

## **The Impact of Grassland Protection Policies on Mixed Herding/Farming Families in Northwestern Jilin Province, PRC**

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### **Abstract**

*The grasslands and pastures of China are the third most extensive in the world, providing employment for upwards of 39 million persons while supporting the world's greatest concentration of sheep and goats and the fourth largest number of cattle. China's grasslands have not fared well during the reform era. There are myriad ecological and historical reasons for the current degraded conditions of China's grasslands, including ill-advised agricultural expansions during the 1950-60s, ineffective reclamation efforts beginning in the 1970s, and more recent problems including poor pasture management, overgrazing, a decline in species diversity and regional declines in annual precipitation. As everywhere, poor places often result in poor people; and the actions of poor people often exacerbate ecological problems in such environments. Often under-reported in the Western press, current efforts to protect the grasslands are unprecedented in scope and investment as well as with respect to the range of strategies employed. One solution to this degradation applied in western Jilin Province is to enclose and protect the grasslands by limiting the traditional access to these lands by herding households, while re-training families to raise cattle, dairy cows, and other "shed-fed" livestock as alternative activities to grazing sheep and goats. These programs are relatively new, but for many herding families, they remain unpopular—creating both economic "winners" and losers" locally, while national and provincial environmental protection goals are met. This paper will present results of a survey of 47 households that compares results for two samples of herding households participating in such a program. Results reflect declining incomes in some areas vis-à-vis full-time husbandry, a greater range in incomes, but more diversified income generating activities are compared to areas where these programs have not been implemented.*

**Key Words:** rural China, environmental protection, rural economic development, grasslands in China, Jilin Province, China.

### ***I. Squaring the Circle: Husbandry and Grassland Protection in China***

Grassland/pasture degradation ranks as one of China's most intractable environmental challenges (Brogaard, Runnstrom, and Seaquist, 2005; Li et al, 2000, Liu 1999, Liu 2008, Wang 2008). Scholars estimate that since 1949, more than 90% of China's grasslands have deteriorated to varying degree due to over-grazing, short-term conversion to cropland, grass-harvesting, and soil compaction (Ellis 2007, Embassy of the PRC 2006, Xu et al. 2008). Degradation is defined by Dong et al. 2007, as non-arable land where physical compaction, nutrient deficiency, and eroded surfaces cause serious economic, social, and environmental problems (Dong 2007, Nelson 2006). In response, in December 2008 Wang Yuqing, Vice Minister of Environmental Protection of China (MEP), stated that the protection of China's grasslands will be given the highest priority in the national environmental protection agenda over the next decade (Wang 2008). This is a well-trod road, but there are reasons to believe new efforts will prove more successful than those of the past.

Ecologists and other researchers assessing on-going programs from the 1950s to 2000 argue that there has been too little to show for the labor of hundreds of thousands and the investment of hundreds of millions spent on the problem over the past half-century. Indeed, conditions in many areas have worsened during the reform era (Ellis 2007, C.L. Li et al. 2008, Liu 2008, Xu et al. 2008, Xue 1996)<sup>1</sup>. As a consequence, more rigorous national-, provincial- and local-level policies designed to address grassland deterioration and desertification have been introduced throughout China since 2000. The new programs are more stringent with respect to regulation of both pasture use and livestock but also better funded. Admittedly, enforcement even within a single province is quite variable, but these new policies for Jilin which will be discussed in greater detail later in the paper are a big step in the right direction. While most agree that the mass mobilization campaigns or the voluntary programs employed in the past were not very effective, there are signs that the new programs are different in a number of ways (Sheehy et al 2006, Wang 2008, Xinhua News Agency 2008).

The new initiatives are better funded and more ambitious, with far greater government support at the national level than those of the past. On the ground, these programs appear to be modeled on the well known and increasingly popular “Grain for Green” programs introduced throughout north and west China to reduce erosion and land degradation by promoting forest cover on slope land once used for field agriculture through the local provision of grain supports (Uchida, Xu, and Rozelle 2005). Like the “Grain for Green” reforestation programs that provide grain subsidies to farm households adopting sustainable practices and/or reforestation on previously cultivated slope land, these new pasture protection and restoration programs are often better described as “set-asides” where land is taken out of field and tree crop production, rather than efforts to promote “sustainable husbandry” (持续牧业) or ecological husbandry” (生态牧业) despite claims to the contrary. Taken in their entirety, these environmental protection measures are not popular programs, even in the mixed husbandry-agricultural areas of Western Jilin where field agriculture (largely corn, soybeans, mungbeans as a rotation crop, and increasingly rice [now #2 in gross grain volume in 2006]) provide approximately 50% of household incomes (Jilin Statistical Yearbook 2007, Table 11-16). Based on a survey of pastoral families in three townships of west Jilin Province in Northeast China, this research provides an opportunity to explore how China’s new pasture management and protection policies and programs are succeeding in their attempts to balance economic growth and environmental protection.

Specifically, we examine the benefits and the costs for 51 mixed farming/herding families who participated in our survey—representing over 100,000 people in western Jilin who rely on the grasslands for their livelihood; that is those most impacted by changes in grassland policy. Is the loss of autonomy over grasslands for pastoral and semi-pastoral families a reasonable tradeoff for halting desertification and protecting the grasslands? Do government policies create regional winners and losers in the wake of environmental protection programs? What alternative income-generating activities have been successful—at least in the short-term? This research is intended to explore and partly answer the questions raised above. We hope the article highlights China’s pressing environmental concerns in pastoral regions in light of issues related to developing sustainable practices for herding families. Effective management of pastoral regions requires a balanced policy approach that promotes environmental protection and restoration while still allowing rural families to achieve a reasonable living—or the programs will fail.

## ***II. The Big Picture: Pasture Resources and Use in China and Jilin Province***

There is genuine awareness at the very highest levels of China’s government that sustainable policies in agriculture, forestry and husbandry must be introduced and supported if the decades of damage are to be reversed (Embassy of the PRC 2006, Nyberg and Rozelle 1999; Veeck et al. 1995; Waldron, Brown, and Longworth 2003). At the local level, programs assuring sustainable grassland practices are important for a variety of reasons including poverty alleviation, maintenance of cultural life ways and traditions, limiting out-migration of the young, protection of the environment, maintenance of species diversity, reducing the impact of “invasive” species on grassland ecology, and improving water quality (Longworth and Williamson 1993, Wright 2008, Zhao 1994).

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<sup>1</sup> Lee Liu (2008) provides an excellent summary of China’s most significant environmental problems, programs and legislation dating back to 1972, while emphasizing how most efforts started after 1985. China’s 5-year plans on environmental protection began in 1996.

State efforts to protect the environment, such as the contemporary pasture protection and mitigation programs discussed in this article, reflect a remarkable level of state intervention, investment, and control and offer an interesting case study of how the entwined goals of environmental protection and economic equality and stability are to be addressed under China's current leadership. Under the new program, grasslands are often protected by government regulations, whereas the alternative activities promoted to raise incomes rely ultimately on market forces. This is, then, a local manifestation of the mixed socialist-market economy currently operating throughout China. While a number of scholars have warned of harmful outcomes that emerge from the adoption of "neoliberal" policies by developing countries in general (Munck 2003, Portes 1997) and by China specifically (Hui 2004, Lee and Zhu 2006, Phillion 2007), China's state-directed environmental policies demonstrate that the state's commitment to market-based principles of free trade and laissez faire to "develop" rural China is far from total. A neoliberal depiction of China's contemporary economic policies in rural China overlooks the heavily activist role of the government in its attempts to mitigate social inequities, corruption, and most importantly for this research, environmental degradation, while maintaining economic growth.

Estimates of China's grassland area range from 390 to 400 hm<sup>2</sup>, accounting for about 42% of the nation's total land resources (China Statistical Yearbook 2007 5, Xu et al. 2008). The grasslands of North China are the third most extensive in the world, supporting the world's greatest concentration of sheep and goats and the fourth largest number of cattle (China Statistical Yearbook 2007 484-485). Given this great expanse, and the importance of the livestock and related products for exports and domestic use, China's pastoral lands represent one of the nation's most important natural resource bases and one that indisputably must be managed more effectively (Zhao 1994). Beyond the local effects of degraded pasture, deteriorating conditions on the grasslands result in massive dust storms that choke China's eastern cities, transporting dust as far as the Pacific Coast of North America (Kim 2007, C.L. Li et al. 2008).

While the origins of some ecological damage to the grasslands and wetlands distributed throughout western Jilin Province and elsewhere must be credited to earlier times and natural causes, there is general agreement that much of the damage was the result of ill-conceived "development" policies introduced since 1949, and perhaps intensified during the reform era (Ellis 2007, F. B. Li et al. 2008, Liu 2008, Nyberg and Roselle 1999; Runnstrom 2003). The reasons for deteriorating conditions are obviously quite complex, and while some causes such as long term climate change are far beyond the goals of this article and our project, few would dispute that the economic reform policies of the past three decades have encouraged the abuse of the grasslands through overgrazing, overstocking, and ill-advised crop land conversions (still going on in many locations). In addition, chronically low local and global prices for most products produced on the vast grasslands represent additional constraints to household investments in pasture and flock/herd improvements (Chen et al. 2008, Liu 1999, Thwaites et al. 1998, Yu et al. 2004). The above limitations, combined with endemic poverty and a household land contract system which is routinely manipulated by local leaders and business interests, make many herders rather ambivalent "stewards" of the land.

Around 2000, China's environmental planners, frustrated by the lack of success of locally-based voluntary grassland protection initiatives that had changed little since the 1980s, started to pressure local resource agency officials (husbandry, agriculture, forestry, water bureaus), demanding better results and more effective programs. But this time the demands for grassland protection meted out to local governments by Beijing come with considerable fiscal support (F.B. Li et al. 2008, Wang 2008, Xinhua News Agency 2008). Further, international financial support for these programs has also been high. These policies and programs are often implemented with partial funding and/or advisement from foreign researchers and NGOs, such as The World Bank and WWF. This extra-regional funding is in sharp contrast to Liu's (2008) comprehensive report on China's growing number of ecological communities that appear to be more "grassroots" with respect to both conceptualization *and* financing. Officially most of the herding households using the pastures on the eastern edge of the great Keerqin Grasslands, upon which this study is based, are classified as "semi-pastoral" households. This status is assigned to households (and counties) where a significant portion of household income for a typical family is also derived from field crop production, forestry, or aquaculture as well as from the activities related to range animals (versus swine or fowl). There are 265 pastoral and semi-pastoral counties in China as of 2008 with 146 (55%) classified as semi-pastoral (Figure 1).

Of these counties (and autonomous counties), the grasslands of West Jilin are some of North China's finest, with greater annual precipitation, spread across a longer growing season, than most of the western grasslands in Inner Mongolia A.R., Gansu, or Ningxia Hui A.R. Still, signs of degradation are identified in virtually every recent study of the Keerqin grasslands including that portion in Western Jilin (F.B. Li et al. 2008, Kawanabe et al 2001). In addition to pasture degradation, erosion, and soil compaction, the western border counties are also prone to desertification, especially in drought years (F.B. Li et al. 2008 384). Certainly most of the farmers and herders of western Jilin Province agree that more must be done to protect the grasslands from excessive use and over-exploitation. In Jilin as elsewhere, however, low incomes from range-based husbandry often make for harsh choices. For Jilin Province, mean annual per capita rural income in 2007 was 4,190 *yuan* (\$559.41) at a time when prices for farm inputs, education and healthcare are skyrocketing (*Jilin Statistical Yearbook* 2008 175).

The interregional environmental problems associated with pasture degradation and desertification (dust storms, chronically poor air quality in coastal provinces and cities, drought, erosion, sediment in water supplies- to name a few) levy considerable pressures on the State to make improvement of the grasslands a national priority. Frequently intense dust storms every spring ensures that citizens from Changchun, Beijing, Tianjin, and other eastern cities now exhibit a new enthusiasm for environmental action, seeking improvements that will alleviate dust problems in urban areas (Fairlie, et al. 2006, Jaffe et al. 1999, Jaffe 2003, and Kim et al. 2006). Unfortunately, success in grassland protection and restoration until quite recently remained quite limited (Embassy of the PRC 2006, Xue 1996, Sheehy et al. 2006).

There are a number of economic and environmental reasons for this poor showing despite often the best intent and significant investments of capital, time, and labor. Grassland restoration is one of the most challenging of ecological mitigation efforts facing resource managers in any nation. First, given limited precipitation within virtually all of the northern grasslands, even when pasture revitalization is achieved, subsequent drought for multiple years erases much of the progress. Pasture grasses are less capable (as compared to trees or even shrubs) of countering the ecological effects of multi-year droughts including the inability of degraded pasture grasses to compete with potentially toxic (to livestock) invasive species, the effects of intensified over-grazing on soil porosity and soil compaction, and the loss during drought years of organic material in the O and A horizons due to intensified effects of wind erosion (Chen et al. 2002, Li C.L. et al. 2008, Xue 1996, Wright 2008). There are also economic considerations that severely restrict mitigation efforts for China's pasturelands. The management strategies used by small-scale herders in many remote and peripheral areas of China are increasingly influenced by national and international markets, joining local environmental or economic conditions. With growing integration in the global marketplace through the production and processing of high quality wools and cashmere textiles and clothing and semi-processed hides and leather consumer goods, there are clear short-term benefits for each herding households to maximize the numbers of livestock on their contracted land (F.B. Li. et al. 2008, Yu, Ellis, and Epstein 2004).

Herding families overstock their pastures with clear understanding that pasture degradation is dangerous in the long-run, but potentially profitable in the short run (Veeck, Emerson and Li 2006). Recently high maize prices (2006-2008)—while down again in 2009—further encouraged farming households in western Jilin to casually use some of their contracted pasture and forest land for grain production typically to produce feed grains and forage for their own livestock to reduce winter feed costs (F.B. Li et al. 2008 387-389). Previously introduced fencing policies intended to protect the most marginal pasture lands by exclusion or restrictions intended to promote herd management may actually intensify use of unfenced pastures resulting in further degradation (Nelson 2006). Given the potential revenues possible through increased livestock or husbandry product sales produced with the minimum investment, ill-advised individual practices such as livestock "crowding" and limited investments in pasture maintenance resulting in environmental degradation should come as no surprise (Liu 1999, Liu 2008, Thwaites et al. 1998).

### ***III. Conditions in West Jilin***

The grasslands of western Jilin Province were selected for this research for a number of reasons. While only ranking 14<sup>th</sup> (of 31 first-order political units) in terms of total area, Jilin Province incorporates a remarkable diversity of environments with a similar range of environmental problems. From east to west, there are four distinctive ecological areas: forests in the eastern part, low mountains and hills in the mid-eastern part, plains in the middle part, and grasslands and wetlands in the western part (People's Government of Jilin 2005, *land resources*).

Jilin Province is a major base of forestry in China, with forest cover over 42.5% of the province, ranking 6th among all China's provinces (People's Government of Jilin Province 2005). While often overlooked because of the more extensive grasslands of Inner Mongolia, Qinghai, and Tibet, Jilin Province is recognized as one of China's "Eight Pasturelands" with a total grassland area of 5.842 million hectares, 4.379 million hectares of which can be used commercially. The province is also one of China's main production centers for commodity cattle and fine-wool sheep, ranking fifth in wool production in 2006 after Inner Mongolia, Tibet, Hebei, and Heilongjiang. Recently, as corn output increases, milk and pork production are increasing apace (Yang et al. 2007).

The interspersed grasslands and wetlands of western Jilin are extensions of the massive Keerqin Grassland of Inner Mongolia. These pastures actually represent an ecotone between the mixed wetlands and grasslands of the east, and the drier grasslands and deserts of Inner Mongolia. Western Jilin incorporates approximately 2.18 million hectares or 11.6% of the province ( $121^{\circ} 38'E$  to  $126^{\circ} 30'E$  and from  $44^{\circ}N$  to  $46^{\circ} 21'N$ ). F.B. Li et al. (2008 384) argue that land desertification is the most pressing ecological problem facing west Jilin, with .858 million hectares classified as desertified in 2000, but variable rainfall is of equal importance (Li et al. 2005, Zhang and Lin 1992). In good years, the grass can reach three feet in height in late August and September, and when there is sufficient rainfall, it is easy to imagine when the endless seas of grass formed the core of the powerful Manchu state that successfully overthrew the Ming Dynasty in 1644.

The recent agricultural history of the grasslands of West Jilin is similar to that of much of northern China. Beginning in the 1950s, the intensification of agricultural activities led to the draining of western Jilin's marshes and the "opening up" of grasslands for agriculture, which, along with chronic overgrazing, resulted in widespread degradation as many agricultural communes lacking irrigation proved unsustainable. Rangeland area was estimated in 2006 to encompass 32.34% of provincial territory with most of this in the western third of the province (Sheehy, Thorpe, and Kirychuk 2006). As additional proof of the newfound commitment to environmental protection in Jilin, in 2007 there were also twenty-three active ecological demonstration areas, up from 10 in 2006, intended to prototypically develop sustainable practices specific to the province (China Statistical Yearbook 2007 437, Liu 2008). Still, even as land once foolishly converted to field agriculture during the Great Leap and other campaigns was returned to pasture over the past several decades, the numbers of livestock raised on this land increased dramatically. By 2000, large animal stocks, as well as sheep and goat herds, more than tripled from 1978 (Figures 2 and 3).

This is the crux of the problem. Even with better stock, there are too many animals and their numbers are growing. While many of the dairy cows and beef cattle are lot-fed, there is no disputing the increases in sheep and goats—and the pressure they put on grassland resources. Figures for year-end sheep and goat stocks for Jilin Province (particularly goats) from 2006 to 2007 emphasize a nation-wide problem. Despite "official" local bans for goats throughout much of Western Jilin, the numbers keep increasing. Province-wide, in 2006 there were 3,800,000 sheep and 700,000 goats. Sheep increased by 80,000 head in 2007, but goats increased 270,000 (up 27.8%) to 970,000 (in a single year!), reflecting higher prices for cashmere for foreign exports (*vis-à-vis* wool). Also within this year, dairy cows (one of the "alternatives" adopted by our survey households) increased by 50,000 to 215,000 in the province (Jilin Statistical Yearbook 2008 242).

As new pasture protection policies have been instituted since 2000, government monies have poured into Western Jilin as never before, subsidizing rural households that have been impacted and/or displaced from pasture lands. This comes on top of the 2007-2008 dismissal of taxes for most farm households. This time, however, matching programs to local conditions appears to be an important priority. For some families, now charged with pasture protection and management, this means loans or other funds subsidizing fencing, corrals, irrigation systems, seed, shrubs, and fertilizer. Beyond the pastures, there are numerous other ambitious and costly programs intended to provide displaced herding families with alternate income opportunities when families are relocated or public access to pasture land is forbidden. Many of these activities are funded by transfer payments from Beijing and the provincial government. Rail and road improvements are just the start. Other infrastructural improvements seen during our visits to just three west Jilin townships included a state-of-the-art dairy, new slaughter houses, a wholesale vegetable depot [market], fish ponds, greenhouses, a program that teaches families to raise raccoon dogs (*Nyctereutes procyonoides*) for furs for the export market, and a number of commercial forestry projects.

#### ***IV: The Survey and Methods of Analysis***

Given the many local variations of the economic “recovery” programs, the use of a household survey is ideal for identifying the types of programs being introduced, and subsequently to determine the effects on the new programs on household incomes and quality of life. Many of these programs are new, introduced since 2006, and we caution that results for these programs over a longer period of time may well prove to be better, or worse, than what is reported in our findings. Households were surveyed by the authors and the remainder of our survey team<sup>2</sup> during July of 2008 in three locations in West Jilin: two townships in Zhenlai County (Dongping Zhen and Momoge Township; n = 39) (Figure 4) and one in Qianguo Erluo Xin Menggu Autonomous Region (Chagan Hua Zhen, n=13) (Figure 5). Townships are the sub-country political units throughout China. Autonomous regions are the equivalent of counties in both form and function. They are referred to as Autonomous regions to indicate that at the time of their establishment, if not now, the majority of the population self-identified as one of China’s minority groups; in the case of Qianguo Erluo Xin Menggu Autonomous region, the people are ethnic Mongols.

The survey locations were selected after consultations between researchers at Jilin University and several local officials in each county. A convenience sample was collected in each township although in advance we asked officials in each township that the sample be as representative as possible for mixed farming/herding families in each location. We are grateful for this local support for the project. Typically, during our interviews we were accompanied by several members of the agricultural or husbandry bureau of each township. The survey, requiring about 40 min. to 1 hour to complete, incorporated questions related to all agricultural activities including crop and livestock production, costs, sales, and net and gross returns by activity as well as data on all other sources of income. In addition, standard demographic data (age, education, gender) for all family members in residence was also collected along with a survey of home characteristics including possessions and expenditures. Data are for the 2007 calendar year as the survey was conducted in mid-2008. While surveying in the two townships and one autonomous district, we also interviewed local officials regarding numerous pasture management policies recently introduced to protect grasslands and promote eco-development.

#### ***V. Results***

There is increasing local variation in adoption and enforcement of programs that specifically address pasture protection and restoration in Jilin Province. These include: outright restrictions or bans on pasture use, relocation of herding households to non-pasture areas, mandatory fencing policies, and fixed quotas on livestock per household including mandatory reductions of cashmere goats. The specific programs adopted and the intensity of enforcement vary significantly even for the three townships we visited. In Momoge in Zhenlai County, regulations no longer allow families to graze sheep or goats in protected areas whereas in Chaganhua Township (Qianguo County), families were allowed to “rent” grassland for use as long as they complied with a rather vague requirement to use “appropriate management methods”. There are important differences across the three townships—two in Zhenlai County (Dongping and Momoge) and one in Qianguo County (Chaganhua). This diversity underscores an important point—solutions to economic improvement are increasingly in the hands of county and sub-county agencies—even if funds come from provincial or national sources. Given the significantly different activities of farming/herding households in the three locations, they will be summarized separately by each location.

#### ***IV.B: Dongping Township***

The programs introduced in Dongping have been the most successful in economic terms and have the greatest chances for success. Incomes are higher here than in the two other townships. Certainly, the level of investment is greatest as well. Sheep and goat production has been sharply discouraged and access to public land has been curtailed significantly so that most families—including those in our sample—sold off their flocks in 2006 or 2007. Family members complained that compensation was insufficient, but who ever met a farmer who said it was? Dongping is on the railroad line running to the major cities of Baicheng to the south and Qiqihar to the north (Figure 4). This felicitous location allowed for the construction of a small township-owned dairy as whole milk can be shipped daily to Baicheng.

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<sup>2</sup> In addition to the authors, the West Jilin survey team included four graduate students from the College of Business of Jilin University (LIU Jinxin, JIN Liang, WANG Yanglei and our co-author ZHU Hong) as well as YU Fang and Robin Veeck. We are very grateful for their excellent help with the project.

Of the 19 households surveyed in Dongping, eight now owned from 1 to 5 dairy cows—a new activity that came after the dairy was built last year (Table 1). Training classes are free and veterinary services and medicines are subsidized. Other families have received small loans to start more specialized production operations of angora rabbits for hair or raccoon dogs for fur. As just one example of business to household cooperative arrangements, one household grew tobacco on 30 *mu* of the 60 they had under contract (and sub-contract from other farm families). China Tobacco then underwrote the cost of construction (CT paid 2/3 cost) of a tobacco leaf drying shed. Six such sheds—clearly marked with the company logo—were observed during our visit. The average contracted (and sub-contracted) land for the 19 survey households of Dongping was 23.3 *mu*, so growing the tobacco allowed the family access to more land. Interestingly, this extended family with three sons was one of only two that continued to raise some sheep (no real reason given), and also grew a special red pepper for dye that was sold to a firm in Changchun that the oldest son located on the internet.

The same family operated a small store as well. For a family with this amount of labor (and political connections), new opportunities fell on fertile soil. On the other hand, five families that previously had raised sheep and goats no longer raise any livestock for sale, and have concentrated on crop production. For these households, as with all others, corn is the major crop, but three of these five also now produce cash crops such as vegetables or tobacco. The shift from sheep and goats has worked well for most of the families surveyed in Dongping. Household income averaged 24,410 *yuan* (raised slightly by four very wealthy families), with an annual per capita income in 2007 of 6,441.4 *yuan*.—significantly higher than the provincial average of 4,190 *yuan* (Table 2). We were told that none of this would have been possible without provincial and central government (Beijing) support. A good location (on the rail line), coupled with high levels of investment and the locally-led promotion of “company to household” linkages, has resulted in a successful transition for these one-time herding families, and presumably greater protection of the grasslands within Dongping’s jurisdiction.

#### **IV. C: Momoge Township**

If the farmers in Dongping represent the “success story; then the conditions facing the families in Momoge raise the most questions and underscore the very real local human costs of environmental protection, however well intended. Also located in Zhenlai County but on the eastern edge (Figure 4), the grassland protection program in Momoge is most radical and unquestionably has had the greatest impact on the lives and culture of residents. After consultation with national and provincial planners and environmentalists, more than 30% of the total county area was taken to [re-]establish the *Momoge* Natural Protection Area. Momoge is located in the middle of the preserve, and is accessed by only a county road. The Natural Protection Area is composed of areas initially targeted for protection by Jilin Province in 1981, and again by the central government in 1997 (*Jilin Sheng Ditu* 2007). The important difference in 2006 is that, unlike the two previous designations of *Momoge* Grassland as a protected area (1981 吉林省保护地区, 1997 国家保护地区), sheep and goat grazing is no longer allowed without a permit, although individual families may sign contracts to cut pasture grass from the reserve for use or sale elsewhere. The vigorous enforcement of the ecological protection area boundaries transformed Momoge. As a consequence, and similar to Dongping, there was a massive “sell-off” of range animals (largely sheep and goats) in late 2005 and 2006 after the program was announced. While the environment is now protected, the communities located within or adjacent to the preserve will never be the same.

As in the previous case, new programs have been introduced to help the farmers shift to new activities and investment options that can evolve within the regional market-oriented economy. In this case, contracted land was increased slightly and a corn/beef cattle base was established (Table 3). Of the twenty households surveyed in Momoge, 11 now raised beef cattle, ranging from 1 to 6 head. As importantly, eight no longer raised any livestock for sale (Table 1). Conditions may improve after a few years, but in this case the “cure has proven worse than the disease”. Farmers consistently admitted having little experience with cattle before the new program was instituted and several of our households reported the death of cattle due to disease. The county provided free training and subsidized veterinary care and medicines—along with a subsidy to buy the first calf for two years running, but there is clearly a learning curve to raising beef cattle or we’d all be doing it! Beef was processed in a nearby slaughter house that was newly refurbished. Again, this was paid for by provincial funding. Three families were raising piglets for sale to other households to add value to the corn crop, although we are not sure there was any support for this activity. Field crop production was devoted almost exclusively to corn with a mung bean rotation in the three year cycle—standard in west Jilin. Households contracted (or sub-contracted) slightly more land than in Dongping (25.9 *mu* as compared to 24.3 *mu*),

but a more significant difference is that the 26 *mu* was distributed over an average of 3.8 parcels versus an average of 2.8 parcels in Dongping (Table 3). The smaller field sizes for corn production raises the costs and labor inputs for moving equipment and workers from field to field. In Momoge, as in all locations, farmers were also able to take out small low interest loans for new farm equipment—largely tractors, small combines, and sprayers to increase field crop production and improve efficiency. Fewer households successfully shifting to the beef cattle program (as compared to the dairy cows in Dongping)—and production problems with the cattle—resulted in significantly lower incomes—the lowest among our three townships. For survey families, mean per capita income for 2007 was less than 1/3 of that for Dongping (1,817 *yuan*) while family size was slightly greater (3.6 resident family members versus 3.3 in Dongping) (Table 2).

After the pasture protection programs were initiated, the percentage of income from field crop agriculture was 76% as compared to 50% in Dongping. Several families noted incomes had significantly declined due to the ban and problems associated with the new beef cattle operations. It is difficult to assess Momoge at this stage. In the short run, incomes have dropped significantly, and a major source of income derived from husbandry (sheep and goats) has been lost for the greater good of pasture protection, while the activities intended as a substitute have not, as yet, been successful. The question of local leadership invariably should come up, but we have no way of assessing the effects that energetic leadership in Dongping (and possibly less energetic leadership in Momoge) may play out in the trends identified by our survey data. The larger issue is that, at least in the short run, it seems that the greater the degree of pasture protection and the more rigorous the enforcement, the harder it is on local families.

#### **IV. D: Chagan Hua Autonomous District**

In contrast to the more draconian regulations facing families in Momoge, the programs in the Qianguo Erluo Xin Menggu Autonomous County (as represented by the Chagan Hua households—Figure 5) merely limits herd size and greatly restricts goat ownership, but still allow farm families to continue to practice husbandry as they have done for generations. Part of the reason given for more relaxed regulations was the higher percentage of ethnic Mongols living in Qianguo, and the importance of herding landscapes to the growing tourism industry. Of the 13 households surveyed, all continued to tend sheep flocks with an average of 51% of net household income derived from herding activities, with the majority of the remainder coming from corn/mung bean rotations. One family reported still owning goats but the rest at least reported compliance with the ban. Public land is still used for grazing. The northeastern portion of the county is well watered with extensive irrigation canals fed by the Songhua River, but field crop agriculture in the southwest, where Chagan Hua is located remains largely rain-fed or dependent on shallow wells (*da kou jing*). Population density is lower than in the two previous townships and mean household contracted (and sub-contracted) land is significantly greater (50.7 *mu* versus approximately 25 *mu* for Dongping and Momoge), but the land including pasture land is of lower quality and often more severely degraded. Net incomes (and per capita incomes) were not as high as those for the dairy farmers of Dongping but were still more than two times those of Momoge (Table 2). Despite a slightly larger family size (family members in residence), mean per capita income was also more than twice that of Momoge (1817.15 *yuan* vs. 4173.72 *yuan*), but 36% lower than that of Dongping.

To some extent, Chagan Hua represents the status quo for mixed husbandry/farming households before environmental reform, and the households in our sample still derived an average of 49% of household income from field crop agriculture. As elsewhere, the families surveyed in Chaganhua were also inventive in their activities. One very wealthy herder had more than 100 horses that he grazed on land he had contracted from the government in exchange for building a fence around the area. The idea was to provide horses for the tourist trade as well as for meat. He also had a contract to cut grass on adjacent pastures and bred peculiar looking dogs that he had trained with his son to run down foxes that he sold to a fur trader. Another raised raccoon dogs for the same purpose. Lower population density resulting in greater access to land certainly will always result in higher incomes in rural China, and the survey of Chagan Hua mixed farming/herding families bears this out. The slight adjustments to environmental policy –nominal herd limits and a ban on cashmere goats—have had limited effect on incomes or activities. The prospect for great tourism opportunities means that families may soon have more options as well. A hotel, replete with Mongol themes, has been built (source of funds is not known), and a hotel clerk mentioned that the hotel routinely hosted visitors from Changchun and that a number of South Korean groups had recently visited. An interesting issue looming is the fact that Qianguo has extensive deposits of oil shale (Qing et al 2005).

To date, discovered reserves in Jilin are estimated at 17.68 billion tons, accounting for 56% of China's known total reserves. As Canadians have quickly learned, oil shale mining is messy work, and at this time—with energy prices falling slightly—it would seem Qianguo is safe for the moment, but any large scale activity of this type will challenge Chagan Hua's herding families as well as plans for grassland protection and tourism in the future.

### **V. Conclusions and Final Comments**

The lessons of Dongping, Momoge, and Chagan Hua clearly indicate that the conditions facing particular prefectures, townships and even villages are still determined as much by government policy as the market. Unlike in the past, planning related to environmental protection and “economic redevelopment” is increasingly local—which seems appropriate and welcome. Still, while the market for raccoon dogs, red pigment, wool or milk may prove capricious, so well may be government policies associated with regional development and environmental protection. While conducting our surveys, we were struck with the sharp contrast between the market-oriented approaches that characterize new or expanded economic activities throughout the region promoted as substitutes for the use of pasture, and the government-mandated policies that have been developed to protect the environment. This duality—market-oriented policies for growth, and enforced mandates for environmental protection-- recalls Chen Yuan's 1982 once-famous speech summarizing the vision that came to be called “birdcage economics” (鸟笼经济) during the 5<sup>th</sup> session of the 5<sup>th</sup> National People's Congress. While countless political and economic initiatives have been promulgated since then, it seems reasonable to ask if environmental protection will prove to be a new “cage” challenging [some of] China's pastoral households? While extension-supported new or expanded agricultural activities encourage entrepreneurship in rural China, our surveys also underscore the sheer power of government policies and programs related to environmental protection in determining *relative* economic conditions in the townships and villages of west Jilin.

We found ourselves wondering if a new “environmental protection birdcage” --环境保护鸟笼 --has evolved whereby government action to protect the environment constrain those unfortunate enough to live within the State's newly emerging environmental reach. Surely, either deliberately or inadvertently, these disparate outcomes place greater pressures on local governments to negotiate fair and equitable outcomes. While surveying in Momoge, we were told a poignant story by a man who had contracted forestry land for more than a decade to diversify his income sources, only to come upon his plot one morning to find all the trees cut and hauled away. The perpetrator was never caught, but as the man noted, it had to be an “outsider” as you cannot hide that much wood locally. Will more be asked of local governments as responsibility for outcomes, intervention, and adjudication is shifted downwards? Will local agencies have the ability and political power to successfully treat conflicts and violations? Indisputably, more effective management of China's grasslands is important—but we worry that this laudable goal is being accomplished on the back of some of the herders who increasingly, and perhaps [some might argue] deservedly, have lost autonomy over the land. How will these policies impact migration? Conditions in Dongping are better than before, while those in Momoge at least in the short run may serve to push young residents eastward—a flow that must be stemmed if urban areas are to meet the needs of their citizens. The survey also raises questions about the types of grassland protection policies that are implemented.

While results of our survey underscore how much these policies vary from place to place, at least in Dongping, Momoge, and Chaganhua, we found little effort spent on developing “sustainable husbandry”. Rather, most implemented programs, to date, concentrated on moving herders from the land and/or banning and limiting the use of pasture while developing alternative economic activities for the displaced families. These alternative agricultural and husbandry activities seldom incorporated free-range grazing on public or contracted pasture. Contracts for cutting grass from pastures were long—ten years in one case—but it is not clear if the bidding process for these contracts was fair and transparent. In the end, perhaps all politics really are local. Predictably, there is mixed enthusiasm among the rural households in our sample for these schemes, with greater support where programs have worked as in the case of Dongping Township's dairy. Momoge, in contrast, has a careworn feel to it. Eight of the 20 households of our convenience sample had simply stopped raising livestock of any type once the grazing ban was put into effect—with dramatic effect. Per capita income in Momoge has sunk below what it was prior to the implementation of the grazing ban. Determining exactly how to mitigate damage and protect the grasslands is complex given that realistically these lands cannot be taken out of production forever. In crowded China, many people need to use these resources. All of this comes to squaring the circle; these fragile but vital grasslands must be protected and reclaimed, while allowing reasonable quality of life and opportunities for the husbandry families of western Jilin Province.

In West Jilin, there probably are many efforts directed at the promotion of sustainable husbandry which are still in the planning stage, but most of our families were really shifted into new activities. Will these activities continue once the subsidies run out? How do governments mitigate the effects of environmental protection at the local level when provincial efforts to protect grasslands run counter to local interests? We firmly believe the government is reacting to genuine and pressing crises on the grasslands and that China's grasslands must be managed more effectively. Environmental protection promises both long and short term benefits to participating households, although the results of our surveys indicate that these benefits vary dramatically from family to family and from village to village. Without equitable strategies related to income generation and the maintenance of quality of life that include sustainable measures to use the grasslands, long-term environmental policies formulated to protect fragile grassland ecosystems may fail as soon as the subsidies run out.

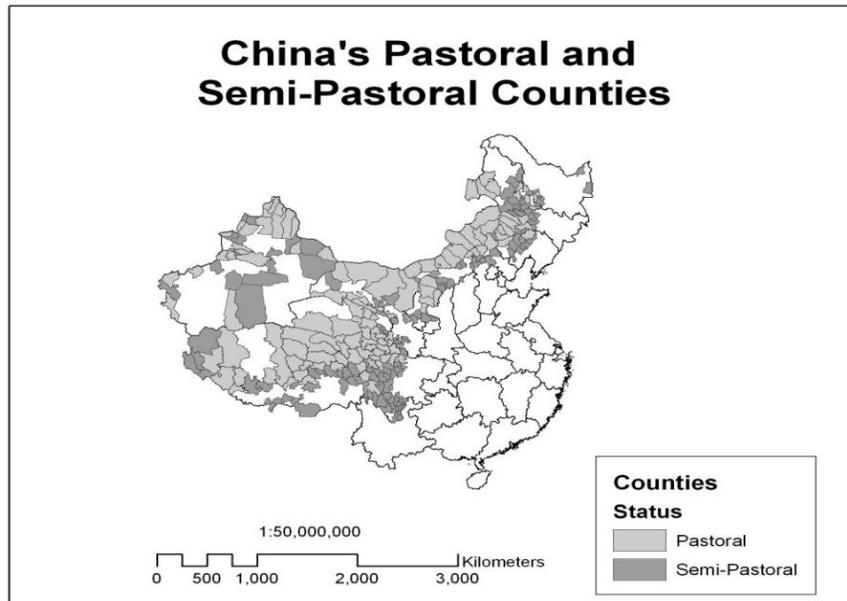


Figure 1: China's Pastoral and Semi-Pastoral Counties in 2008  
 Map provided by Charles Emerson, affiliation to be added later

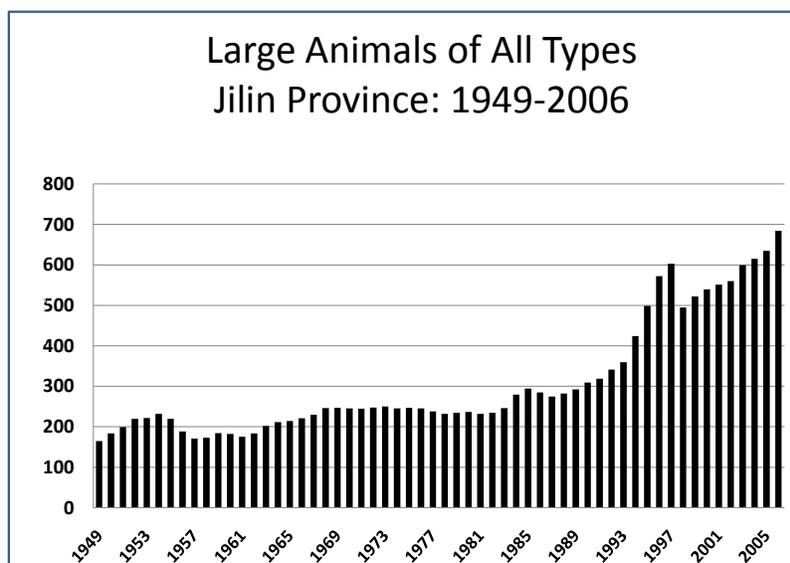


Figure 2: Growth of Large Animal Stocks for Jilin Province 1949 – 2006  
 Source: Jilin Statistical yearbook (various years)

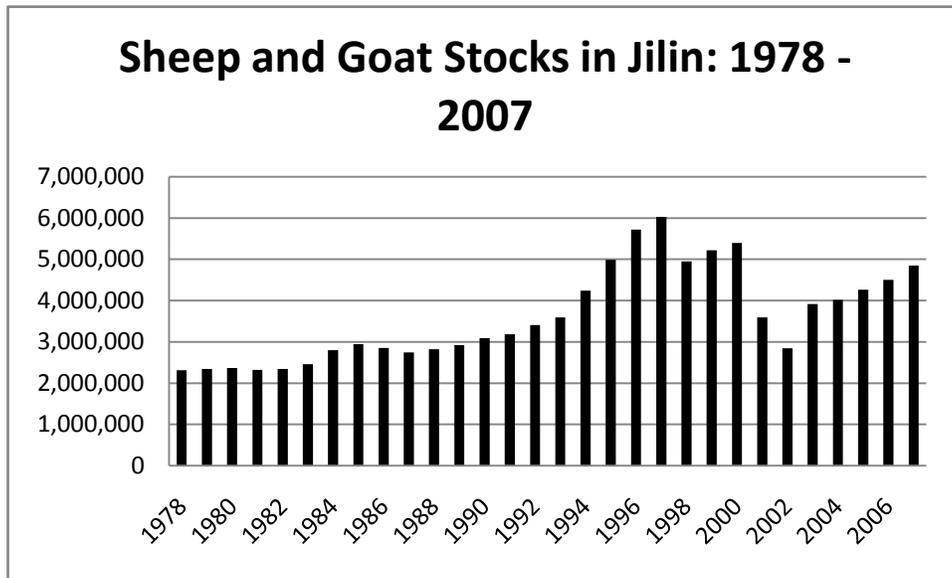


Figure 3: Sheep and goat stocks for Jilin Province: 1978 – 2007  
 Source: Jilin Statistical Yearbook 2001 p. 214, (1978-2000); China Statistical Yearbooks 2001-2006 (pages vary by year), Jilin Statistical Yearbook 2008 (242)

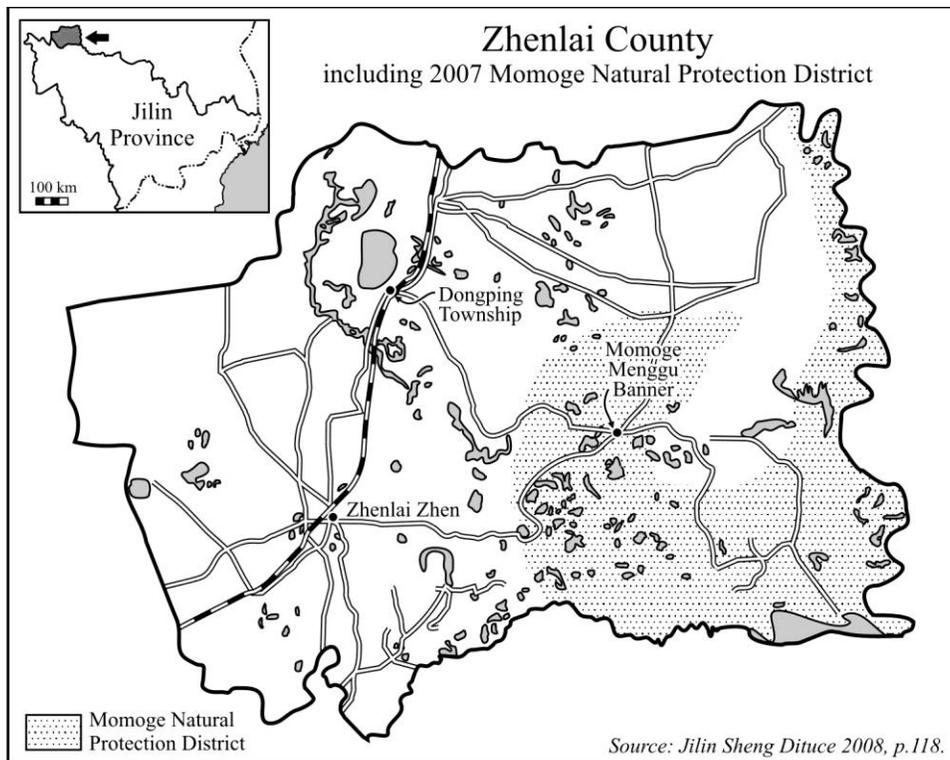
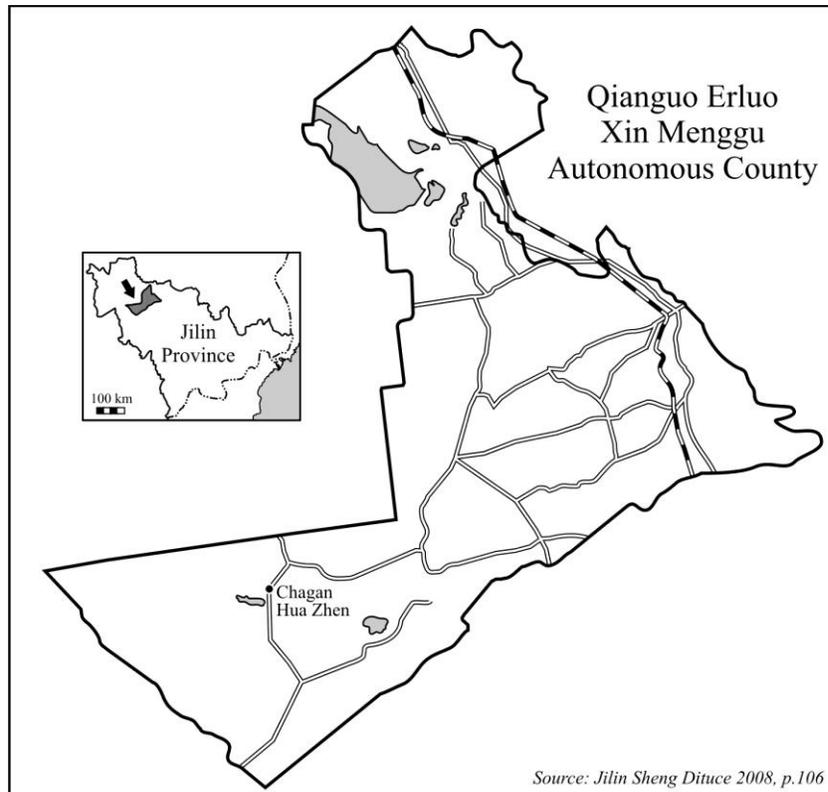


Figure 4: Location of Dongping Zhen and Momoge in Zhenlai County, Jilin



**Figure 5: Location of Qianguo Erluo Xin Menggu Autonomous County in Jilin.**

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**Table 1: Primary Husbandry Activities for Survey Households in Three Townships of West Jilin, PRC: 2008**

DONGPING Township	MOMOGE Township	CHAGANHUA Autonomous District
110101 Milk, Dairy Cow	120101 Beef cattle (1)	130101 Sheep, wool
110102 no longer raise livestock	120102 Beef cattle (1)	130102 Sheep, wool
110103 Sheep, wool	120103 no longer raise livestock	130103 Sheep, goats, wool, cashmere
110104 no longer raise livestock	120104 Beef cattle	130104 Sheep, wool
110105 Raccoon Dogs	120105 Beef cattle	130105 Sheep, wool
110106 Beef cattle	120106 no longer raise livestock	130106 Sheep, wool
110107 Milk, Dairy Cow	120107 Beef Cattle, Hogs	130107 Sheep, wool
110108 Milk, Dairy Cows	120108 no longer raise livestock	130108 Sheep, wool
110109 no longer raise livestock	120109 Beef cattle (4), Piglets	130109 Sheep, wool
110110 Milk, Dairy Cows	120110 Beef cattle	130110 Sheep, dairy cows (year old)
110111 Sheep, Wool	120111 Beef cattle	130111 Raccoon Dogs, sheep
110112 Milk, Dairy Cows	120112 Beef cattle (4)	130112 Sheep, wool
110113 Angora Rabbits	120113 no longer raise livestock	130113 Sheep, wool
110114 Milk, Dairy Cows	120114 no longer raise livestock	
110115 Beef cattle	120115 Beef cattle (3) , piglets	
110116 Milk, Dairy Cows	120116 piglets	
110117 Milk, Dairy Cows	120117 no longer raise livestock	
110118 no longer raise livestock	120118 no longer raise livestock	
110119 no longer raise livestock	120119 no longer raise livestock	
	120120 Beef cattle, piglets	

Source: Surveys by authors, July 2008

**Table 2: A Comparison of Selected Survey Variables for Three Townships in Western Jilin Province**

		N	Mean	Std. Deviation	Minimum	Maximum
Total Net Income (best estimate) ( <i>yuan</i> )	Dongping	19	24410.89	45011.98	-11942.00	194500.00
	Momoge	20	7218.35	8533.78	-4800.00	28800.00
	Chaganhua	13	14511.54	26379.39	-40100.00	51350.00
	Grand (All)	52	15323.54	31026.57	-40100.00	194500.00
Total income in dollars(6.8yuan = \$1.00)	Dongping	19	3589.84	6619.41	-1756.18	28602.94
	Momoge	20	1061.52	1254.97	-705.88	4235.29
	Chaganhua	13	2134.05	3879.32	-5897.06	7551.47
	Grand (All)	52	2253.46	4562.73	-5897.06	28602.94
Per Capita Income ( <i>yuan</i> )	Dongping	19	6441.35	9824.69	-4250.00	38900.00
	Momoge	20	1817.15	1854.24	-1600.00	5760.00
	Chaganhua	13	4173.72	8806.57	-13366.67	24500.00
	Grand (All)	52	4095.91	7595.00	-13366.67	38900.00
Estimated annual cost of living yuan/ household	Dongping	19	14463.16	15016.78	3000.00	70000.00
	Momoge	20	5845.00	5964.94	900.00	25000.00
	Chaganhua	13	15692.31	15542.33	0.00	60000.00
	Grand (All)	52	11455.77	13037.39	0.00	70000.00
% of total income from Agriculture	Dongping	19	0.50	0.38	0.00	1.00
	Momoge	20	0.76	0.25	0.20	1.00
	Chaganhua	13	0.49	0.37	-0.11	1.00
	Grand (All)	52	0.59	0.35	-0.11	1.00
% of Total Income from Husbandry	Dongping	19	0.44	0.36	0.00	1.00
	Momoge	20	0.24	0.25	0.00	0.80
	Chaganhua	13	0.51	0.37	0.00	1.11
	Grand (All)	52	0.38	0.34	0.00	1.11
Age of Respondent	Dongping	19	44.05	10.63	30.00	65.00
	Momoge	20	44.90	11.19	30.00	75.00
	Chaganhua	13	47.00	13.61	23.00	71.00
	Grand (All)	52	45.12	11.47	23.00	75.00
YRS-SCHOOL	Dongping	19	8.16	2.48	2.00	14.00
	Momoge	20	7.70	1.42	5.00	9.00
	Chaganhua	12	7.58	3.40	0.00	12.00
	Grand (All)	51	7.84	2.36	0.00	14.00
Family size (persons)	Dongping	19	3.26	1.05	1.00	5.00
	Momoge	20	3.55	0.83	2.00	5.00
	Chaganhua	13	3.77	1.01	2.00	6.00
	Grand (All)	52	3.50	0.96	1.00	6.00

Source: Collected by authors, July 2008

**Table 3: Selected Agricultural Variables from Surveys of Three Townships  
in West Jilin Province, China: 2008**

		N	Mean	Std. Deviation	Minimum	Maximum
Total Contracted Area (mu)	Dongping	17	24.30	14.28	5.60	60.00
	Momoge	20	25.90	10.50	10.00	47.70
	Chaganhua	13	50.65	28.17	15.00	100.00
	Grand (All)	50	31.79	20.78	5.60	100.00
Number of Parcels of arable land	Dongping	17	2.82	1.29	1.00	5.00
	Momoge	20	3.80	2.21	2.00	11.00
	Chaganhua	13	2.69	1.25	1.00	6.00
	Grand (All)	50	3.18	1.76	1.00	11.00
Per capita land in mu	Dongping	19	6.26	3.71	0.00	15.33
	Momoge	20	7.32	2.64	3.33	13.97
	Chaganhua	13	14.84	11.15	3.75	40.00
	Grand (All)	52	8.81	7.02	0.00	40.00
Livestock Pen (m2)	Dongping	15	74.60	57.49	30.00	252.00
	Momoge	15	54.67	30.63	20.00	140.00
	Chaganhua	13	108.92	75.71	30.00	320.00
	Grand (All)	43	78.02	59.55	20.00	320.00
Pen Current Val.	Dongping	11	9481.82	14509.09	0.00	50000.00
	Momoge	8	4237.50	10417.56	100.00	30000.00
	Chaganhua	8	8125.00	5938.67	0.00	20000.00
	Grand (All)	27	7525.93	11168.55	0.00	50000.00
Home area (m2)	Dongping	19	86.42	31.37	45.00	180.00
	Momoge	20	69.85	18.75	30.00	110.00
	Chaganhua	13	78.46	24.78	50.00	150.00
	Grand (All)	52	78.06	25.99	30.00	180.00

Source: Collected by Authors, July 2008.