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Contemporary Mobility of Herders in Central Mongolia

Azjargal Jargalsaikhan[1,2], Batbuyan Batjav[3,4], Batkhishig Baival[1,5] Tungalag Ulambayar[6,7], Tamir Lhagvasuren[1], Solongoo Tsogtbaatar[8,9]

[1]Nutag Partners, room 2004, block 39, Nomuun khotkhon, 3rd khoroo, Sukhbaatar district, Ulaanbaatar, Mongolia
[2]<azjargal@nutagpartners.mn>
[3]Center for Nomadic Pastoralism Studies, Institute of Geography, Erkhuu street, 7th khoroo, Sukhbaatar district, Ulaanbaatar, Mongolia
[4]<b_batbuyan@yahoo.com>
[5]<batkhishig@nutagpartners.mn>
[6]Dept of Forest and Rangeland Stewardship, Colorado State University, Fort Collins, Colorado 80523-1473 USA
[7]<tungaa@rams.colostate.edu>
[8]Institute of Geo-ecology, Chingeltei district, 4th khoroo, Baruun selbe street, Ulaanbaatar, Mongolia
[9]<sono_bn@yahoo.com>

ABSTRACT

Social-ecological changes occurring in recent years have complicated herders' migration patterns, and because of rangeland climate variability, nomadic movement patterns have changed. The aim of this study was to determine how the present movement patterns of herders situated in different steppe regions along the road infrastructure corridor of central Mongolia have been affected by the intensification of community-based natural resource management activities and household livelihood levels, and to identify how herders adapt to those changes in their movement practices. The number and distance of herders' movements increased between 2010 and 2011, depending on regional geographical location and community-based natural resource management activities. In particular, household income and the number of livestock herders owned determined how far they moved. In the period 2010-2011 in central Mongolia there was a trend of movement from the western *aimags* to the forest steppe and from the desert steppe to the steppe and forest steppe, across administrative borders. Herders have a variety of ways to cope with social-ecological change which demonstrates the basic need for developing location-specific policies when establishing movement regulations and implementing risk reduction measures.

Key words: Mongolia, movement patterns, regional geographic location, herders, CBRM, movement across the administrative borders

INTRODUCTION

Livestock herd movements are a traditional household practice with precise steps (Avarzed and Sodnom, 2008), which have existed for many centuries (Bazargur, 2005), and are the optimal way to use rangeland resources (Fernandez-Gimenez and Le Febre, 2006). Heterogeneity of natural resource distribution dictates the location of pastoral herding, herd structure, and defines herders' lifestyle. In conducting movement research it is appropriate to use the indicators of the direction, the distance and the number of herders' movements (Bazargur, 2005).

Since transformation of the political system in 1990, and subsequent social-economic change in Mongolia, livestock has been privatized and herders confronted with the need to independently arrange their household income and other financial issues, which led most herders to increase livestock numbers as much as possible (Saizen et al., 2010). This has changed the distribution patterns and timing of herders' movements, increased livestock density, and created a condition when large numbers of livestock consume key natural resources at the same time (Fernandez-Gimenez, 1997). The distance of herders' movements has shortened, and there has been a tendency for a decrease in the number of movements per year (Bazargur, 2005), which has affected rangeland resource conditions (Johnson et al., 2006).

In response to these changes, international donors and NGOs began supporting herders to improve rangeland use and livelihood sustainability, and this support has been aimed at facilitating community-based rangeland management (CBRM). This approach increased as herders began uniting into groups after the *dzud* of 1999-2002. By acting collectively, herders' capacity to adapt to and cope with social-ecological change, and to access new knowledge and information, as well as their social relationships and experience have improved (Batkhishig, 2012).

The goal of this research was to define the impact of herders' livelihood level and CBRM activities on the number, distance and direction of herders' movements in three ecological zones (forest steppe, steppe and desert steppe) along the road corridor in central Mongolia, and to discover how herding practices have changed. We assumed that the number and direction of herder movements in Central Mongolia would vary with ecological zone, livelihood level and CBRM activities.

STUDY SITES

Movement patterns of herders were studied at the following sites, all of which are close to the road infrastructure corridor of central Mongolia; Saikhan and Bayangol Soum in Selenge (forest steppe), Bayan and Bayantsagaan Soum in Tuv (steppe region), Ulziit and Undurshil Soum in Dundgobi, and Khankhongor and Tsogt-Ovoo in Umnugobi (desert steppe) (Figure 1).

METHODS

In 2010-2011 we collected, using qualitative and quantitative methods, information about the number, distance and direction of movements, household income, and the reasons for these movements, from herders of four CBRM and four non-CBRM *soums* in four *aimags* located in forest steppe, steppe and desert steppe of central Mongolia. A total of 200 household surveys, 48 focus group discussions and 55 individual interviews were undertaken (Table 1). To improve the completeness of the data, we collected additional information using the relay station discussion technique (Creswell, 2003) from central and gobi region discussions conducted in June 2014.

Quantitative data were analyzed using an ANOVA, linear regression and correlation (Quinn and Keough, 2002) in SPSS.17.0 (http://www.spss.co.in). Number of livestock was transformed into sheep units using the standard methods (Bedunah and Schmidt,

2004). Qualitative data were processed based on the classification method of narrowing the general (Creswell, 2003).

RESULTS

The number of movements

There was a significant interaction between ecological zone and year in the number of movements (F-29.08, p<0.001). In 2010 the herders in the desert steppe region moved more (2.89 ± 0.17 times) compared to the herders in steppe (1.64 ± 0.16 times) and forest steppe (1.51± 0.14 times) regions (Table 2). In 2011, steppe region herders moved more (3.73 ± 0.15 times), than forest steppe (3.00 ± 0.13 times) and desert steppe (2.94 ± 0.12 times) (Figure 2).

There was a significant interaction between year and CBRM type in the number of movements (F-5.6, p=0.01).When comparing CBRM type by the year 2010 with the year 2011 the following result is observed: the number of herders' movements in CBRM (2.03 ± 0.195 times in 2010; 3.25 ± 0.140 times in 2011) and non CBRM (2.53 ± 0.129 times in 2010; 3.05 ± 0.103 times in 2011) has generally increased (Table 3; Figure 3).

The distance of movements

There was a significant interaction between year, ecological zone, and CBRM type (F-3.01, p=0.001) (Table 4) in the distance of movements. In 2010-2011 in the desert steppe, CRBM herders' (60.2 ±30.8 km in 2010; 76.2 ± 42.7 km in 2011) distance of movement has increased, but non CBRM herders' (113.3 ± 40.9 km in 2010; 78.5 ± 41.9 km in 2011) distance of movement decreased. In the steppe region between 2010 to 2011, CBRM (51± 31.5 km in 2010; 81.1 ± 19.2 km in 2011) and non CBRM herders' (35.8 ± 43.1 km in 2010; 52.4 ± 40.3 km in 2011) distance of movement are appear to have increased. But in the forest region between 2010 to 2011, CBRM (47.6 ± 9.7 in km 2010; 90.4 ± 34.5 km in 2011) herders' movement doubled, compared to non CBRM herders' (33.8 ± 56.7 km in 2010; 37.7 ± 53.4 km in 2011) distance of movement (Table 4).

According to herders in the steppe and desert steppe, the increase in the number and distance of movements is related to a decrease in rangeland productivity. For instance, a herder from Undurshil *soum* stated: "*Anyone moves where he wishes*. *Because for the household with many herds it's difficult to settle in one area for a long time.*"

The direction of movements

Generally, we observed that non-resident herders from other *aimags* moved to the forest steppe and steppe regions, while herders from the desert steppe region moved out across their *soum* and *aimag* border towards the east and north-east. We categorized herder movement into two kinds: temporary movements in times of drought and dzud, or movements to become permanent inhabitants of the destination *soum*.

In the central research area, movement directions were as follows: from western *aimags* to Selenge *aimag*, from Umnugobi to Dundgobi, from Dundgobi to Tuv *aimag*, and from Tuv *aimag* to eastern *aimags*.

Based on identifying the location of movements, the herders of Bayangol and Saikhan *soums* in forest steppe region move locally in their *soum* or moved to Khushaat in Selenge *aimag*, Bornuur in Tuv *aimag* and Darkhan, and also a number of herders came from other *aimags*, namely from Khovd, Uvs and Khuvsgul *aimags* (Figure 4). For example, during interviews with Bayangol *soum* herders they indicated that many non-resident herders come from outside by saying: "*Our population is growing and growing. Many people come from the western aimags. The reason why many people are arriving might be because our soum is centralized. And the rangeland is degrading more and more.*"

The herders of the steppe region Bayan and Bayantsagaan *soums* mainly moved to Mungunmorit, Bayankhangai and Zaamar, and non-resident herders move in there from Ulziit, Undurshil, Khankhongor and Tsogt-Ovoo (Figure 4). For example, from the interview with the herders of Bayantsagaan *soum* you can see that they move northwards while non-resident herders move into their area from the southern *soums*: "*Many herders from our aimag and Dundgobi aimag are coming to our area. Non-resident herders mostly come during dzud disaster periods while our aimag's herders nowaday move to different soums because of land and water degradation. Due to the last years poor land produce we had to move to Sergelen and Bayanchuluut soums of Tuv aimag, and in winter we move further than Ulanbaatar city to spend winter there. It's the only way for us to keep our livestock.*"

Herders from the desert steppe regions of Tsogt-Ovoo and Khankhongor *soums* moved to Dundgobi and Gobisumber *aimags*, the herders of Dundgobi *aimag* moved to Tuv *aimag* and Khanbogd, Manlai, Mandakh and Tsogt-Tsetsii *soums* of Umnugobi *aimag* (Figure 4). Herders of Umnugobi *aimag* Tsogt-Ovoo *soum* generally move north-east and east: "*We moved to Dundgobi and Gobisumber aimags. When the conditions worsen we move further away and when it gets better again we move around the area. Last summer we moved to Mandakh in Dornogobi aimag*". Herders from Ulziit and Undurshil *soums*, and herders from Khankhongor and Tsogt-Ovoo *soums* of Umnugobi moved into their area (Figure 4): "*When the conditions worsen we split to do the otor movements. Many herders are moving in from Umnugobi aimag*".

Distance and number of movements in relation to number of livestock and household income

Results of linear regression show that the number of movements ($F=12.6$, $p<0.001$), and the distance of movements ($F=0.08$, $p<0.001$) in 2011 was dependent on herders' income in 2010 (Figure 5A). The total distance of herders' movements ($F=11.0$, $p<0.01$) in 2011 also depended on the same year's livestock number (Figure 3B). Qualitative data supports that in any region, the households with greater numbers of livestock and better income moved more times and longer distance. For herders in the Gobi desert, households with higher income and livestock numbers had a need and ability to move more. For instance, a herder from Khankkhongor *soum* stated: "*Nowadays land production is decreasing and those who have more livestock and more wealth move faraway to reach the productive land to raise own livestock well.*"

From the relay station discussion we observed that non-resident herders who came from the forest steppe and the desert steppe region used the rangeland by formally registering their household members in several different *soums*. Based on the interview of participants in the forest steppe relay station discussion: "*Herders make the arrangements for themselves to move to the various areas by registering their family members or their relatives under the several soums. First one of them moves in without the livestock, and then he moves in his kins and the livestock. Even the husband and the wife of one family separate to become the subjects of the different soums.*"

DISCUSSION AND IMPLEMENTATIONS

Patterns of herders' movements in central Mongolia differed depending on CBRM membership and geographical location (forest steppe, steppe and desert steppe) (Bazargur, 2005). The number of herders' movements, increased between 2010 and 2011 in all regions (forest steppe, steppe and desert steppe). CBRM herders moved more than non-CBRM herders. This could be related to the lessons learnt from the previous year's *dzud*, as well as herders' perception of the need to raise their livestock well. We also observed that the lesson learnt from the dzud of 2010 has intensified the use of otor movements for both CBRM (Fernandez-Gimenez et al., 2012) and non-CBRM herders. In 2010-2011 steppe and forest steppe CBRM and non-CBRM herders', but not

desert steppe, CBRM herders' distance of movement increased where most of the movements were done to the outside *soum*.

When comparing movements of desert steppe region herders to those in the forest steppe and the steppe regions, there are many instances of crossing administrative borders. This has been linked to vegetation cover and precipitation conditions (Vandandorj et al., 2015), indicating that the herders who reside in the area with non-equilibrium ecosystem condition (Fernandez-Gimenez and Allen-Diaz, 1999) move more in response to weather and pasture conditions, as they always have. When non-resident herders move into a different *soum's* area, the local residents see them as increasing local herders' risk of winter disaster or drought (Fernandez-Gimenez et al., 2012) and this perception leads to social conflict and unfavorable relationships between the herders. Therefore, when the government defines the number of the livestock moving to the target *soum,* social and ecological risks should be considered, so that the conditions of the target area are not further degraded. These patterns of cross-border movement demonstrate the need to improve rangeland use and conservation policies, suitable to the particular area's size and ecological zone characteristics.

At the *soum* level, individual herder movement patterns were related to their household income and livestock number. Therefore it would be reasonable for appropriate policy to manage the herders movements inside the *soum* or bag, considering household livestock number in the rangeland use planning. Herders show many different movement responses in the attempt to deal with the risks in winter disaster or drought. The flexible population registration legislation provides some ways for herders to overcome natural perturbations and exercise rights for the formal use of rangelands in a different *soum*. Therefore it is necessary to consider geographical location and region specifics when establishing *otor* movement relations between *soums* or *aimags*, and when taking measures to protect herders from various risks in winter disaster of drought. Our results also highlight the need for the coordination of winter preparation in each *soum* with other *soums'* policies.

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Table 1. Study area of movement pattern research.

Aimag	CBRM *soum*	Individual interview	Group interview	Household survey
Selenge	Bayangol	7	6	25
Tuv	Bayantsagaan	7	6	25
Dundgobi	Ulziit	13	10	46
Umnugobi	Khankhongor	6	5	20
Aimag	Non-CBRM *soum*	Individual interview	Group interview	Household survey
Selenge	Saikhan	5	5	20
Tuv	Bayan	5	5	20
Dundgobi	Undurshil	6	5	24
Umnugobi	Tsogt-Ovoo	6	6	20
TOTAL		55	48	200

Table 2. The number of herders' movement in relation to year and ecological region.

Average number of movements (annually)		*n*	mean	*SE (±)*	F	*p*
2010	Desert steppe	98	2.89	0.17		
	Steppe	56	1.64	0.16	24.7	<0.001
	Forest steppe	45	1.51	0.14		
2011	Desert steppe	105	2.94	0.12		
	Steppe	56	3.73	0.15	7.1	0.001
	Forest steppe	45	3.00	0.13		
*Year*regional geographic location interaction*	Desert steppe	203	1.29	0.02	29.08	<0.001
		112	1.21	0.04		
	Steppe	90	1.11	0.03		

Table 3. The number of movements in relation to CBRM and non CBRM herders.

Average number of movements (annually)		*n*	mean	*SE (±)*	*Year* CRBM organizational interaction* F	*p*
2010	CBRM	77	2.03	0.195	5.6	0.01
	non CBRM	122	2.53	0.129		
2011	CBRM	80	3.25	0.140		
	non CBRM	126	3.05	0.109		

Table 4. The distance of herders' movements in relation to year, ecological region and CBRM type.

Interaction to year, regional geographic location and CBRM type			*n*	*mean*	*SE (±)*	F	*p*
2010	Desert steppe	CBRM	55	60.2	30.8	3.01	0.001
		non CBRM	38	113.3	40.9		
	Steppe	CBRM	56	51	31.5		
		non CBRM	37	35.8	43.1		
	Forest steppe	CBRM	25	47.6	9.7		
		non CBRM	19	33.8	56.7		
2011	Desert steppe	CBRM	59	76.2	42.7		
		non CBRM	40	78.5	41.9		
	Steppe	CBRM	59	81.1	19.2		
		non CBRM	38	52.4	40.3		
	Forest steppe	CBRM	25	90.4	34.5		
		non CBRM	19	37.7	53.4		

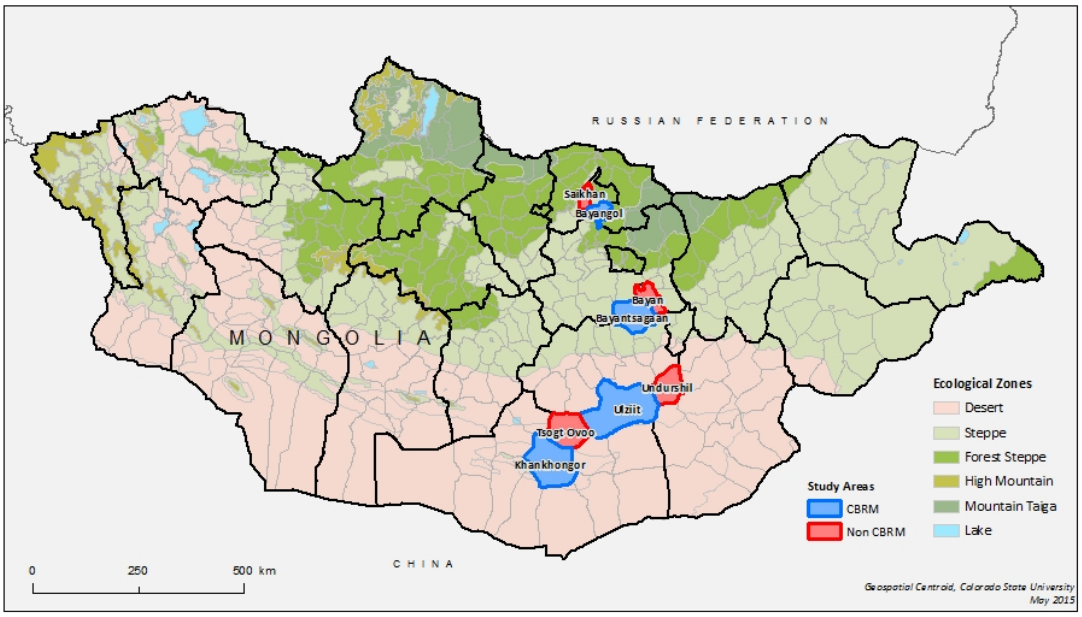

Figure1. Location of the eight paired *soums* with CBRM and non-CBRM grazing practices, located in the forest steppe (Saikhan and Bayangol *soums* of Selenge *aimag*), steppe (Bayan and Bayantsagaan *soums* of Tuv *aimag*) and desert steppe regions (Ulziit and Undurshil *soums* of Dundgobi *aimag*, and Tsogt-Ovoo and Khankhongor *soums* of Umnugobi *aimag*). [Map from MOR2]

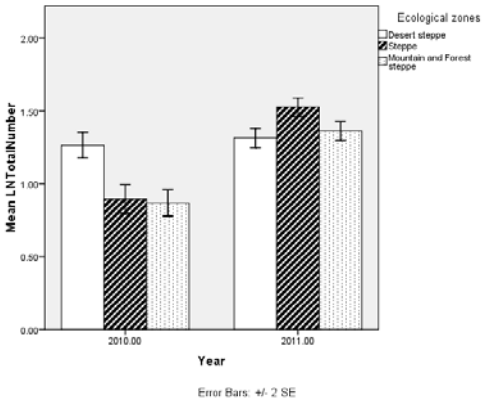

Figure 2. The number of movements in different ecological regions, in 2010 and 2011.

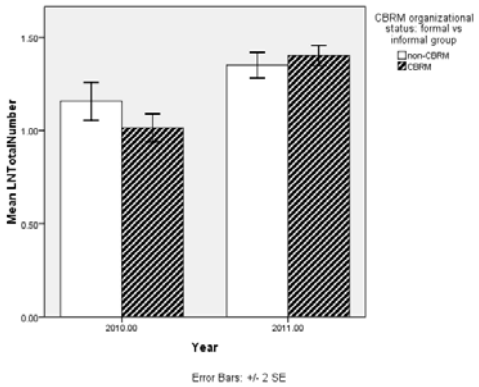

Figure 3. Comparing, in 2010 and 2011, CBRM herders' and non CBRM herders' number of movements.

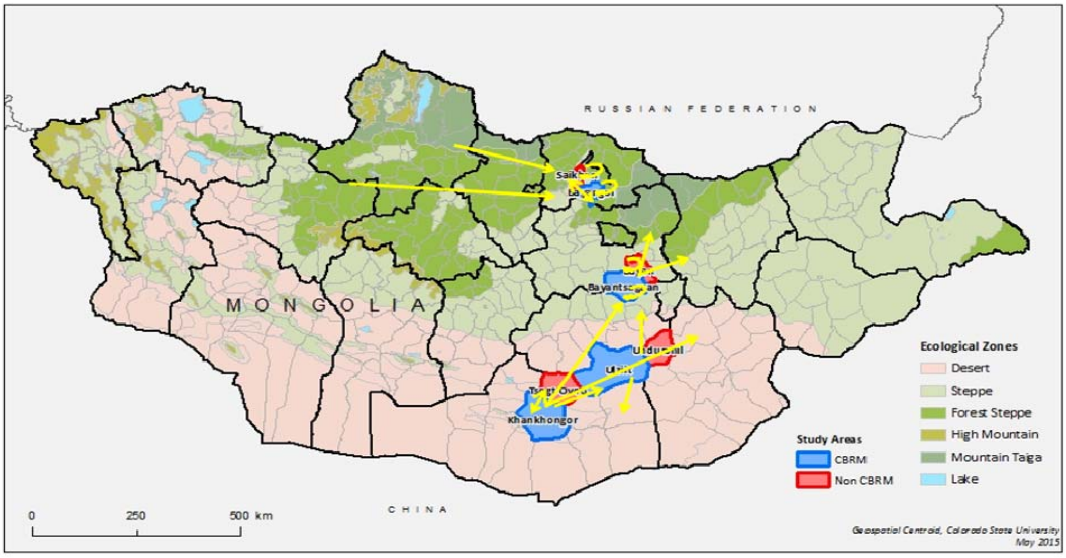

Figure 4. Movement directions of herders in forest steppe, steppe and desert steppe regions. [Map from MOR2]

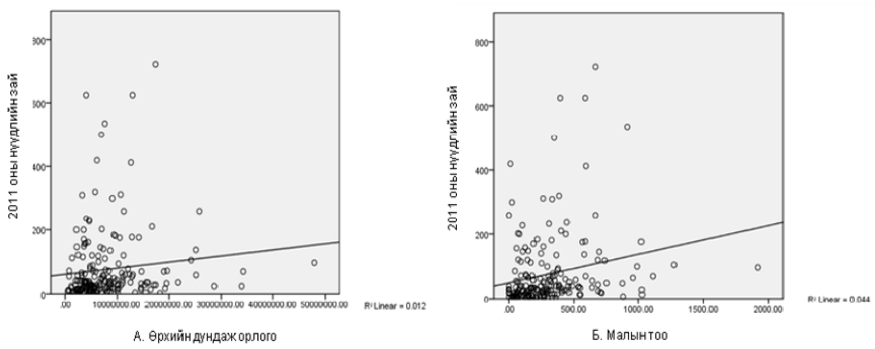

Figure 5. Relation between herders' movement distance in 2011 and a) household income, and b) livestock number.