Edward Copenhaver, PA School for Excellence in the Ag Sciences
Upper Saint Clair High School, Pittsburgh, PA
Mongolia, #7: Animal Agriculture

Overgrazing in Mongolia

Mongolia is a landlocked country in north-central Asia. It is the second largest landlocked country in the world, at around 603,909 square miles (around 1.56m square km). Mongolia's geography is very diverse; it has upland steppes, deserts, and semideserts. Mongolia's western and northern regions contain high mountain ranges that alternate with lake-dotted basins. Mongolia can be considered as largely a plateau, with an average elevation of around 5180ft (1580m) above sea level. Nearly three-fourths of its area is pastureland. Mongolia has a marked continental climate. It experiences long cold winters and cool-to-hot summers. It also experiences winter storms called dzuds, severe winter storms preceded by a dry summer, that cause damage on a large scale. In 2025, it was estimated that Mongolia had a population of around 3,569,000 people. Mongolia's small population and large size leads it to have one of the lowest average population densities in the world (Britannica, 2026). In part because of Mongolia's low population density, many of its citizens practice nomadic herding and are therefore reliant on animal agriculture.

The average family size in Mongolia varies. However, most families have between three to four members. The majority of households, at 62.3%, are nuclear households, where two parents live with their dependent children in one residence. The second largest type of household, at 24.9% are extended family households, which can house many generations under the same roof. Due to Mongolia's harsh climate, most meals are centered heavily on meat and/or dairy products, making animal agriculture key to Mongolia's food system. Most other foods, such as vegetables, have to be imported from other countries. Mongolia has compulsory primary education and secondary education. 92.5% of those aged ten or older have at least a primary education. Mongolia has a relatively high literacy rate, with 98.3 percent of everyone aged fifteen or older being literate (National Statistical office of Mongolia, n.d.). Additionally, around 31% of the population has at least a Bachelor's degree, which can be considered high compared to the surrounding regions (WorldData.info, 2026).

Mongolia, with a life expectancy of 70 to 72 years, provides free, universal healthcare to its citizens. However, as explained by the Borgen project, although access to healthcare is free, it is not guaranteed. There is an insufficiency of basic healthcare services within certain facilities (Forsyth, 2023). Health services are offered at three different levels. These levels denote the type of care one could receive in a specific place. Primary health is provided by family health centers, district hospitals, and inter-district hospitals. Primary healthcare is the most basic type of healthcare. It focuses on disease prevention (vaccination), health maintenance (checkups), and early diagnosis. Secondary healthcare is served by rural hospitals and private clinics. Secondary healthcare involves specialized medical expertise for specific conditions (cardiologists, dermatologists, etc.). Tertiary care is served in multi-specialty central hospitals, as well as specialized centers in the capital city of Ulaanbaatar. Tertiary care focuses on complex treatments and major surgeries (neurosurgery, cardiac surgery, etc.). It can be difficult for many who are in rural areas to access healthcare services, as much of Mongolia's infrastructure is concentrated near the capital city. Around two-thirds of Mongolians live in cities and urban areas. The other third lives relatively nomadic lifestyles as herders ("The Last Nomads", 2023). These nomadic herders live in traditional Mongolian dwellings called gers (yurts) and move several times a year in order to find new pasture.

Because only around 1% of Mongolia's land area is suitable for growing crops, nearly all farmers have to raise livestock. (Britannica, 2026). Herders raise many different types of animals. The five most popular are known collectively as "The Five Snouts" (Self, 2025). The first is horses, which provide transportation, herding, and fermented mare's milk (a national staple). The second kind of animal is sheep. Sheep provide wool and skins, and are the nation's primary source of meat. Third are camels. They serve as pack animals and help move cargo across harsh terrain. Fourth are yaks. They are used for heavy labor and transport. Yaks also provide milk and leather. The fifth animal, goats, have become one of the most important animals to modern-day herders. This is because goats produce cashmere, which can be sold for a profit due partly to high global demand. Cashmere is important because it serves as the main source of hard currency for herders (Strode, 2019). Also, cashmere is non-perishable and has a high value to weight ratio. This makes cashmere important for herders who live miles outside of the nearest population center, as they can travel for a time before having to sell their wares in a city. Cashmere comes from the soft undercoat of a goat. There are different strains of goats that each produce slightly different kinds of cashmere. While the cashmere itself can vary, the harvesting process is mainly the same. Farmers use large combs to pull loose fibers from a goat's undercoat. Pastureland is the main source of nutrition for most livestock, including goats being raised for cashmere. In Mongolia, while animals are owned privately, nearly all pastureland is owned by the government for communal use. This means that herders do not own their farmland, but instead use communal land and move around according to the season and the needs of their herds. Commonly, herds winter in low-lying areas. The terrain helps to protect against the harsh winter weather. Then, in summer, the herd is moved to higher, mountainous areas (Suitte, n.d.). These mountainous areas generally receive more precipitation in the summer than other areas of the country, and are therefore more likely to have good pasturelands.

There are many barriers facing nomadic herders in Mongolia. One such barrier is water access. Water is a key resource with regard to herding. However, water access is limited in much of the country. One reason for this is the poor state of wells in Mongolia. This is highlighted through the fact that although in the years 1990-1997 600 new wells were sunk, 12,800 remained unusable (Suitte, n.d.). This lack of water has left nearly 10,700,000 hectares of pasture unusable. Another barrier facing the typical family is transportation. While the capital is connected to nearby provincial centers with paved roads, much of the road system is unpaved (Britannica, 2026). During spring thaws or heavy summer rains, these unpaved roads can become dangerous or even unpassable. This limits many people's access to vital services, markets, pastures, and wells. Thirdly, the climate presents barriers to food production and market access. Severe winter storms, such as a dzud, can physically block access to markets. Dzuds present another problem: the snow and ice from a dzud can cover much of the ground and limit what is available for livestock to eat.

Although Mongolia faces many agricultural challenges, one of the largest challenges is overgrazing of pastureland. This issue is nearing critical levels and is worsening every year. According to the United Nations, 70% of Mongolia's pastureland is degraded to some degree, with 23% being severely degraded as of 2021 (Kharkhuu, 2023). Additionally, Mongolian livestock levels have surpassed the carrying capacity of the land by about 2.6 times as of 2022.

Overgrazing causes and contributes to many different issues faced by Mongolia. Firstly, overgrazing removes the protective vegetation layer that helps to keep soil in place. Without roots to bind soil together, wind erosion accelerates. This wind erosion leads to violent sandstorms that can cause damage nationwide (Han et al., 202l). Secondly, overgrazing can lead to a reduction in plant diversity and total above ground biomass (Karpinski et. al, 2023). Because of this, many herders must seek new pastureland for their flocks. When seeking new pastureland, herders often move into land once reserved for wild

animals. This forces the wild animals off the land and makes them vulnerable to disease and starvation ("Mongolia's wildlife at", 2024). Thirdly, overgrazing and soil degradation reduce the soil's ability to absorb and hold water. This is disastrous, as Mongolia already receives very little precipitation (around four inches annually in deserts to around fourteen inches annually in northern mountains) (Britannica, 2026). The reduced ability of the soil to absorb and hold water creates a vicious cycle in which pastureland is overgrazed and then grazed again before it has time to recover. Lastly, overgrazed pastures leave livestock without any 'emergency' standing hay for winter (Altansukh et. al, 2024). When a dzud occurs, millions of animals die due to a lack of fodder. This is compounded by the fact that, during the spring thaw, these decaying animal carcasses can contaminate already vulnerable water sources. Additionally, because livestock are the herders' main form of sustenance, when these livestock are killed, many herders are left without a way to earn a living. This forces the former herders to migrate to cities to look for work. The sudden influx of people to cities increases the strain on social services and urban infrastructure, and leads to an increase in those living in poverty in urban centers.

Because many of Mongolia's issues stem from overgrazing, reducing or eliminating overgrazing is a priority. A solution that can be implemented at low cost by a typical family is the reduction of herd size. If fewer animals are grazing, then there would be less stress on pasturelands. More importantly, reducing herd size makes it easier for herders to maintain optimal grazing pressure. Optimal grazing pressure is important, as a 2020 study found that soil infiltration rate increased by 33% and soil loss decreased by 78% when optimal grazing pressure was applied (Sone et. al, 2020). The soil infiltration rate and soil retention help pastureland regrow more quickly. Managing grazing pressure can be difficult, but even reducing herd size by a few can make it much easier. As a bonus, smaller herds are much easier to house and feed through winter. In order to reduce herd size and still make a living, herders will need to focus on quality over quantity.

One strategy for herders to focus on quality over quantity is leveraging their reduced feed demand and supplementing cashmere producing goats' feed during the cashmere non-growing period (late April/early May to late July/early August). A study conducted in 2023 found that cashmere goats with a fasted live-weight gain of 5-10kg during the cashmere non-growing period had an increased cashmere yield of 17.10% and an increase to staple length by 8.09% (Zhang et al., 2023). This means herders can increase both the quantity and quality produced by each animal if the right measures are taken.

While focusing on quality can help herders improve their income, the resulting reduction of grazing pressure helps degraded rangelands recover. A study published in 2021 found that an increase in grazing pressure correlates with a decrease in net primary production (NPP), a decrease in soil conservation (SC), and an increase in soil wind erosion (SL). NPP is the total amount of carbon absorbed by plants through photosynthesis, minus the carbon that is released through cellular respiration. In this study, NPP is used to measure plant growth, grassland biomass activity, and overall ecosystem health. SC is used to measure the capacity of vegetation cover and roots to hold soil in place, and thus prevent degradation. SL is the estimated weight of topsoil eroded and carried away by wind. Also important to this study is the grazing pressure index (GPI). GPI is a number from 0-1, with 0 meaning no grazing, and 1 meaning total vegetation depletion. This study found that when grazing pressure increases by 0.1, NPP decreases by 0.02 kg C/m^2, SC decreases by 34.72 t/ha, and SL increases by 0.15 kg/m^2 (Li et al., 2021). This study was conducted in the Xilingol typical steppe, which is similar to Mongolia. Therefore, it is logical to conclude that a decrease in grazing pressure would improve the health of Mongolia's rangelands.

Some financial incentives have been created in order to push herders in this direction. However,

additional incentives are needed to encourage a reduction in herd size. One financial incentive that could be created is a tax reduction. Those who focus on the quality of their livestock and reduce their herd numbers will receive tax breaks. Most importantly for this approach, herders can join cooperatives that help them secure better pricing and reduce income volatility. To augment this, Mongolia started to facilitate investment loans for cooperative member herders ("Key legislative updates", 2024). These loans can be used to buy better stock, purchase new processing equipment, and therefore increase herd quality. Through legislation, funding, and determination, Mongolia can better sustain its agriculture for generations to come.

In order to complement the above solution, the existing Mongolian digital infrastructure can be leveraged to both monitor pasture health and help herders maintain optimal grazing pressure. To accomplish these goals, an app could be created. This would be an official government app that could be easily downloaded onto a mobile device. Importantly, this app would function as a survey, with herders responding whenever information about their herd or grazing practices changes. First, a herder would put in information including but not limited to: herd composition, number of each animal, grazing location, and the date grazing began at that location. After this information would be entered, the app would then use historical meteorological and satellite data to determine how long a herd could sustainably graze in a certain location. In addition to being beneficial to herders, this app would also serve as a source of valuable data for studying pasture degradation and regrowth. This approach could be successful for two reasons. Firstly, as of 2019, ninety-four percent of the rural Mongolian population had at least one mobile phone. Secondly, as of 2020, nearly 100% of individuals in Mongolia live in an area covered by a 3G network, allowing them access to mobile internet (Fluhrer and Kraehnert, 2023). This high rate of technological adoption means that the app could reach many different people in many different parts of Mongolia.

While developing this app would be no easy task, there are many groups already working in Mongolia that could help with this app's development. One such group is the Global Green Growth Institute (GGGI). This institute has worked with the Mongolian government before, and could partner with the Mongolian government again to develop this app.

Mongolia is very vulnerable to the ravages of climate change and unsustainable grazing practices. Infrastructure degradation, desertification, and overgrazing have culminated in a time of crisis for the people of Mongolia. Soil is being eroded, wildlife is being endangered, and herders' lives and livelihoods are continually at risk. However, through internal reform at the national level and the help of outside organizations, Mongolia can exit this age of plight and return to its status as a steward of the Earth.

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