustain this form of bureaucratic pastoralism, emperor Yongle commissioned two border commanders to survey suitable sites for new ranches, thereby extending imperial oversight over ecotonal landscapes and integrating them into the empire's equine provisioning infrastructure.

The resulting pasturelands and the official horse ranches in northwest China were concentrated in areas that were neither too close

[28] *MSL* Taizong 59, pp. 856–57; Zhang Tingyu 張廷玉 et al., *Ming shi* 明史 (Taipei: Dingwen chubanshe, 1980; hereafter *MS*) 75, pp. 1845–46. Tani, *Mindai basei no kenkyū*, pp. 143–45.

[29] *MSL* Xuanzong 84, p. 1950; Chu Fu 褚鈇, *Chu Sinong wenji* 褚司農文集, in Chen Zilong 陳子龍, Xu Fuyuan 徐孚遠, and Song Zhengbi 宋徵璧, eds., Chen Naiqian 陳乃乾, coll., *Ming jingshi wenbian* 明經世文編 (Beijing: Zhonghua Book Company, 1962; hereafter, *MJW*), *j.* 386, pp. 4182–83.

[30] In the 1500s, Yang Yiqing, discussed, below, main text, memorialized that he could still locate these regulatory statutes governing the Pasture Office that had originally been instituted during the Yongle reign; see *Guanzhong*, *j.* 1, p. 29; idem, *Yang Shicong wenji* 楊石淙文集, in *MJW*, *j.* 114, p. 1057. On actual cases of pastoral soldiers recruited from garrison soldiers and Grace soldiers, see *MSL* Xuanzong 84, pp. 1950–51; and *MSL* Yingzong 29, p. 575.

[31] *MSL* Taizong 59, p. 857.

to agricultural regions nor too exposed to Mongol incursions. In the eleventh lunar month of 1406, two months after Yongle initiated his ranch-rearing project, a border commander reported the identification of eighteen places suitable for grazing horses within the ecotones in northwest China.[32] While some of these proposed sites were relatively close to agricultural areas, they were ultimately not selected for development. Instead, the court consistently avoided establishing ranches in areas that might disrupt crop cultivation. As seen in map 2 (following), the Ming court consistently refrained from selecting agriculturally productive regions for equine operations.[33]

By the late 1430s and 1440s, after Yongle, the geopolitical landscape had shifted. Ranches located southwest of Ordos and along the Chinese-Tibetan borderlands were all abolished.[34] According to contemporary reports, repeated Mongol incursions from the north compelled the court to dismantle the ranches vulnerable to such attacks and relocate two of them farther south (see map 3). These developments reflect the Ming court's evolving calculus: while the ideal was to place ranches in ecotonal zones distant from farmland, border instability ultimately dictated their viability. In this context, the spatial logic of official horse-rearing was shaped not only by ecological planning but also by the political and military contingencies of the mid-fifteenth century.

After the 1430s, most official ranches were concentrated in the regions within the boundaries of Pingliangfu prefecture. Most of the ranch pasturelands had already been used for animal husbandry under the Yuan empire, which allowed Yongle to incorporate them into the Ming empire's equine infrastructure with minimal resistance from local residents. During the previous Yuan Mongol period, many lands within Pingliangfu were distributed as fiefs to the Mongol imperial princes for grazing purposes. For example, the lands east of point B in map 3 were the prince of Anxi's 安西王 grazing lands for three generations (1270s–1320s). The lands at point A were the prince of Yu's 豫王 grazing lands for two generations (1350s–1360s).[35] Following the fall of the Yuan, emperor Hongwu later distributed these former princely

[32] *MSL* Taizong 61, pp. 885–86.

[33] On the location of these ranches, see *Guanzhong*, *j.* 1, pp. 33–35; Zhu Lixia 朱麗霞 and Zhou Song 周松, "Ming dai Gansu yuanma si kaolun" 明代甘肅苑馬寺考論, *Journal of Henan University (Social Science)* 59. 5 (2019), pp. 70–76.

[34] *MSL* Yingzong 25 p. 550; *MSL* Yingzong 52, p. 997; *MSL* Xiaozong 24, pp. 542–43.

[35] Zhu Hengyan 朱亨衍 and Liu Tong 劉統, comp., *Yan cha ting zhi beiyi* 鹽茶廳志備遺 (rpt. *Xibei xijian fangzhi wenxian* 西北稀見方志文獻 [Lanzhou: Lanzhou guji shudian, 1990]), *j.* 1, pp. 9–10. Vered Shurany, "Prince Manggala – The Forgotten Prince of Anxi," *Asiatische Studien - Études Asiatiques* 71.4 (2017), pp. 1169–88, see 1172.

lands to the Ming imperial princes as their pasturelands.[36] After the reconsolidation of dynastic power in the early-fifteenth century, Yongle adopted a more centralized and bureaucratized vision of border governance. While he allowed the princes to retain their grazing lands, he also established a separate system of official ranches under the supervision of the Pasturage Office. In doing so, he established multiple officially-administered pastoral zones within Pingliangfu, building upon Mongol territorial precedents while reconfiguring them to serve the bureaucratic and military priorities of the Ming empire.

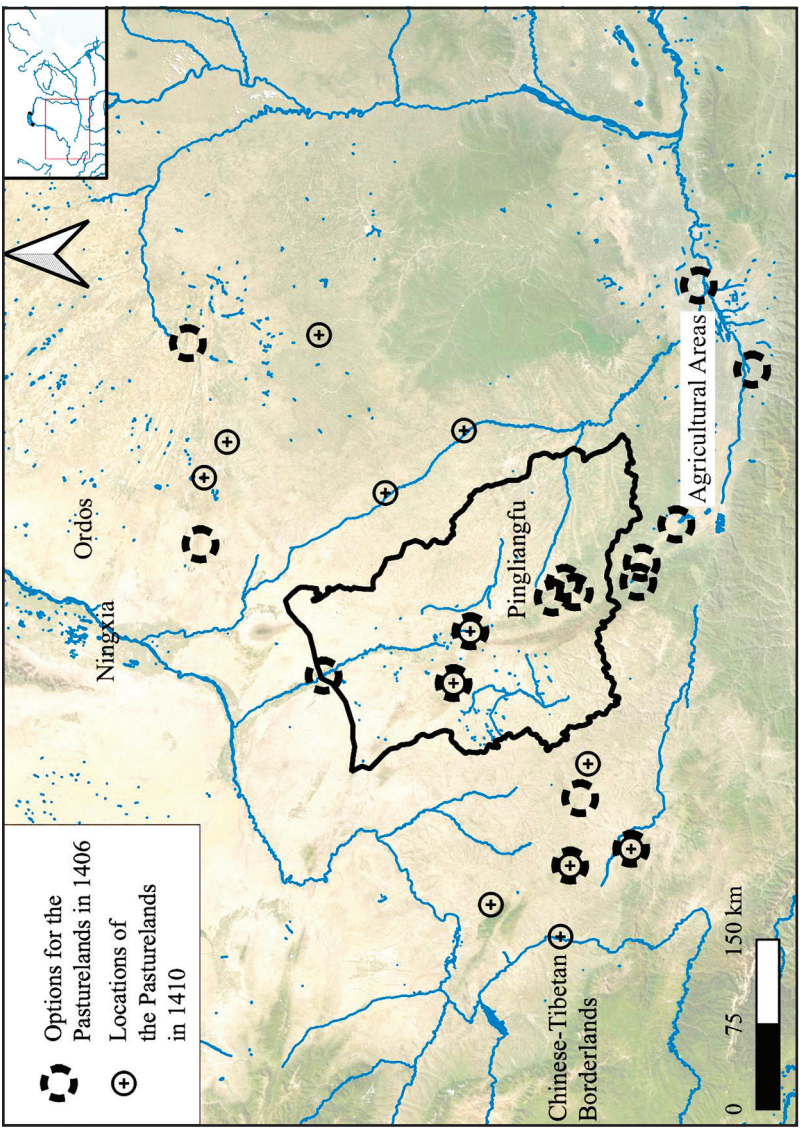
The characteristics of these horse-rearing ranches and their special horse-rearing communities made it difficult for the border settlements to remain prosperous. First, the ranches were highly vulnerable to attack. Founded specifically for stock-breeding, they housed significant concentrations of horses and thus became prime targets for Mongol raids. Second, the soldiers stationed at these ranches, many of whom were exiled convicts, faced demanding labor obligations that far exceeded those of civilian populations. Subject to heavy exploitation and personal liability for equine losses, many deserted their posts, further undermining the stability of these institutions. In short, the specialized nature of stock-breeding communities, simultaneously overexposed and underprotected, rendered them particularly fragile.

While desertion posed a serious challenge, it was far easier to manage than the threat of external attacks. The Ming court's response to the loss of manpower was pragmatic: rather than conscripting civilians from settled communities, it recruited criminals to serve as horse-rearing soldiers.[37] In contrast, defending the ranch offices themselves, particularly those exposed to Mongol incursions, proved far more difficult. The abolition and relocation of several ranches after the 1430s reflect both the escalating pressure of northern raids and the court's reluctance to commit substantial military resources to their defense. The southwest edge of the Ordos Plateau, where many of these ranches had been concentrated, likely remained sparsely populated during this period, further diminishing the strategic incentive to defend the area.

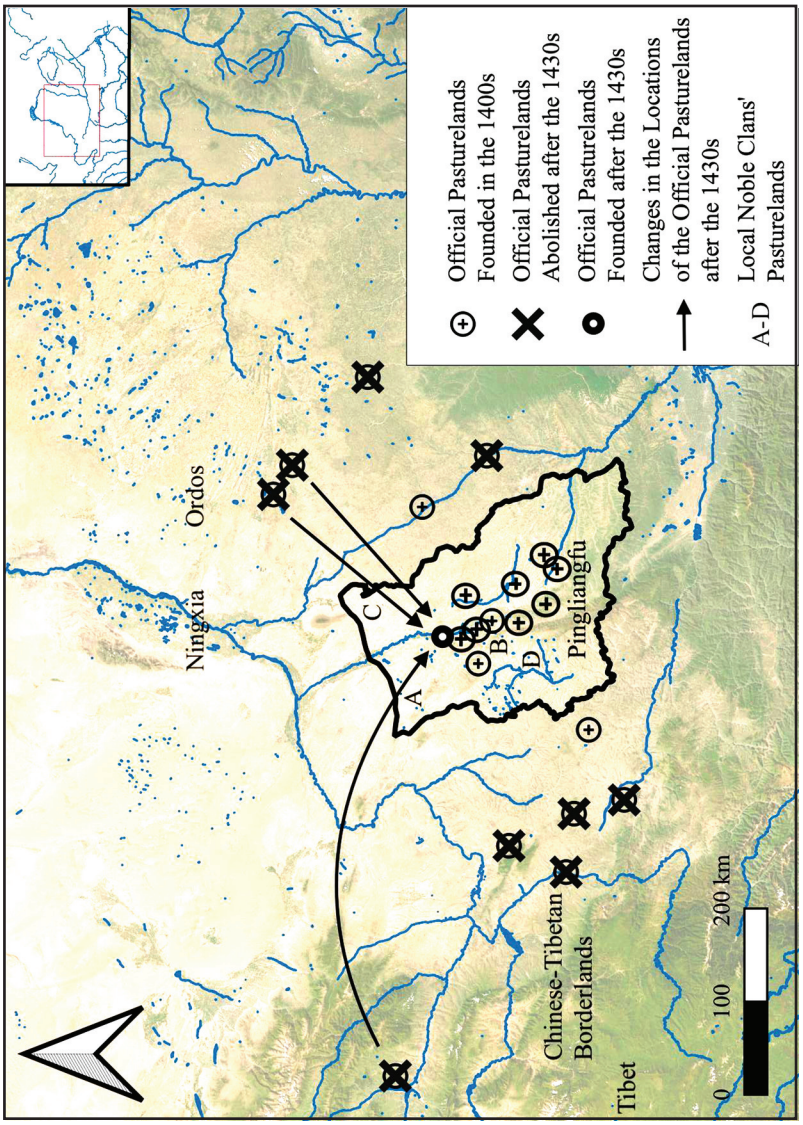
Nevertheless, the ranches in Pingliangfu and the bureaucratic pastoral zones remained operational through the end of the Ming period, continuing to supply horses to the border garrisons. As a result of the Ming court's sustained commitment to official horse-rearing policies, a

[36] Yang Jing 楊經, comp., Niu Dasheng 牛達生, and Niu Chunsheng 牛春生, punct. and coll., *Jiajing Guyuan zhou zhi* 嘉靖固原州志 (Yinchuan: Ningxia renmin chubanshe, 1985), *j.* 1, pp. 21–23.

[37] See *MSL* Xuanzong 84, pp. 1950–51; *MSL* Yingzong 10, p. 199.



Map 2. Locations of Official Pasturelands in the 1400s



Map 3. Abolishment and Rebuilding of Official Pasturelands after the 1430s

significant number of horses were raised on the bureaucratic pasturelands. In the early- to mid-Ming period, these horses, along with the horse-rearing soldiers assigned to their care, participated in regular patterns of mobile movement, particularly during the spring and summer months. Although such mobility declined in the latter half of the Ming period, the earlier patterns helped constitute a dynamic "stockscape" that reshaped the socioecological landscape of the Ming northwest.

To sum up, the early-Ming court's establishment of horse-rearing institutions in northwest ecotonal zones laid the foundations for a distinctive mode of border governance, what this article terms "bureaucratic pastoralism." Initiated under emperor Yongle, these institutions combined territorial administration, military provisioning, and ecological management. Drawing selectively from Mongol grazing practices, the Ming court developed a hybrid mobile–sedentary horse-rearing regimes organized through bureaucratized ranches and specialized horse-rearing soldiers. While the system remained vulnerable to external violence and manpower desertion, it also restructured both administrative authority and ecological space. These developments underscore the notion that the grasslands were not peripheral wastelands awaiting agricultural transformation, but they were managed resources embedded within the imperial vision of border governance. Through the stockscapes of the Ming northwest, the empire enacted its authority not only over people and animals, but over the environmental contingencies of the borderlands themselves.

SECURING OFFICIAL PASTURELANDS AT THE BORDERS

In the Ming northwest, the Pasturage Office and its affiliated ranches took on roles that extended beyond horse provisioning. In vulnerable border regions like Pingliangfu, such agencies evolved into quasi-administrative and defensive outposts, addressing concrete challenges such as Mongol raids and cavalry supply. This transformation in the agencies is evident from the efforts of a high court official Yang Yiqing 楊一清 (1454–1530), who in the early-sixteenth century sought to revive the Shaanxi Pasturage Office by constructing horse-rearing forts, stables, and secure housing. By developing this infrastructure and stationing horse-rearing personnel within these fortified sites, Yang reconfigured horse-rearing agencies into strategic defensive nodes along the empire's borders. This section examines how such agencies in Pingliangfu were reshaped into defensive strongholds, emphasizing

their role in converting ecotonal landscapes into governable imperial borderlands.

The status and tasks of the Pasturage Office and its affiliated stock-breeding ranch offices were distinct. The Pasturage Office reported directly to the Ministry of War and operated independently of local civil governments.[38] It oversaw the entire bureaucratic apparatus of official horse-rearing, while ranch offices, functioning under its supervision, were responsible for maintaining land registers, managing personnel, and directing daily operations on officially designated pasturelands.[39] Prefects and county magistrates had no authority to intervene in these operations. This administrative separation is reflected in a local Pingliangfu gazetteer, which noted that certain tracts of land within the prefecture's boundaries were not governed by the prefectural authorities, but instead fell under the jurisdiction of the Pasturage Office.[40] Since the horse ranch offices administered livestock, lands, and people, the pasturelands under their management became prime targets for Mongol incursions. In the late 1430s, probably after the Oirat Confederation began to dominate the steppe north of China, the raids on the border ranches became more frequent and began to appear regularly in official records.[41] There are also records showing that Mongol forces pillaged the Ming prince of Chu's horses on his pasturelands (point A, map 3).[42] The Ming court's initial response was passive: it either relocated or abolished the ranches that were seen as vulnerable to attack.[43] However, this strategy proved insufficient, as Mongol raids soon extended into ranches situated further south within Ming-administered territories.

The ranches in Pingliangfu came under increased threat following the Ming defeat in the Tumu Crisis of 1449, during which Mongol forces decimated the imperial army and captured the reigning Ming emperor Zhengtong 正統 (r. 1435–1449; later known as Tianshun 天順,

[38] *MS* 75, pp. 1845–46. Tani, *Mindai basei no kenkyū*, p. 143.

[39] On the role of the Pasturage Office in maintaining land registers and overseeing personnel, see *MS* 75, pp. 1845–46.

[40] *Pingliang, j.* 1, p. 19.

[41] The Oirats, also known as the Western Mongols, were ethnically and linguistically part of the broader Mongol world, yet they occupied an ambiguous position in Mongolian history. At times, they contested the political dominance of the Eastern Mongols; at others, they established autonomous polities or became integrated into wider Mongol confederations. In the early-15th c., the Oirats played a pivotal role in reshaping the geopolitical landscape along the Ming empire's northern and northwestern borders, emerging as both formidable military adversaries and influential actors in the empire's border affairs, see Christopher P. Atwood, *Encyclopedia of Mongolia and the Mongol Empire* (New York, N.Y.: Facts on File, 2004), pp. 419–23.

[42] *MSL* Yingzong 26, pp. 517–18; *MSL* Yingzong 206, pp. 4425–26.

[43] *MSL* Yingzong 25, p. 550; *MSL* Yingzong 52, p. 997; *MSL* Xiaozong 24, pp. 542–43.

r. 1457–1464).[44] In the aftermath, the Ming court withdrew from its previous northmost positions on the steppe, allowing Mongol groups to penetrate deeper into Ordos and place increasing pressure on northern Shaanxi. As the border line gradually shifted southward, Pingliangfu's ranches too became exposed to Mongol raids, which increased beginning in the 1450s.

In response to the growing threat, the Ming court undertook a series of defensive initiatives in Shaanxi province, which included Pingliangfu and the strategically situated fort of Guyuan 固原. A military battalion was established in Guyuan in the early 1450s, and by the late 1460s, the garrison was expanded and formally reorganized into the Guyuan Guard. In the 1470s, Ming commanders constructed a network of forts and walls along the south edge of Ordos, fortifications that later became integrated into the broader system now known as the Great Wall of China.[45] These measures proved temporarily effective: after 1472, no major Mongol incursions into Shaanxi's horse ranches were recorded for the rest of the century.[46] This consolidation of military infrastructure established Guyuan as the core of the Guyuan Defense Area, which emerged as one of the Nine Defense Areas (*jiubian* 九邊) along the Ming empire's northern borders.

Because horse ranches functioned as quasi-administrative entities within the local landscape, they also assumed responsibilities for regional defense. Their role in border defense is once again illustrated by developments in Guyuan. In 1451, the prefect of Pingliangfu submitted a proposal to restore the Guyuan fort, which had been abandoned by the Ming in 1369.[47] However, local sources suggest that the initiative may have come instead from an official of the Shaanxi Pasturage Office.[48] A stele inscription from Guyuan, referring to the fort by its earlier name "Zhenrong 鎮戎," recounts how Mongol raiders had killed or abducted residents and looted horses and supplies. In response, a horse-director-

[44] The Tumu Crisis was a major military disaster for the Ming empire that occurred in 1449. While leading a poorly planned campaign against the Oirats, Zhengtong was captured after Ming forces were ambushed near Tumu Fortress in modern-day Hebei. The defeat resulted in the deaths of tens of thousands of soldiers and exposed serious weaknesses in Ming border defense. It marked a turning point in Ming–Mongol relations, leading the Ming court to adopt a more defensive posture, including the strengthening of border fortifications such as the Great Wall. On the Tumu Crisis, see Twitchett and Mote, eds., *Cambridge History of China Vol. 7.1*, pp. 322–25.

[45] Arthur Waldron, *The Great Wall of China: From History to Myth* (Cambridge: Cambridge U.P., 1992), pp. 91–107.

[46] *MSL* Xianzong 101, p. 1955.

[47] *MSL* Yingzong 204, p. 4359; *MS* 42, p. 1005.

[48] *Jiajing Guyuan zhou zhi*, *j.* 1, p. 10.

ate chief petitioned the court for protection.[49] The court subsequently appointed both low- and high-level personnel to oversee the fort's reconstruction. In the absence of a county magistrate, this horse-rearing official assumed the role of a local administrator – both managing imperial livestock and safeguarding local inhabitants. While clearly operating under imperial mandate, the actions of this official demonstrate how the pastoral institutions assumed responsibilities that blurred the boundary between state provisioning and local governance.

Following the mid-fifteenth century, the intensification of Mongol incursions had wide-ranging effects on the productivity and stability of the Ming empire's official horse-rearing operations. These raids disrupted the logistical infrastructure that underpinned the tea and horse trade, undermining the steady supply of equines to imperial ranches. First, the frequent attacks destabilized key trade routes and severely hindered the movement of goods, leading to a noticeable shortfall in the number of horses acquired through officially sanctioned exchanges.[50] Second, the raids inflicted material damage on horse-rearing communities – for example, through the killing or seizure of livestock – leading to both a physical reduction in livestock and the dispersal of remaining herds, further eroding the viability of official equine provisioning.[51] Third, the growing need for defense along the borders prompted the diversion of labor away from ranches to garrison duty, depleting the workforce essential for maintaining pastureland operations.[52]

This decline in official horse procurement coincided with a marked rise in private tea and horse trade along the northwestern borders. Since the early Ming, private merchants had sought to trade tea for horses with Inner Asian pastoralists, despite repeated bans issued by the court. After the 1450s, however, the worsening security environment and the resulting scarcity of military personnel to oversee tea shipments provided new opportunities for private actors to dominate the trade.[53] This shift eroded the empire's control over the border exchange economy and further weakened the empire's capacity to sustain its official horse population.

[49] "Chongxiu Zhenrong cheng Beiji" 重修鎮戎城碑記, in Yinchuan meishu guan 銀川美術館, ed., *Ningxia lidai beike ji* 寧夏歷代碑刻集 (Yinchuan: Ningxia renmin chubanshe, 2007), pp. 58–59.

[50] Rossabi, "Tea and Horse Trade," pp. 149–50.

[51] *MSL* Yingzong 188, p. 3828.

[52] *MSL* Yingzong 299, p. 6352.

[53] Rossabi, "Tea and Horse Trade," pp. 149–50.

The diminished effectiveness of the Pasturage Office became a subject of contention within the imperial bureaucracy. While critics of the Pasturage Office regarded it as a money pit, supporters of the horse-rearing offices emphasized that it was a necessary expense. In 1489 during the Hongzhi 弘治 period (1488–1505), an imperial inspector for Shaanxi proposed further reducing the number of personnel in the horse-rearing directorates; this implied that the court had already dissolved some horse directorates. The Ministry of War defended the continued relevance of the ranch system, arguing that despite its current inefficiencies, the pastoral infrastructure remained indispensable. Ultimately, a compromise was reached: some officials were dismissed, but the agency itself remained intact.[54]

The severity of the situation was further highlighted in 1501 when Mongol forces launched a devastating raid into the official pastoral zones, reportedly killing over a thousand soldiers and pillaging livestock and residents on a massive scale. The attack reached as far as Pingliangfu and, according to contemporary reports, "shocked" the imperial court.[55] Another report suggested similar outcomes, namely, that the attack on Pingliangfu and Guyuan killed 1,000 soldiers and pillaged almost 100,000 people and livestock.[56] While such figures were often rhetorical or symbolic in nature – meant to convey scale rather than precise data – Yang Yiqing's reports from the same year are more concrete. Yang, who would soon be appointed to lead the revival of horse-rearing operations, reported that 3,962 horses were lost in that year alone.[57] A 1501 internal investigation later revealed that, between 1493 and 1500, about 19,400 horses had either died or been stolen (with no available figures for 1501), and that a shortage of qualified personnel made fulfilling imperial quotas for horses increasingly difficult. Yang petitioned the court to reduce the horse quotas, prompting dissatisfaction from the Ministry of War. Nevertheless, the ministry ultimately accepted his request.[58] Records from the Pasturage Office echoed the imperial court's own findings: from 1491 to 1500 the number of breeding horses was roughly 20,000 fewer than expected.

Alarmed by these developments, emperor Hongzhi launched a thorough reevaluation of the official horse-rearing practices. As part of a broader effort to restore equine capacity in the northwest, he sought

[54] *MSL* Xiaozong 24, pp. 542–43.
[55] *MSL* Xiaozong 182, p. 3358.
[56] *MSL* Xiaozong 183, p. 3379.
[57] *Guanzhong, j.* 1, p. 7.
[58] *MSL* Xiaozong 182, p. 3364.

to revive both the tea and horse trade and the administrative infrastructure of official ranches. At the end of 1502, he appointed Yang Yiqing as the left vice-censor-in-chief, tasking him with overhauling horse administration in Shaanxi.[59] He stayed in the region for eight years. In 1506, he was promoted to grand coordinator of Shaanxi to direct the defensive affairs across a vast border area in the Shaanxi region (encompassing modern-day Gansu, Ningxia, and Shaanxi). His tenure was marked by efforts to reestablish the tea and horse trade at the northwestern borders, reinforce border defenses through the construction of walls, and implement reforms in the management of pasturelands. Yang documented his initiatives in a series of memorials, which form the basis for the following analysis of his attempts to rehabilitate imperial horse-rearing in northwest China.[60]

Yang Yiqing envisioned a revitalized system of bureaucratic pastoralism that integrated the mobile and sedentary methods. To restore the effectiveness of the Shaanxi Pasturage Office, he advocated for both the expansion of border infrastructures and the consolidation of the imperial presence at the borders. As Morris Rossabi illustrates, most of Yang's actions were conventional: he sought to restore the early-Ming emperors' designs, that is, a system monitored and controlled by the government.[61] Central to his strategy was the construction of forts within pasturelands, which he saw as essential for stabilizing horse-rearing communities and ensuring institutional functionality. In a 1504 memorial, he lamented that most ranches lacked permanent offices or fortifications, forcing officials to reside in rented buildings or, more precariously, in local "cave houses 窑洞" carved into the loess hills. While such housing was common among local populations, Yang Yiqing observed that garrisoned soldiers from other regions found these accommodations unsuitable, and that this contributed to high rates of desertion. Beyond concerns for personnel, Yang stressed that horses also suffered in the absence of proper infrastructure. While open grazing was suitable in spring and summer, exposure to the severe cold and food shortages in autumn and winter led to widespread equine mortality. He linked the 1501 Mongol raid, during which thousands of horses were lost, to the absence of shelter. As a remedy, Yang called for the construction of fortified compounds, administrative offices, stables, and proper housing, arguing that such measures would reduce deser-

[59] *MSL* Xiaozong 194, pp. 3579–81.

[60] John Dardess, *More Than the Great Wall: The Northern Frontier and Ming National Security, 1368–1644* (Lanham: Rowman & Littlefield, 2020), p. 301.

[61] Rossabi, "Tea and Horse Trade," p. 157.

tion, enhance animal welfare, and reestablish the strategic viability of the ranches.[62]

Yang Yiqing moreover proposed to establish towns across the pasturelands to serve not only as administrative centers for ranch operations but also as settlements for soldiers and merchants. As he outlined, the horse-rearing infrastructure in Shaanxi comprised multiple ranches, each overseeing several subordinate camps 營, with each camp requiring a fort for protection. In total, he proposed that the Ming court construct or restore nineteen such forts.[63] However, his vision extended beyond military fortifications: these sites would become veritable towns. He not only arranged to build houses and stables, but also established market streets 街市 and had trees planted, both developments thus helping to promote trade.[64] Archaeological remains of these fortified settlements exist today; one such town encompasses about 0.06 square miles (158,800 square meters).[65] As a reference, the area of the Guyuan inner fort – revitalized in the early 1450s as the strategic core of the Guyuan Defense Area – covered about 0.49 square miles.[66] This suggests that a typical ranch fort was about one-eighth the size of Guyuan. While smaller in scale, these forts were integral components of a distributed infrastructure that supported both horse provisioning and border stabilization.

Besides founding new forts, Yang Yiqing also sought to recover lost pasturelands. A major challenge facing the horse-rearing system during this period was that the court lost a great swathe of territory to local residents, including members of local noble clans, corrupt officials, soldiers, and commoners (discussed in the next section). According to official documents, the Shaanxi Pasturage Office should have overseen about 2,926 square miles (133,777.6 *qing* 頃) of official pasturelands.[67] However, a 1500 report from the Ministry of War indicated that the central government could only identify about 1,463 square miles (66,880.8 *qing*) of land, which was less than half of the land in the official records. One of Yang's principal jobs in Shaanxi was thus to "recover" these lost lands. After conducting a full investigation, he

62 *Guanzhong*, *j.* 1, pp. 32–33.

63 *Guanzhong*, *j.* 1, pp. 33–35.

64 *Guanzhong*, *j.* 1, pp. 35–36.

65 See "Ming dai ma ying chengbao zhi ba ying gu cheng" 明代馬營城堡之八營古城, October 21, 2019 <http://blog.sina.com.cn/s/blog_48b3c5c70102y7ug.html>.

66 Ningxia wenwu kaogu yanjiusuo 寧夏文物考古研究所, ed., *Ningxia Ming dai changcheng Guyuan nei bian changcheng diaocha baogao* 寧夏明代長城固原內邊長城調查報告 (Beijing: Cultural Relics Publishing House, 2019), pp. 48–49.

67 One *qing* is about fourteen acres. *Guanzhong*, *j.* 1, p. 2.

identified encroached pasturelands that had been occupied by local residents and, in some cases, appropriated with the tacit approval or involvement of local Ming officials. He confiscated these lands, documented the recovered parcels in detail, including their number, area, and boundaries, and submitted these registers to the court.[68] It is likely that his broader initiative to build fortified settlements and to station horse-rearing officials in proximity to the pasturelands also served a preventative function, protecting these lands from further misappropriation through a sustained administrative and physical presence.

Yang Yiqing's vision was not limited to the establishment of new towns for soldiers and the recovery of misappropriated land. He also planned on creating new ranches by opening new pasturelands, establishing new towns, and recruiting new horse-rearing soldiers. In one memorial, he detailed to the court how he identified and mobilized both land and labor for these purposes. While investigating neighboring mountainous areas, he discovered a total area of 58 square miles (2,660 *qing*) of free (*kongxian* 空閑) lands that were untaxed by the government. He promptly incorporated these tracts into the state's equine provisioning system by formally registering them as official pasturelands. He also encountered more than five hundred refugees (*liumin* 流民 or *taomin* 逃民) who had long resided in these mountains, eking out a subsistence livelihood beyond the reach of official oversight. Yang reported that these individuals, facing hardship in their native homes, were "very pleased to agree" to join the ranks of horse-rearing soldiers. He offered them two choices: either return to their native homes or enlist in service on the newly established pasturelands. Most chose the latter, having already adapted to life in the mountains. Yang Yiqing subsequently distributed lands to these newly recruited soldiers for their cultivation and incorporated them into the administrative framework of the Pasturage Office.

With the addition of these new lands and recruits, Yang Yiqing established the seventh ranch of the Shaanxi Pasturage Office.[69] He further added that should the number of horse-rearing soldiers prove insufficient, additional personnel could be recruited from south China or drawn from among penal laborers.[70] In this way, Yang Yiqing expanded the imperial horse-rearing system in Pingliangfu not only through spatial intervention but also through the demographic reconstruction of its

68 *Guanzhong*, *j.* 2, pp. 17–18.

69 *Guanzhong*, *j.* 2, pp. 28-34. Afterwards, the Shaanxi Pasturage Office had its seventh ranch, see Tani, *Mindai basei no kenkyū*, pp. 149–54.

70 *Guanzhong*, *j.* 2, p. 39.

labor force, consolidating state presence while addressing the empire's ongoing demand for military horses.

The case of refugees cultivating farmlands under the pasturage office illustrates not only the growing competition between farmland and pastureland due to the population growth in fifteenth-century northwest China, but also the operation of a sociotechnical imaginary of border governance.[71] During the Yuan–Ming transition, low population density enabled emperor Yongle to designate vast stretches of ecotonal land for horse pastures. However, by the early sixteenth century, the population in the region had increased by nearly two-thirds, from 2.31 million to 3.93 million, intensifying pressures on land use.[72] In this context, Yang Yiqing's plan to convert cultivated lands into pasturelands, while incorporating displaced refugees as horse-rearing soldiers who also farmed, embodied a vision of border stabilization through the integrated management of land, labor, and livestock. This vision can be understood, following Sheila Jasanoff, as a sociotechnical imaginary: a collectively held and institutionally enacted ideal of an ordered border, animated not by scientific or technological progress, but by the political-economic logics of territorial control. Yet, as the demographic pressures and administrative challenges suggest, this imaginary often exceeded its material viability. The reliance on refugee labor and the contested reallocation of farmland underscore the disjuncture between bureaucratic ideals and local reality, a tension explored further in the next section.

Yang Yiqing's goal was to perpetuate emperor Yongle's model of bureaucratic pastoralism, particularly its hybrid approach to horse-rearing that combined mobile and sedentary practices.[73] Central to his strategy was the construction of fortified settlements that could provide shelter for both horses and soldiers during the winter months, thereby facilitating stationary care and feeding. At the same time, Yang envisioned the continuation of mobile style grazing in the summer, made possible by maintaining expansive tracts of pastureland. In his memorials, Yang Yiqing articulated what he believed to be the ideal horse population on the ranch pasturelands: with 1,872,886.4 acres of available pastureland (133,777.6 *qing*, or 2,926.385 square miles), he calculated a total of 32,500 horses.[74] This translated to approximately 57.6

71 On sociotechnical imaginaries, see Jasanoff, "Future Imperfect," pp. 1–33.

72 See Cao Shuji 曹樹基, *Zhongguo renkou shi* 中國人口史 (Shanghai: Fudan U.P., 2000) 4, p. 225.

73 *MSL* Taizong 59, p. 857.

74 *Guanzhong*, *j.* 1, p. 2.

acres per horse, or roughly 7.64 to 11.45 pounds of live horse weight per acre.[75] Compared with modern standards, which suggest a horse requires thirty to forty acres of poor-quality grazing land, and with Northern Song records, which estimated 7 acres (0.5 *qing*) per horse on more fertile land, Yang's proposed stock density was notably low.[76] This suggests that his model emphasized mobility: allowing sufficient space for horses and soldiers to engage in daily movements characteristic of mobile herding. In short, by constructing winter shelters while maintaining summer grazing expanses, Yang Yiqing aimed to institutionalize a seasonal rhythm of horse-rearing that reflected and extended Yongle's vision of hybrid equine management at the borders.

Yang Yiqing's intention to breed more horses in the Pasturage Office did not achieve the desired results. When he assumed office in 1501, the official records indicated a population of over eight thousand horses within the Shaanxi ranches.[77] Yang planned to increase this number to more than thirty thousand horses.[78] However, by the time of his departure in 1508, the actual number of horses had risen only to about thirteen thousand horses, far fewer than his target.[79] A subsequent report from 1518 noted that the number of horses in the ranches remained roughly 14,000 short of projections over the preceding eleven years.[80] Despite the expansion of grazing lands and the recruitment of additional

75 The horse height can determine horse weight. In 10th–17th c. China, the average warhorse height was about 130 to 145 cm. Based on this, we can estimate that the average weight in premodern China was 200–300 kg, or 440–660 lbs.

On the average height of warhorses in pre-modern China, see Xie, *Zhongguo yangma shi*, pp. 33–35. On how to convert the horse height to the horse weight, see "Rug Size Conversion," *Saddlery Trading Company* <https://www.saddlerytrading.com/documents/RugSizeConversionChart.pdf> (accessed March 28, 2020); "What is the Average Weight of a Horse?" *Horsemart* <https://www.horsemart.co.uk/community/article/health/what-is-the-average-weight-of-a-horse-> (accessed March 28, 2020).

76 On modern criteria for ideal horse stock density, see "How much land do I need for a horse?" (see n. 14, above). In modern grazing guidelines, high stock-density can reach 10,000 or even 100,000 lbs. per acres, see Hugh Aljoe, "What Is High Stock Density Grazing?" *Noble Research Institute*, April 8, 2019 <https://www.noble.org/news/publications/ag-news-and-views/2019/april/what-is-high-stock-density-grazing>; Heather Thomas, "Ranchers Sing the Praises of Mob Grazing of Cattle," *Beef Magazine*, February 28, 2012 <https://www.beefmagazine.com/pasture-range/ranchers-sing-praises-mob-grazing-cattle>. Moreover, according to Christopher Atwood, high stock-density grazing was possible in the premodern period, such as pastoralism around Mongol rulers' palace tents in the 12th–13th cc.; see Atwood, "Imperial Itinerance and Mobile Pastoralism," pp. 324–30.

On horse density in the Northern Song period, see Xu Song 徐松, comp., *Song Huiyao jigao* 宋會要輯稿 (Beijing: Zhonghua Book Company, 1957), bing 兵, *j.* 21, p. 26.

77 *Guanzhong*, *j.* 1, p. 7.

78 *Guanzhong*, *j.* 1, pp. 15–16.

79 *MSL* Wuzong 45, pp. 1030–31.

80 *MSL* Wuzong 169, p. 3271.

horse-rearing soldiers, the scale of equine growth envisioned by Yang remained unrealized, underscoring the persistent gap between administrative planning and ecological or logistical constraints.

Yang Yiqing's actions also redefined the institutional role of the ranches as quasi-defensive bureaus in northwest China. His strategy, constructing forts, reorganizing grazing zones, and embedding personnel in newly built facilities, not only enhanced the security of horse-rearing operations but also deepened the imperial presence along its borders. These measures reaffirmed the Shaanxi Pasturage Office as an actor in regional defense. In times of crisis, such as the Mongol incursion into Guyuan in 1522, the court consulted both the officers of the Guyuan Guard and the Pasturage Office. Similarly, a 1536 report by a local censor noted that the defense of grazing lands depended on the chiefs of horse-directorates and ranches, placing them on par with military garrison chiefs and civil officials such as magistrates and prefects.[81]

This development exemplifies what Francesca Bray describes as the operation of "technologies" as sociopolitical templates – material and institutional arrangements that, although devised for specific technical purposes, simultaneously structure wider patterns of social organization and political authority.[82] Although Yang's reforms aimed at logistical improvement, the infrastructures he introduced, forts, ranch offices, and pastureland registers, functioned beyond their immediate administrative goals. They became instruments through which imperial authority was materialized, border populations were integrated, and border territories were rendered governable. In this sense, bureaucratic pastoralism not only facilitated horse-rearing but also served as a material template for territorial rule. Yang Yiqing's efforts in reviving the function of the Shaanxi Pasturage Office yielded only partial success. Although after 1510 the Shaanxi Pasturage Office did not meet Yang Yiqing's envisioned scale of horse provisioning, it continued to supply the military garrisons, and Yang nonetheless reshaped the spatial and institutional landscape of northwest China. Through the construction of fortified ranch compounds and newly established settlements for horse-rearing personnel, he redefined the region's physical and bureaucratic infrastructure. These sedentary communities, along with preexisting patterns of mobile grazing, generated a reconfigured early-sixteenth-

81 On these two cases, see Wang Jiusi 王九思, *Wang Meibei wenji* 王渼陂文集, in *MJW*, *j.* 139, pp. 1385–86; *MSL* Shizong 188, p. 3970.

82 On Bray's concept of technology as a sociopolitical template, see Bray, *Technology, Gender and History in Imperial China*, pp. 39–56.

century "stockscape." This stockscape was not simply the result of horse-rearing practices, but the product of strategic infrastructural interventions that anchored imperial authority in space. In this built environment, Yang Yiqing articulated a renewed vision of bureaucratic pastoralism, one that integrated mobility, settlement, and administration into a durable architecture of border governance.

In sum, the transformation of horse-rearing agencies in Pingliangfu in the early-sixteenth century reflects a broader shift in imperial border policy. Initially designed to meet logistical needs through equine provisioning, these agencies gradually assumed quasi-administrative and defensive roles in response to escalating Mongol incursions and administrative challenges. Yang Yiqing's ambitious reforms embodied the enduring vision of bureaucratic pastoralism: a hybrid sociotechnical regime grounded in imperial ideals of order, mobility, and territorial control. His efforts to construct fortified infrastructure, reclaim pasturelands, and reorganize labor embedded imperial authority into the socioecological fabric of the northwest. Although these reforms ultimately failed to restore horse numbers to their intended levels, they generated new patterns of land use, labor organization, and infrastructural development. The remade stockscape highlights Ming authorities' attempt to preserve the pastoral configuration initiated in the early-Ming period. Yet this vision of bureaucratic pastoralism, rooted in centrally imposed objectives, often clashed with the priorities of local officials and residents. The following section explores these tensions in greater detail.

RECOGNIZING PARTIAL CULTIVATION AND MONETIZING REVENUE IN BUREAUCRATIC PASTORAL ZONES

Acting as the Ming court's agent, Yang Yiqing sought to revive the functions of the Shaanxi Pasturage Office, a key agency for imperial stock-breeding. However, his initiatives clashed with the interests of local civil administrations at both the prefectural and county levels. The formal preservation of grazing lands for official horse-rearing conflicted with the mounting demands of local residents, who favored agricultural expansion as a source of livelihood. Over the course of the sixteenth century, partial segments of land within the bureaucratic pastoral zones, specifically those tracts with relatively fertile soil and access to water, were gradually converted into farmland. Rather than reversing this trend, Ming authorities responded by recognizing and taxing this partial cultivation as a source of revenue to support horse

procurement, while still maintaining the institution of official horse-rearing on the remaining pasturelands. This section examines how this partial cultivation was officially recognized, regulated, and monetized, highlighting the evolving administrative role of the Pasturage Office in response to demographic pressures and land-use shifts in the Ming northwest.

As the Pasturage Office came to administer a significant portion of the lands within a prefecture and gradually assumed quasi-administrative functions, provincial and local authorities increasingly viewed it as a competing agency. While central court officials emphasized the strategic necessity of maintaining the horse ranches to ensure a steady cavalry supply, local officials regarded the Pasturage Office as an encroachment: it controlled large tracts of land exempt from taxation and removed from their local governance. Furthermore, the preservation of pasturelands precluded the latter's conversion to farmland, even as swelling populations and recurrent famines drove commoners to seek new cultivable land. During times of hardship, it was common for displaced or landless residents to encroach upon official pasturelands, which they treated not as the military infrastructure that they indeed were, but as latent agrarian resources. These tensions, between imperial objectives and local land pressures, lay at the heart of certain conflicts that shaped the role of the Pasturage Office in the sixteenth century.

We cannot determine the views of ordinary residents toward the imperial horse-rearing institutions: few left behind any written records. The only extant local perspective comes from Zhao Shichun 趙時春 (1509–1567), a Ming literatus and official, and a native of Pingliangfu. Zhao enjoyed a moderately successful bureaucratic career and was appointed grand coordinator of Shanxi in 1553. That same year, however, his military forces were decimated in a border conflict, resulting in his demotion to commoner status.[83] Following this downfall, Zhao returned to his hometown, where he was invited to edit a local gazetteer of Pingliangfu titled *Pingliang fu zhi* 平凉府志, referred to earlier in this article.[84]

In the first volume of the gazetteer, Zhao Shichun voiced deep dissatisfaction with the proliferation of non-civil agencies in his home region. He lamented that much of the land within Pingliangfu was occupied by the Pasturage Office, military garrisons, and members of the imperial clan, rendering the prefecture's place in the Ming administra-

[83] *MSL* Shizong 402, pp. 7037–38; *MSL* Shizong 405, p. 7081.

[84] Cited in full, n. 3, above.

tive hierarchy effectively nominal.[85] Based on his own investigation of local history, including oral accounts by village elders, Zhao identified thirteen systemic flaws in the Ming administration of Pingliangfu. Foremost among them was number five – the overwhelming presence of personnel affiliated with the horse-rearing and military agencies. According to Zhao, their numbers exceeded those of the regular prefectural and county officials by a factor of ten. These officials seized vast tracts of land that would otherwise have been available for civilian use. Yet despite this encroachment, local tax obligations remained unchanged, placing a disproportionate burden on the remaining civilian population and driving many residents to flee the region. As a result, Zhao observed, the local civil administration, namely the prefectural and county governments, experienced a decline in both its population base and its own local tax revenues.[86]

Zhao Shichun's critique was grounded in both empirical observation and ideological conviction. As I showed in the first section, emperor Yongle's initial allocation of pasturelands in the 1400s was explicitly aimed at utilizing uncultivated tracts in northwest China for official horse-rearing, thereby avoiding disruption to existing agricultural land. Later, however, Zhao Shichun would be critical of Yongle's land-use policy. In the fourth volume of his Pingliangfu gazetteer, he indicated that after the government pacified the chaos that occurred during the Yuan-Ming transition, the region still contained abundant forested, weedy, and saline lands, areas not yet cultivated but lying fallow and awaiting agricultural development.[87] Yet rather than reserving these lands for local use, emperor Yongle, as we have already discussed, established official ranches upon them. Moreover, subsequent imperial policies furthered this trend: additional uncultivated tracts were allocated to military garrisons, ranches, and members of the imperial clan. To support these extralocal agencies and their personnel, the court imposed increased fiscal burdens on the local civilian population.[88] From Zhao's pragmatic perspective, imperial expansion of bureaucratic and military agencies came at the direct expense of local communities. Ideologically, Zhao viewed all uncultivated land within Pingliangfu as latent civilian farmland and rejected the legitimacy of its conversion into pasturelands. He condemned the horse-rearing agencies for "seizing all

85 *Pingliang, j.* 1, p. 19.

86 *Pingliang, j.* 1, pp. 21–23.

87 Saline lands, in this context, refer to alkaline or salt-affected soils that, while initially unproductive, could potentially be reclaimed for farming through labor and proper management.

88 *Pingliang, j.* 4, pp. 1–2.

civilians' uncultivated farms 奪諸民未墾之田," which reflected what was considered a normative idea, namely that all lands within Pingliangfu should be reserved for agricultural development under local control, rather than repurposed for imperial pastoralism.

From the perspective of local officials such as Zhao Shichun, and likely that of many local residents, the Pasturage Office was squandering large expanses of land that could have been brought under cultivation. Yang Yiqing had envisioned a horse-rearing system based on low stock-density, whereby vast tracts of land were reserved under the jurisdiction of the Pasturage Office. His model required soldiers to raise horses through extensive grazing practices and regular daily movement, leaving substantial portions of pastureland deliberately underutilized. To local observers facing mounting demographic and fiscal pressures, such underuse appeared not as prudent resource management but as a misallocation of potentially productive agricultural land.

Underutilized lands increasingly attracted the attention of local residents and officials alike. Corrupt officers occasionally appropriated them for personal use; landless refugees cultivated them in defiance of state regulations; and even members of the court advocated for their redistribution during periods of famine. In 1489, Xiao Zhen 蕭禎 (1432–1501), an imperial inspector for Shaanxi, proposed the dissolution of certain horse directorates, officially citing the ranches' vulnerability to Mongol raids. Yet it is possible that Xiao harbored an additional, unstated motive: the reallocation of grazing lands to displaced and landless populations. One of his primary assignments in Shaanxi was to resettle deserters and refugees. That same year, he petitioned the court to distribute abandoned farmlands to residents of Xi'an, the provincial capital.[89] In this context, it is reasonable to infer that Xiao also envisioned repurposing parts of the Pasturage Office's extensive holdings as farmland for those in need.

The appropriation of grazing lands for cultivation was not only the expected reaction to an incapable administration, concerned about land seizure by corrupt officers and local ruffians. It also reflected deeper structural tensions stemming from increasing population and the resulting competition for land use between farming and animal husbandry. On this matter, previous scholarship has tended to argue that Ming officials were unable to safeguard official pasturelands, attributing this

[89] Jiao Hong 焦竑, ed, *Guochao xianzheng lu* 國朝獻徵錄 (rpt. *Ming dai zhuanji congkan* 明代傳記叢刊 [Taipei: Mingwen shuju, 1991]), *j.* 52, pp. 12–14. Wan Ming 萬明, *Ming dai "Wanli kuaiji lu" zhengli yu yanjiu* 明代"萬曆會計錄"整理與研究 (Beijing: China Social Sciences Press, 2015), p. 294.

failure primarily to entrenched interests at the local level.[90] However, such interpretations overlook the underlying conflict between competing ideologies of land use. Such tensions manifested not only in the rivalry between farming and animal husbandry, but also from divergent administrative logics, namely, the friction between horse-rearing institutions and the local civil bureaucracy, each of which embodied different priorities regarding territorial governance.

In addition, the hybrid model of horse-rearing envisioned by the Ming court gradually gave way to sedentary practices on the official pasturelands. This shift was not necessarily the result of a deliberate policy change, but rather the cumulative outcome of administrative compromises, demographic pressure, and economic necessity. As noted above, population growth was one such pressure. Equally important, however, were the subsistence challenges faced by the horse-rearing soldiers. In theory, these soldiers were sustained by monthly provisions 月糧, allowing them to dedicate themselves entirely to stock-breeding.[91] We can surmise, however, that in practice the stipends were likely insufficient, irregular, or subject to deductions, forcing many to seek supplementary income through farming.

To alleviate the pressure, officials under the Pasturage Office in the 1500s began distributing parcels of pastureland to horse-rearing soldiers for agricultural use. As discussed in the previous section, Yang Yiqing had explicitly recognized that many of the refugees he recruited as horse-rearing soldiers continued to engage in cultivation on the designated pasturelands. In another memorial, he further noted that this practice of land allocation by ranch officials was already under way.[92] By documenting the practice, Yang tacitly acknowledged the impracticality of implementing full-scale mobile horse-rearing under conditions of fiscal austerity and ecological constraint. Ad hoc land allocations were thus not part of a deliberate reform, but rather an improvised response to material constraints.

Over time, the relevant communities evolved into hybrid agro-pastoral settlements, where soldiers engaged in both cultivation and pastoralism. As more soldiers were permitted or compelled to farm, the seasonal grazing cycles essential to mobile horse-rearing, particularly

[90] E.g., Yao Jirong 姚繼榮, "Ming tai xibei pu yuan guanmu zhidu ji qi yanbian" 明代西北僕苑官牧制度及其演變, *Journal of Qinghai Normal University (Philosophy and Social Sciences)* 86 (2000), pp. 53–58; Xue Zhengchang 薛正昌, "Ming dai Ningxia mazheng" 明代寧夏馬政, *Journal of Ningxia University (Social Science Edition)* 25.6 (2003), pp. 58–64.

[91] On the horse-rearing soldiers' monthly provisions, see *MSL* Xiaozong 130, p. 2299.

[92] Yang, *Yang Shicong wenji*, *j.* 117, p. 1112.

summer mobility, became increasingly untenable. Instead, soldiers either practiced sedentary horse-rearing or abandoned their stock-breeding duties altogether. Rather than reflecting a deliberate abandonment of mobile principles, this shift illustrates how administrative improvisation and socioeconomic adaptation fostered a modified model of land use, one that blended both sedentary and mobile elements within the imperial framework.

It is important to note that cultivation within the Pasturage Office's jurisdiction was inherently partial, confined to the limited subset of its total landholdings. Only those tracts with relatively fertile soil and reliable water sources were suitable for sustained agriculture and attracted long-term encroachment by local residents. According to official land surveys, of the 1,872,886.4 acres (133,777.6 *qing*) administered by the Shaanxi Pasturage Office, only 514,531.8 acres (36,752.27 *qing*), or roughly one-quarter, were classified as cultivable. The remaining areas consisted largely of arid, rocky, or otherwise topographically challenging terrain, rendering them unsuitable for long-term agriculture.[93] While some of these marginal lands may have been temporarily cultivated during periods of famine or demographic pressure, they generally failed to support stable harvests and were soon abandoned. As a result, the competition between farming and pastoralism was concentrated primarily on the more arable minority – those tracts that were gradually converted into farmland over the course of the sixteenth century. This dynamic underscores the fundamentally partial nature of agricultural expansion within the bureaucratic pastoral zones.

Nevertheless, ranch officials continued to fulfill the obligation of supplying horses to the border garrisons through an alternative mechanism that emerged in practice: substituting silver payments for horses. This arrangement worked as follows: first, ranch officials collected silver from the horse-rearing soldiers instead of receiving their horses directly; second, they transferred this silver to the border garrisons as a designated fund for horse procurement; and third, the border garrisons then used the silver to purchase horses. The practice originated as a remedial measure introduced by Yang Yiqing in 1508, when he allowed soldiers unable to produce horses – due to equine infertility or other constraints – to pay three taels of silver instead. However, what

93 The land surveys were likely conducted during the Ming period, but the results preserved later, in a local gazetteer compiled during Qing; see Li Di 李迪 et al., comp., Liu Guanghua 劉光華 et al., punct. and coll., *Qianlong Gansu tong zhi* 乾隆甘肅通志 (Lanzhou: Lanzhou U.P., 2018), *j.* 13, p. 560.

originated as a pragmatic workaround in exceptional cases gradually evolved into a routine mode of operation.

As the Pasturage Office increasingly accepted silver in place of horses, this shift eased the logistical and economic burdens on soldiers and ranch officials. Horse-rearing required significant inputs: extensive pasturelands, fodder, veterinary care, and continuous labor. In contrast, silver payments allowed soldiers to reallocate time and resources toward cultivating food crops, which were essential for their household subsistence amid growing pressures for self-sufficiency.[94] Unlike livestock, silver could be collected, stored, and redistributed with far less risk, labor, and daily oversight. For some soldiers, this shift enabled a partial or full retreat from active pastoral duties; for others, horse-rearing continued, though in more constrained or supplementary forms. Rather than the result of an intentional policy shift, this evolution reflected the cumulative effects of administrative improvisation, institutional inertia, and socioeconomic pressures. The monetization of obligations did not eliminate animal husbandry and the broader pastoral framework altogether, but it did institutionalize a more flexible and mixed model of pastoral provisioning, one that increasingly accommodated sedentary agricultural practices within the evolving bureaucratic landscape of border horse-management. (The changing role of silver in Ming fiscal policy is discussed below.)

At the same time, the Pasturage Office began to formally collect cultivation-based revenues in silver from portions of the lands under its jurisdiction and to allocate these funds for the procurement of horses. The process unfolded in several steps: first, relatively fertile parcels were leased to local residents for agricultural use; second, ranch officials collected rent from these tenants in the form of silver. This silver was referred to as "grassland rent silver 草場租銀" or "horse price silver 馬價銀." Finally, the silver was remitted to the border military garrisons, which used it to purchase horses. This practice can be traced back to Yang Yiqing, who in 1504 began collecting silver from cultivated lands under the pretext of administrative fees.[95] Building on this precedent, ranch officials subsequently formalized the leasing of the parcels for cultivation. In 1521, the Ministry of War explicitly acknowledged the widespread appropriation of such land by local residents and recommended legalizing the practice by instituting formal leases, an approach

[94] Chu, *Chu Sinong wenji*, in *MJW*, *j.* 386, p. 4183. Chu Fu submitted this report in 1572, see *MSL* Shenzong 7, pp. 251–52.

[95] Chu, *Chu Sinong wenji*, in *MJW*, *j.* 386, p. 4183.

that received imperial approval.[96] This decision suggests that agricultural encroachment had become sufficiently pervasive to prompt institutional adaptation. By the time Yang Yiqing returned to Shaanxi in 1525 as the supreme commander overseeing border defense, the Pasturage Office had amassed a considerable quantity of silver through such rents.[97] Yang Yiqing drew on this revenue to provide the border garrisons with horses, offering a practical means to meet the empire's provisioning requirements.[98]

The integration of silver as an officially recognized output of the Pasturage Office in the early-sixteenth century coincided with the initial stage of Ming China's broader transition toward a silver-based economy. While the court had occasionally accepted silver as a medium for tax payment as early as the fifteenth century, its role remained limited. Over time, however, as both the imperial fiscal demands and market transactions increasingly centered on silver, it assumed a more central role in the empire's monetary regime. By the early-sixteenth century, the Ming government had begun to impose fixed silver tax quotas on local administrations, a clear indication that silver had become an indispensable instrument of fiscal governance.[99] The gradual monetization of the Pasturage Office thus must be understood within this larger economic transformation, reflecting the growing convergence between imperial revenue strategies and the evolving dynamics of the silver-based market economy.

While the gradual monetization of the Pasturage Office's output signaled a shift in how the empire collected revenue, the gradual turn to private horse procurement reflected a broader reconfiguration of imperial provisioning strategies, namely, an increasing reliance on market mechanisms. Ming sources indicate that local residents of the "Western Border 西塞," (likely referring to Shaanxi) primarily engaged in animal husbandry as a means of livelihood. These records further suggest that Ming officials relied heavily on horses obtained from such local populations, implying that an increasing portion of the horses supplied to border garrisons likely originated from resident breeders in Shaanxi. Alternatively, silver remitted to the border garrisons could be used to purchase goods, such as textiles, food, and daily supplies, from nearby

[96] *MSL* Shizong 6, pp. 257–58.

[97] On Yang Yiqing's second service in Shaanxi, see Dardess, *More Than the Great Wall*, p. 374.

[98] *MSL* Shizong 55, p. 1341.

[99] Noa Grass, "Imperial Silver Laundering: The Official Narrative on Gold Floral Silver and the Silverization of Ming State Finance," *Ming Studies* 76 (2017), pp. 7–31.

markets, which were then brought to the horse fairs along the Chinese-Mongol frontiers and used to buy horses from Mongol traders.[100] As imperial officials increasingly turned to the market to meet provisioning needs, they moved away from exclusive reliance on horses reared within official ranches.

In mid-1572, an imperial inspector for Shaanxi proposed expanding the amount of land officially leased for cultivation in order to increase silver revenues from the territories administered by the Pasturage Office.[101] His initiative reflects broader dissatisfaction over the low productivity of extensive horse-rearing on the official pasturelands. It is highly likely that, by this time, most of the more fertile lands under the Pasturage Office had already been converted into farmland. The inspector's memorial did not introduce the practice of cultivation per se, but it did mark a critical policy shift: the large-scale and officially sanctioned monetization of this transformation through systematic leasing and silver rent collection. Although these lands under the Pasturage Office became de facto cultivated lands, official documents continued to refer to them as "grasslands 草場" or "pasturelands 牧地," preserving their nominal association with horse-rearing. In response to the inspector's memorial, and following court deliberations, an edict issued only a few months later, at the end of 1572, ordered that, beginning the following year, the Pasturage Office would collect silver from 601,594 acres (42,971 *qing*) of cultivation land 熟地 leased to tenant farmers.[102] When compared with official land surveys that indicate that 514,531.8 acres (36,752.27 *qing*) under the Pasturage Office were suitable for cultivation, this figure suggests that by that time all arable land within the agency's jurisdiction had been formally converted to farmland and brought under taxation by this time.

The silver collected from these cultivated lands became a significant source of revenue, with one courtier referring to it as "pasture-land tax silver 牧地稅銀." In 1572, the total tax revenues projected for the following year (1573) from the cultivated lands administered by the Shaanxi Pasturage Office were estimated at about 18,320 taels of

[100] See *MSL* Shenzong 201, p. 3773. I suggest that Ming border garrisons likely used silver to procure horses from domestic markets or, alternatively, to purchase goods from nearby local markets, which were then used to buy horses at the horse fairs. This inference is based on the fact that silver functioned as a common medium of exchange in internal trade, whereas at these frontier fairs, Ming officials typically used Chinese goods to purchase horses from Mongol traders. On the media of exchange used at the horse fairs, see Henry Serruys, *Sino-Mongol Relations during the Ming, Vol. 3: Trade Relations, The Horse Fairs (1400–1600)* (Bruxelles: Institut belge des hautes études chinoises, 1975), pp. 255–68.

[101] *MSL* Muzong 57, pp. 1401–2.

[102] *MSL* Shenzong 7, pp. 249–50.

silver.[103] Shortly thereafter, another courtier suggested increasing the amount of silver extracted from these lands to help finance the salaries of border soldiers. This proposal was ultimately rejected, as other officials contended that most tenant farmers could not withstand an increased tax burden.[104] This debate in the court underscores a shifting perception among Ming officials: the Pasturage Office was increasingly viewed not only as a horse-rearing agency, but also as a land-tax collecting bureau.[105]

The ratio of land to horses on the grazing lands under the Shaanxi Pasturage Office in the 1570s indicates a marked departure from the hybrid horse-rearing models promoted by emperor Yongle in the early 1400s and later revived by Yang Yiqing in the early 1500s. Under Yang's tenure, about 13,000 horses were raised on grazing lands totaling 1,872,886 acres, a ratio of roughly 144 acres per horse, consistent with a low-density, mobility-oriented model of pastoralism. By contrast, figure from 1572 suggest a significantly higher stock density: 19.5 acres per horse (171,514 acres/8,770 horses). These ratios imply a shift toward more intensive equine management, likely accommodated by the increasing integration of agriculture on lands formerly reserved exclusively for grazing. Together, these figures reflect the late-Ming court's pragmatic adaptation of imperial horse-rearing policies – abandoning the earlier emphasis on expansive mobility in favor of a more compact, mixed-use model of land and livestock management.[106]

This transformation suggests that, despite reductions in both pastureland and horse numbers, the ranch offices were expected to operate with greater overall efficiency by generating increased silver revenues for horse procurement. During the mid-sixteenth century, court discussions sometimes expressed concern over the insufficient number of horses being reared on the official pasturelands. In response, Ming authorities officially monetized the cultivated portions of land under the Pasturage Office's jurisdiction. Rather than relying solely on officially reared horses, they directed ranch officials to collect increas-

[103] *MSL* Shenzong 7, pp. 249–50.

[104] *MSL* Shenzong 8, pp. 286–87; Chu, *Chu Sinong wenji*, in *MJW*, *j.* 386, pp. 4183–84.

[105] A comparable development occurred within another imperial horse-rearing agency, the Court of the Imperial Stud (*Taipu si* 太僕寺). Increasing numbers of officials came to view this horse-rearing agency as a silver-collecting office. See Liu Liping 劉利平, *Cong mazheng dao caizheng: Ming dai zhong hou qi taipu si de caizheng gongneng he yingxiang* 從馬政到財政, 明代中後期太僕寺的財政功能和影響 (Beijing: Zhonghua Book Company, 2021).

[106] The abandonment of extensive horse husbandry by soldiers under the Shaanxi Pasturage Office was likely driven in part by regional population growth, which exerted increasing pressure on land resources and contributed to the intensification of land use.

ing amounts of silver from tenant farmers and use these revenues to purchase horses on the market. In this way, the previously unauthorized or informal cultivation of select tracts was officially recognized, marking a shift in the administrative function of the Pasturage Office: from a dedicated horse-rearing apparatus to a bureau tasked with both livestock provisioning and fiscal extraction. Once the office started to collect silver from farmland, annual revenues reportedly rose by an additional 18,000 taels. Taken together, these developments reflect the late-Ming empire's pragmatic recalibration of border resource management, charging the Pasturage Office with the responsibility of sustaining a reliable cavalry supply while maximizing fiscal returns on partially cultivated lands.

While the taxation of cultivated land under the Pasturage Office might appear to represent a deliberate policy of agricultural development, Ming authorities were not the principal drivers of environmental transformation in these zones. The shift from a purely pastoral regime to a mixed landscape, where designated "official pasturelands" gradually became interspersed with fields and permanent settlements, was neither abrupt nor the result of centralized planning. Instead, it unfolded incrementally through localized adaptations: displaced populations encroached upon underutilized tracts; under-compensated horse-rearing soldiers cultivated marginal lands to supplement their livelihoods; and tenants turned to subsistence farming. The formal recognition and monetization of these partial cultivations thus represented a reactive measure of bureaucratic accommodation rather than a proactive agrarian policy. The resulting new stockscape, a hybrid landscape of pasture, farmland, and agro-pastoral communities, emerged less from imperial design than from the adaptive improvisations of border residents. Thus, the ecological and fiscal reconfiguration of these zones was driven primarily from below, with the Ming administration formalizing preexisting grassroots transformations rather than directing them.

To conclude, during the 1510s, Ming authorities still sought to uphold Yongle's ideal of bureaucratic pastoralism by reinforcing the formal structure of the Shaanxi Pasturage Office. Yet it was during this very effort at consolidation that the office began to take on new fiscal functions. Over time, officials increasingly relied on silver extraction from partial cultivation within the pastoral zones and permitted the procurement of horses from private markets, thereby abandoning exclusive reliance on livestock raised within the official pasturelands. This transformation did not stem from a centrally orchestrated vision of land development or environmental engineering. Rather, it evolved through

a series of administrative accommodations to preexisting conditions, pressures from local populations, the subsistence needs of horse-rearing personnel, and the persistent encroachment on the more fertile grazing lands. This transition generated what may be termed a new stockscape – a hybrid socioecological formation characterized by intersecting regimes of grazing, cultivation, and agro-pastoral settlements, in which communities engaged in both agriculture and sedentary forms of horse-rearing. What emerged was not the dismantling of the pastoral system, but its gradual reconfiguration: a shift from expansive, mobility-based horse-rearing to a hybrid model that integrated elements of intensive pastoralism and fiscal extraction from cultivated plots into the institutional framework of the ranch offices.

CONCLUSION

The evolution of horse-rearing institutions in Ming China's northwestern ecotones reveals the adaptive vision behind what this article terms bureaucratic pastoralism, an imperial project that sought to integrate local livelihoods, territorial administration, and ecological management into the framework of border governance. In the premodern world, cavalry played a critical component in warfare, and horses constituted one of the most strategically vital military resources. As a result, nearly all major premodern empires developed state-managed systems to secure a reliable supply of horses. The Ming empire was no exception.

Among these regimes, the Ming case stands out for its institutional rigor and administrative accountability.[107] Rather than treating grasslands as unproductive wastelands awaiting agrarian transformation, Ming authorities recognized these grasslands as critical imperial pasture resources that required systematic governance. To this end, the Ming court established specialized agencies to oversee both equine provisioning and pastureland administration. These institutions implemented detailed protocols to monitor land use and livestock productivity. Officials meticulously calculated pastureland acreage, maintained annual horse registers, and set production quotas based on the number of horse-rearing soldiers and the extent of pastureland under their charge. These soldiers were held to strict performance standards and

[107] For other cases of state-managed horse-rearing in premodern empires, see Ann Hyland, *The Warhorse, 1250–1600* (Stroud, Gloucestershire: Sutton Publishing, 1998); Kathryn Renton, *Feral Empire: Horse and Human in the Early Modern Iberian World* (Cambridge: Cambridge U.P., 2024).

made personally accountable for any shortfalls, including financial restitution for missing or deceased animals.

Ming bureaucratic pastoralism exemplifies how a premodern empire constructed durable institutions to manage pastureland, livestock, and labor across contested borderlands. Initially established under emperor Yongle, the Pasturage Offices and their affiliated ranches operated independently of civil administration and functioned as key institutional and logistical foundations of imperial authority. Drawing on Mongol pastoral precedents but embedding them within a bureaucratic framework, Ming authorities constructed a hybrid system of stock management that combined seasonal mobility with administrative oversight, aiming to sustain cavalry forces, regulate border land use, organize border communities, and assert control over both people and land. Within this framework, livestock management was not merely a logistical concern, but a bureaucratically embedded obligation that integrated environmental governance with imperial power.

As external threats intensified and encroachment reduced available pasturelands, the operational capacity of these institutions came under strain. In response, officials like Yang Yiqing in the 1500s attempted to reinvigorate this model by reorganizing labor, recovering misappropriated pasturelands, and constructing a fortified administrative infrastructure. These efforts, though only partially successful in restoring horse numbers, nonetheless reshaped the political ecology of Pingliangfu and reaffirmed imperial oversight through a renewed configuration of land, labor, and ecological resources.

Yet even the institutional rigor and infrastructural expansion could not fully contain the transformations unfolding within local landscapes. Ming authorities were not the primary agents of environmental change in these zones; rather, they responded to dynamics already set in motion by local residents. As the institutions expanded their reach, they encountered increasing resistance from local officials and communities whose economic needs increasingly conflicted with the empire's pastoral priorities. During the early-sixteenth century, the Pasturage Office had begun to drift from its founding ideals. Encroachment by displaced populations, the subsistence demands of horse-rearing soldiers, and shifting patterns of land use prompted officials to accommodate partial cultivation within the pastoral zones and allow the purchase of horses from private sources.

What emerged was not the dissolution of bureaucratic pastoralism but its pragmatic transformation into a mixed-use regime. The new

stockscape – a socioecological formation of overlapping grazing, cultivation, and agro-pastoral settlements – reflected the Ming empire's flexible approach to border governance. In practice, bureaucratic pastoralism became a hybrid creation: part normative vision for imperial border governance, part ad hoc response to the realities on the ground. The partial unraveling of the original design, evident in the shift to silver-based quotas and the shrinking of open pasturelands, was not a failure but a revealing moment of recalibration. It highlighted both the limits of centralized authority and the adaptive resilience of Ming statecraft, which adjusted its strategies without abandoning its fundamental aim of securing and administering the borderlands.

Theoretically, the evolution of bureaucratic pastoralism in Pingliangfu exemplifies how imperial projects can serve as both ideological visions of order and technological interventions. In Francesca Bray's terms, the Ming horse-breeding infrastructure functioned as a template for ruling the borders: its forts, ranches, and registries were ostensibly designed to raise horses, but they also structured social and political life in borderlands beyond that immediate purpose. These institutions materialized imperial power across the landscape, from the organization of pasture towns to the daily routines of horse-rearing soldiers and their animals. Likewise, drawing on Sheila Jasanoff's concept of sociotechnical imaginaries, bureaucratic pastoralism embodied a collectively imagined vision of border order, in which expertise in animal husbandry, logistics, and land management was coproduced with a normative framework of imperial authority. This imaginary cast the grasslands as a disciplined, productive space that could be engineered to serve the empire's future security and prosperity.

Pingliangfu represents a particularly well-documented case of Ming bureaucratic pastoralism, but it should not be taken as a uniform model for all regions in China. The Pasturage Office system was limited in its geographic scope and was found primarily in northwest and northeast China, where ecological conditions and military demands justified the establishment of large-scale, specialized official-managed horse-rearing agencies. Moreover, the administrative operations of the Pasturage Office in the northeast are comparatively less well-documented, making detailed analysis difficult. In contrast, the Ming court adopted alternative strategies in other regions. In north and south China, for instance, horse-rearing relied on civilian households, while in other border zones, guard soldiers were tasked with equine maintenance as part of their garrison duties. These variations underscore the flexible and context-specific nature of Ming horse-rearing policy. Rather than

offering a template, Pingliangfu exemplifies one mode of imperial land-use governance, intensively institutionalized and territorially embedded, within a broader repertoire of adaptive strategies employed by the empire across its diverse ecological borders.

In sum, the case of bureaucratic pastoralism in northwest China offers a powerful lens through which to examine how a premodern empire sought to govern its ecological margins. Through institutions that blended mobility with administration, and through policies that balanced imperial ideals with border realities, the Ming court pursued a form of border governance that was both structured and adaptable. This study thus contributes not only to the environmental and institutional history of the Ming empire, but also to wider scholarly discussions on how early empires sustained authority over complex and contested landscapes through infrastructural design, ecological management, and bureaucratic innovation.

LIST OF ABBREVIATIONS

Guanzhong	Yang Yiqing 楊一清, *Guanzhong zouyi* 關中奏議
MJW	Chen Zilong 陳子龍, Xu Fuyuan 徐孚遠, and Song Zhengbi 宋徵璧, eds., *Ming jingshi wenbian* 明經世文編
MS	Zhang Tingyu 張廷玉 et al., *Ming shi* 明史
MSL	Zhongyang yanjiu yuan lishi yuyan yanjiu suo 中央研究院歷史語言研究所, comp., *Ming shilu* 明實錄
Pingliang	Zhao Shichun 趙時春, comp., *Pingliang fu zhi* 平凉府志