Chapter 5: The Zone of Upland Mixed Economy.

Between the Intensive Agricultural Zone of China and the similar intensive agriculture zones of India and Southeast Asia lies a vast mountainous region, comprising the eastern and southeastern "foothills" or "fringes" of the Tibetan Plateau, which was formed when India slammed into Asia between 55 and 25 million years ago. It is a zone of extreme relief (Henck et al. 2011), crosscut by high mountain ranges and deep river valleys, which has two implications for its physical geography. First, within very short distances, climate varies from semi-arid subtropical through moist temperate to alpine, or within similar distances in other areas, from moist-tropical to sub-tropical to temperate. Second, the topography itself is very vertical. There are small patches where intensive agriculture is possible, but they are separated by wide stretches of mountain slopes where, until very recently, the main mode of cropping was shifting agriculture, in which people clear a patch of forest land, farm it until its soil fertility runs low—typically just a few years—and then allow it to revert to forest, moving on to another patch. Depending on climate, slope, and soil types, after anywhere from 8 to 50 years the original patch will be ready to farm again (Altieri 1995: 130-36; Berkes 1999: 60-68; Sturgeon 2005: 120-22). This type of agriculture supports population densities in the tens per square kilometer—about an order of magnitude lower than the intensive agriculture zone and about an order of magnitude higher than the pastoral zone. In addition, shifting agriculture is more productive per unit of labor than is intensive agriculture (Whitney 1980: 111). As long as population density remains low, the shifting agricultural regime can be sustained for many centuries.

Joseph Whitney, in fact, refers to the Mixed Economy zone as the "zone of shifting agriculture." This, however, is a misleading designation. In the first place, there are alluvial basin areas where people have long practiced intensive agriculture, as around Kunming and Dali in central Yunnan, around Xichang in southern Sichuan, around Anshun and Weining in Guizhou, and around in the Tai-speaking areas of Sipsong Panna in on the Lao-Yunnan border, Keng Tung in northern Burma, Chiang Mai in northern Thailand, and Vientiane in Laos. In these areas, relatively small-scale state organizations have developed over the last two millennia, deriving their surplus revenue from agricultural taxes or labor levies on peasant farmers (Leach 1954, Hsieh 1995, Whitaker 2008; Wang Ningsheng 1985; Backus 1981; Wiens 1954). These are, in a sense, mini-zones of intensive agriculture, duplicating on a much smaller scale the relations of production found in the macro-zone we have called China proper. Second, even outside the zones of small-scale state-formation, there are local patches, usually of flat, alluvial land, where people grow crops on short-fallow rotations or even every year, restoring soil fertility with farmhouse fertilizer rather than by long-term fallowing. Third, people who practice shifting agriculture, or a combination of shifting and constant agriculture, almost always also keep fairly sizable herds of domestic livestock, much smaller than those found in the Pastoral Zone, but much larger than those kept by Han farmers in China Proper. Fourth, forestry is much more important here than in most parts of either China Proper or the pastoral zone, as people typically have access to more forested area and more trees per person, extracting not only timber and firewood, but many wild plant and animal products from their forests (Sturgeon 2005: 18-23; Urgenson et al. 2010; Trac et al. 2013). There is thus an ecologically-influenced continuum of subsistence strategies

here, from mostly agricultural to mostly pastoral, with the most widespread consisting of what we might call agro-silvio-pastoral adaptations (see Xu et al. 2005).

As a result of its extreme relief and fragmented topography, subdivisions within this zone tend to be based on ecological patch structure. Unlike peoples in the pastoral zones, who move between patches according to the annual round of growth and ripening of grasses, most peoples in the Upland Mixed Zone are stationary, and thus the subunits tend to be divided by watershed and by altitude. In many cases, these distinctions of subsistence coincide with distinctions of language, religion, and ethnic identification, though not always (Leach 1954, Harrell 2001, Scott 2009). Often one ethnic group will occupy the valley floors, forming a small state or becoming a loose dependency of an empire centered in an intensive agricultural zone of East or Southeast Asia. Other ethnic groups will occupy different ecological niches at different altitudes, and ordinarily have decreasing interaction with the large states or empires they higher up they live, though there are often relationships of trade or of feudal subordination between groups at different elevations (Tapp 2001, Cheung 1995, Hansen 1999, Hsieh 1995). Thus the sub-units here are divided along two dimensions: a watershed is held together by peoples living downstream and upstream, or streamside, hillside, and hilltop, while a people living at a common elevation is united across watersheds by bonds of language, culture, kinship, and intermarriage.

Because there is no clear dividing line between the intensive agriculture and the mixed economy zones, but rather a patchy landscape of intensive agriculture, mixed economy, and pastoral modes of subsistence (Xu et al. 2005), and because within the intensive agricultural zone itself, particularly in its southern areas, there are large patches unsuitable for cultivation, the boundaries between China Proper and the Upland Zone are not strictly drawn, and have varied across history. The historical process of shifting boundaries stands in sharp contrast to the process on the frontier between China Proper and the Pastoral Zone, where there were clear barriers to the expansion of Chinese methods of intensive agriculture and to effective Chinese bureaucratic control, barriers that remained until the introduction of industrial technologies in the 20th century. As the Hua or Xia peoples who formed in the North China area in the 4th and 3rd millennia BCE began to spread their system of language, bureaucracy, and intensive agriculture outward from their home base, they quickly incorporated nearby areas to the east, south, and west where the ecology was similar to the original homeland. By the beginning of the common era they had spread all over the northern part of the Intensive Agricultural Zone and into the Yangtze Valley in the center; by the late Tang dynasty they occupied most of what we now think of as South China. But they did not expand north beyond the agro-pastoral boundary. They did expand into the Upland Zone, but the process was slow and fragmented.

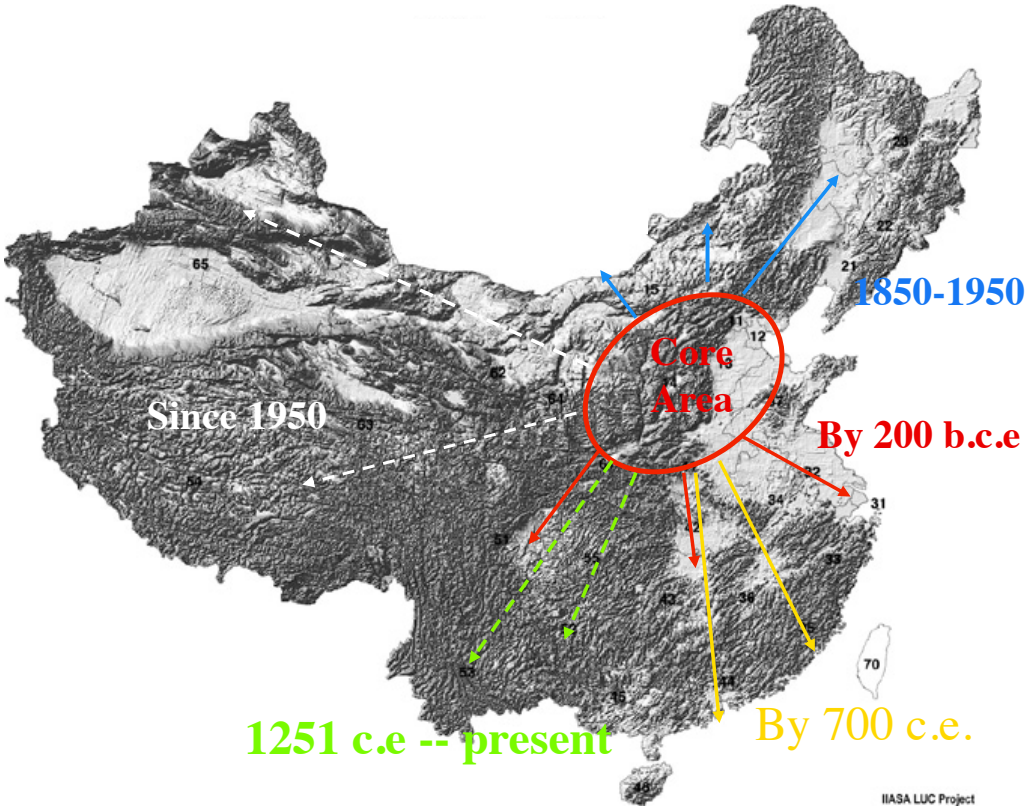

Figure 5.1: Expansion of the Hua or Han (Chinese) people

A few Chinese moved into the basin areas of Yunnan and Guizhou as early as 2000 years ago, sometimes displacing small indigenous states. With the waning of the Han empire, however, the present-day southwest was given back, as it were, to the ecological or topographical mixture of peoples described above. The Mongol conquest of the Southwest in the 1250s began a second round of encroachment of China-centered empires on the Southwest, gradually incorporating some areas into the economic and political spheres of the Yuan, Ming, and Qing dynasties. But the fundamental ecology of the area changed little with these political changes; the economy was still profoundly mixed based on local-level ecological adaptations, and the ecological mosaic often, though not always, correlated with the ethnic, cultural, and linguistic mosaic.

The position of ethnic Tibetans in all this requires a special note. What we might want to call Tibet Proper,[1] the area ruled by the Dalai Lamas' regimes in the late Ming and Qing periods (in Tibetan terms, the provinces of Ü and Tsang), consisted as mentioned before of a meso-scale intensive agricultural area in the midst of a large swath of the Pastoral Zone. But in the northeastern province of Amdo, and particularly in the more moist eastern province of Kham, where the topography of high ranges and deep valleys is continuous with the Upland Zone, ethnic Tibetans lived a mixture of

[1] The analogy to China Proper is deliberate.

subsistence styles no different qualitatively from those of their neighbors of different ethnic groups to the east and southeast of them. In fact, just like the Chinese, who extend into the Mixed Zone from below, the Tibetans extend into this zone from above, so that the ethnic mosaic of some areas, at least, can include Han Chinese in the plains, other ethnic peoples in the mid-altitudes, and Tibetans in the high pastures.

The borders between the Chinese People's Republic and Vietnam, Laos, Burma, and northeastern India all cut right through the Upland Zone. The exact location of today's borders is a result of two processes. First, as James Scott points out (2009), the Upland Zone, for which he uses the political name Zomia, was a region where no large states held sway until the 20th century. So as the technological developments of the 20th century finally enabled states to divide the earth's entire land surface up among them, Just where the boundaries ended up slicing through Zomia had little to do with the distribution of ethnolinguistic groups in Zomia itself, but was rather the outcome of wars and treaties between the Qing land empire and the French and British sea empires in the late 19th and early 20th centuries. The locations of these borders are rather arbitrary from an ecological standpoint, other than the fact that they tend to be located away from the centers of the various agrarian civilizations, where neither the Qing nor the Southeast Asian regimes and their colonial successors could easily assert control. But whether a particular valley or mountainside ended up in China, Laos, Thailand, Burma, or Vietnam affected the policies to which its people and resources were subjected in the second half of the twentieth century, as different regimes with different ideas of nation-building and development altered the ecologies of these areas in different ways (Sturgeon 2005; Michaud, Turner, and Bonnin 2015).

As with the Pastoral Zone, then, the history of the Qing in the Upland Zone is a story of population incursion and military and bureaucratic takeover, without extensive technological change. Here as in the Pastoral Zone, it remained for the Communist Party to substantially alter the ecology and the relationships between people and resources. But to set the scene, we need to describe the local ecology of the Upland Zone in more detail, along with the buffers that protected the resilience of local complex human ecosystems in this area.

The mid-scale ecological mosaics

As the introductory part of this chapter makes clear, the Upland Zone is diverse at many scales, from the local landscape to the macro-level features of the Zone itself, which slopes downward from the northwest to the southeast. Each gradient from mountaintop to river bottom is a little bit different from all others, both ecologically and ethnically. To give an idea of the range of ranges, so to speak, I present three brief examples.

The Yongning-Lugu Lake Region. Beautiful Lugu Lake, as a tourist song goes, reflects its surrounding mountains in its 48km^2 surface at an elevation of about 2600 meters, straddling the modern provincial border of Sichuan and Yunnan. The population center of the lake basin is a few kilometers to the west of the lake, at a slightly lower elevation on the Yongning Plain, where an ancient caravan town, along with scattered villages

around the plain and in the foothills, reaching as far as the shores of the Lake itself, are inhabited by people of the Na and Prmi ethnic groups. They have probably been here since the early first millennium CE, farming the flat and gently sloping fields intensively in wheat, barley, oats, and in recent centuries corn and potatoes. They keep herds of cattle and smaller numbers of sheep, as well as taking forest products from around the foothills. Men traditionally engaged in long-distance caravan trade during the long agricultural off-seasons in the cold winter weather. Since the Ming period, the Na and Prmi in this area have been Tibetan Buddhists, and it was customary for one son from every mother to enter the monkhood, but unlike the monks in Tibet, monks in this area continued to live at home and to marry or have regular sexual partners, so the monasteries did not serve as mechanisms of fertility limitation (see Shih 2010, Weng 1993, Blumenfield 2010, Cai 2001).

Figure 5.2: Dapo Village in the Yongning Basin. Photo by Tami Blumenfield

Upward and downward from the Yongning Basin, the local ecology is very different. On the downside, in the Labai area to the west, the topography is much more rugged, and there are no flat places suitable for intensive planting. Instead, Na and Prmi peoples there traditionally practiced shifting agriculture, kept larger numbers of animals than their relatives on the plain, and had access to more forest (Mattison 2010: 29). Ethnicity and language did not correlate perfectly with ecological adaptation. Upward from the basin, in the higher hills, the population was Nuosu, who migrated to this area after 1700, and like the people in Labai practiced shifting cultivation, animal husbandry, and forestry at much lower population densities.

Figure 5.3. Topography in the region around Lugu Lake, on the border between Sichuan and Yunnan. From Mattison 2010.

Sipsong Panna. Sipsong Panna, in the local Tai language, means twelve feudal estates. The border-making process of the late 19th century divided these twelve administrative sections of a local Tai ministate between two nations—ten in the PRC and two in Laos. Before 1900, the population of the plains areas around the capital town of Jinghung, at an elevation of 588 meters, consisted of the minor local lords, subordinate to the Sipsong Panna king, and their serf-retainers, who grew wet rice intensively in paddy fields and owed grain tribute and labor services to their lords (Hsieh 1995; Sturgeon 2005, Hathaway 2013).

Above the Tai peasants topographically, but subordinate to the Tai in their feudal dependency, lived several "hill peoples" practicing shifting cultivation, along with herding and forestry. These peoples, despite their similar or identical ecological adaptations, were distinct ethnically and linguistically, belonging to the Akha (called Hani in Chinese), Lahu, and Jinuo ethnic groups in the Tibeto-Burman linguistic family, and the Bulang in the Austroasiatic Family (Hansen 1999). They were bound to Tai overlords by obligations of tribute, but sometimes also had to give gifts to each other, as when Akha villagers needed to reward a neighboring Bulang headman for the right to make swiddens in his territory (Sturgeon 2005: 82).

The Anshun Region in Southwestern Guizhou. The Anshun region was incorporated into the regular administrative hierarchy in the early Qing, when magistrates appointed by the imperial authorities in Beijing replaced the former *tusi* or local lords who owed only allegiance and light tribute to the previous Ming court. But despite its administrative incorporation into the Qing state, the region retained its basic human ecological features, which were not transformed radically until the PRC. Cheung describes the political hierarchy of the area during the Qing period:

> The Han, Yi, and Hua Miao in this area thus constituted a political-economic hierarchy somewhat like a pyramid. At the top were the Han, concentrated in walled cities, towns, marketplaces, and villages along the main transport routes, and subject to direct rule of the state. The middle stratum was the Yi, concentrated around the strongholds of their overlordly estates, who form an acephalous system of chieftainship semi-independent from the rule of the Chinese state. At the bottom were the Miao, living in discrete villagers scattered around among the Yi strongholds, and subject to tenancy and oppression at the hands of the Yi lords [Cheung 1995: 230].

What we might point out to complete Cheung's account is that this social pyramid was the inverse of the actual pyramids formed by the mountainous topography, with Han in and near the towns, Yi at the middle elevations, and Miao (called Hmong in their own language), as is their wont everywhere in the Upland Zone, mostly on the hilltops.

These three brief examples illustrate the fragmentation of peoples in the Upland Zone, according to ecological adaptation, language, and kinship. Whether this Zone is so fragmented because there were never states to perform their standardizing and homogenizing work on local populations, as happened in China Proper, or whether, as James Scott suggests, the fragmentation is more due to this being a zone of *refuge* for people who fled state power at lower elevations and closer to governmental centers (Scott 2009: 6) is really immaterial to the story told in this book. The impact of the PRC projects on the ecology of this zone is the impact of development, of attempts to increase the output of agriculture through what Sturgeon (2005: 34) calls "state-sponsored simplified land-use practices," imposing the elegant simplicity and ecological vulnerability of monocropping on a previously intricate and complex landscape. To illustrate this complexity at a very local level, I present two examples of the spatial ecology of households in the Upland Zone.

Some local household ecologies in the Upland Zone

The spatial ecology of households in the Upland Zone depends of course on their specific positions in the eco-ethnic mosaics like those described in the last section. But the household ecology of all Upland Zone peoples has certain characteristics in common. It resembles the ecology the households in China proper in that it is tied to residence in a particular place, and to the use of specific resources within a short distance. Migration across the landscape is not part of the temporal cycle of these households, as it is with those in the pastoral zone. But household ecology here differs from that of households in China Proper in that it makes use of more diverse resources, is less dependent on exchange and markets, and covers a wider territory in its daily and yearly rounds. Here I will describe two cases in detail as examples of how this spatial ecology works.

The Nuosu of Liangshan in Southern Sichuan.[2] For our first case, we go back to the fictional character Aga in our first vignette of victims of progress, or perhaps more accurately to her ancestors three or four generations ago, before there were tractors, cell phones, or plastic mulch. The Nuosu people,[3] to whom Aga and her relatives belong, have lived in the Liangshan area of what is now Southern Sichuan for about 1800 years. In the areas where they have lived the longest, the Nuosu are dominant at all elevations; in others, such as the regions to the west where they have migrated in the last few centuries, Nuosu are part of a mosaic that they describe using different species of bovine animals: Han Chinese, known as "water buffaloes (*yynyi*)," in the river valleys; Nuosu, known as "cattle (*nuonyi*)," in the mid-altitudes; and Tibetans, known as "yaks (*bbutnyi*)" in the high mountain areas. The household ecology of Nuosu in their typical mid-altitude communities involves exploitation of a variety of resources of field, pasture, and forest.

Figure 5.4 Nuosu men in front of a traditional house in Ebian Sub-Prefecture, 1913. Photo by Hedwig Weiss, courtesy Tamara Wyss.

[2] The description of Nuosu ecology, where no specific sources are cited, comes primarily from my own field knowledge and conversations with Nuosu scholars. See Harrell, Bamo, and Ma 2000 for a general description of contemporary Nuosu ecology, arts, and religion.

[3] The Nuosu, who number about two million, are now classified by the Chinese state, and themselves mostly identify, when they are speaking Chinese, as part of the larger Yi *minzu*. But their ecology and society are quite different than those of many other Yi groups, so this description should not be taken to apply to all Yi.

Traditional Nuosu houses were built of whatever local materials were available, including mud walls in many areas and stone in a few places where it was abundant, like Hema beside the Dadu River in Ganluo, but where forests were plentiful, they always preferred to use wood, often with elaborately shaped and carved paneling and post-and-beam decoration **(Figure 5.4).** Each nuclear family had its own house, centered on the a circular hearth in the floor that was both the social and the economic center of the household. People passed the time around the fire, sitting on felt capes or mats spread out on the packed earth, and slept there around the fire on cold nights (**Figure 5.5)**. A wok or kettle placed on hearthstones over the fire or hung from the wooden rafters could cook staples from boiled potatoes to buckwheat steamed cakes or pancakes, and also boil water for tea in those areas where Nuosu drank it. On special occasions meat, carved into chunks, would boil for hours while hosts and guests drank liquor or locally brewed beer and recited songs and poetry. Domestic animals ran freely in and out, sharing the space with their human owners.

Figure 5.5 Sitting around the hearth in a traditional Nuosu house, 1993. Photo by the author.

The local (non-village) community. The next scale outward in the Nuosu household ecology resembled neither the village of China proper nor the mobile group of related households in the Pastoral Zone. Nuosu ordinarily did not live in compact villages. A few closely related households, brothers for example, might build their houses inside a single walled compound, but most houses were scattered about the landscape. The Nuosu book *Hnewo Teyy* (The Book of Creation) described the ideal setting for a house:

> In back of the house are mountains, where we can herd our sheep
> In front of the house are plains, where we can grow our grain
> On the plains there is a field, where we can race horses

In the wetlands, we can raise pigs

Nuosu local communities reflected the structure of their society. They are organized into patrilineal clans, and each clan is a member of a caste-like stratum of aristocrats or commoners (Harrell and Fan 2003) . About 40% of the Nuosu population belongs to serf and slave strata, which have no clans. A typical community would consist of all strata, though the differences were not reflected very much in their houses: many travelers report that it was impossible to tell the house of an aristocrat from that of a slave by its physical appearance, except that the richer aristocrats sometimes had larger houses (**Ma Changshou**?). A watershed would have houses scattered about the lower slopes of its hills, and the inhabitants of each house would be related by kinship, marriage, or ties of lord-serf or master-slave obligation. On the whole, however, ties of kin are more important to Nuosu than ties of place; they are attached to the aesthetics of certain kinds of landscapes rather than to particular places on a map.

The resource circle. The resource circle of the Nuosu was composed of three zones: field, pasture, and forest. Before the late Ming period (**check**) when New World crops reached the area, Nuosu agriculture depended on a mix of grain crops grown at different elevations. In rare, low-lying alluvial plains, people might grow rice, a highly-prized food but one that people still thought of as "foreign." More typically, either in permanent fields in river valleys, short-fallow on relatively level benchlands, or swiddens on ridgetops or south-facing mountain slopes,[4] people grew buckwheat, oats, wheat, and barley. Buckwheat was the most adaptable but low-yield, while wheat was more sensitive to weather than the other crops and could only be grown at the lowest elevations, while oats and barley were high-mountain crops. A single household would usually try to grow at least three of these varieties. Corn and potatoes entered the Nuosu area **in the Qing**, and replaced buckwheat as the most important sources of calories, though buckwheat has always maintained its symbolic significance. Nuosu also grew a large amount of a variety of turnips called *vama*. When fresh in the fields, people can pull them up and eat them on the spot for their water content; at the end of the growing season they were dried with their tops to be stored up as a winter food in the form of a reconstituted soup.

Nuosu agricultural property rights varied according to the type of land. Fields planted every year or in short-fallow were owned by individual households, while those used for swidden belonged to the household that first cleared them, but when abandoned reverted to the status of forest, where anyone belonging to a local clan segment could make a clearing.

The pasture zone, where grazing rights were held in common by a group of related or dependent households, was also an integral part of the Nuosu resource circle, because it served to feed all their livestock other than poultry. Nuosu animals roamed freely about the house and compound at night, but in the daytime all of them, including pigs, were let out to pasture. Meat played a much more significant role in the traditional

[4] A Nuosu saying states: *bbuhlit zzabbo he; busi sybbo he:* "Sunny slopes are good for grain; shady slopes are good for trees."

diet of the Nuosu than it did for the farmers of China Proper, reflecting the lesser degree of agricultural intensification possible or necessary, and the abundance of pasture areas on hillsides too steep to farm. Meat was not an everyday part of the diet; rather a household would slaughter one or more animals for a special occasion, such as a wedding or funeral, priestly ritual, or a visit from relatives living far away. Depending on the size of the event and the size of the animal, a smaller or larger circle of relatives and dependents would partake of the meat. So the typical household had pigs for meat and fertilizer; cattle for traction, leather, and meat; horses for riding and for pulling carts; and probably most importantly sheep and goats, which provided the most frequently eaten meat and also the all-important wool out of which Nuosu made most of their clothing, either in the form of cloth, hand-spun and woven on a backstrap loom by women, or felt pounded, rolled, and dried by men (Figure 5.6; Harrell, Bamo, and Ma 2000: 17-31). In contrast to peoples of the pastoral zone, however, Nuosu rarely consumed milk products and did not milk their cattle, sheep, or horses.

Figure 5.6: Nuosu men making a felt jjieshyr, or cape, 1990s. Photo by the author.

The final sector of the resource circle was the forest. Since the Cool Mountains are cold and there is no other source of heat or cooking energy, firewood was a constant need for Nuosu households, especially in the wintertime when they kept a fire going in the hearth all day and all night. But forests provide far more than firewood. Timber is essential to the construction of a Nuosu house, even one built primarily of mud, so that straight-trunked pines or firs are a necessity. Village specialists used wood to make plows, wagons, and other agricultural implements. People gathered a large variety of wild plants and fungi for food, medicine, and other purposes (pine branches to protect mud walls against rain; lichen as bedding for baby animals, bamboo for making baskets and trays, a large number of animal medicines in addition to the human ones). And the forests were the main place to hunt deer, bear, red pandas, upland game birds, and other sources of rare and prized animal foods and skins. Most importantly, the Nuosu

recognized the value of forests as providers of ecosystem services—particularly clean water and protection against soil erosion and runoff, cultural factors that I discuss in more detail in the section on buffers, below.

Figure 5.7 Loading firewood onto a cart, 2009. Photo by the author.

The widest circle of the Nuosu household ecology, beyond the local community, was less important than in the other zones. There were very few markets in Nuosu territory, and indeed very little surplus to market and hence very little incentive to produce surplus. But there were two important exceptions. First, Nuosu society included highly specialized groups of craftspeople, particularly smiths who made iron tools on the one hand and silver and gold jewelry on the other. Smiths, sometimes members of specialist clans, did not live in every community, so that their products traveled widely in exchange for grain or animals. Other clans specialized in making the lacquered wood eating utensils that Nuosu used where other peoples might have used pottery or porcelain. Second, certain goods, such as cookware, silk, and later on commercial cloth, were purchased with silver from itinerant Han traders. But until the rise of opium cultivation and the entry of firearms and ammunition into Nuosu territory in the 19th century (Hill 2001: 1036-37), households and watersheds were basically independent, economically and ecologically.

Figure 5.8 A Traditional Nuosu smith at his forge, 1998. Photo by the author.

The Akha of Sipsong Panna. The Akha, known as Hani in Chinese, live in hill regions of China, Laos, Burma, and Thailand, almost always as part of a system of vertical stratification where they are among the higher-elevation groups. Most of the Akha lands however, are at relatively low elevations compared with those of the Nuosu—the entire

gradient in this more southerly part of the Upland Zone starts and ends lower down than in the Cool Mountains where the Nuosu live.

Akha houses in Sipsong Panna do not need much insulation in their warm forest environments, so they build their frames of wood from the local forest, the walls of bamboo, and the roofs of thatch from the tough *Imperata* grass. Houses were small, and usually built on stilts and accessed by ladders, with enclosed areas underneath where the livestock could be penned at night (Sturgeon 2002: 124).[5]

Extending outward from the house, the Akha household ecology was structured spatially very differently from that of the Nuosu. In both China and Thailand, Akha clustered their houses in small hamlets *within* the forest, arranged in lines on either side of the main path through the hamlet, and preserving a patch of forest surrounding the houses as a protected forest, where

> Around each hamlet in Mengsong, of which there were then five, was an area of protected forest where people could not cut anything. The ancestors taught that this forest protected the hamlet from evil spirits. Although the size of protected forest would vary from hamlet to hamlet, generally villagers kept it large enough that it took about an hour to walk from their houses through the forest to their cultivated swidden fields. Part of this forest was designated as a burial site. Customary rules forbade villagers from cutting or removing anything from the cemetery forest, and indeed people entered the cemetery only to buy people and clean the graves. Covering the hills above the hamlets were watershed forests where villagers were also forbidden to cut [Sturgeon 2005: 124-5].

More distant parts of the forest, on the mountainsides above the village, were also held as commons, but there people were allowed to cut wood for fuel and construction, and also gathered a large number of food and medicinal plants, and hunted the wild game that was reported to have been abundant in the area as late as the mid 20th-century. Rights to these forests were held in common by all members of the hamlet, but they were not allowed to cut randomly even in these less restricted areas. Someone who cut a small amount of primary forest for any reason was fined an amount of liquor that would satisfy the whole hamlet; a person who cut a larger amount of prohibited wood would have to slaughter a pig and feed all the hamlet families (Sturgeon 2005: 126).

It was only in the areas more distant from the village, beyond the protected home and watershed forests, and usually downhill, that people made their swiddens. Any member of the hamlet was allowed to make a swidden anywhere in this mostly secondary forest; the only restriction was that the forest had to have regenerated enough not to truncate the cycle of cutting and regrowth, but since there was no land shortage, no one would cut immature forest anyway, because everyone knew that the soil quality would not be as good. As long as the particular swidden was being actively farmed—i.e. in the first few years after it was cut, it belonged to the family that cleared it, but once abandoned and reverted to forest, it ceased to be their property, and any village family could make its

[5] The Lahu of Lancang county, to the west of Sipsong Panna, who occupied the same ecological niche as did the Akha in Sipsong Panna, built almost identical houses (Du 2002: 11)

swidden there 15 or 20 years later when the forest was again mature and ready to be cut. In these swiddens, people grew upland dry rice, their primary grain crop, as well as "a rich array of vegetables" (Sturgeon 2005: 8).

In this and other Akha or Hani communities, there was a special kind of common property right, held not at the level of the village, but of the village cluster, to the moist forest known as *sanpabawa*:

> This site of particularly moist primary forest produced abundant rattan. To protect the rattan, Mengsong Akha elders prohibited cutting anything in the Sanpabawa, except once a year at a specific time. Then each hamlet could send a couple of people to cut rattan for all households in the hamlet. Villagers used the rattan in making headgear, knife handles, and the edges of baskets…[Sturgeon 2005: 124-25; see also Xu et al. 2005:]

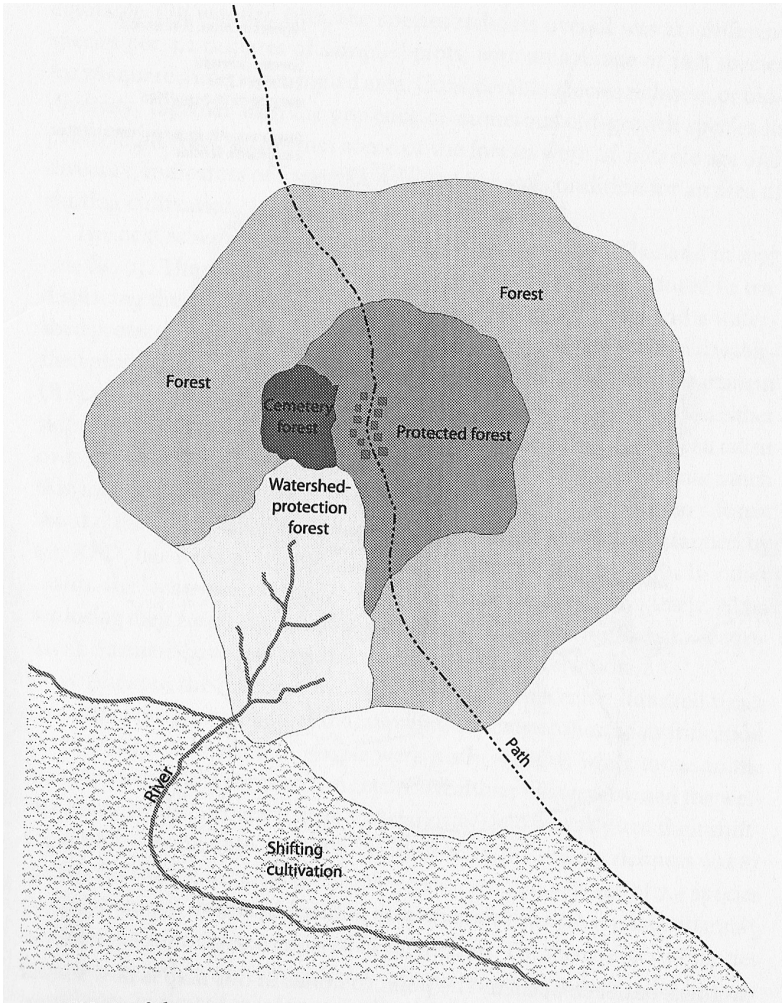

Figure 5.9: Schematic of the ideal landscape of an Akha Village in Sipsong Panna, 1930s. From Sturgeon 2005: 19.

As Sturgeon points out, however, this particular arrangement of hamlet, forest, and fields was not rigid or permanent. Akha farmers recognized what Sturgeon calls

"landscape plasticity," the ability to change the use of various patches according to shifting historical circumstances (Sturgeon 2005: 8-8, 25). In the PRC period, some Akha added new patches to their landscape, in the form of cleared pastures or wet-rice fields. What had been cleared for pasture might become forest again; a lowland area might be converted to wet-rice cultivation; a swidden might be converted to pasture rather than allowed to regrow its early forest cover. This ability to re-envision and re-design a complex human ecosystem in ways that did not lead to permanent degradation, served as one of the important buffers for peoples in the Upland zone, a topic to which I now turn.

Buffers and Guarantors in a Varied Environment

For thousands of years, people of the Upland zone have modified their environment to increase both productivity and resilience. The Upland Zone is not like the Pastoral Zone, where people early on recognized that they would have to adapt to the land rather than adapting the land to their needs. At the same time, the Upland environments did not have the productive potential of China Proper; they were able to tolerate only a moderate level of intensification of production, and thus could support only a moderate density of population. Some hillsides could be terraced; a small percentage of a forest could be swiddened in rotation; a few ridge tops and sunny slopes could be farmed. But it was impossible before industrial technology, and it is difficult even now, to push this intensification too far, to create a landscape that is anthropogenic *to the degree* that we see in the Intensive Agriculture Zone. In terms of resilience and the adaptive cycle, most local landscapes in the Upland Zone never became as dependent on putting energy and effort into maintaining the system as was the case in China Proper; they never entered the "advanced K phase" of the adaptive cycle, in which productivity was achieved at extreme cost in resilience; they never became so vulnerable to disturbance that natural events would send the local ecology into collapse and reorganization. Rather they maintained important ecological, institutional, and cultural buffers against disturbance, buffers that stood them in good stead until the developmentalism of the Communist Party (chapter 7) attempted to apply the same engineering approach to development there as had been so successful in China Proper, and at the same time systematically removed and disparaged the Upland people's buffers as backward and unscientific, causing widespread resource degradation and occasional local ecosystem collapse.

Ecological Buffers. The most obvious ecological buffer for Upland peoples was simply maintaining spatial *patch diversity* in a human ecosystem. Akha farmers made use of swiddens, occasionally wet-rice fields, pastures, and many different kinds of forests, each with its particular rules for who could use what resources, from wood to medicines to wild game to rattan. In the swiddens they produced a wide variety of vegetable crops in addition to their staple upland rice, and they also recognized that specific swiddens had mirco-environmental differences in elevation, slope, aspect, and soil, which might suit them to different crops:

> Fields at different elevations may have separate rice varieties as well as distinct combinations of vegetables intercropped with the grain. Depending on household labor, changes in weather, and infestations of pests, Akha farmers can open fields of varying size in different micro sites (Sturgeon 2005: 120).

Nuosu farmers at higher elevations also recognized the natural diversity of their landscapes and modified and used different patches in different ways. Fundamental to this diversity strategy was the triangle of agriculture, animal husbandry, and forestry, but even within agriculture Nuosu practiced diversity both to take advantage of different characteristics of different patches, and as a buffer against calamity. Sunny slopes and hilltops could be cleared and farmed; shady north-facing slopes were best left to forest. No family ever grew just one kind of grain. Oats and turnips were best at higher elevations, joined later by potatoes. Corn and wheat could be grown in lower elevations. Buckwheat was intermediate; low-yield but hardy. A summer hailstorm can wipe out a corn crop but leave buckwheat relatively unharmed; too much rain in late summer would be bad for potatoes but relatively benign for corn.

Tibetans living in the Upland Zone around Jiuzhaigou in northern Sichuan practiced a similarly diverse economy. They traditionally built their villages not in the valley bottoms by the spectacular lakes and waterfalls of the region, but at middle elevations of about 2300-2500 meters, where there is a natural layer of rich loess suitable for grain cultivation. Over the centuries of occupation, cleared fields in this layer caused a semi-anthropogenic process of terrace formation (Henck et al. 2010; Urgenson et al. 2014**)**; these terraces were the main fields the local Tibetans farmed in recent centuries, growing a diversity of grain and vegetable crops. Lower down were both coniferous and deciduous forests, which local people managed for construction materials and firewood respectively, since birch and maple burn much hotter and more slowly than pine. Within these forests, people cleared a few small patches for cultivation, which were later left as winter pastures. And at the higher elevations, reaching up to over 4000 meters, people pastured their yaks and sheep.

Another type of ecological buffer is *temporal* diversity, namely the "landscape plasticity" described by Sturgeon. This plasticity occurs at different scales. The swidden process itself involves rotation between forest, newly cleared fields planted with grain, more mature fields with tree crops or perennials, immature forest, and back to mature forest again (Berkes 1999: 60-64**).** But this cycle itself may change at a longer temporal scale, as a larger area once used for swiddens might be allowed to revert to forest long-term and not cut for centuries, or conversely a field would be kept clear for pasture after its agricultural fertility was gone, as in Jiuzhaigou. Sturgeon describes the strategies involved at these different time scales:

> Strategies for cultivation involve the ability to imagine how the current landscape could be otherwise or how parts of it could be allocated to new uses for a while, knowing that use could revert in the future. In Akha imagination and planning, not only can forests become swidden fields and fields then regenerate into forests, but fields can become pastures, and pastures can become forests again at a later date. In Akha experience, even wet-rice fields, usually deemed a permanent landscape features, can change into pastures or even forests once again, given enough time [2005: 121].

Of course, long-term ecological change happened in the Intensive Zone as well. But the difference is that, in the Qing period in particular, with increased population pressure on resources, the changes were almost always in the direction of degradation,

and were unidirectional, at least over the century-scale (**Marks**). Regeneration was not part of any cycle that was built into the system, but must now be accomplished as a one-time policy turn, and it remains to see how successful it will be.

Institutional Buffers

Contrary to certain stereotypes held by anthropologists about native peoples, most Upland societies had a mix of private and common-property rights to resources. A society like the Akha, Lahu (Du 2002:13-17; Ma 2013), or Lisu (Harwood 2013) falls at one end of a continuum, where almost all rights to *productive* property were held in common. And the specific design of their commons seems to have conformed with almost all of Elinor Ostrom's famous "design principles" for successful common-property regimes. Since the story of the PRC in this area is partly the irony of Communists' destroying successful common-property regimes in the name of development, it is worthwhile to present specific evidence of just how well the Akha traditional commons conformed to each Ostrom's principles.

Ostrom's Design Principles [Ostrom 1990: 90]	Akha institutions [Sturgeon 2005]
1. Individuals or household who have right to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.	CPR rights determined by hamlet residence, which is in turn determined by clan membership. Rights to rattan forest are determined by membership in one of a group of hamlets [Sturgeon 124-25]
2. Appropriation rules restricting time, place, technology and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material and/or money	Rules are specific to local communities; provision rules not clearly stated. Provision rules were minimal, because there was little or no maintenance required on common-property resources.
3. Most individuals affected by the operational rules can participate in modifying the operational rules.	Rules are set by custom, legitimated by the authority of the ancestors. It is not clear when or how *specific* rules were changed [Sturgeon 124-25,].
4. Monitors, who actively audit CPR conditions and appropriator behavior, are accountable to the appropriators or are the appropriators	The appropriators (hamlet members) are the monitors, accountable to hamlet elders and conceptually to ancestors [Sturgeon 126, Xu]
5. Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense)	Small-scale unauthorized cutting incurs a fine of liquor; larger-scale offenses incur a fine of slaughtering a pig and feeding the whole hamlet [Sturgeon 126]
6. Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials	Not clear **I can ask Janet**

7. The rights of appropriators to devise their own institutions are not challenged by external government authorities	Lowland overlords extracted tribute from Akha communities, but the only "external" authority came from the Akha's own ancestors [Sturgeon 121-22]

Table 1: Conformity of traditional Akha common-property regimes to Elinor Ostrom's "design principles for long-enduring common property regimes."

Not all Akha resources, of course, were held in common; almost all rights to consumption, most importantly the consumption of products from the swidden fields cleared and worked by a household, or to resources gathered or hunted legitimately in the forests, and to the house itself, were privately owned.

Nuosu property rights were more mixed. Land rights depended on the type of land and its use. Territory in the general sense was the "property" of one or more aristocratic clans or, in a few areas where there were no aristocrats, wealthy or prominent commoner clans (**Li Shaoming**). The size of the territory that an aristocratic clan controlled was based on their ability to defend it from rivals. Within the territory of an aristocratic clan or clans, those who could clear swidden fields were members of the aristocratic clans, their commoner retainers, or the serfs bound to either the aristocrats or the commoners. Within these limits, people could clear forest for cultivation in any suitable location. Pastures were similarly held in common, as were water resources.

Forest rights were more complicated. Individual households, or groups of closely related households living near each other, had rights to cut wood and extract other forest products in forests extending from their own houses up to the nearest ridge-tops. Others could cut in these semi-private forests only with the permission of the owners. Forests more distant from habitation were open to resource extraction by anyone, but appear to have been protected from the merciless extraction characteristic of some open-access regimes by the fact that they were too far away for much resource extraction to be possible.

Finally, good valley or lowland agricultural fields, which could be farmed every year or in short-fallow rotations, were individually owned as private property, and could be bought and sold.

The Nuosu thus exercised a system in which they could both promote careful stewardship of intensively-farmed lands by individual owners, and buffer against random disturbances by common rights to resources that are subject to stochastic variation.

Another important buffer is provided by clan solidarity and obligations of what Marshall Sahlins famously called "generalized reciprocity," the obligation to give freely to clan mates in need and expect the same from them, without making any exact accounting of the amount of the gift. This contrasts to the Han peoples of China Proper, where the great majority of productive property was managed strictly by households as trustees for descent lines, and where household division meant drawing clear lines between brother and brother. The Han practice what Sahlins (1972) calls "balanced reciprocity," or quid-pro-quo a favor incurs a debt. But in the Upland Zone, even when nuclear families managed their day-to-day productive activities separately, an ethic

prevailed of mutual responsibility in times of need, without any strict accounting of contributions on either side. I once visited a Laluo Yi community that was experimenting with silkworm cultivation in the early 1990s. Community leaders told me that if one household was running short of mulberry leaves during the crucial season when the caterpillars are putting on their last growth before spinning cocoons, if a relative or even a neighbor had extra leaves, they would contribute them free of charge, *not like Han people who would keep track of who owed whom how much*. In a similar case, the Nuosu community where I often visit experienced a severe hailstorm in August, 2004, and their corn crops were virtually wiped out. But people seemed unconcerned. Not only did they have potatoes and buckwheat, which were less affected than the corn, but they had relatives living a few villages away, and the hailstorm had been very local. The relatives would help out, just as they will help out if a clan member gets into a superior boarding school or college and the family cannot pay the whole tuition. Indeed a Nuosu saying states that *a **xx** a hxie su cyt vi,* "What one cannot **do without** is the clan." This is one of the reasons serfs were so pitiable, and indeed why they were serfs: they have no clan to depend on, and thus must fall back on the generosity of their lords, who exact a heavy price in rents, customary levies, and labor obligations.

Cultural Buffers. Long residence in and experience with the ecologically diverse and unpredictable environments of the Upland Zone ecology has led people living there to develop a variety of cultural beliefs and accordant practices that contribute to buffering themselves and their resources against ecological surprises and other disturbances.

Perhaps the most frequently noted cultural buffer among Upland peoples is the sacralization of the landscape, endowing features and resources with a supernatural significance that affords them extra protection against unwise use. The Naxi people, who live at mid-high elevations in northwestern Yunnan, for example, endow the uncultivated parts of the landscape with a supernatural patron, who protects against resource destruction caused by human temptation and greed:

> The Naxi people worship the spirit of nature, Shu, as a spirit or god that governs nature. In illustrations, Shu has a human body with a snake's tail and wears a *wubao,* a hat with five treasures. In Naxi oral history, Shu and a human progenitor were once stepbrothers who shared the same father. When the two brothers went their separate ways, humans received valleys, crops, and domestic animals, whereas Shu received mountains, rivers, forests, birds, and wild animals. After that time, humans began to invade the property of Shu until the latter became very angry and decided to take revenge by making it difficult for humans to survive. Humans appealed to the Naxi priests and cultural specialists known as *Dongba* to control Shu. Eventually, Shu agreed that he and humankind would never harm each other again. Humans could obtain the necessities of life from nature, but they had to pay Shu by periodically worshiping him [Xu et al. 2005].

For many peoples, particular places in a landscape are specifically set apart as sacred precincts, either off-limits to humans altogether or with severe strictures against appropriating resources. The cemetery forest of the Akha is one example; others are the sacred mountains of many Buddhist peoples, including the lowland Tai of Sipsong

Panna (Xu et al. 2005; Liu et al. 2002), and the middle-to-high elevation Amdo Tibetans of Jiuzhaigou. In the latter area, there is a pilgrimage route around the sacred mountain called **xx**. Though it takes about three days to walk the whole route, pilgrims must not take any resources along the way; in the manner of American camping ethics, they are to take in everything they use, take out everything they don't use, and not leave anything inside the sacred precinct. Watercourses are similarly sacralized, by using them to turn wheels containing Buddhist scriptures; they may not be polluted, literally or figuratively, and this preserves the cleanliness of the water.

Figure 5.10: Pilgrims who use walking sticks on a circuit of xxx Mountain in Jiuzhaigou must leave them for later pilgrims to use, so as not to waste resources on the sacred mountain. Photo by the author.

Figure 5.11. A resident of Jiuzhaigou makes an offering at a prayer-wheel turned by the stream below. Photo by the author.

Sacred precincts have been cited often as centers of biodiversity; species that have otherwise been extirpated from landscapes can often be found around temples and other sacred sites, as for example the Tai "holy hills." In the Nuosu community where I visit,

there is a rare conifer called *rrysy lote* **check** (*Keteleeria davidiana*) which grows only in two places in the local landscape. One of these is a saddle between two nearby hills, where there are about 30 or 40 of the trees. This is a sacred grove, the site of a yearly ritual called *keqy vaqy*, or immolating a dog and a chicken, in which community members swear by the spirits of the sacrificed animals not to violate environmental or other ethical principles. During the Cultural Revolution, a young man violated a taboo on cutting the trees, and was soon struck dead by a mysterious disease. The other *Keetelaria* site contains only two trees, again during the Cultural Revolution one was cut; the fate of the cutter is unknown, but soon afterwards a shaman hung his drum on that tree to signify its sacred status, and it has since regrown into a healthy specimen, and has seeded an offspring tree a few meters away.

Figure 5.12: Sacred grove of *Keteleeria davidiana* near the Nuosu village of Yangjuan. Photo by Lauren Urgenson.

Beliefs about resources mark of not only space but time. The Nuosu year, for example, is divided into a growing season, from the time the first rhododendrons bloom in spring until the last harvest in the fall, when neither hunting nor cutting trees is allowed, while during the complementary killing season from fall to spring, people can both hunt and cut trees in the forest.

Customary beliefs about the environment also tie the conservation and continuity of resources to the continuity of the community or the kinship group. The Akha ancestors, as guardians of the forest and enforcers of the rules of the common-property

regime, are prime examples of this. Nuosu have a series of customary parallel couplets, or *lurby*, that clearly express the parallel between the continuity of the clan and the continuity of the resources upon which it depends:

> *Onyi abbo mi, yy ki lo ji she*. "Mother's brother gives to father; water flow is maintained." When first hearing this saying, I was mystified. A friend helped explain. The long-term continuity of the patrilineal clan, its reproduction, depends on the gift of the wife from her brother to her husband (Nuosu is not a gender-egalitarian society). In the same way, the short-term continuity of the clan, and by extension its long-term continuity as well, depends on preserving and sustaining people's access to resources. The most vital of resources is water, and like the mother who must stand beside the father for the clan to continue, the trees must stand beside the stream to prevent erosion and the silting up of the water source. Hence another *lurby*, *sy zzu i pamu, yy zzu i pamu,* "trees are senior relatives; water is a senior relative."

Other formal teachings about the environment are less explicitly connected with the sacred, but rather express simple conservationist good sense:

> *Bbo ggut mu a nde, pu nyo jjy wep a zze* "Don't neglect thanks for a gift given to you; Don't allow the fertility of land to decline."
>
> *Pu nyo mu su vi; vi ke she su vi*: "Land belongs to those who work it; Affairs belong to those who commit them." In other words, as you are responsible for your actions, you are responsible for the land that you work.
>
> *Ahlo njike guhle rry a zze, jjuonuo njike guhle a qy*. "A rabbit does not eat the grass next to its den; an eagle does not foul his nest." Take care of the resources for which you are a steward.

Finally, there is the aesthetic appreciation of landscape and the relationship of landscape and nature to harmonious relationships between the status and occupational groups that make up human society. A passage from the Nuosu ritual book *Kepu Jjylur Shy-a-te* or "Harmonizing the Spirits," used to patch up a defective human relationship—an unharmonious marriage—summons spirits to assist in the ritual, and in doing so expresses the beauty of nature and of the people who live within it using metaphors of magnificent birds and of the products of human labor:

> White grain hangs above the water
> Out of the water rice grows
> Rice grows luxuriantly
> Spirit of the heavenly ruler
>
> Beautiful like a wild goose
> Like a goose with a golden bill
> Its golden bill glittering and scintillating
> Spirit of the heavenly judge

The wings of the white kite
Flapping is wings
Banking and soaring in the four directions
Spirit of the heavenly priest

Nine measures of white silk
Like flowers covering a mountain
Spirit of the heavenly artisan

Dressed up for a gathering
Many precious jewels
Spirit of the heavenly commoners[6]

We can tell by comparison that the human ecology of the Upland Zone, and the beliefs and practices that have created and sustained it, are neither the same as those of the Intensive Agricultural Zone nor clearly delineated from them. The most important differences are the lesser intensity of land use, intermediate between the Pastoral and Intensive Zones, and the lesser dependency on human alterations to the landscape, on infrastructural buffers, in maintaining the resilience of the complex human ecosystem here. In a sense, the peoples of the Upland Zone have seen themselves as part of the natural word, rather than apart from it, and they have seen that while human modification of the landscape is possible and even necessary, it has its limits. The Qing, as part of its state-building process, attempted to stretch those limits, but still recognized their existence. The Communist developmental program, at least for its first few decades, refused to recognize that the limits existed at all, and thus virtually eliminated the resilience of the ecosystems to major disturbances.

Having reviewed the human ecology of the three primary zones of East Asia, we now turn to their history. We first present a brief summary of the ecohistory of the Qing dynasty, the first major cycle of intensification in the Intensive Zone and attempted (but largely failed) conversion of the Pastoral and Upland zones to intensive production. We then turn to more detailed stories about what has happened since 1950.

[6] The original of this book, handwritten on native paper in blood-and-soot ink, is held in the ethnology collection of the Burke Museum of Natural History and Culture. Translation by Stevan Harrell and Ergu Azhi.