

MONGOLIAN DZUD

Threats to and Protection of Mongolia's Herding Communities

By Allison Hailey Hahn

In far western Mongolia, it hadn't rained since July 2015. The cattle, goats, sheep, and camels that families rely on were growing thin, and as winter began to set in, herders were fearful that they might face a *dzud*, a severe kind of winter storm in which many animals would die. By November, the *dzud*'s heavy snowfall had begun, making it hard for the livestock to reach and eat the grass. Temperatures soon dropped below -50 degrees Celsius/-58 Fahrenheit, putting humans and livestock at risk of freezing to death, and the herds at risk of suffocation as they slept in piles in an attempt to stay warm. When aid workers arrived with food and medical supplies, they met herders such as Bayankhand, who had already lost 450 of her 700 animals.¹ She worried that her family, like those around her, might lose all their animals in the storm. This loss would spell economic and financial disaster for the family, as all their food and much of their income is derived from their herd. Bayankhan's family survived the 2015–2016 *dzud*, but they were still at risk in the spring, as her animals only had a few months to recover before another *dzud* arrived in 2016–2017.

Dzuds (the *d* is silent, *z* is long, and *ud* pronounced as the *ud* in *udder*) have affected Mongolia throughout history. These winter storms are a combination of deep cold, strong winds, heavy snow, and ice. Storms have been fierce enough to freeze entire herds overnight and the snow so deep that it causes flash floods in the spring when it melts. Today, climate scientists argue that these storms are increasing in both intensity and frequency, threatening pastoral nomadic communities who raise cattle, sheep, yaks, horses, cows, and camels across the Mongolian steppe. Traditionally, pastoral-nomadic herders have utilized a migration pattern known as *otor* to respond to *dzud*. *Otor* is still a common coping strategy, alongside fodder reserves, using cell-phones for advanced warning systems, and international aid.

This combination of preparations and services can't prevent a *dzud* from occurring, but can mitigate the storms' impact on Mongolian herders.

Mongolian Herding

One third of Mongolians are pastoral-nomads who migrate seasonally with herds of sheep, goats, cattle, camels, horses, and/or yaks. These herders support their immediate families who rely on herders for access to meat and milk, as well as for keeping their pastoral-nomadic traditions alive. Oftentimes, herders keep their wealth in their herd, meaning that they do not have much cash on hand but have a good deal of wealth in their livestock. These herd animals can be sold in times of need, can be used to back a loan, and can be milked or slaughtered to feed a family. This system of keeping family assets in the herd works well when the weather is predictable or stable, but puts herders at great risk during a *dzud* when many or all their animals might die on a single day or over the period of a week. Such storms can take a family from a position of stability to one of poverty.

What Is a Dzud?

Dzuds are a type of severe winter storm during which temperatures fall below -46 degrees Celsius/-50 Fahrenheit. Mongolians use five terms to distinguish between different types of *dzud*²:

Tsagaan dzud: A white *dzud* identified by deep snow. This makes it difficult for herders to reach their animals and difficult for herd animals to walk long distances. When the snow melts, pasturelands are at risk of flooding or being oversaturated with water and turning to mud.

Khar dzud: A black *dzud* identified by harsh cold but no snow. This kind of *dzud* is dangerous during the storm, as humans and herds can freeze from exposure to the storm. *Khar dzuds* also produce problems in the spring when there is no snow to melt, and therefore



2012 in Ulziit, Uvurkhangai, Mongolia. A herder rides out to collect his animals during a *dzud*. Source: © ZUMA Press, Inc. / Alamy Stock Photo.

WHILE DZUDS WERE ONCE PREDICTED TO OCCUR EVERY EIGHT TO TWELVE YEARS, THEY ARE NOW EXPECTED EVERY OTHER YEAR.



Screen capture from *Protecting Mongolian Herders from Climate-Related Losses*. With over ninety miles to go, herders try to move their herds of cattle, yaks, and sheep to safer pasture during a dzud. Source: World Bank video on YouTube at <https://tinyurl.com/y9ubvpot>.

grasses are not properly watered and streams are not fed. This often produces a springtime drought.

Tumer dzud: An “iron” dzud, identified by impenetrable ice. This dzud begins with a lot of rain followed by a sudden temperature drop. The soil becomes waterlogged by the rain and freezes into a soil layer both above and below ground. This ice is impenetrable by animals, which are unable to reach water sources and cannot eat, as both the grasses and reserve fodder are covered in several inches of ice. This ice also makes for dangerous travel conditions and creates flooding when it melts.

Khuiten dzud: A “cold” dzud typified by a combination of high-speed winds and deep snow. These winds combined with snow make it impossible for herders to see even a few feet in front of themselves. Herders have lost animals in this kind of storm, and at times, herders themselves have become lost and frozen to death.

Khavsarcán dzud: A combined form of dzud, in which deep snowfall is accompanied by a sudden temperature drop. This kind of dzud often occurs suddenly, catching herders and their animals far from home. These herders often have trouble making it home and suffer severe frostbite and the deaths of animals along the way.

Dzuds have occurred throughout Mongolia’s history. However, they have become increasingly common in the last 100 years. Historic records indicate that there were fifteen dzuds that occurred in the eighteenth century, thirty-one in the nineteenth century, and forty-three in the twentieth century. While dzuds were once predicted to occur every eight to twelve years, they are now expected every other year. In the last two decades, six dzuds have occurred.

In addition to increased frequency, dzuds have also become larger. While they once affected regions of Mongolia, they now affect wide swaths of land. For example, in 2006, the dzud affected 80 percent of the country. This puts extreme pressure on Mongolia’s developing economy, as it can take years for herders to rebuild following a storm. The effects of these storms are made even worse when dzuds occur over a series of years, giving herders only a few months of spring and summer before they are again at risk of storms.

How Are Herders Affected by Dzuds?

Herders who are affected by dzuds must take care to revive their remaining livestock in the spring. The weaker animals will have died during the



Livestock covered by snow during Mongolia’s long, harsh winter (dzud) in 2010. Source: United Nations Development Programme, Mongolia Flickr page at <https://tinyurl.com/yb62plq4>.

storm, either from exposure to the fierce cold or from malnutrition. The animals that survive are often exhausted by the long storm and on the brink of malnourishment. Herd exhaustion is made worse if the animals were not at full strength during the preceding summer, when animals are fattened so as to survive the winter. If a spring drought precedes a dzud, more animals will die, and those that remain will be very weak. These remaining animals are likely to have fewer live births and are at risk of having offspring with birth defects in the spring. These births rebuild the herd, but if the birth rate is too slow, herders may still have to buy new animals to rebuild their herd before the next dzud.

While livestock often die as a direct result of dzuds, human populations seldom experience starvation or famine as a direct result of dzuds. For example, between 1940 and 2015, there were thirteen dzuds but only three famines in Mongolia. However, dzud do create food security risks. These problems occur because herding families are semi-self-sufficient. Most of their food is derived from meat and milk, both of which are dependent on a healthy herd. It is estimated that to be sustainable and feed a family, a herder needs to keep at least 200 animals. The size of this herd is usually maintained by animal births and through trading animals with neighbors. The family’s income is also supplemented by selling animals in regional centers and wool and hides at local markets.

DURING THE 1944–1945 DZUD, 8.76 MILLION ANIMALS, OR 32.2 PERCENT OF ALL HERD ANIMALS IN MONGOLIA, DIED.



Screen capture from *Protecting Mongolian Herders from Climate-Related Losses*. Herders of Darnad Valley in northern Mongolia move their yaks, cattle, and sheep during a dzud. Source: World Bank video on YouTube at <https://tinyurl.com/y9ubvpot>.

Dzud often reduce the herd below the 200-animal benchmark, and the exhausted animals are at times in too weak of a condition to have offspring or produce milk. Additionally, the family cannot risk butchering one of the remaining animals and cannot eat those animals that perished during the winter. As such, they have to begin buying their food from local markets. Families typically have some cash on hand from prior wool and animal sales, but those funds are limited and will not be replaced until the herd is rebuilt. Families prefer to keep these market purchases at a minimum and instead focus on rebuilding their herds. This is difficult, however, when an entire region is affected by dzuds and few animals are available for purchase. Rebuilding a herd has become more difficult as dzud frequency has increased.

This is why Bayankhand's family was so worried in 2015. They, like many herders, were on the cusp of losing their livelihood and way of life. If all the herd died, her family would have been dependent on foreign aid agencies for food assistance. If they were lucky, they might receive a cash grant to buy new animals; if they were unlucky, they might move in with relatives or find new jobs in Mongolia's illegal artisanal coal and gold mines. In an attempt to save as many animals as possible, many herders will forgo their own health or stay in distant pastures for long periods of time. For example, Doljin and her sister, herders in northwest Mongolia, stayed with their herd throughout the winter, isolating themselves from other Mongolians for five months. This isolation is common for dzud-affected herders, with a few male and female herders migrating to isolated pasturelands to protect their herds while other family members spend the winter in provincial and city centers. This migration (otor), when combined with a range of new technologies and services, can help herders successfully survive dzud.

Responding to Dzud: Otor

Each season, Mongolian herders must move their animals between pastures. This prevents the herds from overgrazing their pastures, as well as ensures that the herd has access to water. Herders do not randomly migrate. Instead, they follow the same migration routes as their ancestors. Neighboring herding communities also follow traditional migration patterns. This means that even though Mongolian herders do not mark their pastures with fences, everyone knows which animals should graze in which spaces. As a community, herders also decide on pastures to hold in reserve. Herders are not allowed to graze in the reserved land unless their traditional land is affected by a dzud or other environmental catastrophes such as flooding. These reserve lands are kept by the local community, but can be used by distant communities during storms such as a dzud.

When a dzud occurs, herders are able to migrate to the reserved lands, and it is special because of the distance that herders can travel. While herders usually stay within their own region or providence, during otor, they might migrate far away. This is necessary because dzuds often affect an entire region, including the reserved pastures. So herders on otor are migrating to access the reserve pastures of faraway communities that have not been affected by a dzud.

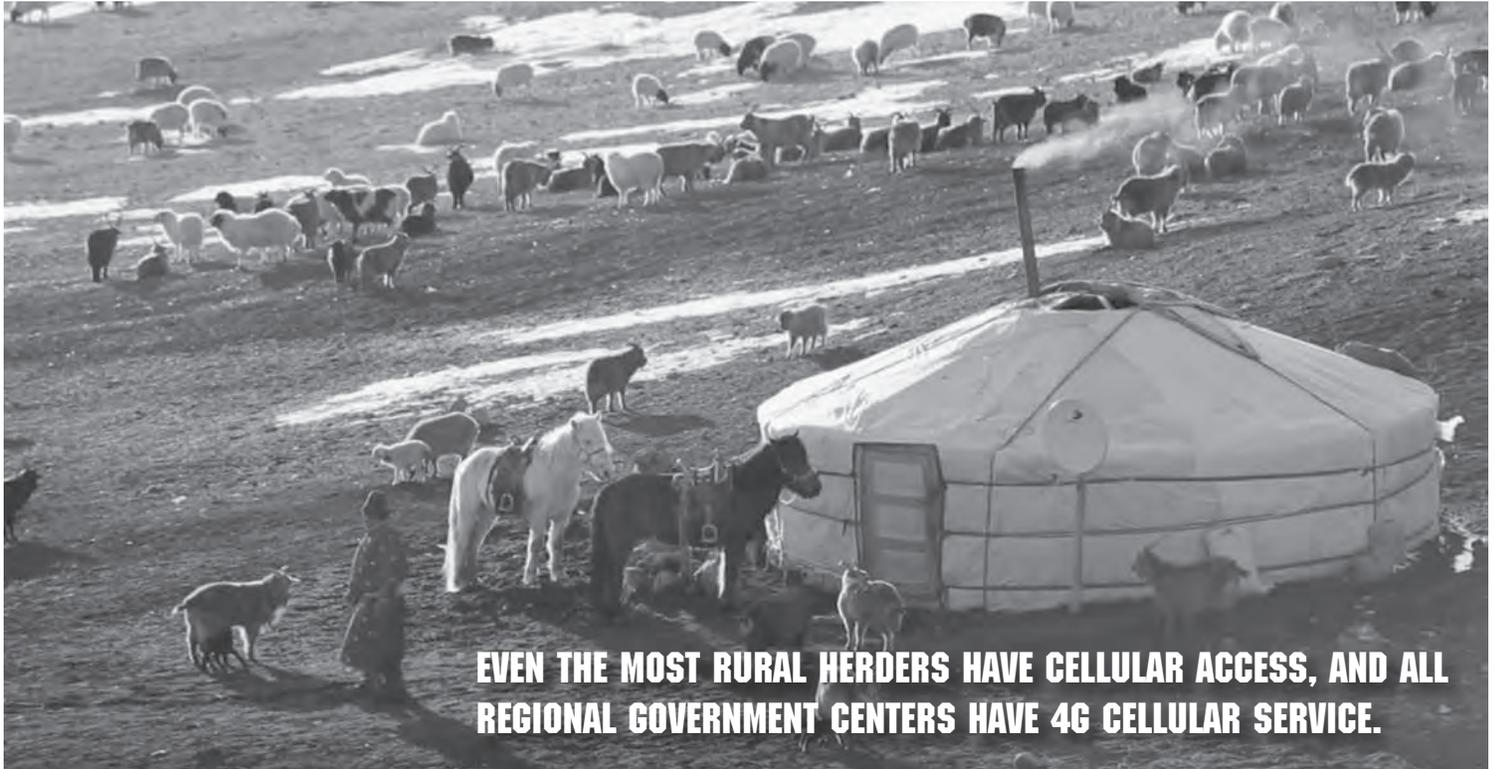
The decision of where to move on otor is also regulated by longstanding relationships among distant communities. These relationships ensure that herders can move between one community and another. They are supported by family connections, marriages, their long history, and more recently by agreements between local government officials of each community.

Modern Responses: Fodder

In addition to otor, Mongolia has established a network of fodder supplies that provide emergency food for affected herds. By providing fodder at the herder's home camp, the herd and herding family can be spared the difficult and dangerous otor. However, maintaining fodder reserves requires a lot of government preparation, support, and funding. The success of fodder reserves is proven when we compare the dzud of 1944–1945 and 1967–1968, two dzuds of comparable temperatures and severity. In 1944–1945, herders were only able to rely on otor. During that dzud, 8.76 million animals, or 32.2 percent of all herd animals in Mongolia, died. The fodder system was put into place and utilized during the dzud of 1967–1968. During this dzud, only 2.6 million animals, or 11.9 percent of the national herd, died.

In the 1960s, the fodder system worked very well but was dependent on funding from the USSR. Mongolia transitioned to democracy in 1989, around the same time that the USSR collapsed. At this time, funding for projects such as fodder reserves disappeared. As a result, during the dzud of 1999–2000, 25 percent of the national herd died, and national damages were estimated at US \$1 billion. During the 1999–2000 dzud, Mongolia applied for and received emergency international aid. However, even with that assistance, Mongolians were not able to fully recover before the dzuds of 2000–2001 and 2001–2002. This recovery was made difficult because Mongolia was going through many governmental and economic transitions. The dzuds complicated all these transitions by limiting travel, transportation, and food sources.

Because the dzuds of 1999–2002 occurred in such quick succession and had such large impacts on herders, some families decided to give up their traditional herding lifestyle. These herders sold their remaining



EVEN THE MOST RURAL HERDERS HAVE CELLULAR ACCESS, AND ALL REGIONAL GOVERNMENT CENTERS HAVE 4G CELLULAR SERVICE.

Screen capture from the SDC (Swiss Agency for Development and Cooperation) GG (Green Gold Project) documentary *Herders Successful Wintering the Dzud 2016*. Note the satellite dish on the yurt. Source: YouTube at <https://tinyurl.com/y7vs3o2w>.

animals and moved to cities to work in mines or factories. When they moved to the cities, many families indicated that they hoped one day, when the economy stabilized, they would return to herding. Those herders who decided to rebuild their herds often had to take out loans to buy new animals. This was a good solution after the first dzud, but has created a new cycle of economic insecurity as herders continue to lose animals in dzuds. The loan interest and repayment is often made by selling animals; herders have difficulty repaying their loans in years when a dzud has occurred and they have no animals to sell. To resolve this problem, the Mongolian government has been working with international organizations to develop new support mechanisms for these herders to better assist them during future dzuds.

Modern Responses: International Aid

Responding to dzuds is difficult because storms can suddenly affect large portions of the country. Local emergency workers are able to quickly respond, but they often have to care for their own herds, as well as coordinate relief efforts. Responders from farther away, either other regions of Mongolia or other countries, have difficulty getting to affected areas because roads are quickly covered by ice and snow. When aid arrives, it takes many forms. In addition to importing more fodder, aid workers bring food for humans and nutritional supplements. They may also bring emergency housing. This is necessary because *ger*, or herders' homes, can collapse under too much snow or be swept away in a flash flood when the snow melts. Some organizations also send psychologists or religious officials to help herders cope with the loss of their herds and resulting loss of income.

Many organizations focus on delivering immediate aid in the winter while the dzud is occurring. However, the need for assistance continues into the spring, when melting snow produces the risk of flash flood. Additionally, aid is needed to properly dispose of the millions of animals who have died during a dzud. If their carcasses are left in the pastures, they will spread diseases to both humans and herds, pollute the groundwater, and result in a putrid smell. These international aid programs come at a high cost, which is not always met. For example, in 2016, the United Nations

Development Program (UNDP) estimated that Mongolia would need US \$14.27 million to respond to the dzuds, but only US \$6.36 million was raised.³

In addition to aid that responds to a specific dzud, Mongolia is working with international organizations to plan long-term emergency response networks and protocols. Some of these protocols are designed to ensure that aid is quickly collected and distributed equally amongst affected communities. Investment has also been made in finding new ways to utilize rural communication networks to predict dzuds and mitigate the storms' impacts.

Modern Responses: Technology

Mongolia has a vast, well-equipped communication network. Even the most rural herders have cellular access, and all regional government centers have 4G cellular service. The government of Mongolia, along with international researchers and aid organizations, has been working to utilize this network to better prepare for and respond to dzud. One example is an early warning system, which alerts herders to oncoming dzuds. This warning allows herders to quickly bring their animals in from the pasture and, if possible, access fodder reserves. Health organizations, such as Save the Children, have also experimented with sending text messages providing information about child welfare for affected communities. And better connectivity allows government officials and emergency workers to better coordinate their emergency responses.

Future Dzuds

Climate scientists expect that dzuds will continue to effect Mongolia and that the storms may increase in intensity. By combining traditional and modern response mechanisms, Mongolian herders are determined to survive these storms and continue their traditional lifestyles. The results of these efforts have been seen in recent years, such as during the 2015–2016 dzud. As a result of quick national and international cooperation, 78,764 affected households across all twenty-one of Mongolia's provinces received support. This support assisted herders facing immediate needs, as well as helped them make the best use of the spring to rebuild their herds



HERDERS INDICATE THAT THEY ARE DETERMINED TO CONTINUE THEIR PASTORAL-NOMADIC TRADITIONS.

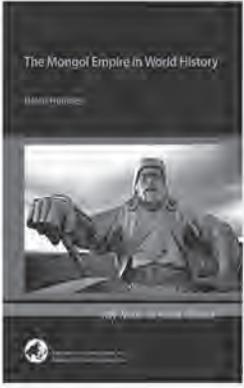
Screen capture from the SDC (Swiss Agency for Development and Cooperation) GG (Green Gold Project) documentary, *Herders Successful Wintering the Dzud 2016*. Source: YouTube at <https://tinyurl.com/y7vs3o2w>.

before another dzud struck in 2016–2017. Dzuds put families, such as those of Bayankhand and Doljin, at great risk. However, when interviewed by government officials and development agencies, herders indicate that they are determined to continue their pastoral-nomadic traditions. More dzuds are expected in the future, so herders, government officials, and development agencies are working hard to combine traditional methods and new technologies so that Mongolian herders can survive dzuds for generations to come. ■

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NOTES

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