Miling and Dairying

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Milking and processing dairy products constitute a major part of the everyday practices of Mongolian pastoralists, particularly for women. This ethnographic exhibit and film comparatively documents dairying practices among several pastoral households in both Gobi (desert) and khangai (forested steppe) regions of Mongolia. The selection of images is intended to show the variety of everyday activities involved in dairying: milking livestock camels, goats, and cattle; feeding livestock; and processing milk into curds and liquor. The exhibit includes images showing mobile and sedentary pastoralists, as well as a small-scale, semi-mobile dairy farm in the Gobi.

The first set of images depicts young women from two households – Enkhee (Figure 134 – Figure 155) and Jargal (Figure 127 – Figure 133) – milking camels in spring and summer. These sequences illustrate seasonal differences in camel milking practices, but also show the variable divisions of labour in camel husbandry. The following sequence depicts goat milking by Saraa and her daughter (Figure 156 – Figure 167), which contrasts with the images of milking by Oyunaa and her mother in the exhibit on "otor" (Figure 74 – Figure 98). In both cases, the milkers make opportunistic use of the labour of others who were visiting or temporarily resident. The images taken at Oyunaa's home include a depiction of her visiting mother, Dolgor, stitching a sack for straining curds, which is later put to use in making *khuruud*. San and Saraa draw on the support of Odsüren, who is a co-resident assistant herder at the time of these images being taken. The following set of images, taken on a separate occasion, shows Oyunaa making *bazmal aaruul*, a type of dried curds shaped in the palm of the hand (Figure 168 – Figure 169).

The second part of this exhibit depicts contrasting dairying practices in Yeröö sum of Selenge aimag. The first two sequences show small, sedentary households whose primary pastoral activity is milking cattle. Sainsana and Baigalia (Figure 170 – Figure 202) are a young couple who managed approximately twenty dairy cows, selling fresh milk to people in the nearby town centre. Tsagaan (Figure 203 – Figure 220) is a former State Farm official – serving at one point as its Deputy Director – who, like many other families in the Yeröö sum centre, kept a few milk cows in his yard for household subsistence. Both Sainsanaa and Tsagaan allowed their cattle to graze on public lands nearby, but provided hay supplements. Both households also benefitted from seed livestock programs operated by the local government: Sainsanaa's family had obtained several high-yield dairy cows, as support for young herders of moderate

means, whereas Tsagaan had been put in charge of an improved bull to be shared amongst several households in town. The next set of images shows Dolgorsüren and her family milking cattle, making aaruul, and distilling milk liquor (Figure 221 – Figure 305). Another retiree from the former State Farm, Dolgorsüren had moved to the country to keep cattle full-time. She kept extremely busy during the summer months processing dairy foods, some of which were sold, but the majority of which were destined for children and relatives.

The final set of images in this exhibit shows the operations at Delger Farm and dairy in Dornogovi (Figure 306 – Figure 380). As the principal supplier of milk and yogurt for school lunches in the town of Sainshand, the dairy processed approximately 80 litres of milk each day at the time these images were taken. Although the farm and dairy were considerably more specialized than the other pastoralists shown here, they shared many features of "traditional" pastoral production: livestock were managed primarily within a kin group; cattle were grazed in addition to stall-feeding; and some of the livestock were taken on *otor*, long-distance seasonal grazing, each spring and summer.

Although nearly all pastoral households in Mongolia milk at least one species of livestock, milking practices vary by region and by household. In a recent survey of pastoralists in five aimags I conducted with anthropologist colleagues at the National University of Mongolia,[234] we found that 53% of surveyed households milked goats, 44% milked yaks, 42% milked cattle, 16% milked mares, 13% milked camels, and 11% milked sheep (Figure 124). Of households who milked sheep and goats, 77–78% obtained milk from between 150 and 210 animals (Figure 125). Those who milked large livestock typically milked fewer animals; close to half of households who milked cattle and yaks milked only 1–5 animals, while hardly any households milked more than 17 animals of any species (

Figure 126).

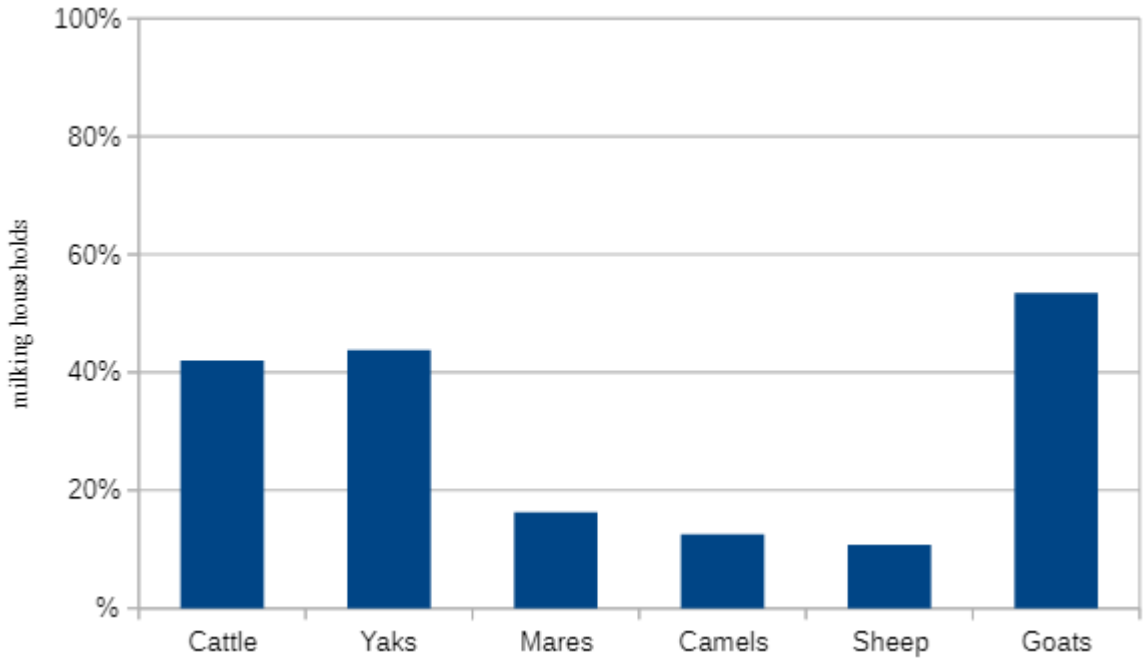

Figure 124: Percentage of pastoral households who milk each species of livestock. Source: Thrift et al 2015.

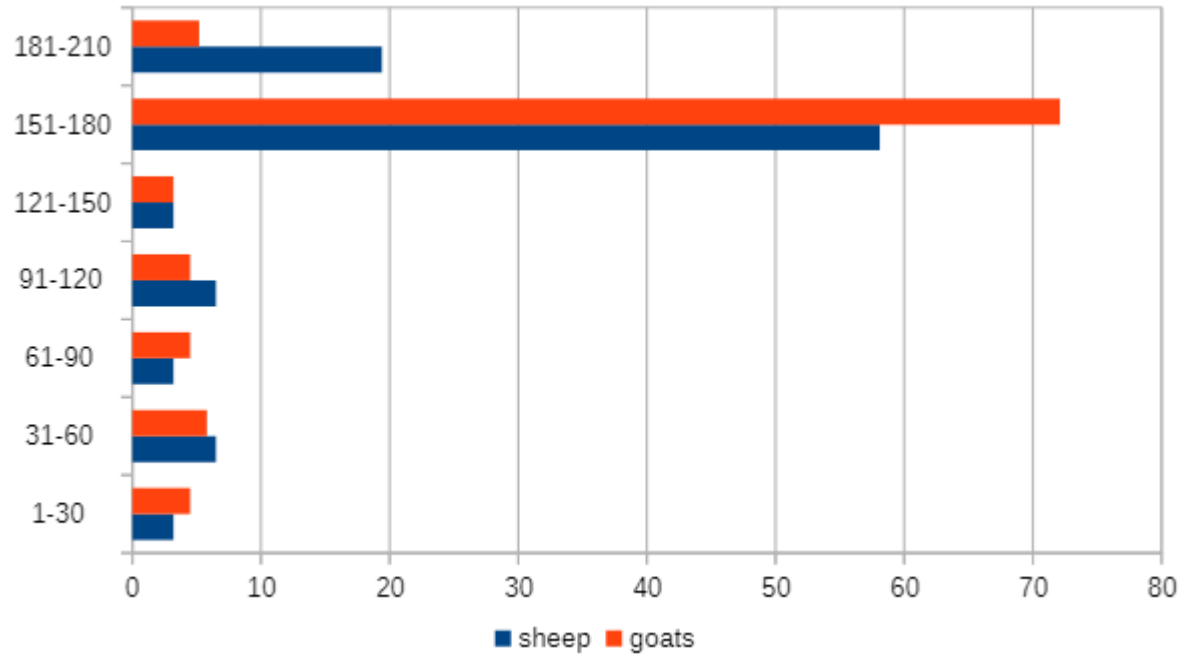

Figure 125: Number of sheep and goats milked, by percentage of surveyed milking households. Data source: Thrift et al. 2015.

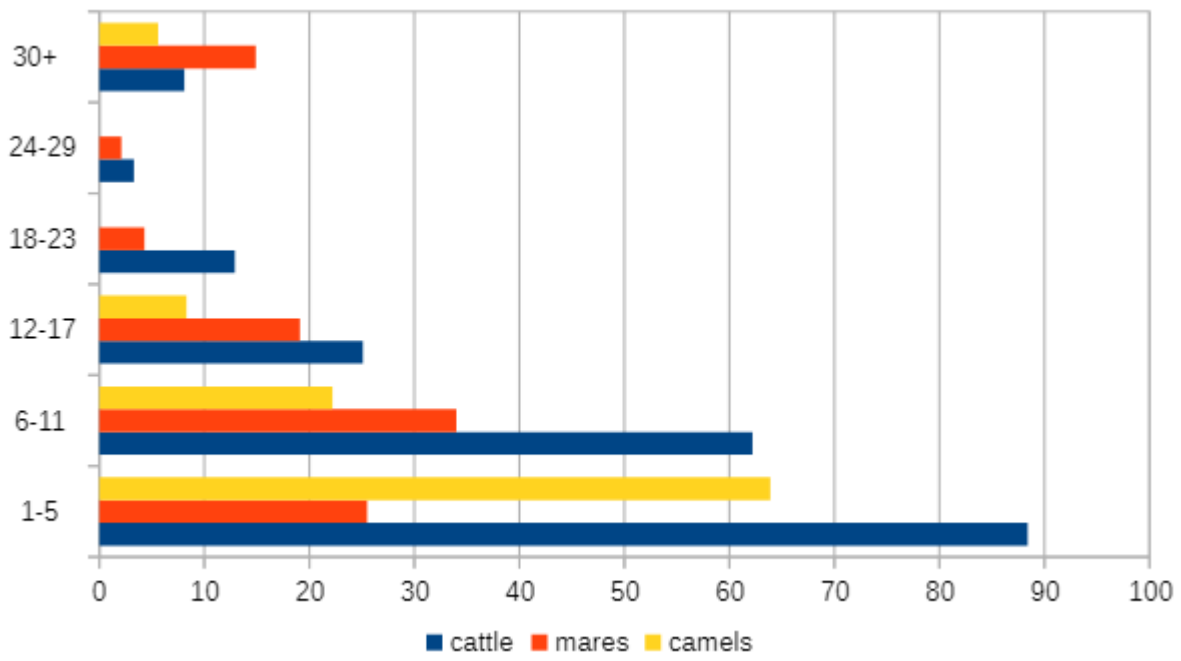

Figure 126: Number of cattle, yaks, mares, and camels milked, by percentage of surveyed milking households. Data source: Thrift et al. 2015.

Camels or cows that are being milked are generally tethered overnight along with their young, being released to graze nearby during the day. (Adult animals that are not being milked do not need to be kept near the home, but can be left to roam wherever the grazing is best – which might be dozens of kilometres from the herder's camp.) Milking large animals (cattle, horses, or camels) is often practised by a team of two – with one person handling the livestock, while the other does the milking. The livestock handler will lead each suckling animal to its mother, allowing it to suckle for a few moments before and after milking, and where necessary returning it to the enclosure or hitching-line afterwards. In some cases men will handle the livestock while women conduct the milking. But in many cases both the milking and handling may be done by a single individual – the principal drawback in this case being that the activity takes longer, since the milker must wait for each young animal to suckle, rather than having it brought to its mother while the previous animal is being milked. Many women only milk half the teats, allowing the calf to continue suckling from the opposite side of the animal as she draws milk into her pail (e.g.; Figure 149; Figure 127).

It is conventional to milk cows sitting on a small stool, but camels – being much taller – must be milked standing up, with the milker usually supporting the milk pail on her bent knee as she leans against the mother camel. Some of the women hobble one of the front legs of the aggressive camels to prevent them from moving away or kicking during the milking. In a few cases they lead the calf to its mother, but in other cases

they leave the calf tethered in a standing position, and the mother comes forward to give milk. The cattle milkers in both Selenge and Dornogovi often tied the rear legs, and sometimes the tails, of their animals in order to prevent the cow from kicking and knocking over the milk pail or from contaminating the milk with its tail (e.g.; Figure 184; Figure 227).

Several of the households with whom I collaborated in the Gobi milked goats rather than camels. Milking goats is much more work, but may be preferable if the family already keeps goats for their cashmere, and does not wish the added labour of managing camels. The images below show milking of goats during an evening visit to San and Saraa's place, about 30 km south of Khamar Monastery, as well as milking goats and making aaruul at Nomin and Oyunaa's place, while the family were on *otor* some 40 kilometres away from their normal camp near the Monastery. Goats can be milked within the livestock pen, with each animal released after it is milked (

Figure 74). Alternatively, the goats can be tied together in a line, using a long rope that is looped around each nanny goat's neck – a method known as *kholboj saakh*. The goats in this method stand still as the milkers proceed from one end of the line to the end, then are released at once by pulling on the end of the rope to undo the bindings (Figure 167).

As these photographs illustrate, milking activity varies seasonally. The livestock are typically milked both morning and evening during the summer, when they are lactating most heavily, and once a day during the autumn. But families needing less milk may elect to milk their animals once a day in summer – as Jargal does with her camels, below – or in rare cases, even three times a day – as is done at Delger Farm, with the cattle being milked in the field at noon.[235] Unlike cattle, camels can be milked year-round due to their two-year fertility cycle, providing fresh milk throughout the winter. Yet as it is not possible to produce cheese in cold weather, the women shown here collect a relatively small amount of milk in the winter – milking only a few animals once a day, in the morning – to be used in making tea and for producing *tsagaa* (fermented camel milk), which may be reduced to a thickened *butsalgaa*.

For some of the women shown here, milking livestock and processing milk took up to six or seven hours a day, while for others the work was far less involved. For most of them, the work was deeply embedded in networks of kin relations. Dolgorsüren was among those who spent much of her time dairying, though – as shown in the images here – the intense summertime work was shared with grandchildren, who sometimes took over from her completely. At the time we made these recordings, Dolgorsüren kept approximately 40 cows and 100 sheep and goats. Dolgorsüren's husband passed away at the end of 2012, leaving Dolgorsüren unable to handle the livestock by

herself. Rather than moving in with her daughter and son-in-law next door, Dolgorsüren chose to live on her own, depending on increased assistance from her children and grandchildren. Shortly after her husband died Dolgorsüren gave her sheep and goats to her daughter and son-in-law to manage, then in 2013 she sent most of the cows to winter with her son and son-in-law who were living in town, both of whom constructed winter shelters for the animals. She took over the livestock in summer, bringing them back to the country home and resuming the dairying activities once her school-age grandchildren had begun their summer vacation.

Jargal, in the Gobi, took at most only about an hour each day milking camels in summer, producing just enough *tsgaa* and *aaruul* for her own family. Unlike the cattle milkers in Yeröö, she milked camels throughout the year; nonetheless, the work remained relatively light: in the springtime sequence shown below, for instance (

Figure 127 – Figure 133), Jargal milked only three camels, which took approximately ten minutes. During a following visit, in the afternoon on a day at the beginning of July, she milked nine camels, taking 30 minutes, and filling up two pails of milk. Jargal often milked the camels alone, waiting as each calf suckled at its mother, though her husband Gantömör is seen helping out in the first sequence (e.g., Figure 131). As the camels were in fact herded collectively with the nearby households of Jargal's mother, sister, and two brothers, they were not always kept at Gantömör and Jargal's place. (On a subsequent visit the following autumn, the camels were not being milked by any of the families.) Jargal's sister Tümendemberel and her husband Batbayar, despite owning some of the animals, did not contribute significantly to the camel husbandry, but concentrated on managing dairy cattle.

The images in the final series were taken at Delger Farm and Dairy, showing a semi-intensive form of production. The farm is located about 30 kilometres outside of the aimag centre, close to Khamar monastery, while the dairy is situated in the town of Sainshand. Delgersaikhan and Altantsetseg established the dairy in 2010, drawing on a small business loan. They began their operations with just two cows, which they increased to a herd of more than twenty within the first two years of business. Most of the cows were specialized dairy cattle, or hybrids obtained using dairy bull semen, which they imported from China.

While a portion of any family's fresh milk will typically be used for milk tea (*süütei tsai*), most pastoral families in Mongolia obtain much more milk than is necessary for immediate consumption. Milk can be preserved by several processing methods. For short-to-medium term consumption, milk can be fermented to produce drinkable yogurt (*tarag*) or koumiss-type beverages (*khoormog*, *airag*). For longer storage, the milk can be curdled, strained, pressed, and dried to produce a variety of cheeses – mainly *byaslag* (high-moisture cheese made from curdled *tarag* yogurt), *aaruul* (very

hard, low-moisture cheese made from curdled *airag*), and *eezgii* (hard curds that have been cooked in whey). As a side product of the curdling process, many families also capture the distillate of heated curds, in the form of milk liquor – known as *shimiin arkhi* ("liquor of [milk] essence"), *mongol arkhi* ("Mongolian liquor"), or *nermel* ("distillate"). These dairy foods become a major element of the economy of reciprocity.

Exhibit

Camel husbandry at Gantömör and Jargal's winter camp (2012-02-16)

Figure 127: Carrying her milk bucket, Jargal walks over to the tethering-line, where the camel calves are tied down to prevent them from joining their mothers. Jargal unties the camel at the end of the tethering-line.

Figure 128: Jargal leads the untethered camel to its mother.

Figure 129: Jargal waits as the calf suckles. At her feet is a pile of gathered camel dung, which she and her husband will use for fuel.

Figure 130: Jargal milks the camel.

Figure 131: Gantömör shows up and helps with the binding of the camels' legs.

Figure 132: Gantömör hitches a camel calf after the milking.

Figure 133: Gantömör drives the adult camels off to graze.

Milking camels at Noogii and Enkhee's place (2012-06-30)

Figure 134: Enkhee has sighted the camels coming home from over the hill; she has gathered two milk pails from inside the yurt in preparation for the milking, and heads outside with her two nephews.

Figure 135: Enkhee stands waiting waiting for the adult female camels to arrive for the milking. She has sent her young nephew, who is staying with her temporarily, off to hurry the camels towards the home.

Figure 136: The camel calves, which have been left tethered close to home, sense the arrival of their mothers.

Figure 137: Enkhee and Nar-Od continue to wait.

Figure 138: One of the adult camels arrives, but does not approach its calf.

Figure 139: Enkhee approaches the camel, carrying her milk pail.

Figure 140: Enkhee pulls the camel by its neck towards the calf. This camel has a blue scarf (khadag) around its neck, which is a seter or mark of a sanctified animal that will not be slaughtered. Several camels at Noogii and Enkhee's place, belonging to Khamar Monastery, had recently been sanctified as offerings for the health of the Dalai Lama, as I learned later from Altangerel. On this occasion I ask Enkhee about

the reason for the sanctification; she jokes that she is not too sure – all she knows, she says, is that the lamas came, read some prayers, and then left!

Figure 141: Enkhee pulls the mother camel around and towards the calf, which is trying to suckle.

Figure 142: Enkhee binds the rear legs of the mother camel.

Figure 143: Enkhee milks the camel.

Figure 144: Enkhee continues milking the camel, as the calf suckles the teats on the other side.

Figure 145: Having finished milking the camel, Enkhee unties the binding on its rear legs. The infant camel continues to suckle.

Figure 146: Enkhee heads off to milk the next camel.

Figure 147: The milk obtained from one camel.

Figure 148: Enkhee binds the legs of another camel, as its calf suckles. This calf has also been consecrated.

Figure 149: Enkhee milks the camel.

Figure 150: Enkhee pours the milk from the milk pail into a second pot.

Figure 151: The camel calf suckles.

Figure 152: The milking is complete, and everyone heads back inside.

Figure 153: Enkhee pours the milk into a plastic barrel containing tsagaa (fermented camel milk).

Figure 154: Enkhee places the lid on the plastic barrel. There is a hole punched in the centre of the lid, which she places over the handle of a plunger inside the barrel.

Figure 155: Enkhee churns the tsagaa several times with the plunger.

Milking goats at San and Saraa's place, Dornogovi (2012-09-06)

Figure 156: Saraa prepares her leather laces and ropes for binding the goats to be milked.

Figure 157: Odsüren, a relative who is staying with the family as a hired hand, rounds up the goats.

Figure 158: Saraa ties the goats together in a long line, facing one another in alternate directions, with a rope connecting them by their necks. This will keep the goats still during the milking, a technique known as connected milking (kholboj saakh).

Figure 159: The other family members help to handle the goats that are waiting to be attached to the rope.

Figure 160: Saraa continues tying the goats together.

Figure 161: The goats have all been tied to the line. Saraa heads off to get her milk pail.

Figure 162: Saraa’s daughter begins milking the goats, from one end of the line.

Figure 163: The goats stand still as the milking progresses.

Figure 164: Saraa arrives with her milk pail and begins milking the goats on the opposite side of the line from her daughter.

Figure 165: The milking complete, Odsüren pulls on the end of the rope binding the goats, which unties the knots around their necks and releases the animals all at once. Altogether the milking has taken about 50 minutes.

Figure 166: The goats begin to disperse as the binding is released from one end.

Figure 167: Odsüren gathers up the bindings as the goats are set loose.

Oyunaa makes *bazmal aaruul* (2012-09-09)

Figure 168: Oyunaa makes bazmal aaruul. These are curds (aarts) that have been obtained by heating fermented milk, then strained in a sack to remove the whey. The curds are shaped by being squeezed in the palm of one's hand, then set out on a platter

to dry in the sun.

Figure 169: Oyumaa making bazmal aaruul.

Milking cattle - Sainsanaa and Baigalia (2012-04-19)

Figure 170: Sainsanaa prepares a mixture of bran and water to feed the cows in the

barn before the morning milking. Sainsanaa and Baigalia are a young couple who live on the South bank of the Yeröö River; they live off a small number of dairy cows.

Figure 171: Sainsanaa adds water to the bran that he has distributed amongst four troughs.

Figure 172: Sainsanaa stirs the bran mixture.

Figure 173: Sainsanaa lifts the three troughs of bran, as Nar-Od looks on.

Figure 174: Sainsanaa carries the troughs towards the barn.

Figure 175: Sainsanaa sets out the bran for the calves, who are being kept in a separate enclosure at the rear of the barn.

Figure 176: Sainsanaa's wife Baigalia begins milking a cow, as a calf suckles at the cow next to her.

Figure 177: Baigalia takes hold of a calf inside the enclosure at the end of the barn, then brings it through the gate and to its mother.

Figure 178: Baigalia leads a calf to its mother.

Figure 179: Baigalia leads a calf to its mother.

Figure 180: As the calf begins to suckle, Baigalia binds the rear legs of the cow to be milked.

Figure 181: Baigalia waits for the calf to finish suckling. Sainsanaa has placed another strap around the neck of the calf; he holds on to the loose end, waiting to lead the calf away.

Figure 182: Sainsanaa leads the calf away and ties it to a post. Baigalia begins milking.

Figure 183: Baigalia milks the cow.

Figure 184: The cow has now been milked, and Baigalia unbinds its rear legs.

Figure 185: Baigalia milks another cow.

Figure 186: Baigalia milking.

Figure 187: Baigalia milking.

Figure 188: The cattle leave the barn and head out to graze.

Figure 189: Sainsanaa comes out of the barn carrying a full bucket of milk.

Figure 190: As Sainsaaa's wife and Nar-Od head back to the house with a bucket of fresh milk, a truck arrives. The visitor is a livestock trader, who is looking for someone to sell livestock.

Figure 191: Sainsanaa's wife pours warm water into a small pot and lays it out for the calves to drink.

Figure 192: The calves are left in the barn while the adult cows are off grazing.

Figure 193: Sainsanaa tethers his horse.

Figure 194: Sainsanaa heads over to the haystack behind the barn to feed the cows that have not gone grazing.

Figure 195: Using a pitchfork, Sainsanaa gathers a bundle of hay for a pregnant cow that is being kept in the yard next to the barn.

Figure 196: Sainsanaa throws the bundle of hay over the fence.

Figure 197: The cow begins eating the hay.

Figure 198: Sainsanaa gathers another bundle of hay for the calves in the barn.

Figure 199: Sainsanaa carries the bundle of hay into the barn.

Figure 200: The calves begin to eat the hay set out for them on the floor of the barn.

Figure 201: Sainsanaa and Baigalia gather dung from the yard, as Nar-Od looks on.

Figure 202: Sainsanaa ties shut a sack of dung. The family will store the dung and use it for fuel.

Tsagaan's cattle, Yeröö sum centre (2012-04-23)

Figure 203: Tsagaan heads from his house to an enclosed area at the back of his yard, where he keeps hay for the cattle. Tsagaan, a retiree who lives in Yeröö sum centre, feeds the cattle he keeps in his yard. The cattle are not yet being milked yet at the time of these images, produced in late April.

Figure 204: Tsagaan gathers a bundle of hay with a pitchfork.

Figure 205: Tsagaan carries the bundle of hay out of the enclosed area of the yard.

Figure 206: Tsagaan brings the hay next to the fence, where he will dump it in a small pile on the ground for the cattle.

Figure 207: Tsagaan finishes dumping three small piles of hay along the fence.

Figure 208: Tsagaan opens the gate to let the cattle out of their enclosure.

Figure 209: The cows head over to the piles of hay.

Figure 210: The cattle eat the hay that Tsagaan has set out.

Figure 211: The cattle continue eating the hay.

Figure 212: Tsagaan lets the small calves out of the barn. Some calves wear blankets to keep them warm overnight.

Figure 213: Tsagaan drives the cows back toward the rear of the barn, and through a gate into the neighbour's yard, where they will be watered at a well.

Figure 214: The cattle proceed through the gate to the neighbour's yard.

Figure 215: The cows drink from a trough next to the well.

Figure 216: The cows continue to drink from the watering trough.

Figure 217: View of the interior of the well.

Figure 218: Tsagaan's neighbour draws water as the cows finish drinking and head off to pasture.

Figure 219: Tsagaan drives the lactating cows and their calves back into the yard.

Figure 220: The calves suckle.

Dolgorsüren and family milking cattle (2012-07-23)

Figure 221: Dolgorsüren and her grandchildren prepare to milk cattle. Urangoo – daughter of Mendee and Sookoo, Dolgorsüren's son-in-law and daughter who live next door – has been going to school in the aimag centre, but is currently helping out during the summer vacation. She gathers up the milk pails, which are stored in the cooking shed, and heads outside.

Figure 222: Uuganbayar, Urangoo, and Dolgorsüren begin milking cows. The boy Uuganbayar, who is Urangoo's cousin, lives in town with his parents during the year but stays with his grandmother during the summer.

Figure 223: Urangoo milks a cow. She has tied its calf to the fence next to which the mother cow is standing.

Figure 224: Uuganbayar waits as a calf suckles from its mother.

Figure 225: Uuganbayar places a tie around the neck of the calf that has been suckling, then leads the calf away from its mother.

Figure 226: Uuganbayar hitches the calf to the corral.

Figure 227: Uuganbayar gathers a second tie to bind the rear legs of the cow to be milked.

Figure 228: Uuganbayar binds the rear legs of the cow.

Figure 229: Uuganbayar milks the cow.

Figure 230: Dolgorsüren empties her bucket of milk into a canister. She strains the milk through a sheet of muslin tied over the opening of the canister.

Figure 231: Urangoo milks a cow. Behind her, Dolgorsüren's sister-in-law (bergen) and her son (not visible) begin milking their own cattle. The sister-in-law moved next door from her home in Bayan-Ölgii, the westernmost province of Mongolia, when her husband was ill; she is now widowed. She keeps a few cattle in Dolgorsüren's corral.

Figure 232: Urangoo releases a calf whose mother has just been milked.

Figure 233: Later in the day, Dolgorsüren and family are making aaruul. Urangoo mixes curds with sugar. The bowl of strained curds (aarts) is in a plastic tub on the table next to the window in Dolgorsüren's ambaar.

Figure 234: Urangoo kneads the curds.

Figure 235: Urangoo has set out materials for making aaruul: a mould, sack of pressed curds, cleaver, and bag of sugar.

Figure 236: Urangoo shows the different molds used in Dolgorsüren's household. At the right of the frame is a bowl of clotted cream; the cloth sack at the rear (as seen in the previous frame) contains curds that have been placed between wooden boards and compressed with a heavy rock to squeeze out all the whey remaining after the

straining.

Figure 237: Uuganbayar carries a bucket away from the home.

Figure 238: Uuganbayar pours the bucket of whey into the trough for feeding to sheep.

Figure 239: The boy from next door walks by the outside of Dolgorsüren's cooking shed, driving the family's sheep and goats to pasture.

Figure 240: Urangoo molds aaruul, placing the formed curds on a wire rack lined with a piece of plastic screening.

Figure 241: Dolgorsüren has been looking for her hat to wear in making an offering (tsatsal örgökh), and not finding it, jokingly puts on the baby's hat. She goes out and makes the offering of milk to the mountains.

Figure 242: Urangoo presses aarts into the mould, using a sheet of plastic film as a backing so that the curds will not stick to the mould. The family makes two types of aaruul, using molds and a homemade extruder, out of curds mixed with chokecherries

and with drink syrup flavourings.

Figure 243: Urangoo removes the moulded aaruul, and peels off the plastic sheet.

Figure 244: Dolgorsüren churns the airag. She uses a toilet plunger with large holes punched around its circumference. As the airag is churned, solid yellow fat (airgiin shar tos) rises to the top. This fat can be used in votive candles, to seal jam jars, or as

an ingredient in pastries and fried biscuits (boov).

Figure 245: Dolgorsüren continues churning the airag.

Figure 246: After a few minutes Dolgorsüren comes over with a sack of pressed curds (aarts). She takes the curds out of the sack and begins cutting them with a string, placing the curds on a wire rack.

Figure 247: Moulded curds on the wire rack.

Figure 248: Urangoo stirs the tea on the stove.

Figure 249: Urangoo lays the moulded curds out on the rack on the roof of the house.

Figure 250: Dolgorsüren mixes powdered drink mix in with curds for making flavoured khorkhoi aaruul.

Figure 251: Dologorsüren and Urangoo knead the flavoured aarts.

Figure 252: Urangoo adds some milk to the curds, to make them thin enough to run through an extruder.

Figure 253: Uuganbayar comes in and begins pressing the aaruul through an extruder made from a tin can with holes punched in the end, using an empty vodka bottle as the plunger. He creates strings of curds that will dry out to become khorkhoi aaruul, or worm curds.

Figure 254: Uuganbayar runs the curds through the extruder, creating thick strands, over top of a sheet of plastic mosquito netting set out on a wire basket. Dolgorsüren

continues kneading the curds.

Figure 255: Uuganbayar removes the bottle plunger from the extruder.

Figure 256: Uuganbayar packs more curds into the tin can extruder.

Figure 257: Uuganbayar continues extruding curds, filling the wire basket.

Figure 258: Dolgorsüren moulds aaruul using the flavoured aarts, creating striped aaruul containing a combination of two different flavours.

Figure 259: The flavoured aaruul.

Dolgorsüren distilling milk liquor (*shimiin arkhi*) (2012-07-15)

Figure 260: Dolgorsüren stokes the fire in the fireplace in her summer cooking shed (ambaar).

Figure 261: Dolgorsüren prepares to empty a barrel of airag – fermented bovine milk – which she uses only for making aaruul and milk liquor. This is Dolgorsüren's last batch of liquor today; during the summertime she makes three batches on alternate days, processing the equivalent of about thirty litres of milk per day.

Figure 262: Dolgorsüren pours the contents of the plastic barrel of airag into a 20-litre pot on the stove.

Figure 263: Dolgorsüren assembles her pot still. First she takes her bürkheer, a tapered cylinder fashioned of sheet aluminum, which will serve as the distillation column in the still.

Figure 264: Dolgorsüren places the bürkheer over the pot of unheated airag on the stove.

Figure 265: Dolgorsüren suspends a smaller pot inside the top of the distillation column, which will collect the liquor. This is an ordinary enamel over steel cooking pot with string loops affixed to either handle.

Figure 266: Dolgorsüren attaches the loops on the small pot to hooks on the outside of the distillation column, suspending the small pot within the column.

Figure 267: Dolgorsüren wraps a cotton band around the top of the distillation column, to serve as an insulating collar.

Figure 268: Dolgorsüren places an empty aluminum basin over the top of the distillation column, then wraps another fabric band around the outside. The alcohol vapour from the simmering airag will condense on the bottom of this basin – which she will fill with cold well water – and drip into the pot suspended below.

Figure 269: Dolgorsüren stokes the fire to begin the distillation. Since the alcohol will vaporize at approximately 80°-c, the fire must be hot enough to cause the airag to simmer but slow enough not to let it boil.

Figure 270: While the airag heats up, Dolgorsüren strains the cooled residue from the previous batch, made earlier in the morning. Dolgorsüren ladles the curds into a cotton sack suspended from a horizontal wooden beam in the yard just outside the entrance to

the summer house, which will allow the whey to drain while retaining the fermented curds.

Figure 271: Dolgorsüren ladles curds into the straining sack.

Figure 272: As Dolgorsüren continues ladling the curds, whey begins to dribble down from the bottom of the cloth sack.

Figure 273: Dolgorsüren's sister-in-law washes jam jars.

Figure 274: A pail and a tub full of strawberry jam, ready to be put in jars.

Figure 275: Homemade butter.

Figure 276: Dolgorsüren carries off a bucket of whey drained from the batch of curds remaining from the first distillation, then dumps the whey into a feeding trough for the sheep and goats.

Figure 277: The sheep and goats drink up the whey. Whey fed to the livestock is not a waste, as it is high in both protein and lactose, allowing the animals to fatten quickly.

Figure 278: Dolgorsüren's sister-in-law continues to wash jam jars. Dolgorsüren washes several washcloths as she waits for the airag to heat up.

Figure 279: The curds continue to drain.

Figure 280: Dolgorsüren heads over to the shallow well inside the yard of her house, to get a bucket of cold water to condense the distillate.

Figure 281: Dolgorsüren fills her bucket with well water.

Figure 282: The airag under the sill has begun to simmer. Dolgorsüren pours the cold water into the basin at the top of the distillation column.

Figure 283: Water inside the top basin. The alcohol vapour will condense quickly on contact with the cold bottom surface of the basin.

Figure 284: The curds begin to simmer.

Figure 285: Dolgorsüren climbs a ladder leading up the roof of her house, to rearrange the aaruul set out on the roof.

Figure 286: Dolgorsüren climbs on top of the roof.

Figure 287: Dolgorsüren has built a wire cage suspended between two wooden blocks, in which she sets out the aaruul (molded fermented curds) to dry in the sun; the cage prevents birds from making off with the cheese.

Figure 288: Dolgorsüren shows her supply of borolzgono (Dasiphora fruticosa), which she has placed in an open box in the attic to dry, which will be used for making tea.

Figure 289: Dolgorsüren checks the still, waiting for the airag to simmer.

Figure 290: As the liquid begins to bubble, Dolgorsüren prepares a ladle.

Figure 291: The airag has begun to simmer, indicating that the distillation is complete. Dolgorsüren ladles the water from the basin at the top of the still, which is now warm.

Figure 292: Dolgorsüren removes the empty basin from the top of the still.

Figure 293: Approximately one litre of spirits have been distilled from the twenty litres of airag.

Figure 294: Dolgorsüren removes the inner pot containing the distilled spirits.

Figure 295: Dolgorsüren pours the liquor into an aluminum canister.

Figure 296: Dolgorsüren places a lid on the canister, using a plastic bag as a seal.

Figure 297: The heated airag has curdled.

Figure 298: Dolgorsüren goes out to help with washing the jam jars.

Figure 299: Inside the sack of draining aarts.

Figure 300: Dolgorsüren's granddaughter eats the sweet solid residues (khusam) from the interior of the distillation column.

Figure 301: Dolgorsüren rearranges the draining sacks of curds.

Figure 302: Dolgorsüren ladles the heated airag from the recent distillation into a large pot.

Figure 303: Dolgorsüren brings the pot outside and ladles the curdled airag into the sacks to drain.

Figure 304: Dolgorsüren’s sister-in-law fills the jam jars.

Figure 305: Strawberry jam.

Milking cattle at Delger Farm (2012-03-02)

Figure 306: Otgon, who is in charge of milking at the farm, prepares feed supplements for the cattle, mixing pelletized feed, water, and bran.

Figure 307: My colleague Nar-Od looks on as Otgon mixes the dry feed with water.

Figure 308: Interior of the barrel of feed pellets.

Figure 309: The mixed feed, in basins ready to be given to the milk cows.

Figure 310: Otgon’s son helps give feed to a calf.

Figure 311: A newborn calf inside the barn.

Figure 312: Otgon milks the cattle. There are fifteen milk cows, which take nearly two hours to milk. This milking process is repeated three times a day. Otgon provides a basin of feed to each cow before it is to be milked, then ties the rear legs of the cow prior to its being milked.

Figure 313: Otgon milks a cow.

Figure 314: As Otgon milks the cow, the animal eats from the basin of feed she has set in front of it.

Figure 315: Otgon finishes milking the cow. Carrying her milk bucket, she heads over to the next animal to be milked.

Figure 316: Otgon milks the next cow.

Figure 317: A goat kid suckles from the udder of one of the cows in the barn.

Figure 318: Otgon measures a portion of fresh milk into a jug, then pours it into a basin outdoors to feed the calves.

Figure 319: Otgon pours the fresh milk into a small basin set on the ground in an open- air enclosure outside the barn, where the calves are being kept.

Figure 320: Otgon gives milk to the remaining calves.

Figure 321: Inside the barn, Otgon feeds milk to newborn calves, which are unable to drink from a basin, using a soft drink bottle with a rubber nipple.

Figure 322: Otgon refills the bottle, in preparation for giving milk to the next animal.

Figure 323: Otgon feeds an infant goat kid from the bottle.

Figure 324: Otgon fills the bottle again.

Figure 325: Otgon cleans dung from the stalls in the barn.

Figure 326: Otgon feeds several newborn calves that are now several days old, and that are just learning to drink from a basin.

Figure 327: Otgon holds the basin up to a calf, helping it to drink.

Figure 328: Otgon gathers hay with a pitchfork, from a storage area at the rear of the barn.

Figure 329: Otgon provides hay to the older calves being kept outside the barn.

Autumn visit to Delger farm (2012-09-13)

Figure 330: Delgersaikhan shows off the large stack of hay that he recently mowed from a site close to the farm.

Figure 331: The stack of hay, situated to the rear of the barn.

Figure 332: Exterior of the barn. Currently the barn is empty, as the milk cows are out grazing. The calves and heifers have been sent to graze in an area to the north of Sainshand.

Figure 333: The new reservoir that Delgersaikhan has had installed at the farm. The well inside the building has been drilled to a depth of 80 metres, with the water surface located at 27 metres underground; this well provides one tonne of water per day.

Figure 334: Delgersaikhan shows the interior of the reservoir.

Figure 335: The water pump. Delgersaikhan uses a gasoline pump to draw water from the open reservoir, which then feeds a sprinkler system to irrigate the corn crop.

Figure 336: Corn feed crop.

Figure 337: Delgersaikhan demonstrates the gasoline-powered hand-held mower that he used for making hay in a field nearby.

Figure 338: Delgersaikhan demonstrates how the mower is used.

Figure 339: Delgersaikhan shows a recent photograph on his phone depicting a load of hay being transported with a tractor.

Figure 340: Exterior of the herders' yurt.

Operations at Delger Dairy (2012-03-09)

Figure 341: The electric skimmer in operation at Delger Dairy.

Figure 342: Cream pours out the side of the milk skimmer.

Figure 343: Moulded aaruul set out on racks to dry inside the dairy.

Figure 344: Cut block aaruul set out on racks to dry inside the dairy.

Figure 345: Delgersaikhan assembles the tarag packaging machine.

Figure 346: Container of tarag to be packaged for delivery to the local school.

Figure 347: Delgersaikhan shows the sour cream (tsötsgii) packaged and being stored in the refrigerator in preparation for sale.

Figure 348: Delgersaikhan shows the refrigerator containing containers of sour cream.

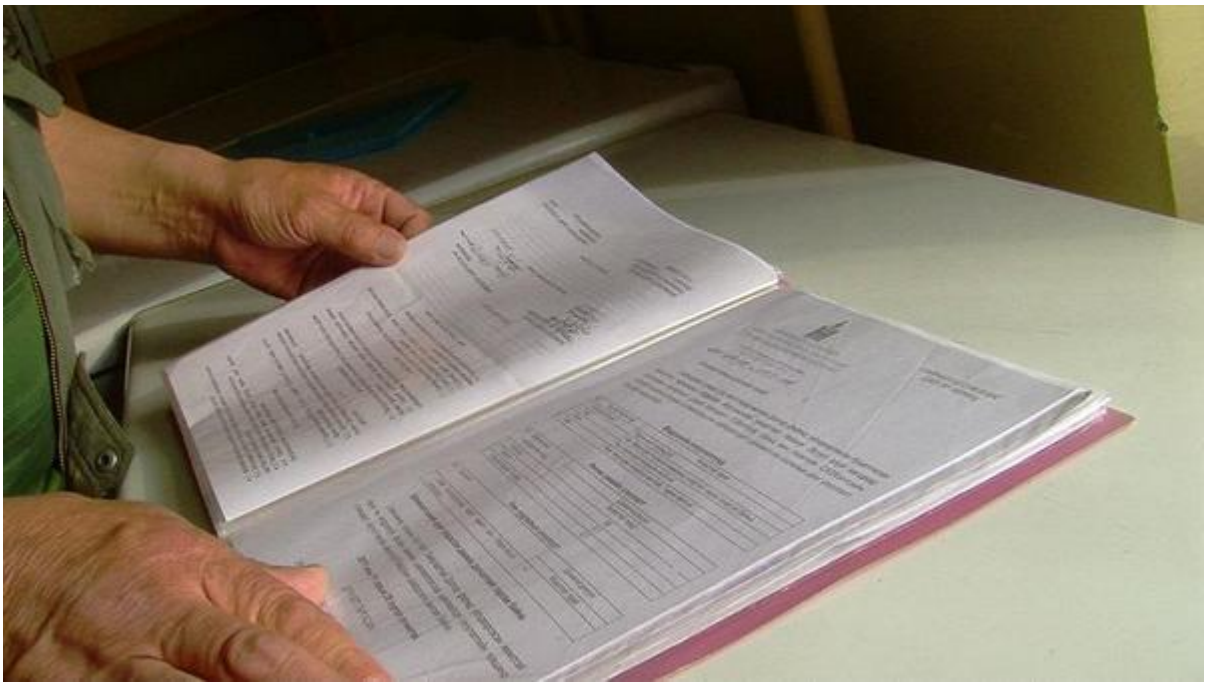

Figure 349: Delgersaikhan shows the record of food safety inspections.

Figure 350: Whey collected from straining curds to make aaruul.

Figure 351: Draining curds (aarts).

Figure 352: Mechanical press used in making aaruul.

Figure 353: Containers of sour cream set out on the window sill to ferment prior to being sealed and refrigerated.

Figure 354: Cutting out and preparing the labels for the single-serving tarag cups.

Figure 355: Delgersaikhan adds milk to the skimmer.

Figure 356: The dairy technician stirs the tarag.

Figure 357: Delgersaikhan removes plastic cups from their package, separating them and placing them in a tub in preparation for filling.

Figure 358: Delgersaikhan places the plastic cups loosely in the tub.

Figure 359: The dairy assistant sets out cups in a row on the table next to the packaging machine.

Figure 360: Delgersaikhan fills a pitcher with tarag.

Figure 361: Delgersaikhan pours tarag from the pitcher into the single-serving cups set out on the table.

Figure 362: Delgersaikhan pours tarag into four cups placed inside the holder that will feed into the sealing machine.

Figure 363: Delgersaikhan lifts up the metal holder.

Figure 364: Delgersaikhan feeds the four cups into the sealing machine. Plastic sealing wrap feeds into the machine from a roll at the top, and is adhered to the tops of the cups then cut with a manual crank.

Figure 365: A sealed single-serving cup of yoghurt, with an adhesive label with the dairy's logo and address pasted on top.

Figure 366: Altantsetseg checks the temperature of milk she is heating in preparation to be innoculated with tarag (yoghurt) culture.

Figure 367: Packaged single-serving tarag.

Figure 368: Altantsetseg stirs the morning batch of tarag, which has now coagulated and is ready to be packaged.

Figure 369: Altantsetseg pours sour cream into plastic containers, measuring the quantity of each container using an electronic scale.

Figure 370: Altantsetseg checks the weight of the cream on the scale.

Figure 371: Altantsetseg checks the temperature of the tarag.

Figure 372: Altantsetseg begins to heat a pot of milk on the cooker.

Figure 373: Altantsetseg pours pasteurized milk into a stainless steel pot, in which she will make the next batch of tarag.

Figure 374: Delgersaikhan washes the inside of the pasteurizer.

Figure 375: The delivery assistant moves the packaged tarag into a chest freezer (set at a low setting), where it will be kept until delivery the next day.

Figure 376: The delivery assistant continues moving cups of tarag into the chest freezer.

Figure 377: Altantsetseg checks the temperature of milk she is heating on a small cooker, which she will mix into a larger vat of milk in making tarag.

Figure 378: Altantsetseg mixes a freeze-dried yogurt culture into a dipper of warm milk, which she will use to innoculate the next batch of tarag.

Figure 379: Altantsetseg stirs the culture with a whisk until dissolved, then pours the culture into the warmed milk.

Figure 380: Altantsetseg covers the innoculated yogurt with a blanket to keep it warm.