

A Pastoral Frontier: From chaos to capitalism and the re-colonisation of the Kazakh rangelands

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Abstract

There is little research on pastoralists' responses to new expansion opportunities. We explore how pastoralists in Kazakhstan have responded to rapid, fundamental institutional and macroeconomic changes. We compare use patterns of grazing and water sites in two periods; 1999-2003, after the collapse of the Soviet Union, when the rural economy was in crisis and 2012-14, following a recovery in livestock numbers and a boost in the national economy. The study uses historical studies, formal surveys and anthropological interviews to document changes in livestock ownership, management and selection of pasture and water sites. In 2012-14, owners of the largest flocks had extended their grazing sites further away from the settled villages, moving away from more densely used sites more easily accessed in the 1990s. These new pastoral elites are colonising abandoned state-owned pastures and wells developed by Soviet state farms. Smaller-scale livestock owners based in villages are now less able to entrust their animals to larger-scale owners at remote desert sites, a change since the early post-Soviet period. The economic recovery of Kazakhstan has encouraged pioneering moves by entrepreneurial individuals, moves permitted by post-Soviet laws for privatised pasture land tenure. This expansionist movement parallels ecological patterns of site sequencing in wildlife.

Key words: Pastoralism; former Soviet Union; livestock; Kazakhstan; site selection

1. Introduction

The territorial expansion of commercial livestock production on an open frontier is a globally and historically significant process. Examples in the 19th century include Australian sheep stations (McMichael 1984), American ranches (Osgood 1929), Argentine estancias (Strickton 1965), or Botswana cattle posts (Peters 1994) in the mid-20th century. Efforts by producers to assert exclusive control over natural resources are a recurrent feature of these frontier forms of market-orientated resource appropriation. Often the land tenure system goes through two phases – an initial period of informal exclusive ownership sanctioned by violence or local political processes (e.g. 'squatting', customary rights) followed by the legalization and registration of individual land rights (Osgood 1929). Contemporary developments on the Kazakh rangelands fit this pattern. The post-Soviet collapse of livestock populations and state farms after Independence in 1991 created an open territorial niche consisting of pasture and wells abandoned by the Soviet state farms (Rus. *sovkhov*). There was a simultaneous adoption of a capitalistic economy based on the private acquisition of former state assets, including livestock, thus presenting an unusual combination of developments by the early 2000s – an expanding capitalist frontier in a semi-arid environment with extensive livestock production. This is referred to by rural Kazakhs as 'the period of chaos'. A decade or so later, there has been a transition from 'chaos to

capitalism,' including the formalization of land rights, the emergence of new pastoral elites and new systems of commercial livestock production.

This paper presents a case study from one rangeland area of Kazakhstan, comparing the changes in livestock distribution, management and ownership in two periods ten years apart (1999-2003 and 2012-2014). During this period there were major transformations in the institutional and economic conditions within which pastoral livestock are managed in the remote desert. Through comparison of two distinct time periods, we can draw inferences about the processes of expanding pasture territories under changing circumstances. The comparison over time also allows us to detect any convergences between the patterns we observe and ecological predictions on animal movement that might still apply when humans have the dominant role in deciding where animals are distributed.

We present three propositions to explain the observed patterns:

The first is a temporally dynamic one – i.e. after enabling legal conditions occur, subsequent economic growth later stimulates some livestock owners to extend their pasture locations. This proposition concerns how the value and use of natural resource territories might be redefined under a pastoral livestock system: Shifts from open access to exclusive resource use will (a) be facilitated by enabling legal conditions but (b) will actually occur only when the increased commercial value of pastoral output warrants the private appropriation of productive resources. The second proposition concerns the type of people who will take advantage of these temporal changes. It relates directly to the role of human agency in diverting or directing access by livestock to optimal natural resources: Entrepreneurial individuals who colonize new areas have distinctive socio-economic profiles that give them the confidence to creatively reinterpret their legal rights in order to defend their privileged positions.

The attributes that make these entrepreneurs innovators within their own communities – high levels of livestock wealth, risk taking personalities and the command over a core of male kinsmen (brothers or sons) – may also equip them for success in the new world of commercial profit and private property. These dominant personalities may therefore be among the first to defect from older forms of community solidarity, which collapse when the costs start to outweigh the benefits to a new livestock elite. The research explores the resources and incentives that encourage certain individuals to act as agents of legal, economic and technical change, by taking advantage of new opportunities.

The third proposition is that there is a noticeable sequential occupation of sites which may be more suitable for livestock, though more costly for people to access, as earlier-occupied sites which had certain biophysical disadvantages, have become full up and may be overused. Sequential site occupation in low density populations has been well-studied for a variety of animal populations and habitats (e.g. Houston and Lang 1998; Greene and Stamps 2001; van Beest et al. 2014). Here we consider whether some of these ecological principles are relevant to understanding how pastoralists manage domestic livestock.

Predictions may be made concerning the sequencing of site selection where the resource user and resource are not at equilibrium. In this case where an initially low number of livestock are now expanding into the area available, these predictions apply to human decision-making, and may include (from Winterhalder et al. 2010):

- (i) As total population grows, habitats will be settled in order of decreasing suitability;
- (ii) The site ranked second will not be settled until its basic suitability is matched by the (declining) suitability of the first-ranked site.

“Settlers were familiar with the suitability of the habitats they were about to occupy and, we might predict, they established residential sites in an orderly process of adaptive decision-making: Settle first in the most salubrious location. When, with growing exploitation or crowding, its resources were depressed and its value declined to match the next-ranked locale, establish a new settlement there (Winterhalder et al. 2010: 469).

2. Scope and aims

The paper seeks to explain how the perception of site suitability – in effect what defines a “salubrious location” - has been altered by two main push-pull effects: a) the most accessible (and thus cheapest) sites often with poor quality water becoming filled up over time, while (b) due to growing prosperity, the attractiveness has increased of previously abandoned, more remote sites with better quality water and pasture, but more expensive to access. By the end of the second period, the livestock population of the study site was still only about 20% of the former livestock population kept by the Soviet farms on the rangelands by the end of the 1980s (Behnke 2003; Robinson and Milner-Gulland 2003b; Alimaev and Behnke 2008) . Hence much of the better pasture is still relatively unoccupied. We consider how changed external circumstances lead to shifts in how costs and benefits are evaluated by the protagonists.

Our explanation will proceed in three stages corresponding to our propositions: (a) identification of the enabling factors (economic, legal and technological) that encouraged expansion in the 2003-12 period; (b) a description of the emergence of a new rural capitalist elite and the stagnating situation of those left behind; (c) finally, an explanation of the geographical pattern of expansion – the sequencing of well occupation with the creation of new livestock enterprises or the expansion of old ones.

3. Methods

Field research used social anthropological approaches to elicit some of the complex management practices used by pastoralists, currently and in the recent past, for gaining access to key resources for raising livestock in the study area. In two small desert settlements (respectively containing 250 families and 87 families in 2012), 167 open-ended interviews were conducted with 97 individuals (many interviewed more than once), in five field work periods in 2012-2014; April and October 2012, April and June 2013 and March-April 2014.

The respondents were familiar with the international and national research team members, who had previously conducted fieldwork in this same study area between 2000 and 2005. The researchers stayed in pastoralists’ family homes, which generated opportunities for unexpected lines of enquiry to arise informally. Interviews were open-ended but followed a check list of central questions. The aim of the interviews was to uncover livestock keepers’ changing motives over time, in selecting pasture and water locations for their livestock. Whenever a respondent brought up a spontaneous explanation, such as the lowering cost of fuel for vehicles or the informal approaches for gaining access to disused wells, they were encouraged to elaborate on these topics. Interviews were discursive and conversational, and often raised secondary and tertiary lines of enquiry. New topics introduced by respondents were also followed up in subsequent interviews with other respondents.

Notes were taken in each interview, with the respondent’s prior permission, and were recorded verbatim in English translation, as a Kazakh interpreter was used. Interviews were conducted in people’s homes or on the open rangelands, and not all topics were asked in a single interview, as repeat visits were often made. Interviews could last a minimum of 30 minutes and up to 3 hours or more, depending on the respondent’s loquaciousness and leisure time at their disposal.

The central questions included:

- Brief life history of family from the period of the Soviet livestock collective (*sovkhos*) to the present.
- Main assets currently owned, including species of livestock and mechanical equipment such as vehicles and pumps for wells.
- Current and past employment as well as other income sources of family head and spouse as well as adult offspring still assisting parents with labour or money.
- Reasons and timing for initially choosing a pasture and well site after the collapse of the *sovkhos*.
- Reasons for remaining or abandoning these sites, and reasons for choosing new sites.
- How the livestock owner characterized each pasture and well site in terms of vegetation suitable for each species of livestock kept; characteristics of soils and topography; water point type and access
- The livestock owners' assessments of the advantages and drawbacks of using each different site of pasture and water point in different seasons, in terms of their economic and social costs.

Interviewees included livestock owners, as well as their close family members, though not necessarily co-resident (e.g. spouses, sisters, brothers, sons and fathers), hired shepherds, former livestock owners, village mayors, veterinary officers, former professional employees of the state livestock farm, and those responsible for the state forestry department. All interviews are anonymized, and individual statements cited here from informants are identified by their ID number in the data set.

Overall 118 unique livestock owners were recorded. Of these owners, full livestock ownership information was available for 80 owners in 2003 and 84 in 2012; whilst 58 owners appeared in both years. Since a series of quantitative surveys were conducted over three years and five field trips, some questions were asked of all livestock owners in the study area present at the time of the field work, or some were asked only those in one of the study villages. This is indicated in each table or graph.

After several trips in which open-ended investigative interviews were carried out, two short formal questionnaire surveys were designed, tested and then conducted; the first was on livestock monthly movements of 64 livestock owners. This survey aimed to be a complete census, and was asked for all livestock owners present at the time of the survey in the entire study area. The survey asked about each different pasture location and water source for the owners' large stock and separately for their small stock in each month of the preceding year (2011-2012). The second survey was limited to 25 well-occupiers who had semi-privatized pasture land, on their use of 42 wells from the mid 1990s to 2014. This survey asked for the names and dates when each used well was occupied or abandoned, as well as reasons for stopping use of a well. Two field surveys were also carried out in 2012 and 2014 of 57 used and abandoned accessible wells in the Moiyunkum desert with the vegetation recorded at 43 well sites. These surveys involved visiting all accessible wells in the rangeland formerly under the state farm control, taking GPS measures, describing main vegetation and interviewing any pastoralists found at the wells.

In order to study the impact of distance from home settlement on site sequencing in the Moiyunkum desert, we used the livestock location information from the above surveys, which indicated livestock presence at 26 locations in 2002/2003 and 40 during the fieldwork period of 2012-2014. We compared distances from home settlements of these used sites with those of unused sites. These potential but unused sites were defined as locations having wells in the Soviet era not recorded as used in either in 2003, or in 2012-2014. These were digitised from a 1980s set of 1:50,000 topographic maps, along with sites used in our study periods. Expansion of livestock into new areas is occurring primarily from the village of Ulan bel'. For the distance analysis we thus

examined a subset of 102 used and potential sites within the boundaries of former Chu and Moynkum *sovkhoz*, which is the area into which livestock were expanding from Ulan bel' during the time of the study and in which we could be sure that no false absences were recorded. These boundaries are shown in Figures 1 and 2. We then used vegetation data, mapped GIS data, published and unpublished materials to assess the changes we observed in livestock management, grazing patterns, rangeland occupation and use, and livestock seasonal movement, in the context of major economic, social and institutional developments which occurred over the same period.

4. Study area

The case study is based on two locations in a system of semi-arid rangelands in south central Kazakhstan; Moynkum district (Rus. *raion*) in the northern part of Dzhambul Province (Rus. *oblast'*) (Figure 1) where the main livelihood has been raising livestock extensively, due to the low average annual precipitation of 170mm, mostly falling in spring (March-May) but can fall as snow from late November to March. There is annual precipitation variability with CVs of over 0.30 (Coughenour et al. 2008). Temperatures are extreme, falling to -45o C in winter (December to February) with a maximum of 46o C in summer from June-August (Kerven et al., 2006). Nucleated villages are located along the Chu River that runs through the desert. No rainfed or irrigated crops are grown, due to aridity.

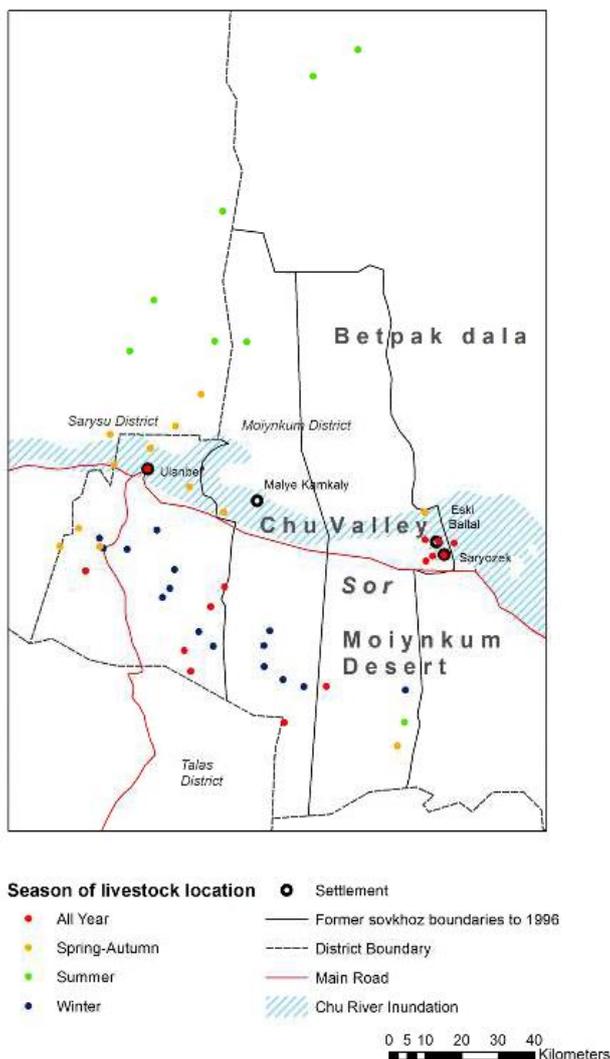


Figure 1: Administrative boundaries and main ecological zones

The study area comprises three former state collective farms (*sovkhos*), with villages based along the Chu river; each of these farms used to raise up to 80,000 livestock, principally sheep, in the Soviet period from the 1950s to 1991. The first former farm is centred on a large village called Ulan Bel (UB) with coordinates of 44.825 N and 71.136 E. In 2012, in UB there were 1,200 people (662 males and 538 females). The number of inhabitants had not changed since the early 2000s. In the associated nearly deserted village of Malye Kamkale there were 22 people. This village was one of the three former livestock *sovkhos* about 30 km distant from UB and had a bridge across the Chu river, but the bridge has been destroyed for 10 years. The third former state farm is located 90 km east of UB, and contains two smaller villages of Sary Ozek (SO) and the satellite village of Yeske Baital at coordinates 44.589 N and 72.156 E. SO has 344 people and Yeske Baital has 67 people. SO and Yeske Baital are treated as one unit in this paper.

4.1. Main ecological zones

In 2012-14, some pastoralists in the study area moved their livestock between up to four ecological zones. Further information on these zones is provided in earlier publications about the previous land use in the Soviet collective farm period, the climate and natural resources (Alimaev and Behnke 2008; Kerven et al. 2004; 2006; 2008; 2015). These zones are briefly described below. The four major ecozones lie across a north-south latitudinal axis; clay desert, riverine area, salty clay desert and sandy desert. Each zone contains specific vegetation associations used for pasturing livestock, and also has particular types of above and ground water needed for livestock as well as pastoralists. In this paper we consider how pastoralists have established privatised bases in two of the four zones, which are the salty clay and sandy deserts to the south of the permanent villages along the Chu river.

Betpak dala, extending north of the Chu river for several hundred km: In spring numerous ephemeral plant species appear, which are a rich source of protein for herbivores in early spring, following the winter period of vegetation dormancy.

Riverine area of the Chu river valley: The riparian land contains mostly coarse reeds which are suitable pasture mainly for cattle, and the reeds are cut as hay for winter feed. Some higher areas are briefly flooded in spring and may be eaten by sheep but cover a relatively small area. There is plentiful water all year from the river, though becoming polluted and mineralised from agricultural wastes upstream in summer.

Salty clay desert of the plain south of Chu River: Immediately south of the Chu river and extending up to about 35 km from the river is a flat clay plain dominated by salty plants. Ground water here varies between fairly saline or alkaline.

Sandy desert of the Moiynkum: The sandy dunes begin about 40km south of the Chu river valley, and the vegetation becomes highly diverse. The tall shrubs, particularly *Haloxylon aphyllum*, are a crucial protein-rich forage resource for livestock in winter. Ground water becomes sweeter to the south nearer the boundary of the study area.

4.2. Overview of changes during and after the Soviet period

Prior to the establishment of the state farms, Kazakh nomads ranged over this large area. As one 80-year-old shepherd (No.5) recounted, he was 15 years old when the *sovkhos* was set up in 1951: his parents “had livestock, of course, they moved all the time from one place to another and did not have a permanent place – they used yurts carried by camels. When the *sovkhos* started, it was not heaven here – they did everything with their hands”. During the second part of the Soviet period from the 1950s onwards, the new state

collective farms (*sovkhoz*) largely replicated the seasonal movements of livestock based on the previous nomadic patterns, spanning over 350 km in a latitudinal circuit (Mateev and Polykov 1950; Mynbaev 1957; Alimaev and Behnke 2008). Livestock pastured in the wintering grounds in the sandy Moiynkum desert in the south, were moved northwards after lambing in spring first to the riverine area of the Chu, then across the clay deserts of Betpak dala, and summered in the desert-steppe region of Sary Arka in the north, returning to a salty plain south of the Chu river for mating in autumn, before once again spending the winter in the southern sandy desert. The shepherds tending the livestock lived in yurts during spring, summer and autumn, and in small stone houses in the Moiynkum desert over winter. The people's main residences during the collective farm period were based, as today, in settlements along the Chu river valley, where the state built infrastructure of water points, schools, hospitals, agricultural machinery workshops and administrative blocks, to which electricity was provided.

The use value of landed resources necessary for raising livestock on Kazakhstan's rangelands has been radically altered in the last decades. Previous research has shown that the value of the environment has been manipulated through human interventions, beginning in the mid-Soviet period of the 1950s, which have transformed the attractiveness of grazing at certain types of pastures (Robinson et al. 2000; Behnke 2003; Kerven et al. 2003; Robinson and Milner-Gulland, 2003a, 2003b; Kerven et al., 2004,2008) . These interventions were instigated by the *sovkhoz*, and concerned primarily the drilling of many wells in the semi-arid rangelands, provision of motor pumps, the construction of key infrastructure resources such as bridges, barns and winter houses for shepherds grazing livestock in remote locations, and state provision of services to new permanent villages - including electricity, telecommunications, schools and health facilities. Notable by their absence both in the past and present, are any physical barriers to livestock movement or fenced delimitation of private land ownership. The semi-arid rangelands of Kazakhstan are as yet unfenced. The historical cause and sociological maintenance of the unfenced rangelands is outlined in Section 6.

5. Results

5.1. Enabling conditions: Temporal changes

Several factors have created enabling conditions for those pastoralists wishing to seek more exclusive resources for their livestock. Four changes since the early 2000s set the stage for developments up to 2014: a) growth in livestock numbers; (b) improved economic conditions for livestock keepers; (c) the promulgation of new (and much cheaper) ways to legalize individual land rights; and most recently (d) availability of cheaper and more efficient pumps for wells. This combination of biological, institutional, economic and technical factors has motivated some livestock keepers to formalise their land rights, because pasture and water for livestock production are acquiring a higher commercial value and are in greater demand. Meanwhile, legal developments have cut the costs of formalization while latterly the availability of improved water pumps has cut the costs of production. Over time, these processes resulting in a widening gap between larger-scale versus smaller-scale livestock owners.

5.1.1. Changes in livestock numbers and ownership patterns

Overall, the population of livestock has grown over the study period. There have been increases in the number and changes in the species of livestock owned by households in our study areas, but without any major changes in number of households in these villages. Data from the previous study's 2003 census of livestock owners and official figures from the local administrations in 2012-2013 show that in UB smallstock numbers more than doubled in the ten year period, from 6,500 to 15,000 and increased fourfold in SO from 2,200 to 8,800. Small stock are sheep (80%) and goats (20%). Large stock are principally cattle (85%), with 260 horses and 77 camels. The median number of livestock per owner has likewise increased between our previous

census in 2003 and our census in 2011/2012, both of small stock and large stock, mainly cattle. The median number of livestock amongst paired owners (having livestock in both 2003 and 2011-2012) increased significantly over the study period (Table 1)

Table 1. Change in median livestock ownership in 2003 and 2011. Medians are presented rather than means due to highly skewed livestock ownership distributions. V is the test statistic for Wilcoxon signed rank test

Village	Stock type	Number of Paired households	Median Number in 2003	Median number in 2012	V	Significance (%)
All	Small stock	55	44	75	455	>95
All	Large Stock	55	9	14	253	>99
Ulan Bel'	Livestock units ¹	33	84	135	92	>99
Sary Ozek	Livestock units	22	79	163	56	>99

Only a few owners concentrated on raising horses or camels commercially, so their prevalence is not shown in the aggregate figures. In the 2012 survey, several older people remarked that in the last ten years, people now have jobs in a neighbouring gold mine, or dig up and sell surface sandstones or gold from old mines around the Chu plain, so there is cash income, more livestock, and some of the very richest livestock owners also applied to government departments in the provincial centre in Taraz city to get pedigree cows and sheep. The proportion of goats in SO was relatively higher than sheep in 2003, as at that time people kept more goats as they are easier to keep and kid often, according to the local mayor. In the second study period, people were better off, and mutton was the preferred meat; sheep sold for almost four times the price of goats in the nearest city market.

5.1.2. Higher prices and lower production costs for livestock

The economic boom in Kazakhstan due to exploitation of oil and gas since the early 2000s (Pomfret 2005, 2010; World Bank 2013) meant a large increase in the price of mutton produced by the Kazakh pastoralists. By the second study period, the inflation-adjusted commercial price of sheep on the main market in Taraz city was more than 400% higher and beef 133% higher than in 2003. This is where most livestock owners in the study area sell their live animals and meat (Table 2). The main input cost for owners selling livestock to Taraz is the fuel needed for the large fuel-inefficient Soviet-era trucks from the remote areas to the city. However, compared to the considerable increase in the market price of livestock, the real price of fuel over the ten year study period had decreased when adjusted for inflation, from USD 0.74/litre in 2001 to USD 0.67/litre in 2012.

This leap in consumer demand for meat was a principal incentive for livestock owners in the study area to expand their holdings and invest more capital into their livestock enterprises. All livestock owners in the study area sold some of their animals sometimes. Households with very few animals tried to keep a milk cow for home use, selling male calves when grown, for meat, and raise a few sheep and goats for occasional sale or

¹ Five small stock or one head of large stock is equivalent to one livestock unit, based on FAO units. <http://www.fao.org/ag/againfo/programmes/en/lead/toolbox/Mixed1/TLU.htm>

home slaughter. Larger livestock owners viewed their flocks and herds as a business, and planned an annual offtake of the adult male sheep and cattle, while keeping a modest number of goats (20-100) for home slaughter and to feed their hired shepherds.

For example: No. 74 occupied a well in the Moiynkum sands after the *sovkhos* collapsed. In 2008 he sold all his animals as he could not get the benefit from animals that he planned. He sold the barns and house then for USD 1,480, to another villager in Ulan Bel. No. 74 remarked that in the USSR there was a government subsidy (Rus. *dotatsia*) for livestock farming, but after farming become private, when he wanted to sell animals people did not have money and animal prices were low. Also he got no income from wool, which the *sovkhos* used to sell. "The prices of livestock went up only recently but now people have money and can afford to buy meat".

Table 2. Livestock prices 2001 and 2012, Taraz city livestock market (adjusted by consumer price index) . Source: field interviews.

Type of livestock or product or product	Market price 2001 USD	inflation adjusted (1)	Market price 2012 USD	Percentage change
Karakul breed ram (2)	18	n/a	n/a	n/a
Kazakh fat rumped ram	29	71.3	367	415
Mature ewe (female sheep) (3)	20	n/a	n/a	n/a
Mature female goat (village) (4)	25	61.5	83	35
Mature cow	121	n/a	500	nil
Mature bull/ox	207	509.2	1,000	96
Mature horse (5)	n/a	n/a	1,351	n/a
Kg beef	1.8	4.3	10	133
Litre horse milk	n/a	n/a	1	n/a
Kg sheep wool	0.03	0.07	0.4	471
Kg goat fibre	1.3	3.2	10	213
Sources:				
Market prices from Kerven's field data				
Kazakhstan inflation http://www.tradingeconomics.com/kazakhstan/inflation-cpi				
http://www.factfish.com/statistic-country/kazakhstan/inflation%20rate				
http://www.indexmundi.com/g/g.aspx?c=kz&v=71				
Notes:				
1. Consumer price index inflation 2001-2012 = 246%				
2. In 2001, many livestock owners had only Karakul sheep from the former sovkhos. This breed is no longer preferred as it is smaller and produces less fat and meat.				
3. In 2001, poorer households sometimes had to sell a female sheep, the most preferred type. No households in 2012 needed to do this in our study.				
4. In 2001, female goats were relatively valuable, as households tried to build up their private flocks after the collapse of the state farms in the mid 1990s, and goats reproduce fastest.				
5. In 2001, very few households had horses or horse milk available for sale				

5.1.3. Enabling land tenure: registration and rental of pastures

The process of acquiring former *sovkhos* pasture land early on after the breakup of the Soviet state farms was relatively expensive and inequitable. According to the 1995 law on land after the breakup of the *sovkhoses*, all *sovkhos* workers should have received conditional land shares, redeemable for physical land shares through

registration (Behnke 2003). By the early 2000s when we conducted our first study, most residents of the study area had not redeemed their shares due to high registration costs, lack of transparency, and low numbers of private livestock, compared to the ease of using pastures informally. Thus for a while, pasture access remained essentially free and open. For example, No. 67, who first came to SO in 1996, did not have to ask any permission to create his base on the floodplain some 10 km from SO and he explained that he “just used the *ex-sovkhoz* land for free”. Since 2001, two further legal changes became available for gaining exclusive tenure rights to pasture land ([Robinson et al. 2012](#)). The legal conditions pertaining by 2014 are summarized in Table 3.

Table 3. Legal pasture access conditions and each type of pasture ecozone

Long-term lease 49 years	Short-term rent, annual	Open access	Communal access
Pasture and hayland adjacent to Chu river, permanent access to water.	Forestry department land in clay and sand Moiyunkum desert, dependent on ground water from wells.	State reserve land in Betpak dala clay desert north of villages and Chu river, not yet privatized, dependent on ground water from wells.	Peri-village land adjacent to Chu river, 3 km radius under control of village administration, with permanent access to river water.

Firstly, private individuals could register and rent former state farm (*sovkhoz*) pasture land on 49 year leases. This land comprised a thin strip along the Chu river, much of which nearby villages is now already occupied by renters, since this is valuable as hay land and year-round grazing for cattle (but not sheep). In the example cited above, following the land law of 2001 which increased pressure to formalise land titles by imposing a deadline for registration of shares and banning subleasing of share land, at this point No. 67 took out a rental contract on 750 ha for 49 years, plus 26 ha of hay land nearer the Chu river. Since 2003 such land may also be converted into permanent ownership (Articles 43 & 47 of the 2013 Land Code, [Government of Kazakhstan, 2013](#)), but only one pastoralist (with the largest flock of many thousand head of sheep and hundreds of cattle) in the study area had done this, because the low rental costs made land purchase relatively unattractive.

The second option which became available to pastoralists after 2003 was to rent land on an annual basis from the *Leskhoz*, the state Forestry Department, which controls large areas of pasture land in the Moiyunkum desert. The cost of registering in 2012 was USD 540, to pay for the survey to mark the boundaries, a map, and government stamps. Annual rent is paid to the district administration of Moiyunkum, calculated on a per head of livestock (recommended stocking rate) and varied between USD 203 to 270 per year among our informants.

Open and communal access rights also exist side-by-side in the study area. Pastures in the northern clay desert of Betpak dala still belong to the State reserve but can be used for free at present, and peri-village pasture is also used on a communal basis and cannot be leased or privatised (Article 109, 2003 Land Code, [Government of Kazakhstan, 2013](#)).

The maintenance of exclusive access without fences around pastures and wells is not problematic at present. In the small isolated communities of these rangelands, there are considerable social sanctions moulding behaviour. While not everybody conforms, there are the typical inhibitors of gossip, family pressure and ostracism in small-scale societies to deter “anti-social behaviour”. There are also norms of social unity, expressed as “we are members of one village”, that are referenced as assurance that other village members will not invade one’s exclusive pastures or use wells within these pastures. Cultural norms permit kin or

friends to temporarily graze their animals, if necessary, within exclusively-maintained pastures and to water their animals briefly at wells within these pastures. A very new trend is appearing, nevertheless, in which outsiders who are not originally from the ex-sovkhoz village families are successfully obtaining legal access to abandoned remote pastures with wells. These newcomers must assert some entitlement to pasture lands through village kin, but this can be a fictitious claim by agreement with a village family, but is then acted upon (even knowingly) by the local officials who have the power to allocate legal pasture land rights.

For more than a decade, therefore, livestock owners had been able to gain temporary exclusive rights by obtaining occupancy to two types of land, although each type has very different access to water – long-term leased land adjacent to the Chu river with year-round water available, versus annual rental of land in the desert, which has only ground water requiring wells. Without access to water, an area of pasture has no value for grazing. Livestock owners can gain de facto private access to wells, although wells remain state property, by legally leasing a section of pasture land that encompasses a well. This is the practice in the Moynkum desert sand pastures. The wells in the Moynkum sands are the single most critical resource for larger-scale livestock owners, as livestock can be raised on Moynkum pastures year-round. Leasing pasture land which abuts the Chu river, however, means water for livestock is available year round from the river. For livestock owners, acquiring rental rights to this type of riverine pasture land has another key value; the swampy floodplain is the ecozone where luxuriant reeds grow and can be harvested as hay for winter feed, either for sale to other livestock owners or to supply an owner's private livestock.

The main problem that large-scale livestock owners stated with annually renting pasture land from *Leskhoz* in the Moynkum was that they lacked security of tenure, as the contract can be terminated after a year. According to No. 32 in SO, back in 2006 the *Leskhoz* told people “where you want, you can get land” in the Moynkum desert. He had since rented three parcels of pasture land there, each containing a well. But he was concerned that his agreement on paper “is only on an annual basis, and if *Leskhoz* wants, they can get us off the land, as there is no guarantee with *Leskhoz*”. Villagers said that *Leskhoz* keeps an eye on their land in the Moynkum desert because saxaul wood (*Haloxylon* spp.) is valuable – selling for USD 10 per bundle and used for cooking *shashlik* (kebabs) in the towns. The *Leskhoz* has control of the land and the saxaul trees, but not the wells, which legally belong to the government.

In the Kazakh pastoral areas, the term *fazenda* has become widely used to refer to a semi-privatized piece of pasture land. The term is borrowed from a Portuguese term for an agricultural estate, from the Brazilian soap opera “Pantanal” of the 1990s, which was aired on Kazakh TV in the 1990s, and featured families living on small livestock ranches in the Pantanal pastoral region of Brazil. In Kazakhstan these *fazendas* are typically registered as leased land, under the legal conditions summarised above. Throughout the rest of this paper, we use the local term *fazenda* to refer to these semi-private leased pasture occupancies by livestock owners. It is important to note that no one can obtain legal property rights to wells in the pastures. Throughout the paper we refer therefore to well occupiers rather than owners.

In 2003, we recorded 22 *fazenda* occupiers (28%) out of all 80 livestock owners in both villages. By 2014, of the 2003 sample, 12 (54%) still occupied *fazendas*, though some had moved to different wells. In 2014 we recorded a total of 24 *fazenda* occupiers (29%) out of 84 livestock owners. Of the 2014 *fazendas*, 12(48%) were new occupiers since 2003. The *fazendas* were nearly all in the Moynkum sandy desert south of the settled villages around the Chu river, due to the relative attractiveness of pasture sites in the Moynkum and the warmer winters, so livestock could, if needed, be grazed there year-round (Kerven et al. in review). Only three *fazendas* were located in the Chu valley flood plain, very close by the village of SO, where there was also sufficient pasture for livestock to be grazed all year around.

5.1.4. Enabling technology: new and cheaper pumps can access deeper wells

There are two types of wells remaining from the *sovkhoz* period: *squazhina* (Rus) are boreholes which were lined, deep and closed, and require a powerful pump to lift the water. According to older informants, many of these were broken by “hooligans in the period of chaos” in the mid-1990s, filling the wells up with stones after the collapse of the *sovkhoz*, and most of these wells were not working at the time of the study. The pumps and pipes were dug out and sold as scrap metal. The other type of well are *shakhtnyi kolodtsy* (Rus) or *ashyk kydyk* (Kaz), lined but open and not so deep, up to 40 metres. These are the ones mostly used since the end of the state farms in the mid 1990s, as old Soviet pumps privatised from the *sovkhoz* could be used to draw the water from shallower depths.

Until a few years before 2014, it was relatively expensive to use the deeper wells and maintain the old Soviet-made pumps. This meant that using some deeper wells with good supplies of sweet water was only financially viable for a very few livestock owners, despite these wells being unoccupied, due to the cost of extracting water. Consequently, there were numerous unoccupied sites which were potentially suitable for livestock. However, rehabilitating these wells takes considerable capital investment and some risk of losing the investment, since the annual pasture leases are not secure. Hence only a few large-scale owners were willing to risk undertaking the necessary investment.

According to a senior local official, since the wells belong to the state-level government, “people don’t try to improve them. There is a plan since 2012 to repair the wells in Moiynkum, as President Nazarbaev gave an assignment to Ministry of Agriculture, down to local government, to repair all the wells because he wants livestock to be developed in future”. However, the large-scale livestock owner No. 2, one of the newest *fazenda* occupiers, noted that “there are a lot of deep wells left in Moiynkum which do not work. It’s a big problem, the Number One problem here, as it would cost two to three million tenge to repair one well (USD 13,330 to 20,000). The state is not interested in repairing the wells, and even if an individual repaired a well, it’s not on their land and *Leskhoz* can take the land away as its only rented land. The state’s priority is Amangeldi gas field [south of Ulan Bel] and the state will repair wells for them, but the state is not interested in livestock”. This particular new *fazenda* occupier recently arranged to have two deep but abandoned wells rehabilitated by informally paying a crew hired to construct a road to the new gas field. He noted with satisfaction that this transaction cost him half the commercial price.

The recent introduction (in the last couple of years) of new technology, in the form of more powerful and cheaper deep water pumps imported from China, Russia and Ukraine, had altered the attractiveness of some well sites in 2014. Wealthier livestock owners could now afford to buy these new pumps, which gave them access to deep wells with sweeter water. The old Soviet belt pumps (Zit) can only reach depths of 40m, while simple pumps (without belts) referred to as “shepherd’s pumps” because they were very easy to operate, can reach only 15 m depth. The new models of pumps are used down to 80 m depth. The average cost of a new deep well pump bought by 17 pastoralists in our 2014 survey was USD 390, ranging from USD 133 to 830 (with a generator included in the upper price range). In exchange value, (2012), this average cost was slightly more than the price for a mature male sheep sold at the regional city market.

For example, No. 34, a professional shepherd who takes others’ livestock on long-distance migration, in the past used a Soviet-made Zit pump but recently bought a new Chinese deep water pump for USD 333; he said “because now it’s difficult to find the belt for the Zit pump, and the old ones are worn out”. He also bought a new Chinese generator to provide lights and TV for his shepherd camps in the remote pastures. No. 4, one of the biggest livestock owners in UB, bought a Chinese pump in 2012 for use at his summer grazing block, because he used the Zit (Soviet) pump at the winter well, which is shallower and needs to be used less in winter as the livestock drink less at that time of year. The Chinese pump was the same price as the Zit and he

commented that he's "satisfied with the new pump; it works down to 80 m depth and is more economical than the Zit".

5.2. Response to enabling factors: The growth of a new pastoral elite

The transformative effects of national economic growth and new land laws since the "period of chaos" have offered both the means and motivation for livestock owners who were able and willing to take advantage of opportunities to appropriate resources for their own exclusive use. One of the means is to re-colonize abandoned pastures and wells. Are these livestock owners likely to "have distinctive socio-economic profiles that give them the confidence to creatively reinterpret their legal rights in order to defend their privileged positions"? It is to this question that we now turn.

5.2.1. Characteristics of fazenda occupiers

Acquisition of a *fazenda* is a process of selecting a site (or several) for exclusive access. The site should, in the perception of the livestock owner, contain necessary and desirable resources for raising his livestock (all *fazendas* are registered by men). Not all village livestock owners have the socio-economic capacities required to gain a *fazenda*. Not all have the need for a *fazenda*, if they do not own many livestock. And, not all have the personal initiative to seek out and maintain a *fazenda*, which most recently (in 2014) may be up to 130 km distant from the home village, on deep sand tracks in the remote desert. Those who have created a *fazenda* have invested their private capital (no cases of formal credit were recorded) into building or repairing infrastructure at the desert well site; typically a house, one or several barns, water pipes and troughs, well repairs and equipment. Furthermore, *fazenda* occupiers nearly always hire shepherds who are not related to them and are often from outside the Moynkum district, in addition to depending on their younger kinsmen, often sons, to supervise the family livestock and hired shepherds.

There are thus a number of measurable as well as intangible characteristics of *fazenda* occupiers. Here we can only report on the objective attributes. Those who have acquired *fazendas* do indeed have distinctive socio-economic characteristics. First of all, *fazenda* occupiers have already accumulated bigger flocks and herds (Table 4). This pattern was already noted in the previous study of the same area (Kerven et al. 2004; 2006); owners with bigger flocks had removed their livestock from communal village grazing lands to outside sites for at least some part of the year, due to insufficient pasture and inability to control grazing around village pastures.

Table 4. *Fazenda* occupier compared to non-occupiers, among livestock owners in study area, 2011-2012. Large stock owner: >300 small stock and/or >25 cattle; small stock owner: <300 small stock and <25 large stock.

<i>Fazenda</i> occupier	Small livestock owner	Big livestock owner	Total
No	55	6	61
Yes	2	21	23
Total	57	27	84

Note: this was a complete census of all 84 livestock owners in the study area. X-squared = 47.16, df = 1, p-value = 6.5e-12, Highly significant (>0.99)

The *fazenda* occupiers typically came from the professional and most educated elite of the former Soviet collective farm – the *sovkhos*. These were the farm managers, mechanics, accountants, warehouse managers,

long distance heavy truck drivers and tractor drivers (Table 5). These were positions with privileges such as more higher education, and after the collapse of the *sovkhos*, greater access to capital resources. Those who have dedicated themselves to raising livestock on a larger scale at *fazendas* also tended to have come from professional shepherding families, known as “steppe generals” or “champions”, (these terms in Russian are similar to English), who received medals and honours in the Soviet *sovkhos* era (Table 5).

Table 5. *Fazenda* occupier characteristics, based on a survey of 42 livestock keepers present in Ulan Bel, 2013

Previous situation in <i>sovkhos</i> pre-1995	<i>Fazenda</i> occupier	Livestock owner but non- <i>fazenda</i> occupier	Total n	X-squared	Significance (%)
Held senior position in <i>sovkhos</i>	19 (n =20)	7 (n = 22)	42	15.16	>0.99
Obtained 1 or more heavy machines after <i>sovkhos</i> collapsed	13 (n = 15)	0 (n = 24)	39	27.42	>0.99
Father or brother was employed as shepherd in <i>sovkhos</i>	15 (n = 18)	8 (n = 24)	38	5.74	>0.95

An example: No. 74 ‘s father was the Communist Party secretary to the *sovkhos*, next in importance to the director. Then his father became a farm deputy, and later a warehouse manager. After the *sovkhos* collapsed, it could not pay salaries for one year as it was bankrupt, so in 1998 the *sovkhos* gave his father animals instead and also a Gaz 53 large truck as he was “an honourable person”. The father and son used this truck to transport hay and fodder to the new private well they started to occupy in 1998. He said they chose that particular well because it is close to the main asphalt road, only 39 km from UB. He recounted that he knew about that well because he had a responsible job in the *sovkhos*, as construction site manager travelling around, and he knew about all the wells.

Given their privileged position, these senior employees were able to gain access to the most valuable heavy agricultural equipment when the *sovkhos*es were disbanded in the mid-1990s – this applied to 65% of *fazenda* occupiers. Machinery in these cases consisted of heavy trucks or four-wheel drive jeeps, tractors, hay harvesting equipment, and mobile homes (wagons) for shepherds staying in remote pastures. Those *fazenda* well-occupiers whose fathers were shepherds for the *sovkhos* felt some personal attachment to the wells where they and their parents shepherded over many years. There is sense of inheritance rights. For example, No. 15 was one of the biggest livestock owners in UB, and his father and mother were “champion shepherds” in the *sovkhos*. No. 15 has occupied No. 31 well in MK sands since 1999; this had been one of the winter wells previously used by his father as a *sovkhos* shepherd.

5.2.2. Current indices of socio-economic differentiation

Fazenda occupiers also had different income sources additional to livestock, compared to non-*fazenda* livestock owners (Table 6). Formal jobs were in the village administration or schools. State pensions were relatively generous in 2012-14, and could support a whole family. The semi-steppe of Betpak dala contains saiga antelope horns left from animals slaughtered in the Soviet period – these horns are now commercially

valuable in Chinese traditional medicine. Rocket parts from several launch pads in Betpak dala are collected for their scrap metal value. Non-*fazenda* occupiers tended to rely more on these four income sources, which do not require capital inputs, in contrast to owning a shop or large truck. Transport services, driving heavy vehicles to haul livestock or hay, were exclusively an income source for *fazenda* occupiers, who were also the main shop owners in the villages. Both these income sources are capital-intensive. Lastly, *fazenda* occupiers were more likely to receive assistance in the form of labour or funding from relatives, (61%) compared to non-*fazenda* livestock owners (13%; X-squared = 8.86, p-value =0.0013). All current *fazenda* owners had one or more pieces of heavy equipment, whilst of the sampled non-*fazenda* owners only 33% owned such equipment (n=46, X-squared = 19.65, p-value = 9.32e-06).

Table 6. Other non-livestock income, resident adult male kin and heavy equipment ownership, by *fazenda* and non-*fazenda* occupiers, 2013. Due to small cell size of individual categories, statistical tests of significance cannot be performed.

Other income sources	Livestock owners, no <i>fazenda</i> (n =30)	<i>Fazenda</i> occupiers (n =23);
Formal Job	27%	9%
Hunting	7%	4%
Pension	30%	9%
Collect rocket parts or old saiga horn	20%	9%
Shop	3%	17%
Transport	0%	22%
None	13%	30%
	100%	100%
Male adult kin resident		
Adult sons	39%	50%
Brothers/Cousins	15%	23%
None	46%	27%
	100%	100%
Current ownership of heavy machinery *		
Harvester	3%	17%
Heavy truck	3%	70%
Jeep	20%	78%
Tractor	3%	65%
Wagon	0%	43%
Unspecified	0%	4%
None	53	0
* multiple types of equipment owned by individuals		

The infrastructure – barns, house, watering and well equipment - on a *fazenda* was bought and sold, though not through official channels - for example No. 72 in UB, stated he had recently paid USD 2,700 for the house, well and barns on a pasture plot at a former *sovkhaz* winter base. This was paid to No. 74, but with no legal papers, with the transaction described as a “Kazakh agreement” on trust. This plot is only 9 km from the winter pasture and well of No. 72’s older brother No. 15, who had been looking after their four brothers’ livestock inherited from their father, a “champion *sovkhaz* shepherd” who died in 2003. When No. 74 (the “seller”) first

occupied this well in 1998 after the collapse of the *sovkhos*, he did not have to get registration, as he said “people did not know what to do to systematise, and the government did not know what to do”. After No. 74 “sold” his assets at the *fazenda* he invested in a modern and profitable shop in UB and no longer keeps a *fazenda*.

Another example is that of No. 10, described by an elderly neighbour “as a shepherd from God. His wife has a lot of brains and she usually makes the plans”. In 2012 he “bought” a *fazenda* for USD 13,333 outside the boundary of Moiynkum former *sovkhos* in which he and his father before him had been employed as shepherds. Such transactions have no legal status. Together with his son and other younger male relatives, he moved his livestock of 300 cows, 500 sheep and goats, and 5 horses from his former *fazenda* about 80 km distant in the Moiynkum sands which he had rented since 2007. He said that the *fazenda* in Moiynkum was expensive, could only be rented for one year at a time, and was out of mobile (cell) phone range. He had built there a winter house and barn, which he had now dismantled and was taking to his new *fazenda* which he could lease for 30 years, on hay land next to the Chu river at another village. However, he had only an oral agreement with the previous occupant for the transfer of the new *fazenda* of 1,000 ha, which he described as good for harvesting grass and hay, and very good pasture.

These two examples illustrate points about choices and decisions. For No. 72, it was important to be close to his older brother No. 15, recognised in the village as being one of the very best shepherds, who had managed all the family’s inherited livestock for the last 10 years. For No. 10, it was important to relocate from a remote site which had no security of tenure, was relatively expensive to access and rent, and had no telephone communication, to a much more attractive site which was nearer to main roads and villages, and had plentiful hay land for his livestock and as extra income. Due to his livestock wealth, he could afford to make this choice.

5.2.3 Widening gap between the new pastoral elite and other livestock owners

Those who had taken up semi-private pasture blocks (*fazendas*) had traits that were likely to be crucial in the formative early years after the end of the state farm support and the emergence of early capitalism – a professional position in the *sovkhos*, ability to claim *sovkhos* key assets, family composition - all measures of social capital at a time when other sources of funding were extremely scarce. Over time, these social advantages have been translated into economic advantage, with accumulation of livestock wealth. There is now a more discernible differentiation in the livestock ownership and management patterns of *fazenda* owners versus smaller-scale livestock owners. This disparity was becoming apparent by 2003, as the time of chaos was settling into a more stable and prosperous routine. By 2012 *fazenda* occupiers in the Moiynkum had accumulated considerably bigger flocks and herds than village-based owners, compared to a decade previously.

Table 7 shows the main changes in mean sizes of small stock flocks and cattle herds, between these two groups of livestock owners, as well as the changes within each group over the same time period. Village-based livestock owners who did not have *fazendas* owned fewer smallstock in 2012; a mean of 34 head in 2012 compared to 47 head in 2003. But village-based owners had double the average head of cattle in 2012, with a mean of 16 head compared to 8 head in 2003. For *fazenda* occupiers, the decade had been even more lucrative; their flocks of sheep were on average four times larger in 2012, and mean cattle holdings had grown by 450%.

Table 7. Livestock holdings by Ulan Bel villagers and *fazenda* occupiers in 2003 and 2011-2012, including all livestock owners who could be contacted at the time of the questionnaire surveys in Ulan Bel village in 2003 and 2012.

2003	Village residents who are non- <i>fazenda</i> occupiers (n =35)		Moiynkum <i>fazenda</i> occupiers (n =17)
	Keep around UB village Chu river	Entrusted to <i>fazenda</i>	
Smallstock			
% of h/holds	26%	74%	100%
mean flock size	47	45	347
range flock size	20-230	14-200	30-1,200
Cattle			
% of h/holds	17%	63%	100%
mean herd size	3	9	25
range herd size	1-12	2-33	4-90
Horses			
% of h/holds	1%	26%	82%
mean herd size	0.5	2	9
2011-2012	Village residents who are non- <i>fazenda</i> occupiers (n =32)		Moiynkum <i>fazenda</i> occupiers (n =16)
	Keep around UB village Chu river	Entrusted to <i>fazenda</i>	
Smallstock			
% of h/holds	40%	60%	100%
mean flock size	29	31	1390
range flock size	5-100	5-100	82-13,000
Cattle			
% of h/holds	65%	35%	88%
mean herd size	10	26	113
range herd size	2-25	20-35	9-300
Horses			
% of h/holds	20%	20%	94%
mean herd size	1	28	23

Not only have overall livestock numbers increased considerably for both groups, but there has also been greater divergence in the way livestock are managed by smaller-scale village owners compared to large-scale *fazenda* occupiers. During the period of chaos after livestock ownership was privatised, small-scale livestock owners struggled to keep their livestock around the villages in the riverine areas, as these owners lacked herding labour as well as money to purchase winter fodder for their animals if they stayed around the villages all winter (Kerven et al., 2008). In 2003, 75% of village-based households were entrusting some or all of their livestock to larger-scale owners at semi-private pasture and well sites (*fazendas*) in the Moiyunkum desert. This was a more convenient arrangement for the “absentee” owners in villages who had small flocks, to have their livestock managed by fellow villagers (usually related and receiving modest per head payments) who had invested early on in *fazendas* with wells in the Moiyunkum after the collapse of the *sovkhos* support in the mid 1990s (Kerven et al., 2004,2006).

Compared with 10 years before, in 2012 those with smaller flocks/herds were less likely to entrust their animals and more likely to keep their animals, especially cattle, around the riverine villages all year (Table 7). Village residents still found it difficult and risky to keep their relatively small flocks of sheep and goats solely grazing around the villages all year. However, large-scale owners no longer wished to manage others’ entrusted livestock. In UB, one of the former *sovkhos* farm managers (No. 51) explained that village-based people now keep more cows and horses than ten years ago, but fewer or no sheep, as cows and horses can be more safely sent out around the village to graze by themselves with less risk of wolf attack, whereas sheep and goats need to be protected by shepherds (often armed with guns). Few men from the villages were willing to shepherd livestock anymore, as there were an increasing number of alternative income opportunities in Kazakhstan’s cities. There was also an incentive for village-based owners to keep more cattle, as there was a strong demand for dairy products in the villages and some village women even sold their homemade dairy products to the city. No. 51 commented that “It’s difficult to find people in the village willing to shepherd, and if a family has sheep and goats, they try to put them in a large flock of another owner who has rented or leased pasture land, but people with a lot of livestock at these remote pastures are now less willing than in the past [2000-2003] to accept other people’s animals, as they have enough of their own and don’t need to take others’ animals for payment”.

So far we have documented several major changes in livestock management strategies by large and small owners, between 2003 and 2012. These changes are responses to national economic growth, leading to higher labour opportunity costs as rural dwellers can find jobs in the towns, but also higher market prices for certain types of livestock. The next section presents the study’s findings on the spatial consequences of these economic and social changes in livestock management over the past decade.

5.3. Re-colonising a frontier – the sequencing and expansion of well occupation

Livestock owners depend on the availability and quality of water for their livestock. In the pre-*sovkhos* period up to the 1950s, Kazakh nomadic pastoralists used hand-dug wells as well as ephemeral pools from snow melt in spring. According to an 80-year old shepherd (No. 5) whose grew up with his nomadic parents before the *sovkhos* were set up: “In Betpak dala these wells were 2 to 3 m deep, and in Moiyunkum sands up to 15 m deep. The water was pulled up by camels. Over winter in Moiyunkum the nomads moved between different wells because of the vegetation; that was the main reason for moving, because of the erosion of the grazing land. The second reason [for moving around between wells in winter] was that, at one well there was not enough water. The *sovkhos* [in the Soviet times] deepened these wells”. By deepening the wells and providing powerful mechanical pumps, the *sovkhos* farms were able to provide much more water and thus maintain a much higher population of livestock over the winter periods, compared to the previous limitations of the nomadic hand-dug wells. The stocking rate was transformed through new technology, as many more livestock

could be raised on the same areas of extensive pastures, due to the provision of more and deeper wells also equipped with industrial pumps. A *fazenda* occupier, No. 28 recounts that “In the *sovkhos* there were enough wells for all 90,000 sheep but now there are not a lot of sheep but there are not enough wells”. By this he meant enough wells which were useable, accessible and had good water.

After a cycle of deep decline of livestock populations in the immediate post-Soviet period (Behnke 2003; Robinson and Milner Gulland 2003b), in 2012-14 the stocking rate was expanding and wells previously created by the *sovkhoses* and then abandoned in the 1990s, were being re-occupied by larger-scale livestock owners. Livestock owners who accumulate large flocks cannot graze their animals on communal pastures around the villages, as there is not sufficient pasture and such grazing is not socially acceptable as small-scale village livestock owners are deprived of their rights to communal pastures. Large-scale owners therefore seek access to pastures away from the villages located along the Chu river. Ambitious owners have to find an unoccupied well in the desert, with associated grazing land, if they wish to raise larger flocks and herds on pastures away from the settled locations.

Since our earlier study in 2003, there have been a series of new well occupations in the Moiyunkum sands (Figure 2 and Table 8). Some wells have been abandoned since 2003 and then later re-occupied by other livestock owners. Of wells used in 2003, nine were abandoned by 2014; a further 20 wells were still used in 2014 but sometimes with different occupiers. There has been a high turnover of well occupiers. The reasons that previous well occupants said they had left since 2003 included: old age and infirmity, high running costs and difficulties of social and physical isolation. However, 29 wells which had not been used since the end of the *sovkhos* twenty years ago were re-colonised by 2014 by large-scale livestock owners.

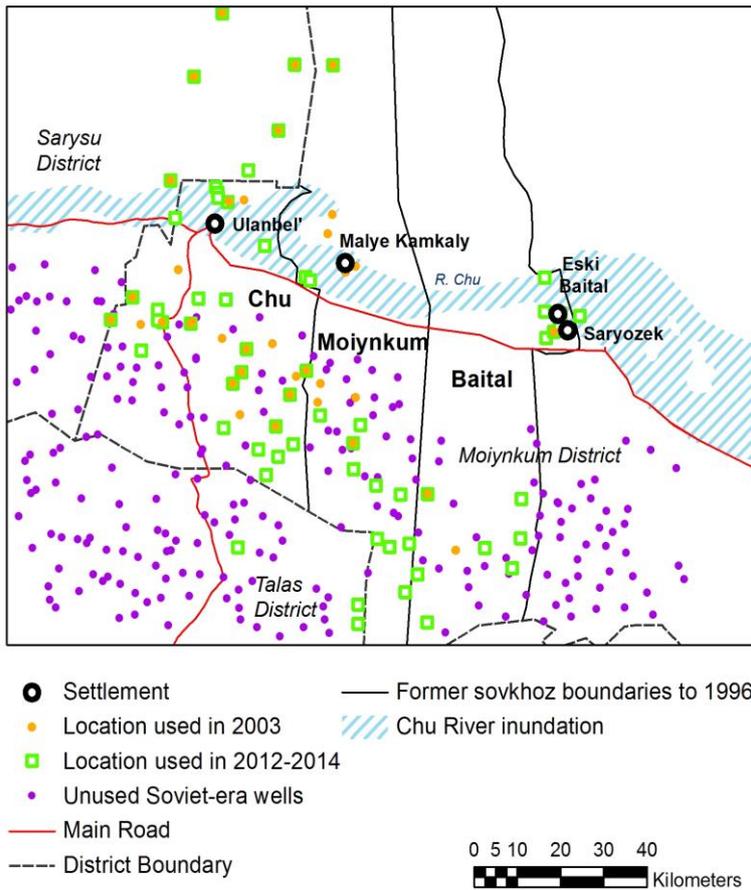


Figure 2: Location of wells used in 2003 and 2012 and major wells recorded on Soviet-era topomaps.

There was an alteration in the location and characteristics of wells occupied over the study period. Two features stand out, corroborated by pastoralists and officials in the study area. Firstly, more recently occupied wells were on average 24 km further away from the two villages along the Chu river than those occupied in 2003 (Table 8); some were even in the deep sand dunes up to 130 km from the villages (Fig. 3). Secondly, the probability that a potential site within the UB combined former *sovkhos* lands was used in 2012 was unrelated to distance; but strongly related to it in 2003 (Fig. 3). According to the UB mayor, the most distant southerly blocks “are on very bad roads, cannot be reached except by Kamaz [several tonne large Russian trucks]”. These are very costly military vehicles only owned by the wealthiest livestock owners.

Table 8: Changes in occupied wells in Moiyunkum desert, between 2003-2014

	Occupied wells in Moiyunkum desert 2003	All occupied wells in Moiyunkum desert 2014	New wells occupied since 2003
Number enumerated (census)	29	49	29
Mean distance from village (km)	37 km	51 km	61 km
Range distance (km) from village	22-58 km	13-130 km	13-130 km
% wells saline	24%		20%
% wells average salinity	33%		20%
% wells sweet	43%		60%

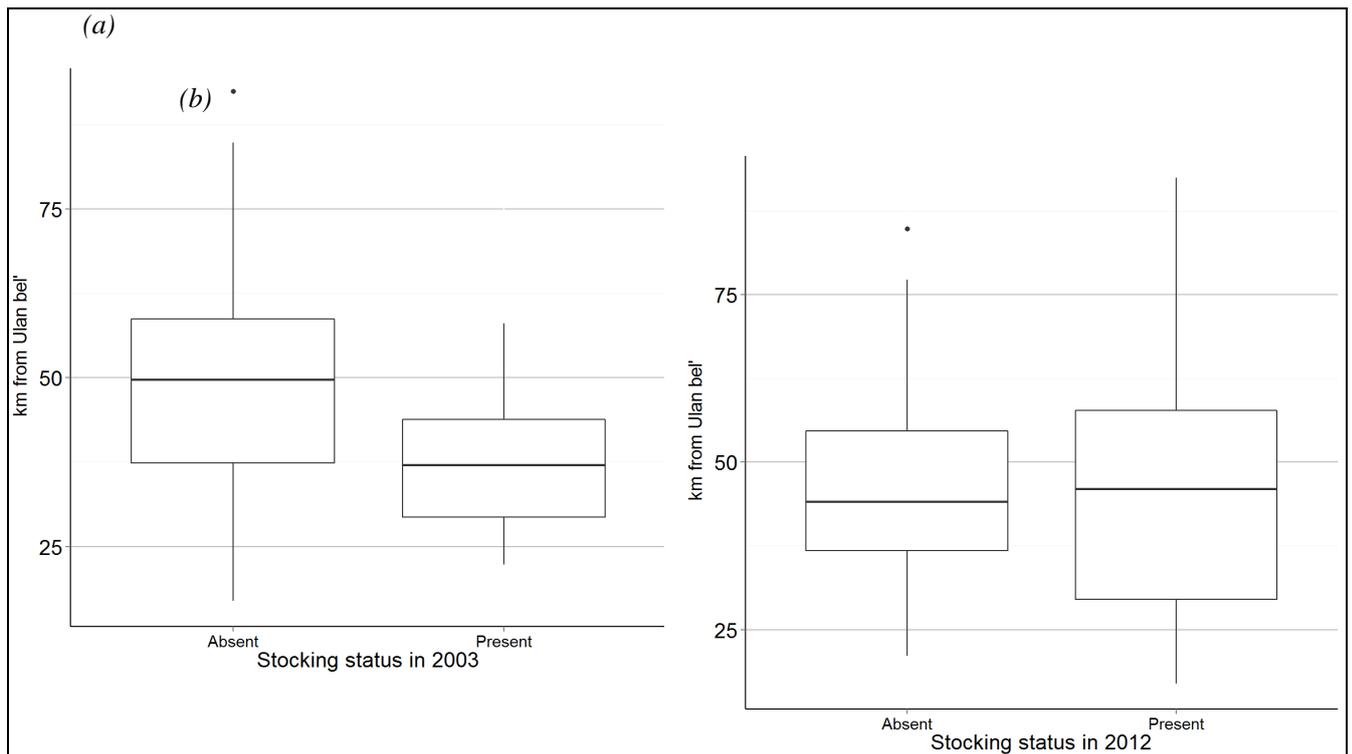


Figure 3. Distance from Ulan bel' and livestock presence and absence.

Notes: The boxplots show median values (horizontal lines in box centre), and the 1st the and 3rd quartiles (top and bottom of boxes). The whiskers extend to values of 1.5 x Q3-Q1. Outliers are shown as dots and represent values > Q1 - 1.5*IQR and < Q3 + 1.5*IQR where IQR = Q3 - Q1. a) In 2003: absence n=78 mean=49.6km; presence n=24, mean=37.1km; t =4.3, df = 66.6, p= 4.53e-05. b) In 2012: absence n=72, mean=46.6m; presence n=30 mean=46.9km; t = -0.081, df = 40.889, p = 0.93.

The second feature of the new pattern of well occupation is a difference in water quality, as estimated by the well users (Figure 4). More saline or alkaline well water is less healthy for livestock to drink, particularly in the very hot summer months. Those pastoralists who had moved to wells further away from the villages provide three main reasons for their moves; a) well water further south in the Moiyunkum desert is generally sweeter but often at a deeper depth than the saltier or more alkaline wells in the northern Moiyunkum, b) all well sites in the northern Moiyunkum (closer to the villages) are already occupied by private owners since the late 1990s and since many have saltier/more alkaline water, this is not good for livestock, (c) new improved pump technology is now available which wealthier livestock owners can afford and this allows them to pump sweet water from the deeper but more remote wells. The trend of saltier wells found closer to UB is suggested by the relationship between well salinity and distance from UB in Table 7 and Figure 4.

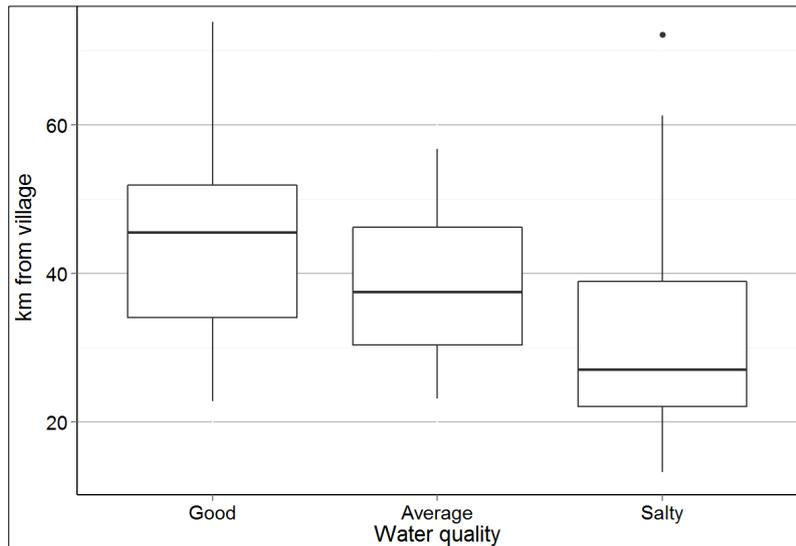


Figure 4. Water quality and distance from village.

Difference in mean distance between good quality wells and the merged group of average and salty wells: $n=17$, mean 44.6km; $n=24$, mean = 34.5km ($T=2.085$, $df=34.21$, $p=0.045$).

Right after the *sovkhos* collapsed, a number of larger-scale and more ambitious livestock owners started to informally privatise the winter houses and barns in the Moiyunkum desert that were closest to the villages, which were therefore cheapest to access. The wells up to 40 km south of UB in the northern Moiyunkum desert were initially chosen for occupation in the “period of chaos” when land tenure regulations were in flux and former *sovkhos* employees had low incomes and smaller private flocks. There was a vacuum of land tenure regulation and enforcement at this period.

One of the largest early *fazenda* occupiers (No. 28) who first occupied a well only 25 km from UB commented “Since 1998, I have been keeping my livestock at No. 24 well [this is a natural artesian well and one of the most productive source of water in the study area]. When I started there, at that time there was privatisation and I got permission from the regional land office to privatise the well. I got a document of privatisation for this, without a time limit”.

According to the chief well engineer (No. 88) of former UB *sovkhos*, and two of the *sovkhos* farm directors (Nos. 51 and 90), these closer wells in the northern Moiyunkum had moderately to very salty water and had previously only been used by the *sovkhos* (and before them by the nomads) for a few weeks in autumn or even more briefly in spring at lambing time. The edible pasture plants in that ecozone are salty but were valued as

an autumn nutritional boost for livestock reproduction and going into winter, and again briefly grazed in spring as a boost after the leaner winter period and for newly-lambled ewes. These closer saltier well sites are not ideal for more lengthy occupations, but had to suffice when newly-privatised livestock owners had less wealth more than a decade ago.

The senior professional staff of the former *sovkhoz* pointed out that the *fazenda* occupiers who first occupied the closer salty wells, cannot keep their animals there for the hot summers when animals need to drink more. Those *fazenda* occupiers have to either find a second well with sweet water in the Moiynkum desert for summer, or move their livestock out for summer to BD with sheep, or else take their large stock of cattle and horses for the summer to Chu riverine pastures with suitable forage but not for sheep. This is in fact the observed pattern by all the *fazenda* occupiers on the more salty wells of the northern Moiynkum desert. This pattern is confirmed by the manager of the *Leskhoz* lands of the Moiynkum desert (No. 8).

6. Conclusions

According to Strickon (1965) the 'Euro-American ranching complex' is based on 'an economic-ecological pattern built around such features as the grazing of livestock, dependence upon a money market, and the extensive use of land and labour' (1965: 229). Having recognized ecological determinants, Strickon emphasizes the primacy of economic considerations for 19th century ranchers:

The 'frontier' into which the cattle complex had expanded in the second half of the nineteenth century was as much the slums of Manchester and Pittsburgh as it was the empty grasslands of Montana or Santiago del Estero.' (1965: 238).

This paper has re-examined Strickon's central problem – the interplay of economic forces and ecological conditions in the evolution of a ranching system – in a contemporary Asian setting in which the new ranchers consciously style themselves on a Euro-American ranching model borrowed from Brazilian TV. We have not, however, argued for the primacy of either economic or ecological factors in the process of ranch development. We do report the changing use of the landscape adopted by actors with different economic endowments, whose economic circumstances change over time. From a pastoral perspective, the natural resources of the Kazakh rangelands are not constant; biological resources are seen through a variable lens adjusted by radical shifts from collective state farming, unravelling to chaos and settling now into capitalism.

New trends are observed; in particular, there is an emerging dispersal to previously familiar but abandoned state farm sites, involving moves further from the pasture and water sites that pastoralists first occupied after the collapse of the state farms in the mid 1990s.

This longitudinal study of a pastoral area has documented three main changes occurring in the decade 2003 to 2014. Firstly, there are more livestock, but little change in the number of livestock owners. Secondly, there is a growing differentiation between livestock management systems based on the scale of operation. Thirdly, the number of wells and grazing areas effectively privatised has increased and newer ones are located at a greater distance from permanent settlements.

There have been significant changes in the types and numbers of livestock owned in the decade since the early 2000s. These changes result from several factors external to the local pastoral region; a buoyant national economy as oil and gas have been exploited, and new wealthier consumers have pushed up urban demand and thus prices for meat. Growing income opportunities in urban areas have led to flows of money to pastoral areas, but economic growth has also increased opportunity costs of family labour for shepherding in pastoral regions. There are different types of livestock owners, with different resource endowments – socially,

technically, financially, and in terms of initiative, family background and other personal attributes. As external conditions changed, their livestock management choices were either constrained or opened up according to their individual capacities. These choices are melded together to become the distinctive strategies pursued by different types of livestock owners over a heterogeneous landscape. In this case study, we found that some owners had sufficient socio-economic resources to permit dispersal from initial settled sites, in order to colonise abandoned but familiar sites which may be more biophysically suitable for livestock but required a greater expenditure for the owners to access.

As the national economy has boomed, the increasing market value of livestock in Kazakhstan led to a local growth in livestock numbers from the early 2000s. Certain types of livestock owners were encouraged to seek out and invest in exclusive pasture holdings around wells. These holdings are termed *fazendas* (Portuguese) after a Brazilian TV soap opera watched by Kazakh pastoralists in the post-Soviet 1990s. This dispersal has incurred into frontiers which had formerly received heavy investment during the later Soviet state farm period, but were not at first colonised by newly-private pastoralists after those state farms collapsed. The observed sequence of pasture and well occupation since the late 1990s suggests that initial changes in the land tenure regulations in the mid 1990s to the early 2000s might have been a necessary but not sufficient condition to partly motivate this expansion of private property tenure by the time of our previous study in 2003. However, it was only after the commercial value of livestock rose considerably that more entrepreneurial big-scale stock owners increasingly sought to lease more remote pasture blocks containing desirable wells, despite the lack of economic security they could expect from the annual leasing conditions. These events bolster our first proposition that, even if the enabling conditions are there, a shift from open access to exclusive resource use will actually occur only when the increased commercial value of pastoral output warrants the private appropriation of productive resources.

The evidence we have presented suggests that the expansion of commercial livestock-keeping in this remote semi-arid rangeland area was caused by alterations in the enterprise scale of the average *fazenda*, not just by adding new *fazendas* – i.e. *fazendas* became larger and more spatially dispersed operations. As individual flocks grew, large-scale livestock owners had to find more wells and pastures. The new pastoral elite are stretching further away from the less physically favourable, but more accessible and therefore more densely occupied, sites which were first occupied by newly-privatised pastoralists in the mid 1990s. Such individuals may be assumed to have an unequal competitive advantage. Travel costs were a crucial variable in the initial process of occupying sites after the end of the Soviet farms, and were thus a factor in site selection and sequencing. Due to changing economic conditions, travel costs have become less of a constraint for those individuals with more financial resources and incentives.

Our findings do not show a strong deviation from de jure land rights under the new legislation, although privileged individuals are subtly distorting some of the legal land rights, in line with our second proposition. Certain types of individuals who came through the period of the Soviet collective farms have been energetically pursuing their exclusive rights to pasture land and wells. There are innovative twists in their use of social capital in the form of kinship connections and patron-client relationships, as well as reference to time-honoured Kazakh customary practices of mutual trust as in transfers of physical property without legal documentation, so as to advantageously interpret recent sets of formal land tenure rules; at the same time, the authorities are not so far applying these rules very strictly. This sometimes involves the elite bending the rules, and this is resented by villagers with fewer economic and social assets. Kazakh pastoral culture is complex and there is also admiration and respect for the new “big men”, who provide patronage to those having less – e.g. wages for hired shepherds, truck transport for hay and taking animals to urban markets, a sheep for a wedding feast, etc. There is also emergent socio-economic differentiation, as the new pastoral

elites are defecting from older forms of community solidarity such as informal resource access and entrustment of flocks, in response to new commercial and land tenure opportunities.

The dramatic growth of the national economy has offered non-pastoral formal job opportunities for younger members of the pastoral communities, as well as substantial state pensions and social welfare payments. These new income sources have ameliorated the loss of previous arrangements for livestock entrustment by small-scale livestock owners based in villages to large-scale owners using remote pastures, while at the same time creating difficulties for these large-scale livestock owners to attract and retain shepherding labour.

We find evidence of gradual exclusionary behaviour by wealthier pastoralists in this study area. But in none of the various types of pasture land have fences been erected. This is remarkable in a commercializing rangeland livestock industry and contrasts with European ranches which were fenced for the most part by the 20th century in southern Africa, Australia, North and South America. The Kazakh nomadic khans and clan leaders annually planned their groups' long distance migrations of between 200-1,000 km through territories which they could defend and within which individual families of a sub-clan (the migratory unit) could freely pasture their livestock (Olcott 1995). The imposition of Soviet rule in the early 20th century eschewed the concept of private exclusive property, and also destroyed the tribal political structures which had overseen allocation and defence of pasture territories. The Soviet government exerted control over pasture land and water points through strictly enforced government farm regulations. Thus by the time that a new capitalist elite was forming a decade after the end of the Soviet Union, there had been no tradition or model for fencing the new ranches. In future, maintaining exclusive access to pasture and water without legal tenure rights re-enforced with fences could become problematic if the economy remains strong, livestock populations continue to increase, investors see the profits from large-scale livestock units and as a result, access to key natural resources becomes competitive.

Larger-scale livestock owners, with initiative and greater socio-economic resources, have been able successfully to combine de jure property rights to pasture with usufruct rights to state-owned wells. This is not at present resulting in a land squeeze, pushing others out of prime pasture territory, but only because the level of livestock ownership is still relatively low in relation to available pasture land with water supply. The landscape is as yet far from being filled up, so space is not the issue, on one scale – but is the big issue on another scale, due to the distances and costs involved for all pastoralists to access distant unused grazing and better water resources. This has become a major policy issue for the Kazakhstan government.

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