

# **GRASSLAND TENURE IN CHINA: AN ECONOMIC ANALYSIS**

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## **ABSTRACT**

The literature on property rights in rural China has had an almost exclusive focus on cropland tenure. The primary purpose of this paper is to make a contribution towards extending the coverage of this literature to China's extensive grasslands, which comprise some 40% of its territory. Two unique characteristics of grassland tenure are found: group tenure arrangements and 'fuzzy' boundaries. In conventional microeconomic analysis, both of these characteristics raise efficiency concerns. However, it is argued that these concerns are only partly justified. Furthermore, by using a new institutional economics perspective and giving due consideration to the nature of resource endowments and the economic environment, 'hidden benefits' of group tenure and fuzzy boundaries are revealed. These benefits include facilitating the realization of economies of size with respect to herding labour, equitable household access to resources, and insurance against economic risk. Whilst Chinese cropland tenure also facilitates the latter two, it does this through different tenure mechanisms and this reaffirms the role of natural resource endowments in shaping institutional arrangements.

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## INTRODUCTION

Within the literature on property rights reform in rural China, two general approaches to the economic analysis of land tenure arrangements can be distinguished. On the one hand, there is the conventional neoclassical microeconomics approach that highlights several possible inefficiencies in the contemporary land tenure system (Wen, 1995; Hu, 1997; Li, 1998). Periodic re-allocations of land are seen to be undermining land tenure security and this in turn is associated with sub-optimal household investment in land and even the over-exploitation of land resources. Furthermore, restrictions on the transferability of use rights both impede household access to credit, as they can't use land as collateral, and prevents land from gravitating to its highest-value use. The implication of the conventional microeconomics approach is that the further privatisation of land is desirable. On the other hand, there are those that take a more new institutional economics approach (Dong, 1996; Liu et al, 1998; Kung, 2000). This approach questions whether the degree of land tenure insecurity is actually that high and, more fundamentally, places efficiency in the context of the broader institutional environment, characterized by incomplete and imperfect markets and positive transaction costs. Thus periodic reallocations of land are viewed as a low-cost means of providing economic insurance, and deficiencies in markets make the supposed efficiency gains from the further privatisation of land somewhat dubious. Those adhering to this approach emphasize the regional diversity and complexity of land tenure arrangements and partially explain this in terms of a process of decentralized institutional innovation that has enabled local interests and conditions to shape institutional arrangements.

The literature on rural property rights in China has had almost an exclusive focus on cropland. The primary purpose of this paper is to attempt to make a contribution to the extension of this literature to China's vast grasslands, which comprise some 40% of its total territory. Such an endeavour is timely, given the increasing focus of the Chinese government on both sustainable development and the development of its western regions. Grassland degradation problems are perceived by many officials and researchers to be worsening<sup>2</sup> and it is believed that land tenure arrangements are a significant contributing factor (Li and Duo, 1995; Longworth, 1990, 1993; NRC, 1992; Tuoman, 1993; Yu et al, 1996; Wang, 1995). Furthermore, because China's extensive grassland areas are predominantly located in its western regions and play an important role in the livelihoods of the rural poor, they must play an integral part in China's western development strategy. This paper focuses on the particular case of grassland tenure in Altay Prefecture of northern Xinjiang. This area was purposively chosen because it is still characterized by significant dependence on semi-nomadic to transhumanant pastoralism<sup>3</sup>. In less pastoral areas, it could be surmised that the distinction between cropland and grassland tenure is somewhat more blurred and thus drawing out the distinctions between the two could have been rendered more difficult. Field work methodology included rapid rural

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<sup>2</sup> According to official sources, some 90% of China's rangelands are degraded to some degree, including 42% moderately to seriously (SDPC, 1996:82-94; SEPA, 1998).

<sup>3</sup> As opposed to agro-pastoralism, such as that studied by Ho (2000b, 2001) in Ningxia, where livestock are kept within the vicinity of the village throughout the year.

appraisal and a random survey of 30% of households in three communities that represented the major types of pastoral communities found in Altay: plateau-based 'settled' and 'unsettled' Kazak communities, and mountain-based Tuvan communities.

The paper is divided into five sections. The first section outlines a conceptual framework, including the conventional microeconomics approach and a critique of it, as well as the new institutional economics approach. The second section introduces the case study area and the third provides a description of the grassland tenure arrangements found. The fourth section subjects these findings to both conventional microeconomic analysis and new institutional economic analysis. In the fifth section, the findings are contextualised in the broader literature on rural property rights in China, and in the sixth section conclusions are drawn.

## **1. CONCEPTUAL FRAMEWORK**

### **Institutions and Efficiency**

Mainstream neoclassical economics is neutral in its treatment of institutions. Whilst it acknowledges the existence of various political, legal and other institutions, it treats institutions as if they have no consequence for economic performance (Furubotn and Richter, 1997:8-9; Bardhan, 1989:3). Underpinning neoclassical economics' neutrality with respect to institutions is its assumption of perfect information and, implicitly, zero transaction costs, as transaction costs are invariably associated with the acquisition of information about exchange (Eggertsson, 1990:14-15). Transaction costs include search and information costs, bargaining and decision costs, and policing and enforcement costs. the costs. The development of New Institutional Economics (NIE) represents an attempt to rectify the naïve treatment of institutions in mainstream neoclassical economics. NIE proceeds according to two fundamental propositions: that 'institutions do matter' and that 'the determinants of institutions are susceptible to analysis by the tools of economic theory' (Matthews, 1986:903, as quoted in Williamson, 2000:595).

NIE is based on some of the same key conceptual foundations as neoclassical economics, including methodological individualism and utility maximization (Ingham, 2000:245-249; Furubotn and Richter, 1998:2-3). Methodological individualism implies that the analysis of collectivities – groups, institutions, societies – should not start at the collective level but instead be firmly based on the views and behaviour of their individual members. As with neoclassical economics, NIE also accepts that individuals 'seek their own interests as they perceive them' (Furubotn and Richter, 1998:3) and maximize their utility, though subject to the existing institutional structure as well as their budget constraints. What potentially transforms NIE from a mere extension of the neoclassical framework into a new paradigm altogether is its treatment of the issue of individual rationality. Many contributors to the NIE literature relax the neoclassical assumption of perfect individual rationality and instead use the concept of imperfect or bounded

rationality (Furubotn and Richter, 1998:3-4). Imperfect rationality arises from the positive transaction costs associated with the acquisition of information and agent's limited capacity to process information. Because it implies that individuals' preferences can no longer be assumed to be consistent, complete or stable, it represents a repudiation of the rationale choice model, a crucial element of the 'hard core' of neoclassical economics (Eggertsson, 1990:5-7; Furubotn and Richter, 1998:31-32).

The presence of positive transaction costs and bounded rationality complicates the analysis of the 'efficiency' of an institution. In neoclassical microeconomic theory, the 'efficient' allocation of individuals' property rights occurs when they maximize their utility subject to a budget constraint (Furubotn and Pejovich, 1998:97). Private property is usually associated with utility maximization, as it embodies the efficiency-enhancing properties of universality, exclusivity and transferability (Posner, 1977). However, in the presence of positive transaction costs, efficiency is not independent of the initial assignment of property rights (Coase, 1960). Thus the property rights associated with Pareto-optimality can't be used as a benchmark for efficiency in the real world. This is tantamount to comparing an unattainable ideal with the actual, what Demsetz refers to as the 'nirvana approach' (Demsetz, 1969). Demsetz postulates that a relevant concept of efficiency 'must refer to scarcity and people as they are, not as they could be' (Demsetz, 1969).

One way of bridging the gap between Pareto optimality and the real world is through the use of the concept of constrained maximization: welfare is maximized subject to the constraints of imperfect information and incomplete markets. However, this potentially encounters the problem of tautology. Any failure to perform better than actual can be attributed to some 'constraint' and therefore, what actually exists is always efficient (Furubotn and Pejovich, 1998:97). A second approach to the question of efficiency is to abandon the neoclassical criterion altogether. Demsetz (1969:1-22) argues that it is more meaningful to gauge the 'efficiency' of a particular institutional arrangement through comparing it with other real alternatives. Furubotn and Pejovich (1998:97-98) similarly argue that:

As a practical matter, it seems to be preferable to do without the neoclassical efficiency criterion when judging institutions in a world of "frictions". Rather, institutions or organisations can be assessed on the basis of their comparative production of desired results – as evaluated by the individuals granted decision-making power.

Thus the use of neoclassical efficiency criteria to gauge the efficiency of different types of institutional arrangements is somewhat dubious. Instead, this paper will use the comparative approach advocated by Demsetz and Furubotn and Pejovich.

## Land Tenure and Efficiency

In conventional economic analysis of land tenure institutions, the superiority of private property is asserted. Private property is regarded as embodying the efficiency-enhancing characteristics of completeness, exclusivity, transferability and enforceability (Posner, 1977:10-13; Randall, 1975:157-158). Exclusivity ensures that users have the incentive to invest in land improvements and adoptable sustainable land management. Transferability provides owners with access to credit, since land is an important form of collateral in rural developing areas, and also ensures that resources gravitate to their highest-value use. However, this conventional economic analysis is what Demsetz describes as the 'nirvana approach', as it assumes complete and perfect markets, and zero transaction costs.

Demsetz and other early contributors to the Property Rights School (PRS), a sub-field of NIE, placed considerable emphasis on the benefits and costs of exclusion in explaining rural land property rights. Increasing natural resource values caused by increasing population pressure on natural resources, or the development of new technologies or markets, increased the benefit of exclusion. Technological change, on the other hand, offered opportunities for a reduction in the costs of exclusion. As the benefits of exclusion typically increase, and the costs of exclusion typically decrease, over time, an evolutionary path of institutional change can be mapped out: open access → common property → private property<sup>4</sup>. By supposing that the mere existence of net potential gains from institutional change will be sufficient to ensure it occurs, the early PRS's treatment of institutional change has been rightly criticized for being too crude<sup>5</sup>. Nevertheless, the proposition that the degree of exclusion is associated with the relative benefits and costs of exclusion is a useful proposition. Exclusivity can be thought of both in terms of the unit of tenure (community, group or household, in ascending order of exclusiveness) and the degree to which boundaries are monitored and enforced in practice.

Because of the presence of positive transaction costs, including information and enforcement costs, markets are frequently incomplete and imperfect. This is particularly so in the context of developing rural areas, including in China (Dong, 1996; Ellis, 1993; Lin, 1995). Given incomplete and imperfect markets, some particular institutional arrangements can be explained in terms of being substitutes for markets, or acting as non-price controls. These include what are seemingly 'inefficient' institutional arrangements according to the neoclassical criterion. For example, Stiglitz (1974) argued that

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<sup>4</sup> PRS theory has been used to explain the evolution of property rights in the North American West (Anderson and Hill, 1975). Population pressure and commercialisation increased the benefits of exclusion, whilst the introduction of barbed wire decreased the cost of exclusion, inducing a shift from open access to common property and then private property.

<sup>5</sup> Bardhan (1989:7) argues that such an approach is replete with 'historical teleology, ahistorical functionalism and vulgar Darwinism' and: 'no more helpful [in terms of understanding the process of institutional change] than the Marxists' routine reference to the laws of motion of history'. North, the major contributor to another sub-field of NIE, the new economic history, gives greater recognition to the collective action and free riding problems that need to be overcome if the potential gainers from institutional change will actually be able to bring it about (Bardhan, 1989:8).

sharecropping arises from missing markets for tenants' effort and for risk (Hoff et al, 1993: 6-7). Under a conventional wage contract system, there is a need to monitor workers' effort but this is costly and imperfect, especially in the context of agriculture. Sharecropping, acting like a piece-rate system, enhances workers' incentives, thus enabling landlords to economise on monitoring costs and for output to be greater than in the case of a conventional wage contract system. Stiglitz didn't dispute Marshall's (and others') conclusions that sharecropping attenuated incentives, only that if monitoring costs were considered, then sharecropping was the better arrangement. Sharecropping also enabled tenants to bear less risk, compared with the alternative of renting land, given their lack of access to insurance markets.

Interlinking is a common characteristic of markets in the rural areas of developing countries (Ellis, 1993; Hoff, 1993:6-7). Interlinking has been defined as the 'simultaneous fixing of transactions between two parties over several markets, with the terms of one transaction contingent on the terms of another' (Hoff, 1993:6). An implication for institutional analysis is that specific institutional arrangements shouldn't be considered in isolation. One explanation for the phenomenon of interlinking is that, through involving barter-type exchanges, it facilitates transaction costs savings. Another explanation is that interlinking helps to mitigate the incentive problems associated with incomplete and imperfect markets. Hoff (1993:6-7) cites the example of interlinked product and credit markets. A wholesaler, through serving as an exclusive buyer of a farmer's produce, can better ascertain the farmer's willingness and ability to repay a loan before extending one. Thus what appears to be a market imperfection can actually be a device to organize exchange in a transaction costs-saving manner (Furubotn and Richter, 1998:283).

It will be recalled that conventional microeconomic theory is pessimistic about the prospects of group tenure: the non-excludability of others is seen as dampening incentives for investment in improvements and, worse, creating incentives for individuals to jointly exploit natural resources beyond biophysical limits. Yet this theory can be criticized on two accounts: it ignores what Eggertsson (1990) refers to as the potential 'hidden benefits' of group tenure<sup>6</sup>, and it is unduly pessimistic about the capacity of individuals to act collectively. One of the possible hidden benefits of group tenure is that it enables the realization of economies of size with respect to herding labour (Dalhman, 1980; Stevenson, 1991; Baland and Platteau, 1998:646). Such potential economies will exist if a household's herd is below the number of livestock that a single herder can feasibly herd. If so, labour savings can be made through several households combining their herds together and providing or procuring a herder to take care of them. Group herding arrangements in turn imply joint use of pasture, and group tenure may represent the lowest-cost institutional arrangement for facilitating this, particularly in the absence of markets for grazing rights. Another potential benefit of group tenure is that it can facilitate equitable access to natural resources, especially 'patchy' natural resources that could otherwise be difficult to fairly subdivide between households. A final potential benefit of group tenure, particularly in the context of arid and semi-arid environments

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<sup>6</sup> The benefits are 'hidden' in the sense that they are not identified in standard microeconomic analysis. Members of group tenure arrangements are, of course, aware of them.

that are subject to high environmental variability, is that it can enable the management of environmental risk through facilitating mobility and flexible access (Scoones, 1995). In the absence of well-developed credit, insurance, or feed markets, group tenure could represent the lowest transaction-cost means for households to mitigate the effects of environmental risk. However, it should be noted that mobility will only enable the abatement of environmental risk if the covariance of environmental risk across a community's feasible zone of resource use is relatively low.

The existence of 'hidden' benefits of group tenure doesn't in itself imply that individuals will be able to overcome the problems of group tenure identified in the conventional microeconomics critique. However, there is now a large body of empirical evidence that indicates that groups are able to jointly invest in and use resources on a sustainable basis (Baland and Platteau, 1996; McCay and Acheson, 1987; Ostrom, 1990). These groups have appropriate provision and appropriation rules and effective arrangements for their monitoring and enforcement. The potential for free riding always exist. However, when institutional arrangements are embedded in social relationships, structures and norms, this can considerably lower the propensity for opportunistic behaviour and the cost of monitoring and enforcing group rules. The problem of collective action has been phrased in terms of a "problem of assurance": for individuals to adhere to group rules and norms, they need assurance that other group members will follow suit (Lane and Moorehead, 1995; Runge, 1984, 1986). Small group size is conducive to the overcoming of the assurance problem, as is group homogeneity in terms of mutual interest in, and dependence upon, the natural resource (Baland and Platteau, 1996:298-302; Ostrom, 1990). Finally, when considering the issue of the unit of tenure, group or household, it needs to be remembered that there are transaction costs associated with individual tenure as well as group tenure<sup>7</sup>. These transaction costs include social overhead investment in structures for the recording and administering of individual property rights, and the adjudication of disputes. They also include the costs of monitoring and enforcing individual boundaries.

## 2. STUDY AREA

The general area in which the study has been conducted is Altay Prefecture in northern Xinjiang. Pastoralism still forms an important source of livelihood in Altay, with the pastoral population constituting some twenty two percent of its total population of 550,000 people<sup>8</sup>. Most pastoral communities are Kazak by ethnicity, with their

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<sup>7</sup> An influential intermediate microeconomics text (Varian, 1999) uses the case of a common pasture to illustrate the 'Tragedy of the Commons'. To its credit, the text acknowledges that: "... a system of rules could be formulated about how many cows can be grazed on the village common. If there is a legal system to enforce those rules, this may be a cost-effective solution to providing an efficient use of the resource' (Varian, 1999:585)". Nevertheless, by asserting that private property will always lead to Pareto efficient outcomes but common property won't when "the law is ambiguous or non-existent" (Varian, 1999:585), the text is asymmetrical in its treatment of the two. Private property also resides in an institutional environment characterised by imperfect information, legal ambiguities and, most importantly, positive transactions costs.

<sup>8</sup> Statistics Division, Altay Prefecture, 1995 data.

descendants having migrated east from present-day Kazakhstan as early as the mid-eighteenth century. Despite a rapid increase in the Han population since 1949, Kazaks still account for some fifty percent of Altay's total population<sup>9</sup>. Pastoralism is the predominant form of land use, with rangeland accounting for some eighty one percent of Altay's total area compared with cropland's two percent<sup>10</sup>.

Pastoralists are semi-nomadic, migrating between summer pasture in the Altay mountains and winter pasture in the Junggar Basin, up to 160 kilometres away. In the foothills in-between and on the edge of the Junggar basin lies spring-autumn pasture. The winter base of most households is also located at the edge of the basin, next to the natural flood plain of rivers where hay is harvested or, in the case of officially 'settled' households, alongside their irrigated plots. Pastoral household settlement constitutes the core of the state's current pastoral development strategy. Settlement entails the construction of irrigated land for pastoral households, on which they grow fodder (principally perennial grasses) and food crops. By the end of 1997, over sixty percent of the pastoral households in Altay had been 'settled'<sup>11</sup>. World Food Programme (WFP) Project 2817, which lasted from 1989 to 1994, was responsible for the settlement of over half of these. Settlement has generally reduced the demands on, and duration of use of, winter pasture. But the livestock of most settled households still utilise summer and spring-autumn pasture, if not winter pasture as well. Less than one percent of all pasture is fenced, with hayfields and perennial grasses accounting for the major proportion of this<sup>12</sup>.

Although summer pasture is the smallest in terms of area, accounting for only fourteen percent of Altay's total pasture, it is also the most productive, being about four times more productive than the much larger winter and spring-autumn pastures (Zhang, 1992: 114-115). This is partly related to differences in rainfall, with the Altay mountains receiving an average of 630mm of rainfall per annum, whereas the lower regions where spring-autumn and winter pasture are located only receive on average 126mm and 210mm respectively<sup>13</sup>. Annual rainfall and grassland productivity is quite variable in spring-autumn pasture, the driest. However, the coefficient of variation in annual rainfall is some twenty six percent<sup>14</sup>, putting it below the thirty three percent threshold that is commonly regarded as a definitive indicator of rangeland ecology in disequilibrium. There is considerable variation in seasonal temperatures, which in spring-autumn pasture average  $-16^{\circ}\text{C}$  in January, the coldest month and  $22^{\circ}\text{C}$  in July<sup>15</sup>. Minimum temperatures of  $-45^{\circ}\text{C}$  and maximum temperatures of  $38^{\circ}\text{C}$  have been recorded in the Altay region.

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<sup>9</sup> The Han population increased from 1,000 to 237,000 between 1949 and 1995, with their proportion of the total population increasing from 2% to 43% over the same period (Statistics Division, Altay Prefecture).

<sup>10</sup> Land Division, Altay Prefecture. Figures based on a 1991 land-use survey.

<sup>11</sup> Animal Husbandry Bureau (AHB), Altay Prefecture.

<sup>12</sup> AHB, Altay Prefecture.

<sup>13</sup> Data for Buerqin County and from the Buerqin County Weather Office.

<sup>14</sup> The coefficient of variation was calculated on the basis of annual rainfall data (1960-97) acquired from the Buerqin County Weather Office.

<sup>15</sup> Average of daily maximum and minimum temperatures. Based on 1960-1990 data acquired from the Buerqin County Weather Office.

The critical feed constraint for pastoralists is winter and early spring, a constraint that pastoral household settlement is designed to help alleviate. Grazing pressure on all pastures has increased considerably over the last half century, with livestock numbers and sheep-equivalents rising some seven and six-fold respectively between 1949 and 1997<sup>16</sup>. Rangeland degradation is perceived by prefecture and county officials to be an increasing problem, particularly in spring-autumn pasture, where urban populations and agricultural settlements also tend to be concentrated. Degradation in the vicinity of agricultural settlements is in part attributed to the increased number of livestock being raised by agricultural households, which now account for some twenty eight percent of Altay's total 4.4 million livestock<sup>17</sup>.

For the purpose of this study, three case study communities in Altay were chosen. The communities represent the three different types of pastoral communities found in the region (see Table 1). Ak Tubeq and Sarkum are both typical in the sense of having their winter bases at the edge of the Junggar basin and being Kazak by ethnicity. Both communities have extensive summer, spring-autumn and winter rangelands. The major difference between them is that whilst Ak Tubeq is not yet officially settled, Sarkum was completely settled between 1989 and 1994 under the aforementioned World Food Programme project. Thus Sarkum has irrigated fodder land, whereas Ak Tubeq is still wholly dependent upon 'natural' hayfields around the vicinity of its winter base. The third case study, Kom, is one of the three mountain-based Tuvan pastoral communities in the region. These communities have much shorter migration patterns than the basin-based Kazak communities, travelling a maximum of twenty five kilometres between their winter bases on the valley floors, where their natural hayfields are located, and summer rangelands at higher elevations. The settled community, Sarkum, is the wealthiest, followed closely by Ak Tubeq, the most populous. Kom is one of the poorest communities in Altay, its poverty in part being associated with the severity and longevity of winter in the mountains. Animal husbandry is the major source of livelihood for virtually all households in the three communities.

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<sup>16</sup> Averaged daily minimum and maximum temperatures for the years 1960-1990. Based on data from AHB, Altay Prefecture.

<sup>17</sup> AHB, Altay Prefecture, June 1997 data, excluding pigs and donkeys. Pastoral households account for the remaining 72% of livestock.

**TABLE 1**  
**BACKGROUND DATA ON**  
**CASE STUDY COMMUNITIES**  
**(1997)**

<b>Case Study Community</b>	<b>Ak Tubeq</b>	<b>Sarkum</b>	<b>Kom</b>
Ethnicity	Kazak	Kazak	Tuvan
Winter base location	Plateau	Plateau	Mountains
Population	1,580	1,045	946
Livestock per person	23	29	5
Income per person (yuan)	1,657	1,955	<899
Total pasture (hectares)	37,291	40,023	-

Source: Buerqin County Animal Husbandry Bureau

### 3. GRASSLAND TENURE

#### Grassland Policy

Communes were de-established in Xinjiang in 1984. Former commune-owned livestock were distributed to individual households on the basis of household population and labour force. The same year, grassland use rights were distributed to groups of households and cutting lands were distributed to individual households. The distribution of grasslands and cutting lands was done on the basis of livestock numbers and thus, implicitly, household population and labour force. The legal and regulatory framework has evolved since, with the passing of the national Grassland Law in 1985, the Xinjiang Grassland Law in 1989, and various regional government grassland regulations<sup>18</sup>. The legal and regulatory framework provides for continuing collective ownership of grasslands but the contracting out of grassland use rights, with the emphasis on the household as the basic unit of contract. This has been done through the issuance to households of grassland use certificates in 1989, followed by grassland use contracts over 1995-96. The grassland use contracts are more specific than the certificates, detailing the different areas of seasonal pasture that have been allocated to each household and the associated allowable stocking rates. They also specify grassland use fees. According to official statistics, some 94% of Xinjiang's useable grassland had been contracted to individual households by 1999. Policy has also emphasized stability in the allocation of grassland use rights: initially, use rights were to remain stable for a 'long period of time', before a 30-year term was introduced in 1993 and this was superseded by a 50-year term in 1996. Use rights are

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<sup>18</sup> Two principal government regulations are: Government Regulation No.247 (1992) 'Regulation on the Collection and Use of Grassland Management Fees in Xinjiang Uygur Autonomous Region' and; Government Regulation No.88 (June 1996) 'Regulation of the Grassland Contract in Xinjiang Uygur Autonomous Region'.

inheritable but not saleable. The transfer of use rights requires the administrative approval of the local Animal Husbandry Bureau, which has formal responsibility for implementing and monitoring the grassland contract.

### De facto Tenure

Cropland, artificial pasture and cutting land have been allocated to individual households in all three case study villages. However, grassland largely remains under group tenure arrangements that can trace their origins back to the initial distribution of grassland in 1984. These group arrangements have persisted despite the implementation of the grassland contract system over 1995-96. The grassland use certificates issued to households at this time do not clearly delineate household boundaries and neither have groups informally subdivided their grasslands. Data on the size and kinship basis of the pasture groups is presented in Table 2 below. The groups range in size from two to twelve households and are very much kin-based, with some 89% and 90% of sample households being related to some or all of the other households in their group. Furthermore, the nature of the kin relationship is usually very close. Although some of the original groups have subdivided, especially in Sarkum, the mean size of the groups has still increased in both villages because of natural population growth. New families formed since 1984 have had to share the grasslands of the husband's parents' group, as villages have had no extra grasslands to allocate them, and this accounts for the increasing size of groups.

**TABLE 2  
PASTURE GROUPS**

	Number of households in group		Kinship relationship of sample household to other households in group (%)			Original groups that have subdivided (%)
	Range	Mean	All related	Some related	None related	
<b>Ak Tubeq</b>						
- 1985	3 – 6	4.6	74	15	11	
- 1998	3 – 12	6.0				6
<b>Sarkum</b>						
- 1985	1 – 5	2.7	84	6	10	
- 1998	1 – 8	3.2				36

Source: survey data (n=143)

Another characteristic of grassland tenure is fuzzy boundaries. Although boundaries at the village and group levels are clearly demarcated, the degree to which they are monitored and enforced considerably varies according to the seasonal type of pasture as well as the type of livestock. Boundaries are most strictly enforced in winter pastures and least enforced in spring-autumn pasture. In the latter, only the villages' pasture boundaries are adhered to by pastoralists and thus a form of internal open access prevails. In terms of the type of livestock, small livestock (sheep, goats) tend to be actively herded within boundaries, whereas larger livestock are allowed to roam more freely. There is strong consistency between grassland policy and de facto practice with respect to stability

in the allocation of grassland use rights. Grassland allocation at the village, group and household levels has been largely unchanged since the grasslands were initially distributed in 1984. Sarkum has experienced the only real re-allocations, but these have been partial and in response to specific events, including the expropriation of the village's spring-autumn pasture for Project 2817 and shifting households' demand for forage as they switch to more dependence on fodder crops or artificial pasture.

The nature of grassland resource endowments has had a significant influence on the spatial aspects of grassland tenure. Because grasslands are a low-productivity resource versus cropland, the size of grasslands allocated (at least nominally) to households is relatively large. For example, it is not uncommon for households in Ak Tubeq and Sarkum to have been allocated 300 to 400 hectares of grassland in total. Given the agro-climate, grasslands can be most optimally utilized on a seasonal rotation basis, entailing the wintering over of livestock in the desert basins and the utilization of relatively productive mountain grasslands during summer. Given this, each household has been allocated at least one parcel of grassland in the three different seasonal pastures, and these are located many kilometres apart. Thus the resource configuration has given rise to a pattern of tenure that is distinct from cropland areas, where the land allocated to households is very small and a household's parcels are concentrated in a much more confined geographic space.

#### 4. ANALYSIS OF FINDINGS

##### **Group Tenure**

The proposition in conventional microeconomic analysis that group tenure in grasslands is associated with sub-optimal household investment in natural pasture improvement appears to be substantiated by the lack of evidence that households are making any investments in improvements in Altay. However, arguing in the tradition of Schultz (1964), the lack of private investment may be first and foremost reflect a lack of appropriate and financially viable investment opportunities. The investments in improvement in natural pasture that are observable, such as pest eradication and aerial sowing of seed, have to invariably be publicly funded because of the problems of coordination and externalities inherently associated with such activities. One type of investment that households are able to make is in 'grassland construction' or the establishment of artificial pasture<sup>19</sup>. The correlation between individual household tenure and artificial pasture is irrefutable: artificial pasture is always cultivated on land that has been allocated to individual households. Yet the establishment of artificial pasture is not really an investment in the improvement of natural pasture. Instead, it represents a transformation of natural pasture, in much the same way that the reclamation of natural pasture for cropland does. Furthermore, a correlation between individual household tenure and artificial pasture doesn't constitute proof that the chain of causality is simply: individual tenure → artificial pasture. To the contrary, in northern Xinjiang the development of large-scale gravity flow irrigation schemes usually proceeds the

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<sup>19</sup> 'Artificial pasture' is Chinese terminology for perennial grass species, such as alfalfa.

establishment of artificial pasture. After the initial investment in irrigation infrastructure is made, then an individual household tenure system is implemented and artificial pasture cultivated. Thus the role of individual tenure in *precipitating* investment in artificial pasture should not be overstated. Furthermore, it should also be noted that a large proportion of natural pasture is not suitable for conversion to artificial pasture, either because it is too water-deficit and irrigation development is not feasible, or because it is too distant and remote from villages. Thus it is these factors rather than the lack of group tenure that can explain the lack of household investment in artificial pasture.

The second proposition of conventional microeconomic theory, that group tenure leads to a ‘tragedy of the commons’, appears to be supported by the perceptions of officials and researchers in Xinjiang. However, a fundamental assumption of this theory is that groups are incapable of comprehending the benefits of regulating their joint use of a resource and, even if they are able to appreciate the benefits, they simply lack the capacity to act collectively. Fieldwork in northern Xinjiang has revealed a more complex situation (see Banks, 2001). On the one hand, there is quite effective community exclusion of non-members from community-owned pastures and regulation of their seasonal use. At the small-group level, group boundaries are also monitored and enforced, especially in winter and summer pastures. Thus the situation is far from the unregulated, free-for-all, implied in the ‘tragedy of the commons’. On the other hand, the stocking rates for household pastures that the government has ascertained are poorly enforced, if at all. The lack of enforcement of stocking rates may in itself not present a problem if the stocking rates are, as argued by some, inappropriate for the environmental context. Furthermore, small-groups are usually comprised of households with very close kinship connections and these households cooperate in a variety of economic and social spheres. These factors, coupled with the smallness of the groups, suggest that they could relatively easily, and at little cost, regulate their joint use of pasture. Thus lack of internal regulation is unlikely to be caused by any problem of collective action at the group level.

The propositions that group tenure necessarily leads to sub-optimal resource investment and resource over-exploitation have been found to have limited relevance to grassland tenure in Altay. More fundamentally, conventional microeconomic theory can be criticized for overlooking what Eggertsson (1990) labels the ‘hidden benefits’ of group tenure. It is proposed that one of the major ‘hidden benefits’ of group tenure is that it facilitates the realization of economies of size with respect to herding labour. The potential for economies of size exist because the average herd size of pastoral households is about 120 but one household is capable of herding up to 400 – 500 livestock or 3-4 household’s herds, in summer pasture and autumn pasture. In winter pasture this number decreases somewhat, because the cold climate and more stringent confinement of livestock within group boundaries increases the intensity of herding required. However, the number of livestock that a household can herd still exceeds 120 livestock. Only in spring pasture, due to the lambing season, does the number of livestock that can be herded by a household falls close to, or below, the size of the average household herd.

Households' herding labour requirements are complicated by the need, during some seasons, for them to simultaneously graze their livestock in distant pastures. During winter in Altay, for example, large livestock are kept near households' winter bases but small livestock are grazed in desert steppe pastures some 40 to 90 kilometres to the south. During summer, small livestock are typically taken to more northerly and higher summer pastures than large livestock. Underpinning the rationale for the simultaneous grazing of household livestock in different pastures is the imperative to match feed and forage resources to livestock requirements, and to ensure the utilization of even remote pastures. Another challenge for households arises from the need for them to simultaneously herd livestock and cultivate crops or cut hay. Crop cultivation activities occur from spring through to autumn, when livestock are being grazed in distant seasonal pastures. Likewise, even households without cropland have to provide for the cutting of hay near their winter bases when their livestock are being grazed in distant summer pasture. The multiplicity of tasks that households have to simultaneously manage in distant locations creates the incentive for them to capture, where possible, economies of size with respect to herding labour and this gives rise to the phenomenon of group herding arrangements.

Survey data on household herding arrangements in the three case study villages is presented in Table 2 below. These vary according to both the village and type of seasonal pasture but two common characteristics are evident. Firstly, forms of group herding arrangements are common. The converse, the case of a household herding its own livestock, and only its own livestock (category 1.1), is not a standard arrangement in any of the case study villages. The incidence of this arrangement varies from a low of eight percent in the case of Sarkum's summer pasture, to (an atypical) forty six percent in the case of Ak Tubeq's spring pasture<sup>20</sup>. The relatively low incidence of such arrangements is not consistent with grassland policy, which is premised on the basis of individual households herding their own livestock on their own pastures. Secondly, group herding arrangements have a strong kinship basis and are often exclusive to members of the same herding group. The percentage of households that utilise only their own labour and/or kin labour (adding categories one to three) range from a low of eighty three percent in the case of Sarkum's winter pasture, to a high of ninety eight percent in the case of Ak Tubeq's autumn pasture.

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<sup>20</sup> The high spring figure for Ak Tubeq reflects the high demand for household herding labour during the critical lambing season. The relatively high incidence in Kom is related to the close proximity between a household's summer pasture and its winter base.

**TABLE 2**  
**HOUSEHOLD HERDING ARRANGEMENTS**  
**(% of surveyed households)**

Herder(s) of household livestock	Summer			Aut. AT	Winter		Spring AT
	AT	SAR	KOM		AT	SAR	
1. Household only:							
1.1 only own livestock	23	8	39	24	20	10	46
1.2 and relatives' livestock too	27	18	8	12	16	20	10
Total	49	26	47	36	36	29	56
2. Relatives only	33	52	28	19	16	35	15
3. Household and relatives (jointly herding together)	13	5	6	42	44	18	26
4. Friends only	5	0	11	3	4	0	3
5. Commercial labour	0	16	8	0	0	18	0
Households using pasture	100	98	62	99	95	82	99

Source: survey data (n=200)

Herding groups are largest during seasons when a household's livestock needs to be subdivided according to type and grazed simultaneously in distant pastures, as in the case of Ak Tubeq and Sarkum during winter and Ak Tubeq in summer. A typical group herding arrangement involves a young family from the pasture group and young males from other households in the group jointly herding all of the group's small livestock together. The rest of the households take care of the large livestock in another pasture or at their winter base. Group herding arrangements are also common in Sarkum over summer, when households have to simultaneously make provision for the management of their irrigated cropland in Sarkum proper. Thus it is common to find the arrangement whereby some households herd all of the pasture group's livestock in summer pasture and the other households reciprocate by managing the herding households' cropland in Sarkum.

Interlinking group tenure and herding arrangements in Sarkum have persisted despite the rising use of commercial herders since the settlement of Sarkum from 1989. Commercial herders have an interest in maximising the number of livestock that they herd, subject to the constraint that losses, which they are liable for, don't unduly increase. The only way that a number of households' livestock can be herded together is if the households' have joint use rights to the same pasture. Thus commercial herders usually herd the livestock of households that belong to the same pasture group or neighbouring pasture groups. Even in winter pasture, where tenure can be flexible from year to year, commercial herders have relatively more freedom regarding the choice of households that they work for. Even, then, however, members of the same summer pasture group often have a preference for employing the same commercial herder over winter. Thus group tenure arrangements exist because they facilitate group herding arrangements and these in turn enable the realization of economies of size with respect to herding labour. The

imperative of economizing on the use of herding labour explains why group herding arrangements and, implicitly, the joint use of grasslands, persists even after grassland use rights have been formally assigned to individual households.

A second 'hidden benefit' of group tenure is that it facilitates the monitoring and enforcement of village and group boundaries. During their season of use, boundaries in pastures can be relatively easily monitored and enforced by herders in the field. Thus by facilitating economies of size with respect to herding labour, group tenure arrangements also implicitly lower the cost of the monitoring and enforcement of boundaries. The greatest potential problem comes from the out-of-season use of pasture by others. As explained in the previous section, in order to protect their pastures from out-of-season encroachment, villages encourage several of their households to stay in their different seasonal pastures all-year-round. Collective ownership of pasture facilitates this arrangement. Village leaders are able to organize the stationing of households at relatively low cost, and the strong sense of collective ownership instilled in pastoralists ensures that they are supportive of such arrangements.

### **Fuzzy Boundaries**

The monitoring and enforcement of pasture boundaries has been observed to vary according to the season and type of livestock. This variation is in part accounted for by the relative scarcity values of different seasonal pastures: the strictest monitoring and enforcement of group boundaries occurs in winter and winter-spring pastures, which is the time of year that the feed constraints faced by pastoralists are the severest. In summertime, when forage is plentiful, group boundaries are less strictly monitored and enforced.

In spring-autumn pasture, there is no monitoring or enforcement of group boundaries and internal open access prevails, but this has little to do with the relative scarcity value of the pasture. Instead, it is related to the patchy and non-uniform distribution of forage and water in spring-autumn pasture, coupled with the emphasis of grassland policy – and villagers – on ensuring equitable access to grassland and water resources. The patchiness of forage in spring-autumn pasture renders the task of ensuring an equitable distribution of grassland to groups, let alone individual households, a very difficult task. Another unique resource characteristic of spring-autumn pasture is the spatial concentration of water resources in just a few streams and/or spring ponds. This contrasts with the case of other pastures, where water resources are much more evenly dispersed: in summer pasture, by the numerous mountain streams and in winter pasture, by snowfall (small livestock obtain water from eating snow whilst grazing). Under a household tenure system, pasture would need to be allocated in very long and thin strips in order to ensure all households had direct access to water resources in spring-autumn pasture. This simply isn't practical for grazing or the monitoring and enforcement of boundaries. Conversely, a rule allowing livestock to transit over others' pasture in order to access water resources could also ensure equitable access. However, given that livestock need to be watered on a daily basis, the number of transits involved in any one season would be considerable. Furthermore, the cost of this rule would mostly be borne by those who

benefited from it the least: the people with grassland allocated in the vicinity of water sources. It is conceivable that stock routes could be delineated within the village pasture, but this could be a complex process. As in the case of patchy forage, internal open access represents the lowest-cost and less contentious method for ensuring equitable access to disparate water sources.

Another explanation for the lack of the monitoring and enforcement of boundaries in spring-autumn pasture is its location in the transition zone between desert winter pasture and mountain summer pasture, coupled with the need to maintain vertical mobility. It is common for pastoralists from the same village and other villages to transit through a group's pasture during their seasonal movements between pastures. This is not an insurmountable problem: stock routes between seasonal pastures could, and to some extent already have, been delineated. Nevertheless, the lack of group boundary monitoring and enforcement facilitates inter-seasonal mobility and this can be considered an incidental benefit of internal open access.

The fencing of grassland could potentially aid the stricter monitoring and enforcement of boundaries, as well as reduce household herding labour requirements. Yet virtually no pasture in any of the three case study villages is fenced. It could be argued that group tenure arrangements dampen the incentive for household investment in fencing. Yet in other parts of China, the presence of de facto group tenure has not constituted a barrier to household investment in the fencing of group boundaries. Groups have been able to overcome potential free-riding problems through sharing the cost of fencing according to mutually agreed upon provisioning rules. One reason for the lack of fencing in winter pasture in Altay may be that strict exclusion is more or less achieved by institutional means anyway. Since the cost of exclusion, via the direct observation of herders in winter pasture, is a largely sunk cost, exclusion by such institutional means may be less costly than exclusion by fencing. In summer pasture, since the sharing of pastures in boundary areas is reciprocal and grassland degradation is minimal, the benefits of fencing may simply not warrant the cost of fencing. Finally, fencing is not a sufficient measure to guarantee strict exclusion. It is porous, particularly in the case of small livestock, and fenced pasture would still need people residing in the vicinity of it to protect it from out-of-season encroachment. The tendency for fencing materials to get stolen in Altay reinforces this argument: even the fences themselves need monitoring.

Finally, another potential 'hidden benefit' of both group tenure and fuzzy boundaries is that they could facilitate the abatement of environmental risk by allowing flexibility and mobility. However, this argument appears to have only limited relevance to northern Xinjiang. The level of environmental variability in northern Xinjiang is not extreme to start with and, more significantly, there is a high covariance of environmental risk (drought or snowstorms) right across the region. Thus if anything, communities and groups are even more protective of their boundaries in years of adverse climate. Instead, farmers are able to moderate environmental risk through accessing feed supplied on a credit basis by the local government.

## 5. GRASSLAND AND CROPLAND TENURE COMPARED

The findings of this study have potential relevance beyond northern Xinjiang.. The insights into grassland tenure provided by field studies of pastoralism in Inner Mongolia (Williams, 1996) and Tibet (Goldstein and Beall, 1991; Miller, 1999a, 1999b, 2000) suggest that group tenure arrangements and fuzzy boundaries are relatively common throughout China's extensive pastoral areas. A priori, it might also be assumed that grassland tenure in these areas give rise to the same type of efficiency concerns, as well as 'hidden benefits', as has been found in the case of northern Xinjiang. It can be generalized that there are considerable differences between Chinese grassland and cropland tenure in terms of their characteristics and the perceived problems and benefits associated with them. Firstly, in terms of the characteristics of tenure, grasslands and cropland share in common collective ownership and de jure household tenure but little else. The de facto unit of tenure in grasslands is groups, implying joint use of resources, whereas in croplands individual household tenure prevails. Grassland use rights have a longer term of duration (50 versus 30 years) and grassland allocation has been very stable. In cropland areas, in contrast, periodic administrative reallocations of land have been relatively common despite formal policy stipulating first a 15 and then a 30-year term of use rights. Another point of contrast concerns the monitoring and enforcement of boundaries: boundaries are fuzzy in grasslands whereas in croplands they are precisely monitored and enforced. Finally, pastoral households use larger parcels of land, dispersed over a much wider area, than their cropping counterparts.

Secondly, in terms of perceived problems of tenure, from a conventional microeconomics perspective both grassland and cropland tenure systems (Wen, 1995; Hu, 1997; Li, 1998) create disincentives for land investment and sustainable land management. However, the tenure characteristics that give rise to these problems differ: group tenure and fuzzy boundaries in grasslands and periodic reallocations in croplands. The institutional environment governing both grasslands and cropland restricts the transferability of use rights and this is perceived, in both contexts, to give rise to the problem of credit deprivation and non-gravitation of land to its highest-value use. In addition, in grasslands, the presence of group tenure could also give rise to problems in using land for collateral. However, the applicability of this conventional microeconomic analysis to Chinese rural land tenure is questioned both in this paper and the literature on Chinese cropland tenure. In the case of grasslands, it has been argued that group tenure is not directly associated with a lack of household investment in grassland improvement and that the 'tragedy of the commons' is, at best, only partial. In an analogous manner, in croplands it has been argued that the frequency and comprehensiveness of periodic reallocations of cropland are less than what was originally thought (Kung, 2000; Liu et al, 1998). Therefore, they may have had a relatively small impact on land tenure security, and thus land investment and management practices.

Abandoning the 'nirvana' approach, there are commonalities between grassland tenure and cropland tenure in terms of the type of 'hidden benefits' that they facilitate, but differences in the specific tenure characteristics that give rise to them. Equity is a 'hidden benefit' of both grassland and cropland tenure systems. In grasslands, equity is

in part preserved by group tenure arrangements, which give new families a right to share the grasslands of the husband's father's pasture group. Equitable access to forage and water is also facilitated by fuzzy boundaries, particularly in spring-autumn pasture where group boundary enforcement is low and an internal open access situation prevails. In croplands, in contrast, equity is preserved through the periodic re-allocation of lands in response to demographic change, which makes land available for new households. Related to the concept of equity is that of the provision of economic insurance. Households that partially or completely exit farming in order to pursue non-farm activities, retain the option of falling back on farming for 'subsistence'. In grasslands, this is facilitated by group tenure arrangements: any original member of a pasture group has the right to use group pasture as long as they are resident in the community. In croplands, households can likewise receive land-use rights on the basis of residency, thus providing insurance against economic downturn. A final benefit of grassland tenure is that, through facilitating group herding arrangements, it facilitates economies of size (with respect to herding labour). In contrast, in cropland areas, the household tenure system and the associated fragmentation of land holdings is perceived to a constraint to the realization of economies of scale.

## 6. CONCLUSIONS

This paper has sought to describe Chinese grassland tenure, to analyse it from both a conventional microeconomics perspective and a new institutional economics perspective, and to situate the findings in the context of the literature on rural property rights in China. Two characteristics of grassland tenure that clearly distinguish it from cropland tenure are group tenure arrangements and fuzzy boundaries. From the perspective of conventional microeconomics theory, group tenure arrangements may discourage investment in land improvements and encourage a 'tragedy of the commons'. Yet since the pasture groups found in China are of small size and socially embedded in close kin relationships, it should be relatively easy for such groups to overcome the problem of assurance inherent in collective action. It has thus been argued that the lack of household investment in grasslands has little to do with group tenure and more to do with the general lack of viable household (or group) investment opportunities. Whilst a strong correlation between individual tenure and household investment in artificial pasture is observable, the area of grassland suitable to conversion to artificial pasture is very small anyway and it is government investment in irrigation development, not individual tenure, that precipitates household investment in artificial pasture. Regarding the second proposition of conventional microeconomics theory, that group tenure leads to a 'tragedy of the commons', a lack of internal regulation by the groups was found. However, this also can't be attributed to group tenure per se, given the characteristics of the groups and the relative ease to which they could regulate their joint use of pasture. The potential for groups to self-regulate the use of their pastures may have been suppressed by the government's own stocking rate controls, which are of questionable appropriateness and difficult for it to enforce.

The new institutional economics perspective has helped explained Chinese grassland tenure, in its real life setting of imperfect and incomplete markets and positive transaction costs. Two hidden benefits of group tenure were hypothesized: the facilitation of economies of size with respect to herding labour and a reduction in boundary monitoring and enforcement costs. The evidence from the field supports both hypotheses. The nature of natural resource endowments and their utilization patterns requires that different types of livestock have to be herded in different pastures at the same time, and that herding and cultivation/hay cutting activities also have to be simultaneously undertaken. This creates the need for households to economise on the use of labour, which they do through forming group herding arrangements. Group herding arrangements in turn imply the joint use of pasture, and it has been argued that this can be achieved at lowest transaction cost through group tenure arrangements. Evidence of this was found in the strong interlinking of group herding and tenure arrangements. Group herding arrangements also implicitly lower the cost of the monitoring and enforcement of boundaries in pasture during their season of use, through economizing on the use of herding labour. More generally, collective ownership of pasture facilitates low-cost arrangements for the protection of pastures from out-of-season encroachment. The other major characteristic of grassland tenure, fuzzy boundaries, was in part explained by the differing benefits of exclusion: exclusion is more tightly enforced in winter pasture, the season of highest fodder scarcity, than summer pasture, when fodder is in abundance. The absence of any monitoring and enforcement of group boundaries in spring-autumn pasture because of the patchy distribution of forage and water in this pasture, coupled with strong policy support and social preferences for equitable access to pastoral resources. Internal open access represents the low-cost means of enabling this. Although it was also hypothesized that group tenure and fuzzy boundaries enabled the abatement of environmental risk, the high covariance of environmental risk across the Altay region leaves little scope for tenure flexibility to be used for this purpose.

There are considerable differences between grassland and cropland tenure. Kung's (2000) statement that a 'uniform system of land tenure in rural China is unlikely to be successful given its immense diversity' becomes an understatement when grassland is also explicitly considered. Key defining features of grassland tenure, including group arrangements and fuzzy boundaries, ultimately stem from the characteristics of grassland resource endowments, particularly their expansiveness and seasonal pattern of utilization. As in the case of cropland tenure, grassland tenure also gives rise to efficiency concerns but these concerns may not be as valid as originally thought and there are 'hidden benefits' associated with seemingly inefficient grassland tenure arrangements. One of the hidden benefits found, the facilitation of economies of size with respect to herding labour, is unique to the case of grassland tenure. Another hidden benefit, that of facilitating equitable access to resources, is also shared by cropland tenure systems. However, equity is realized through different tenure mechanisms in the different resource contexts: in grasslands via group tenure and fuzzy boundaries, and in croplands via periodic reallocations. This confirms the crucial role that nature resource endowments have in explaining the diversity of rural land tenure arrangements in China.

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