LCLUC Abstract

Title: **Consequences of institutional change: land-cover dynamics in Kazakhstan 1960-2000**

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Kazakhstan is the largest of the Newly Independent States (NIS) that formed following the Soviet Union's collapse. At 2.7 million square kilometers, Kazakhstan is nearly four times the size of Texas and more than one-third the size of the conterminous US. The country is mostly rangeland: almost 70% of the land area is grazed by cattle, sheep, goats, and other livestock.

Since the abrupt institutional changes surrounding the disintegration of the Soviet Union in the early 1990s, the Kazakhstan region has undergone extensive land-cover changes. A recent official study suggests two-fold decreases in agricultural lands and state holdings and a nine-fold increase in settled areas. Marked decreases in livestock and meat production accompany increases in productive rangelands, as measured by vegetation indices, suggesting that institutional change and its socio-economic consequences are primary drivers of the region's land-cover change. However, few details are known about the pace or extent of land-cover change, due to the collapse of regional environmental monitoring networks in the early 1990s.

We propose to reconstruct the pace and extent of recent land-cover change in the Kazakhstan region and to place this episode within the larger context of climatic variability and landscape dynamics since 1960. We shall use a multi-resolution approach to model the spatio-temporal dynamics of rangeland production. At the broadest scale, we shall use standardized 8km AVHRR image time series since 1982 in conjunction with regional 1km direct readout AVHRR data since 1995 and MODIS data since 1999 to establish patterns of seasonal and interannual variability. We shall focus on local land-cover dynamics in five areas of interest using RESURS, Landsat MSS, TM, and ETM imagery. Corona declassified intelligence satellite photos from 1960-1972 will be used to track development in Almaty, Baykonyr, and Semipalatinsk.

This work builds upon significant prior work by the PI and Kazakhstani collaborators. Products from this research will include a library (available on the Web and as CD-ROMs) containing the assembled image time series and corresponding spatio-temporal analyses, including the "landscape trajectories" and "coordinate constellations" that capture land-cover dynamics in Kazakhstan at multiple resolutions using archived standard image products.