“Green Pasture” Soft Loan Project in Chandmana soum of Hovd aimag

Final report

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Агуулга

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1. Summary

The overall goal of the "Green Pasture" Soft loan project for herders is to support sustainable use of rangelands through reduction of livestock numbers to match the carrying capacity of rangelands, apply e- traceability system to ensure quality and origin of livestock products from herder households to processing plants, and to provide recommendations on the implementation structure and dispersal of the soft loans for herders beyond this pilot project.

The "Responsible Nomads" Livestock Raw Material E-Traceability system has been applied in the "Green Pasture" Soft loan project. In the context of increasing rangeland degradation in Mongolia threatening the livelihood basis of nomadic herder families, the Responsible Nomads traceability system aims to incentivize herders to maintain sustainable rangeland and herd management practices and to live in harmony with wildlife.

SDC Green Gold and Animal Health Project and National Federation of PUGs have developed criteria for the selection of herder households. The criteria considered representation of herder housholds in the Chandmana soum as well as main ecological, social and economic conditions of the soum. In addition, it has included criteria from Khas bank that recipients have no poor loan history from banks, including Khas Bank itself.

Out of total 655 herder households of Chandmana soum, 481 herder households (73.4%) participated in the survey prior to the project. Initial request for soft loans totaled 1.9 billion MNT. In the questions regarding usage of the soft loans with a lower interest rate, 20.5% responded to plant livestock forage, 45.7% to buy high productivity breeding animals, 11.9% to purchase urgently needed households' goods, 4.6% to pay children students fee, and 1.1% to invest in alternative income opportunities such as run a small tourist camp or plant vegetables. Out of 481 herder households, 97 met the criteria required and took part in the project.

All herder households used the loans for intended purposes stated in their loan application. In addition to the loans received, herders co-invested MNT 43.8 million to implement investment projects they applied for loans. Out of total soft loans received, 43.6% was spent to pay back pending Khaan Bank loans to qualify for Green pasture loans from Khas bank which has twice cheaper interest rate. 50.2% was invested on activities related with rangeland and herd management: 20.5% for hay making for winter, forage planting for additional feed for livestock and fencing hay making area to improve productivity while protecting from animal grazing during critical vegetation period; 20.2 % was invested on buying high quality breeding animals to improve productivity mainly sheep and goats; 8.3% for rehabilitation of winter shelters; and 1.2% for rehabilitation of roads, wells and invest non-herding income generation activities. Only 6.5% was spent on personal consumption and for the tuition fee of their children studying at universities.

All herder households have paid loans as per schedule agreed with the Khas Bank. As repayment time is only 4 times a year, it has allowed herders more time to manage their cash flows better. Higher repayment rate and none of overdue loans even in the period of COVID outbreak and restrictions which had a drastic influence on herders' income prove that herders are very responsible clients.

Since 2015, with the support of Green Gold Animal Health Project, all herder households of Chandmani soum organized into 5 Pasture User Groups and signed Rangeland Use Agreements with the Soum government. The rangeland health baseline for Chandmana soum was created in 2017. Photo monitoring spots of rangeland health were installed in each of the 4 seasonal rangelands of all 5 PUGs.

When PUGs establish Rangeland Use Agreements with local government, the baseline of rangeland health is agreed between herders and soum land management experts. This baseline is used to monitor and assess grazing management annually whether the rangeland health has stabilized, improved to better state or degraded. As a result of consistent resting during critical vegetation period and reducing grazing pressure on heavily degraded rangelands, the rangeland health in Chandmani soum has been stabilizing since 2017 and had significant improvement quantitatively and qualitatively.

Vegetation cover and productivity are the primary indicators that respond well to management changes. According to the assessment made on rangeland health in Chandmana soum, total basal cover has increased by 2.3 times and the productivity increased by 2.1 times. The increase in total cover and productivity improves the habitat and seed beds that support the recovery for other plants, especially palatable grasses. As a part of rangeland management planning for fiscal year of 2019-2020, one provision was added in the soum Rangeland Management regulation that herder families when they move in and out of autumn rangelands through spring rangelands, not to stay more than 2 days in the corridor/spring rangelands. This has been fully implemented by all herder households and led to recovery of heavily ovegrazed rangelands in main livestock tracking areas.

According to the rangeland recovery class dot map for 2020, state of rangeland health in Chandmani soum has improved compared to baseline created in 2017 especially winter rangeland health has improved significantly. 35% of total rangelands is degraded in Chandmana soum according to National Rangeland health assessment report, heavily degraded areas are found in spring rangelands. These areas require at the least 10 years to recover.

Overall rangeland health is stabilizing in Chandmana soum, all herder households are organized into PUGs and established Rangeland use agreement and able to enforce rotational grazing and manage stocking density. Majority of herders is keen to not to increase herd size rather to reduce or stabilize while increasing productivity and income per head. There are many initiatives to diversify income to sell goat and sheep milk, engage in tourism business during summer, running feedlot and additional hay making. Within the project, cashmere quality of local breed called “Buyant red goat” has been tested which proves to have high quality and preferred color by processing plants. Contacts have been facilitated with Goyo company to source fully traceable and sustainably produced cashmere through Responsible Nomads system.

During first year of project implementation, beneficiary herder households have sold on average 20.3% of total livestock and in the second year 23.6% respectively. Total number of livestock sold on the market with electronic veterinary certificate and registered in animal health traceability at the GAVS has increased by 43.5 percent compared to previous year. The number of live goats sold on the market in 2020 has increased by 53.3 percent and the amount of goat meat increased by 160.6 percent compared to previous year. Sales of mutton decreased by 13.9 percent and sales of live sheep increased by 21.0 percent.

All 97 beneficiary herder families have fulfilled their duties agreed in the Responsibility agreement signed at the onset of the project. During field monitoring, herder families have provided a feedback that they live within two main source of income cashmere sales in spring and autumn sales of meat and in between depend on Khaan Bank loans to cover their cash shortages. By the time they collect cashmere and meat money, they need to pay back Khaan Bank loans plus high interest rate. After this, not much cash is left for them. They need to borrow again to pay for immediate family needs such as food, fuel, children school fee and medical expenses. Longer period and longer payment interval of Green Pasture project has allowed to make investment on some priority issues for livestock and rangeland management such as rehabilitation of animal shelters, fencing hay making area, forage planting and buying high quality breeding livestock.

Buyers and customers bought livestock with traceability information and verified through Responsible Nomads have paid at the least 10% high price and expressed to have long term partnership. E traceability system and online training platforms have reduced costs significantly and enabled to track project implementation in the field in timely manner.

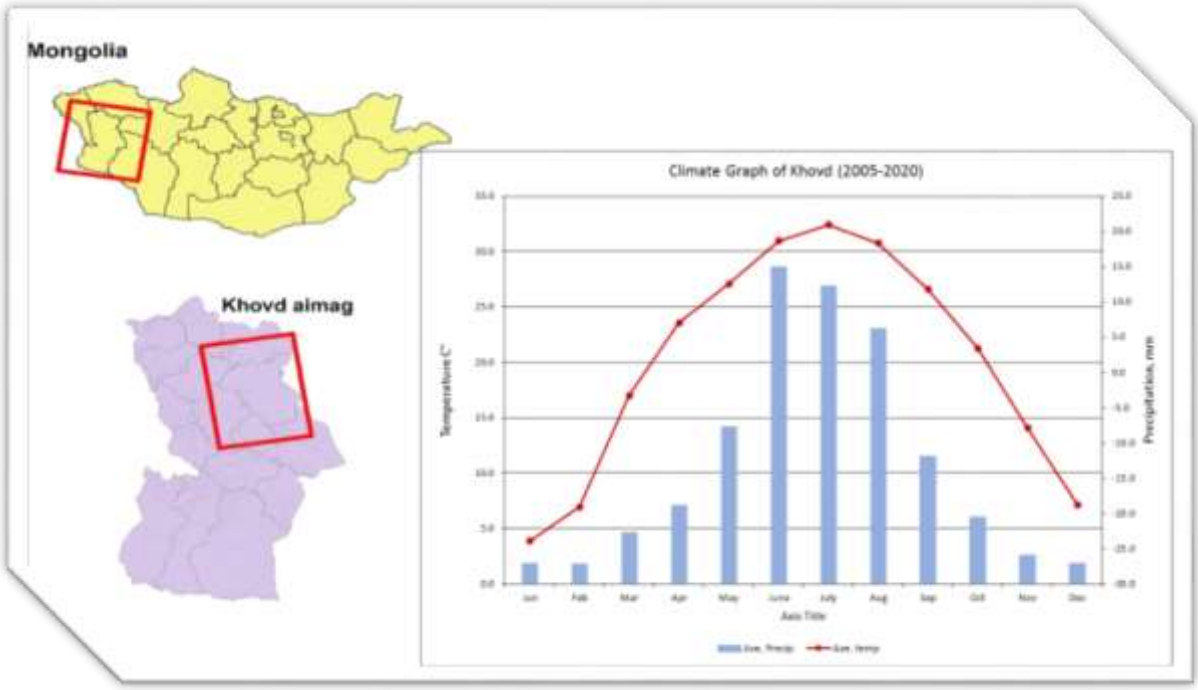
Grasslands/rangelands in Mongolia biggest source of carbon sequestration as it makes almost 70 percent of total land territory whereas forest constitute 8%. Majority of carbon is contained in the strong root system and with increasing rangeland degradation, the capacity of grasslands to absorb carbon diminishes. Based on the results and lessons learned from the Green Pasture project Green Gold project and Mongolian National PUG Federation is keen to expand cooperation with Khas bank and even to use Responsible Nomads platform to develop loan products to incentive herders to ensure sustainable use of their rangelands and safeguard other natural resources.

2. Short introduction about the Chandmana soum of Hovd aimag

2.1 Geography

Chandmani is a sum (district) of Khovd Province in western of Mongolia. In 1923 Chandmani sum was founded. About 60 percent of the total territory is protected. The eastern part is Durgun and Khar-Us lake, and the west is surrounded by hills and Gobi, surrounded by Jargalant and Bumbat khairkhans. It is elevated above sea level at 1,132.3 - 3,796m. It is cold in the winter and hot in summer. January average temperature -26 ° C Average monthly temperature +19.1 ° C annual average wind speed 2.2-2.8 m / s annual precipitation 127 mm. Total land territory is 601,679 ha. The Khar-Us lake was designated in 1998 as one of the Ramsar sites. Chandmana locates within Altai-Sayan Ecoregion and it was identified as one of the most vulnerable regions to climate change. The Khar-Us Lake is largely responsibe to maintain the integrity of the ecosystem of the region.

Picture 1. Chandmana soum of Khovd aimag.



2.2 Population

Total population of Chandmani soum is 2955. There are 751 families, 655 out of which is nomadic herder families.

2.3 Infrastructure

The soum is provided with 24-hour electricity from Durgun hydro power station. Lower pressure boiler system provides heating in winter to offices including hospital, school, school dormitory, kindergarten, Government house and Police office. In terms drinking water, there are 3 deep water engineer wells and 3 water pools, each of which has the capacity to store 3000m3 of water. Chandmana soum is located 80 km from Khovd aimag center and 1800km from Ulaanbaatar city. It is one of three soums connected to the aimag center with paved roads.

2.4 Economy

The main economic activity is livestock herding followed by crop farming and small-scale trading. As a whole, 2.5 ha in area is planted in cereal, 10 ha in potatoes, 1.5 tons in vegetables, 21.5 ha in livestock forage. Annually, soum harvests 7.2 tons of cereal, 53.5 tons of potatoes, 1.5 tons of vegetables, 42.5 tons of livestock forage, and 1500 tons of hay. There are about 34 small and household businesses engaged in

running small grocery shops, cafes, and bakery. The soum has a business incubator center, as well as branches of Khaan Bank and State Bank.

2.5 Livestock herding

Out of total 751 families, 655 are nomadic herder families. Total livestock population is 222'245 378: 8200 horses, 7259 cattle, 3246 camels, 80758 sheep and 106915 goats. Cashmere goats constitute over 50% of total herd. Livestock number has reached a historic peak in 2016 at 280'187 and has been declining since (Table 1).

Table 1: Livestock population.

Livestock types	2016	2017	2018	2019	2020
Total	**280487**	**254723**	**206378**	**222245**	**257679**
Horse	10309	9569	8200	8599	9152
Cattle	10387	9494	7259	7636	8597
Camel	3604	3659	3246	3461	3556
Sheep	116446	104057	80758	87507	100550
Goats	139736	127943	106915	115042	135824

3. Methodology

The "Responsible Nomads" Livestock Raw Material Traceability system for sustainable production has been applied in the "Green Pasture" Soft loan project. In the context of increasing rangeland degradation in Mongolia threatening the livelihood basis of nomadic herder families, the Responsible Nomads traceability system aims to incentivize herders to maintain sustainable rangeland and herd management practices and to live in harmony with wildlife. The code of practices has been developed for more than a decade in collaboration with thousands of nomadic herders living in different parts of Mongolia and local and international researchers participated in the Green Gold Project to rehabilitate degraded rangelands. Responsible Nomads code of practices incorporates as well animal health and animal welfare indicators selected together with herders, local specialists and researchers based on the context of nomadic herding and best practices evolved. Animal welfare indicators reflects high resilience capacity of local breeds of livestock to harsh climatic conditions of Mongolia. It has been approved by the State Standard and Meterolgy Agency in February 2021 as a livestock raw material supply chain standard (Annex 6) Responsible Nomads code of practice and traceability system aims to provide buyers of livestock products of Mongolia with the tools to:

- Appreciate best practices of nomadic livestock herding
- Source their livestock raw materials from nomadic herders maintaining healthy rangeland or improving their management and livestock that have been treated responsibly
- Promote value chain of livestock products that incentivize improvements in animal care and land management
- Ensure transparent chain of custody from a herder household to final product to provide customers with a guarantee that the raw materials of the products their buy is truly from Responsible nomadic herder households.

Key indicators of Responsible Nomads

1. Responsibility of herders
2. Maintaining and improving rangeland health
3. Animal health services
4. Animal welfare
5. Environmental stewardship
6. Traceability

1. Responsibility of herders

Herders taking responsibility for sustainable management of their rangelands and quality of raw materials is the foundation of the Responsible Nomads code of practices. For responsible rangeland management, herders join Pasture User Groups that establish Rangeland Use Agreements with the local government. In order to ensure reliable supply and good quality of livestock raw materials to retailers and consumers, herders establish cooperatives.

a. Pasture User Group Membership

Based on long standing traditional arrangements that a group of herder families share access to the same four- season rangelands, Pasture User Groups (PUGs) are formed. These groups guarantee responsible management of shared seasonal rangelands through collective planning and enforcement of rotational grazing schedules between seasonal rangelands to adjust grazing pressure and stock density.

Evaluation criteria	**Source of verification:**
✓ Keep the livestock within grazing boundaries agreed upon by members and neighbors ✓ Develop and enforce seasonal grazing plans and schedules ✓ Take part and follow joint regulations to enforce grazing/movement plans and schedules ✓ Take part in community-based monitoring to ensure members' compliance of the joint regulation	Registered in the Land management database at the Agency of Land Affairs Geodesy and Cartography and Mongolian National Federation of PUGs with following information: ✓ Aimag ✓ Soum ✓ PUG name **Story platforms: Hand-made PUG Grazing map and plans** ✓ Total rangeland area ✓ Members (man and wife) ✓ Number of livestock ✓ PUG regulation

b. Established Rangeland Use Agreement

Provided that herders are members of PUGs and have adopted common grazing/movement plans and internal regulations, a long-term Rangeland Use Agreement is established with local government.

Evaluation criteria	**Source of verification:**
✓ Member of the PUG ✓ Adopted common grazing/movement plan ✓ Adopted internal regulations ✓ A long-term Rangeland Use Agreement is established with local government.	Registered in the Land management database at the Agency of Land Affairs Geodesy and Cartography and Mongolian National Federation of PUGs with following information: ✓ Date of RUA establishment ✓ Coordinates of four seasonal rangelands ✓ Stocking rate per each of the seasonal rangelands (story platform photo) ✓ Winter, spring, summer and autumn camps

c. Cooperative Membership

To ensure reliable supply and quality of raw materials from herder families, cooperatives are established to manage the sale of raw materials on their behalf. Cooperatives negotiate a contract and organize a supply order with buyers, accounting for the quality and volume of raw materials required by the buyers. The Responsible Nomads traceability system allows the cooperatives to present data and information regarding the quality of the materials, including the environmental impact and sustainability. These cooperatives then facilitate the supply from herder members as per requirements in the contracts.

Evaluation criteria	Source of verification:
✓ Quality of the raw materials ✓ Amount supplied	Recorded in the cooperative and raw material database at the Mongolian National Federation of PUGs: ✓ Name of the cooperative ✓ Raw materials produce by quality and volume: - Cashmere - Adult yak wool - Baby yak wool - Camel wool - Baby camel wool - Skins/hides - Sheep wool Meat

2. Maintaining and improving rangeland health

In the rangeland-based nomadic herding sector of Mongolia, 90 percent of animal feed is sourced from natural rangelands. Thus, maintaining healthy and productive rangelands is essential to ensure enough forage intake for the livestock. Rangeland health is monitored by two sets of indicators: rangeland recovery classes and grazing impact monitoring.

a. Healthy rangelands

When PUGs establish Rangeland Use Agreements with local government, the baseline of rangeland health is defined using rangeland recovery classes. There are five recovery classes identified for all Mongolian rangelands that show the level of degradation compared to its ecological potential and natural regeneration capacity. Through Rangeland Use Agreements, PUGs agree to not degrade rangelands further from the baseline defined in the year it was signed between PUGs and local government.

Evaluation criteria	Source of verification:
I The plant community is at or near reference conditions (not degraded), no action required, maintain current management II The plant community is altered and may be rapidly recovered (one to several growing seasons) with favorable climatic conditions and/or a change in management (e.g., seasonal deferment, rotation). III The plant community is altered and may take several years to over a decade to recover with changed management (seasonal deferment and long-term rest). Alteration represents a significant loss of important ecosystem services, but recovery is possible in time. IV The plant community is altered due to the loss of key species, invasion of noxious plant species that is unlikely to be recovered for well over decade, if ever, without intensive	National Rangeland health database functions at the National Agency of Meteorology and Environmental Monitoring covers 1550 plots.

interventions such as species removal, seeding, or other manipulations. V The plant community is altered due to extensive soil loss, accelerated erosion rates, or salinization. Previous ecosystem services have been lost and it is impractical to recover them.	

b. Grazing impact monitoring

Fulfillment of the agreement through RUAs to prevent further degradation of rangelands from the baseline is monitored annually by rangeland health photo monitoring with three indicators: percentage of palatable species, basal cover, and land productivity. These indicators were chosen to measure the impact of livestock grazing. Soum land managers work in cooperation with PUG leaders and herder members to conduct photo monitoring in seasonal rangelands during first three weeks of August each year. This is processed with sophisticated software and recorded in the soum, aimag and national databases.

Evaluation criteria	**Source of verification:**
Dynamics of following three indicators 1. Percentage of palatable species 2. Total cover 3. Productivity	✓ Annual photo monitoring spots stationed at each of four seasonal rangelands of PUGs ✓ National grazing impact monitoring database at the Agency of Land Affairs Geodesy and Cartography with following information:

3. Animal health services

All animal health services in Mongolia are carried out under professional supervision of the General Authority for Veterinary Services (GAVS). The GAVS conducts annual survey to determine the level of risk of infectious animal diseases nationwide. This survey results and findings become the basis of planning and approving an integrated veterinary action plan for the year. Based on this annual action plan, the soum veterinary authorities develop a detailed action plan of veterinary services in the soum. The Aimag Veterinary Department is responsible for monitoring the implementation of the action plan in the field. For the implementation of annual veterinary service plan, herder households, soum veterinary service units, and soum governors sign a tripartite contract each year on the veterinary services to provide to the livestock.

a. Access to veterinary services

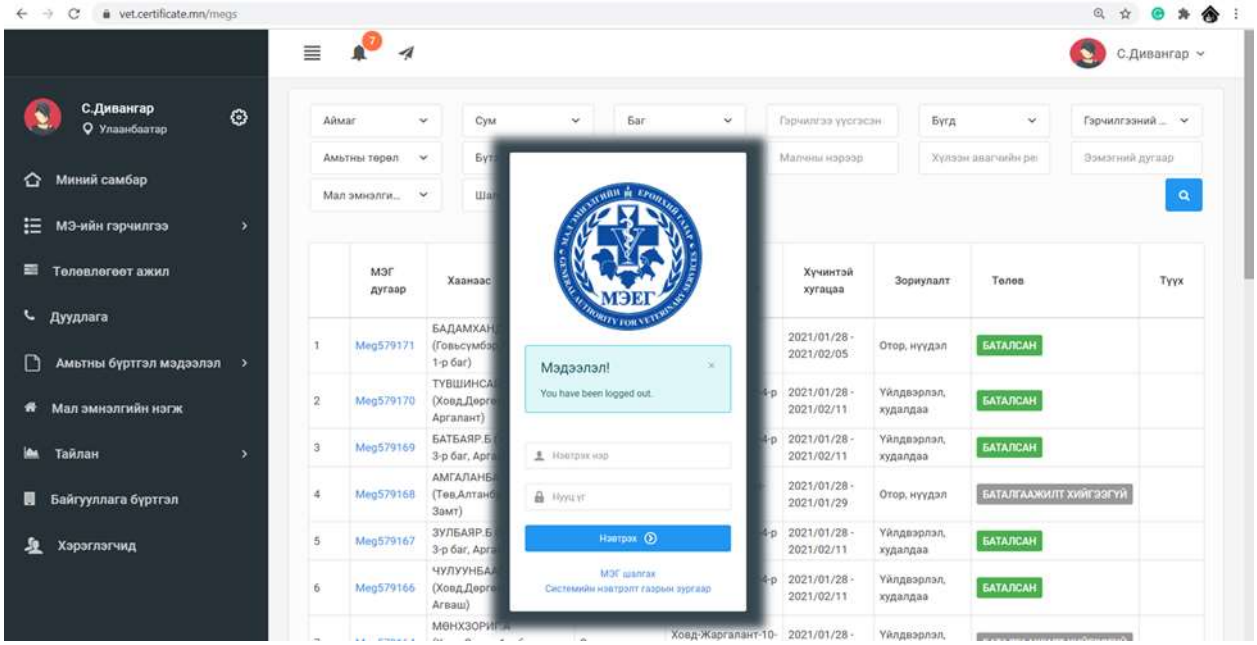
Making access of herders to veterinary services easy is one of the important policies of the government. There are two channels veterinary services are provided to herders. First, routine veterinary services organized according to the above annual action plan, secondly, veterinary servives provided at request of herders in case of emergency.

Primary veterinary services are provided by contracted private veterinarians, who register all the services provided to herder households and clients in the Mongolian Animal Health Information System /MAHIS/. Then, these information and data on primary veterinaty services verified by soum veterinary inspector at the Soum State veterinary unit. MAHIS is the government system developed with the support of SDC Green Gold and Animal Health Project and is being upscaled nationwide in collaboration with the Ministry of Food, Agriculture and Light Industry and the GAVS.

The second system is the internet-based system animal health traceability system that enables to track the health status of the livestock from birth. This system is designed to provide herders and veterinarians to provide accurate and verifiable information on livestock to buyers and consumers, including health history, veterinary treatments, and movements. It is also designed to improve animal health surveillance to identify epidemics and outbreaks of diseases. With the introduciton of the system, database is being created at the GAVS to monitor the quality and availability of veterinary services offered to herder households and create

disease-free zones. This system backed by the new Animal Health Law is making a shift from previous supply chain practices that middlemen collect livestock from different soums and transport to Ulaanbaatar without any guarantee on the health status and origin which soum the livetsock is from. With introduction of the animal health system not it is no longer allowed. The system also has smart phone application. The smart phone application system allows customers and clients to view information on the origin and health status of livestock when buying meat. Consumers can install application free and while getting barcode on on meat packages read, they may view information on animal origin and health, as well as the owner/herder and processing plant.

Picture 2. Animal health traceability system at the General Authority of Veterinary Services



b. Animal health.

More than 300 animal infectious diseases are reported worldwide. According to Government of Mongolia, there are 67 various types of animal infectious diseases are found in Mongolia. The most recent survey carried out in 2019 has identified 12 infectious animal diseases in Chandmani soum of Khovd aimag. Public and private veterinary organizations in the soum have vaccinated livestock in high-risk areas against these 12 infectious diseases and taking measures to prevent transmissions to healthy animals in disease-free areas.

Controlling the movement of livestock is the only possible way to prevent transmission of infectious disease to animals in healthy areas. In order to control the movement of livestock Green Gold Annimal Health Project has developed an animal health traceability system in collaboration with the GAVS "E-Veterinary Certificate" within MAHIS. As a result, soum veterinarians now issue an electronic veterinary certificate and monitor using smart phone application. This allows soum veterinarians to check livestock's medical history prior transportation and notify in advance if there are any symptoms of sickness or if the livestock is at risk. The MAHIS records a history of the animal disease by each herder households and provides information if the animal has been infected with any diseases. Because members of the PUGs share the same seasonal rangelands, it is also very important to ensure that no disease outbreak occurs within the boundaries of the PUGs.

c. Food safety and drug residual control

Significant progress has been made in ensuring safety of meat supplied to the market by identifying the origin of livestock and recording animal health history. By recording dates when animals have been vaccinated or injected with drugs or antibiotics, the animal health system-MAHIS monitors the possibility of drug residual in animal body. However, in order to fully assure the safety of animal products, veterinary organizations need to pay a special attention on the control of drug residues. Therefore, the national program on veterinary drug residue control was issued with the decision of the Minister of Food, Agriculture and

Light Industry, and is being implemented nationwide since June 5, 2019. As part of implementation, the GAVS in cooperation with partner organizations have developed a methodology for detection of antibiotic residues in milk and meat and distributed necessary equipment to soum veterinarians. Chandmani soum veterinarians have been involved in on-the-job training for three years in a row, and for the past two years, they have been testing drug residues in milk and meat products. Soum veterinary inspectors take random samples from meat and milk supplied to the market and make analyzis using a rapid test. The test results then entered into soum veterinary laboratory database system. When a veterinarian issues a veterinary certificate from MAHIS to herder or buyer of a livestock, he/she must attach the above laboratory test to the certificate. If there is any antibiotic residue is suspected, the certificate will be refused and the sample will be sent to the State Central Veterinary Laboratory for advanced analysis.

Evaluation criteria	**Source of verification:**
✓ The origin of the livestock (aimag, soum, bag, herder family) ✓ Records of annual veterinary services provided ✓ Livestock health status ✓ Drug residual	Mongolian Animal Health Information System /MAHIS/ at the General Authority for Veterinary Services /GAVS/ shows following information: ✓ A list of contracted herders with the veterinary organization for keeping their livestock under the animal health control ✓ Execution of planned and emergency measures implemented by veterinary organizations ✓ Veterinary certificate statists on livestock and livestock products supplied to the market

4. Animal welfare

Animal welfare indicators are chosen to be included in the Responsible Nomads system with great care. Officials are in consultation with herders and local specialists to identify local best practices and traditional knowledge, and to assess the resilient capacity of local livestock to climatic and rangeland conditions in the country. Providing secure access to rangelands for each season, water, warm shelter/bedding and reserve forage in winter to all livestock is necessary for nomadic herders to ensure healthy lifestyles for their animals. In addition, herders that lose livestock due to bad management of animal welfare, rather than because of natural disasters or factors beyond their control, is seen as “irresponsible” behavior. This is measured as the mortality rate of newborn livestock, the “responsible” threshold of which is 10% or below.

Evaluation criteria	**Source of verification:**
✓ Availability of four seasonal rangelands Story platforms: Hand-made PUG Grazing map and plans ✓ Access to water sources ✓ Proper winter shelter/bedding (story platform) ✓ Preparation of winter forage/hay reserve (story platform: tables) ✓ Annual mortality rate of new-born livestock is less than 10%	Animal welfare database at the Mongolian National PUG Federation with following information:

5. Environmental stewardship

Nomadic herders share rangelands with wildlife and, thus, maintaining healthy rangelands and livestock has a direct influence on the welfare of wildlife. Herders organized into PUGs have an obligation to take care of wildlife species and promote growth of rare plant species in their rangelands.

Evaluation criteria	Source of verification:
✓ Wildlife co-existence (story platform- wild sheep story to write) ✓ Rare species (story platform)	Habitat of wildlife species and rare plant species marked in the seasonal rangelands of PUGs available at the Mongolian National PUG Federation.

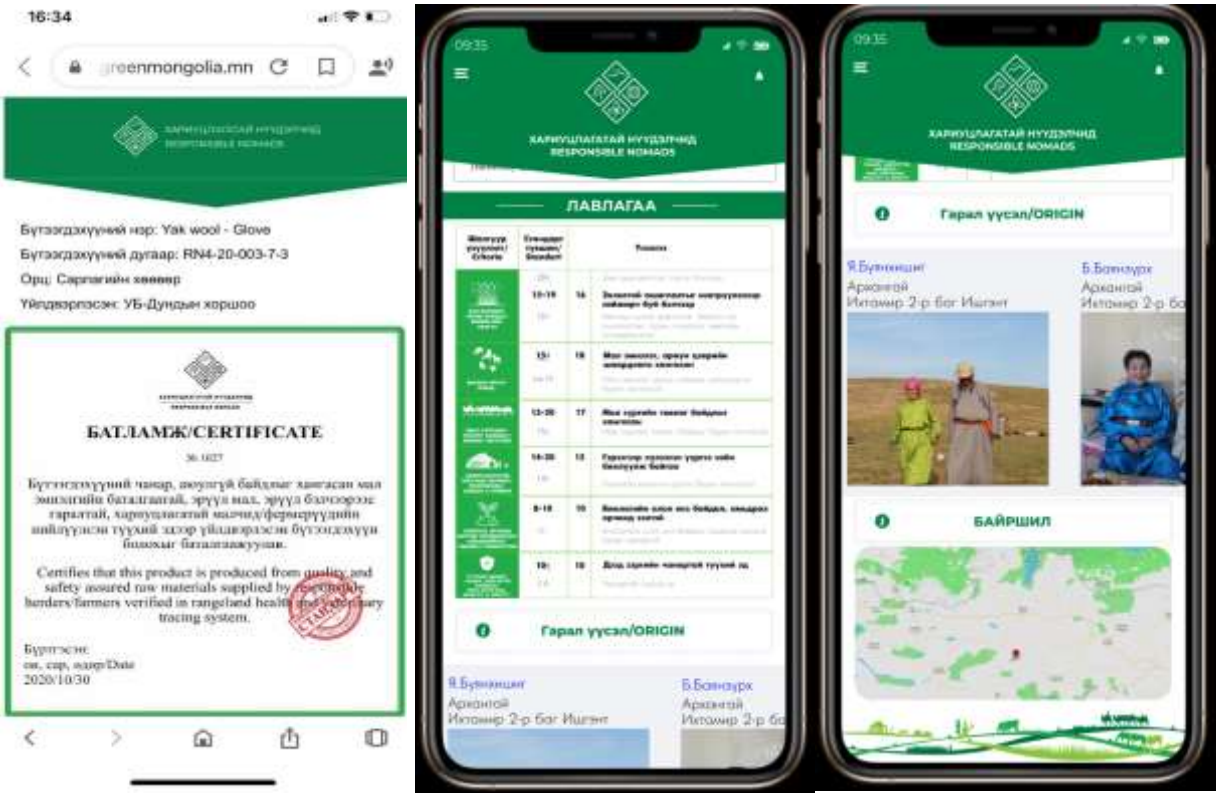
Green Gold Project has supported creation of application for mobile phones for the Responsible Nomads for its customers and buyers to access to information and history about the products verified through the system. The application now has been used in cashmere, yak and baby camel wool and for milk and meat.

6. E-traceability system and smart phone application.

In order to improve quality monitoring, transaprency and accessibility for customers, Green Gold Animal Health Project in cooperation with the Digital Medic., Co., LTD has developed e-traceability system and smart phone application for Responsible Nomads Code of Practice and the standard. The e traceability system enables customers and clients to access the information and data if the raw materials and products made are healthy, and if herder housholds and processing plants participated maintain responsible rangeland and herd management practices and care for the wildlife sharing the rangelands. Responsible Nomads traceability system is administered by the Mongolian National Federation of PUGs: https://responsiblenomads.greenmongolia.mn/login

Picture 2. Operational flow of E traceability system.

Picture 3: Responsible Nomads start phone application (front)



Picture 4: Data and information behind each of the indicators.

3 Beneficiaries

Green Gold Project and National Federation of PUGs have developed criteria based on the feasibility study carried out to assess demand for soft loans from Khas Bank. Out of total 655 herder households of Chandmana soum, 481 herder households (73.4%) participated in the survey. Initial request for soft loans totaled 1.9 billion MNT. In the questions regarding usage of the soft loans with a lower interest rate, 20.5% responded to plant livestock forage, 45.7% to buy high productivity breeding animals, 11.9% to purchase urgently needed households' goods, 4.6% to pay children students fee, and 1.1% to invest in alternative income opportunities such as run a small tourist camp or plant vegetables.

Because the loan portfolio provided by Khas Bank totaled 500.0 million MNT, selection criteria were developed to determine who would benefit from a loan. The criteria considered representation of herder families in the Chandmana soum, taking into account various ecological, social and economic conditions of the soum. In addition, Khas bank required that recipients not have poor loan history from banks, including from Khas Bank. In total, 97 herder families met the necessary criteria required to take part in the project.

1.Ecological/rangeland-related criteria

- Member of PUGs
- Signed PUG Rangeland use agreement
- Implementation of RUAs
- Rangeland health stabilized or improving in the recent three years

2.Social Criteria

- Representative of different herd size groups in the soum
- Women led herder households

3.Economic Criteria

- Representation of poor, middle income and wealthy herder families
- Distance to access to markets soum and aimag centers
- Planned use of the soft loans

97 herders who involved in the “Green Pasture” project represent all 5PUGs in Chandmana soum (Figure 1):

18 herders from Bayankhairkhan PUG
20 herders from Bumbat naran PUG
12 herders from Bumbat PUG
22 herders from Ikh Naran PUG
25 herders from Ovoot PUG

Figure 1: Representation of herders of 5 PUGs

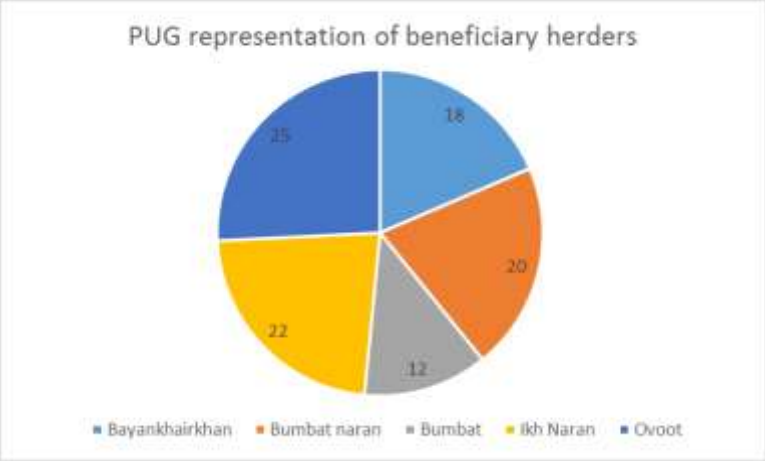


Table 2: Beneficiary-herder households

Herd size	HHs	Number of family members	Percentage in total beneficiary HHs	Livestock numbers	Percentage	Soft loan received	Percentage of in soft loans disbursed
901-1500	6	36	6%	6951	14%	52 500 000	11%
801-900	1	5	1%	919	2%	6 000 000	1%
601-800	19	109	20%	13550	27%	104 000 000	21%
401-600	34	177	35%	16676	34%	175 500 000	35%
301-400	20	87	21%	6574	14%	85 500 000	17%
100-300	17	71	18%	4314	9%	76 500 000	15%
Total	97	485	100%	48984	100%	500 000 000	100%

4. Implementation

4.1 Establishment of the Memorandum of Understanding

The Memorandum of Understanding was established among three participating parties for the implementation of the pilot project: Khas Bank, Green Gold and Animal Health Project of SDC, and the National Federation of PUGs of herders (Annex 1: MoU between three parties).

The overall goals of the project have been defined as follows:

- To support sustainable use of pasture lands, the selected herder households reduce their livestock numbers gradually to match the carrying capacity of the rangeland.
- Develop and test selection criteria on rangeland management, animal health, and stock rate for herder families eligible for soft loans

- Provide materials and information needed to develop training manuals and guidelines for herders, local government and bank officers
- Ensure smooth overall management, implementation, monitoring and assessment of the pilot project
- Provide recommendations on the implementation structure and dispersal of the soft loan beyond the project based on the experiences and results from this pilot
- Successful implementation of the software-based traceability system that traces origin and health of animals from herder households to processing plants. To develop economic design enabling the herder households to earn same income and compensate the livestock number reduction through owning fewer livestock of high quality, producing high quality cashmere and wool
- Based on the project results, develop a proposal of sustainable design for providing financial resources in the form of soft loans for herders.

The role and responsibilities of each party is defined as follows:

1) The Green Gold and Animal Health project of the Swiss Agency for Development and Cooperation is responsible for professional and methodological support

2) The National Federation of Pasture User Groups of Mongolia is responsible for organizing project activities in the rural area including managing, implementing, monitoring and reporting.

3) Khas Bank of Mongolia is responsible for offering soft loan product with discounted conditions to the herders eligible for the project. Will also conduct credit analyses in accordance with the procedure of bank loan products.

4.2 Establishment of Responsibility Agreement and Loan agreement with beneficiary – herder households and dispersal

Each of 97 herder households selected for the pilot project were provided with introductory training prior to dispersal of the soft loan in Chandmana soum. It was carried out jointly by Mongolian National PUG Federation, Khas Bank, and SDC Green Gold Animal Health Project.

In order to monitor the project effectively, the Mongolian National PUG Federation has developed a responsibility agreement (Annex 2: Responsibility Agreement) which was signed by head of each herder household, the Leader of Soum Association of PUGs, the Leader of Aimag Federation of PUGs, the Soum Governor, and the Chairman of Soum Citizens Meeting. The soft loan agreement was signed between herder households and Khas Bank branch in Hovd aimag.

The responsibility agreement details performance criteria on following 3 main issues to be monitored through the Responsible Nomads Traceability system and requires its verification source:

1) Rangeland health
2) Stocking rate reduction
3) Animal health

For each set of performance criteria in the Responsibility Agreement, baselines were established and recorded in the Responsible Nomads traceability system.

4.3 Baseline data recording and registration in the Responsible Nomads Traceability system

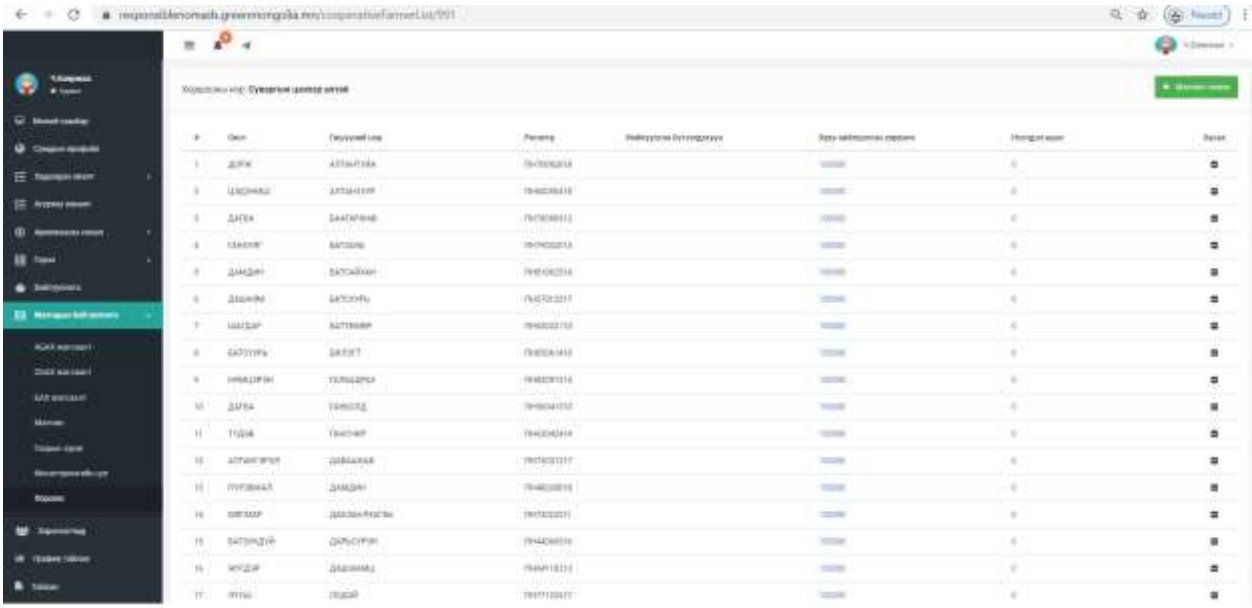
Baseline data on rangeland health, stocking rate and animal health indicators of 615 herder households including 97 beneficiary herder households were registered in the Responsible Nomads Traceability system in cooperation from staff members of the Soum Government step by step. Since the Green Gold Project has been working in the Chandmana soum from 2015, all herders are organized into 5 Pasture User Groups and have signed 15 years Rangeland Use Agreement in 2016 with the soum government covering 531.8 thousand hectors of rangeland. The rangeland health monitoring data dates back to 2015 which makes it possible to monitor changes from 2015 to 2020.

Figure 2. Summary of PUG data registered in Responsible Nomads traceability system.

Cooperative Membership

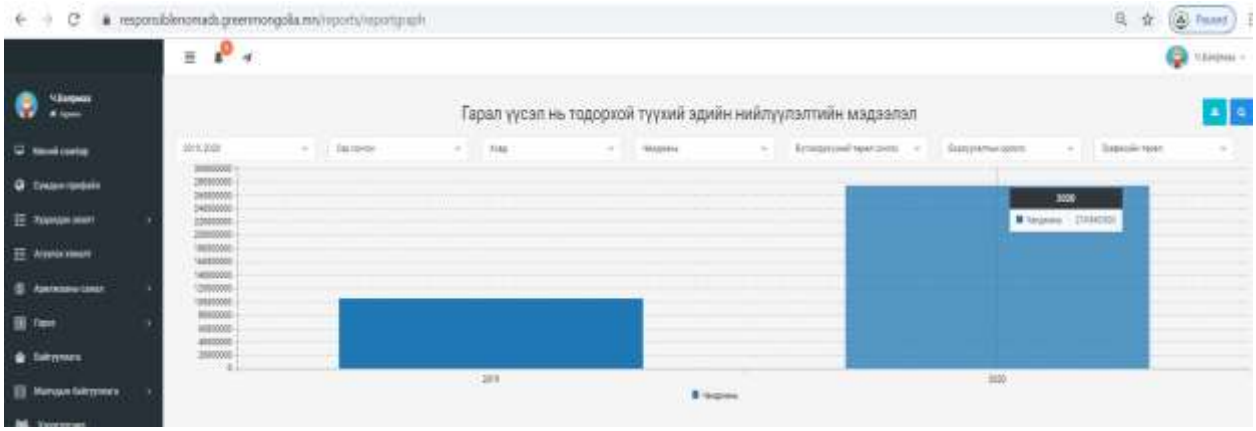
All beneficiary herders are the registered members of the cooperative. To ensure reliable supply and quality of raw materials from herder families, cooperatives are established to manage the sale of raw materials on their behalf.

Figure 3. Registered cooperative members in Responsible Nomads traceability system.



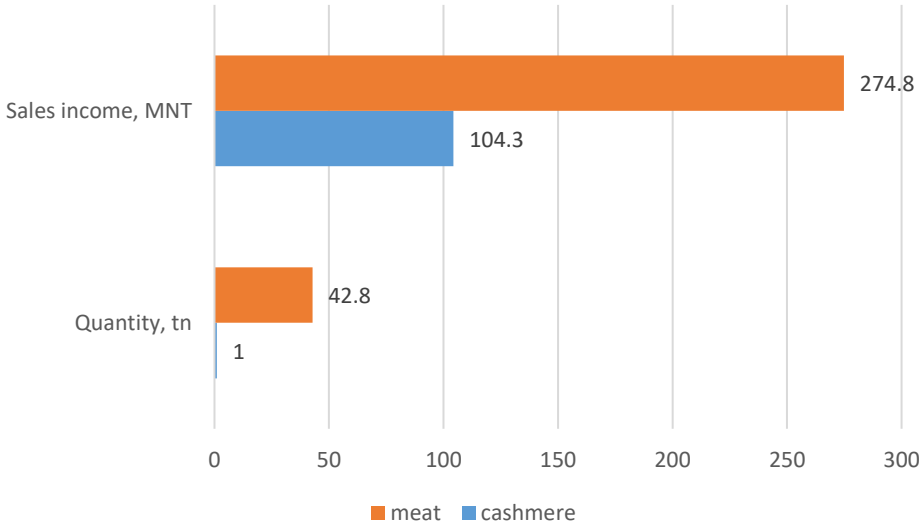
Cooperatives negotiate a contract and organize a supply order with buyers, accounting for the quality and volume of raw materials required by the buyers. The Responsible Nomads traceability system allows the cooperatives to present data and information regarding the quality of the materials, including the environmental impact and sustainability. These cooperatives then facilitate the supply from herder members as per requirements in the contracts. The income of cooperative has been increased by MNT 170.5 million in 2020 compared to the previous year mainly from sales of livestock per herd rotation plan to keep the proper rangeland carrying capacity and caution of herders of difficult winter leading to sell more livestock in the market.

Figure 4. Sales of the cooperative made through Responsible Nomads traceability system.



Herders and cooperatives have been registered in the Responsible Nomads Livestock raw material traceability system for the objectives of linking to new markets, validating the origin and quality of their raw materials for better value. Through the cooperative, herders supplied 42.8 tons of meat and 1 ton of cashmere to the national processing companies in 2019 and 2020 with the sales income of MNT 379.1 million.

Figure 5. Sales made through Responsible Nomads traceability system.



4.4 Training and capacity development activities

Mongolian National PUG Federation and Green Gold Project has carried out three level of training to beneficiary herders, PUGs and Soum Association of PUGs, cooperative leaders and local government specialists.

Introductory training was made twice during feasibility study in March and at the dispersal of soft loans in April to selected herder families in Chandmana soum. This has covered topics related with the purpose of Green Pasture soft loan project, requirements to qualify, training and capacity development activities to offer, and how the performance of beneficiaries to be monitored (Annex 3: Training program).

Mid-season training was carried out in June 2019 focusing on three main topics: data entry, quality check and administration of Responsible Nomads Traceability system, and introduction of on-line animal health traceability system, ear tagging of livestock herders have planned to market in 2019 and finding buyers to sell the livestock and price negotiation (Annex 4: Training program). Green Gold Project has provided

equipment to Soum Veterinary Unit as part of introducing on-line animal health traceability system worth 20 million MNT.

End of season training was carried out in September 2019. It has focused on the topics of source of verification of indicators in the Responsibility agreement: rangeland management, livestock number reduction and animal health (Annex 5: Training program).

In 2020, because of the pandemic disease restrictions and Parliament and local election campaign period, Mongolian National PUG Federation and Green Gold Project has carried out 4 online trainings for aimag and soum APUGs and cooperatives. Training was organized covering 9 topics mainly on PUG development, development and enforcement of PUG and soum rangeland management plan, registration of RUA into land manager database, development and approval of aimag and soum responsible rangeland management regulations, cooperative development, raw material supply, improvement of animal quality and health, estimation of herd rotation at soum and PUG level, estimation/preparation of hay and fodder needed at PUG and soum level and support to PUGs with female leader for the development of Responsible Nomads traceability system.

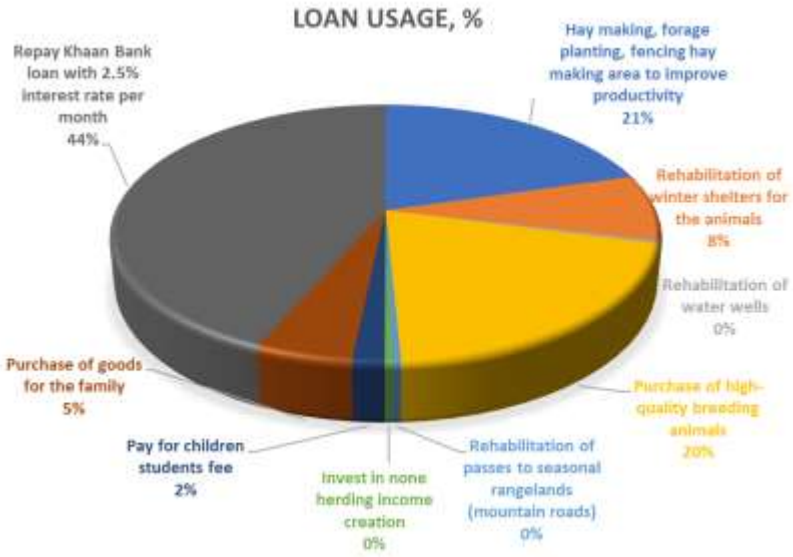
Picture 5: Online training for aimag and soum herder institutions

4.5 Monitoring of project implementation

a) Loan usage

All the herders used the loan for the intended purposes stated in their loan application. In addition to the loans received, herders co-invested MNT 43.8 million for their intended loan purposes. Out of total co-investment, 43.6% of the loan was spent to pay back pending Khaan Bank loans to qualify for Green pasture loans from Khas bank which has twice cheaper interest rate. 50.2% of co-funding were invested on activities related with rangeland and herd management to secure the livestock production: 20.5% for hay making for winter, forage planting for additional forage for the livestock and fencing hay making area to improve productivity while protecting from animal grazing during critical vegetation period, 20.2% was invested on buying high quality breeding animals to improve productivity per head of livestock mainly sheep and goats; 8.3% for rehabilitation of winter shelters and 1.2% for rehabilitation of roads, wells and non-herding income generation (Figure 2). Only 6.5% was spent on personal consumption and for the tuition fee of their children studying at universities.

Figure 6: Soft loan investment



Out of beneficiary herders, 37 percent had less than 400 heads of livestock which is considered as vulnerable and 34 percent had less than 600 heads of livestock when they had received the soft loan. Herders priorities go to own consumption as food items, fuel allowing access to markets and services, education and healthcare, etc if their income is low. For herders with less than 500 heads of livestock, the herd size reduction is not recommended to sustain their livelihood. Rather it is recommended to herders who have more than 600 heads of livestock, depending on the rangeland carrying capacity. The typical Mongolian herder household of 5 members is capable of producing enough raw materials and products to provide for their household needs and make extra earnings by selling the rest, if they own at least a number of 500 livestock, consisting of a proportionate number of 5 different animal kinds. Even, the majority of beneficiary herder households had insufficient numbers of livestock for a wider production, these herders are keeping the number of animals while not increasing.

> **Ts. Yura, herder of Ikh Naran PUG:** My family has received MNT 3 million soft loan from Khas bank. With the loan, we fenced our hay making area of 3 hectors to improve animal fodder supply and reduce the cost spend every year for the purchase of hay and fodder. Every year with my children we prepare 3 tons of hay which costs around MNT 1 million. By having our own hay field, we would save this amount and get return of the loan just within 3 years. As the loan interest rate was low compared with other banks, we were happy to get and pay back the loan from sales income of cashmere and meat. If this kind of soft loan is available for herders, it could have great value to improve lives of herders.
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As herders are livestock business operators which is the main livelihood source of herders, most of them use the loans as an investment to ensure the security of their livestock production business, as to prevent from the loss of animals and decreased animal productivity, as well as to ensure the livestock welfare by

preparing hay and fodder, having better warm shelters and wells. As herders are more thinking and aware of livestock quality instead of the quantity, 20.2 % of co-funding was spent on purchase of high breed males for improved animal breeding, quality, and increased livestock productivity. However, herders' financial literacy is extremely limited to get the loan for higher return businesses. For this purpose, to properly manage and plan herder household business and tackle the shortage of the cash for herders throughout the year, possible intervention needs to be taken further by banks or other stakeholders to enhance capacities of herders to increase the income and have alternative income source.

b) Repayment of Loans

All herder households have paid loans as per schedule agreed with the Khas Bank. As repayment time is only 4 times a year, it has allowed herders more time to manage their cash flow better. As of December 2020, 82 herder families have paid 94% of total loans received and the remaining amount of MNT 29.8 million of 15 herder families will be paid back in January 2021 according to the repayment schedule. Higher repayment rate and none of overdue loans of these herders prove successful implementation of the Green project and herders' effort not to have a poor loan record for this kind of soft loans to be applied in the country for other herders, even in the period with COVID restrictions which has a drastic influence on the income of herders. According to the joint Household Response Survey implemented on a national sample by the National Statistics Office and the World Bank in 2020, more than 70 percent of farmer and herder households reported their agricultural income has declined compared to the same time last year. As a result of COVID-19, global demand for cashmere fell drastically leading to a decline in raw cashmere prices. The sales of final products have also decreased due to lowered demand for cashmere goods in Europe, as the main buyer, since the COVID-19 outbreak. Domestic sales also have declined due to disruptions in the tourism sector and the export of semi-processed cashmere has deteriorated as well, caused by border closures. Meat processing factories and met exporters faced the challenge of revenue reduction of 80% due to the restriction of national large-scale celebrations of Lunar New Year.

c) Improved rangeland management

Since rangeland is the key resource for animal husbandry, the state of rangeland health and its shifts is served as a key indicator if the Responsible management. Based on ecological potential of rangelands, Chandmani soum having up to less than 200 mm precipitation a year belong to the non-equilibrium persistent (NEP) model of rangeland dynamics (Ellis & Swift1988; Behnke & Scoones 993), which focuses on effects of abiotic factors on plant community and herbivore population dynamics. This region is characterized by typical desert steppe climate with relatively dry and windy climate where average air temperature fluctuates. Chandmani soum rangelands fall under category of Stipa/Gobica/Glaresa-Grass-Allium Polyrrhizum-Shrub steppe rangelands in sandy plain desert steppe (Figure 10). Identification of ecological potential of the rangelands help to identify the potential states of rangeland health pertinent yield and carrying capacity and compared to which current state of health or degradation, yield and carrying capacity are defined.

Figure 7: Distribution of the Stipa gobica/glareosa dominated rangeland in Desert steppe including the Chandmani soum of Khovd aimag

Since 2015, with the support of Green Gold Project, all herder households of Chandmani soum are organized into 5 Pasture User Groups (Figure 3) and signed Rangeland Use Agreements with the Soum government. In 2017 rangeland health photo monitoring spots are installed in each of the 4 seasonal rangelands all 5 PUGs.

Precipitation driven fluctuations in rangeland productivity partly support the ecosystem resilience in first and requires lighter grazing management with increased mobility. Because due to drier condition most of plants stay in dormancy for needed time period and able to be bloomed and function well once have the satisfied level of rainfall. Mongolia is one of countries having biggest impacts of climate change, so the continuous rise of air temperature and decline of precipitation requires an adapted management

Within the target area, gravelly hills and sandy plains covered mainly Stipa gobica/glareosa-Semi-shrub and Stipa gobica/glareosa-Grass-Allium polyrrhizum–Shrub desert steppe rangeland types (Figure 14). These rangeland communities are highly resistant to very dry condition;

- Gravels on the soil surface through hills stabilize the soil surface and protects from soil erosion and carbon emission
- Sand in plains cover the perennials base protecting from trampling and moisture evaporation

The dominant plant species are grasses; Stipa gobica, S. glareosa and Allium polyrrhizum. Moreover, subshrub and shrub species like Anabasis brevifolia, Eurotia ceratoides and Caragana spp. are common in these area (Picture 3).

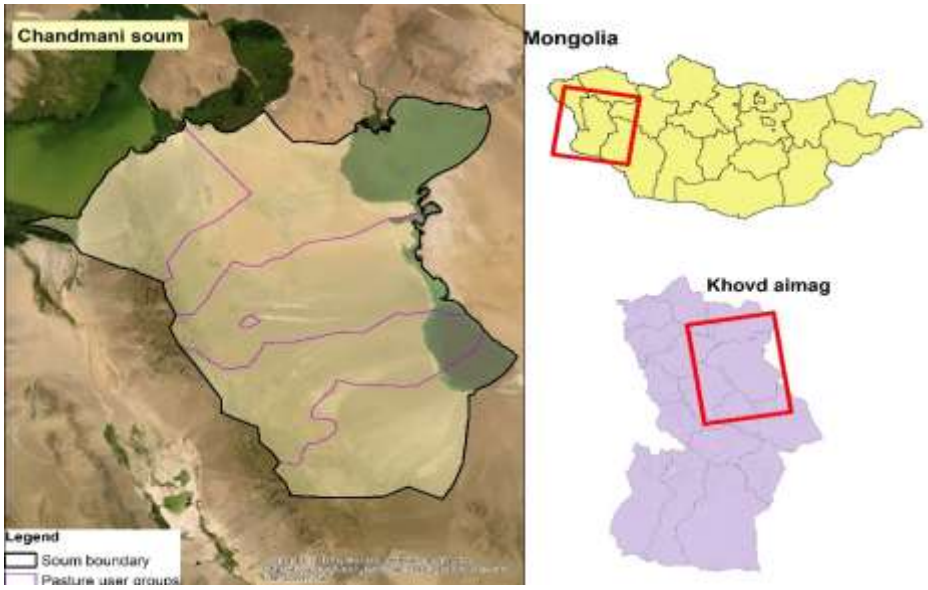
Picture 6. Key plant species in Gobi rangeland. Upper left: Stipa gobica; upper right: Anabasis brevifolia; lower left: Allium polyrrhizum; lower right: Caragana spp.

Table 3. Criteria of the recovery

I	The plant community is at or near reference conditions (not degraded), no action required, maintain current management
II	The plant community is altered and may be rapidly recovered (one to several growing seasons) with favorable climatic conditions and/or a change in management (e.g., seasonal deferment, rotation).
III	The plant community is altered and may take several years to over a decade to recover with changed management (seasonal deferment and long-term rest). Alteration represents a significant loss of important ecosystem services, but recovery is possible in time.
IV	The plant community is altered due to the loss of key species, invasion of noxious plant species that is unlikely to be recovered for well over decade, if ever, without intensive interventions such as species removal, seeding, or other manipulations.
V	The plant community is altered due to extensive soil loss, accelerated erosion rates, or salinization. Previous ecosystem services have been lost and it is impractical to recover them.

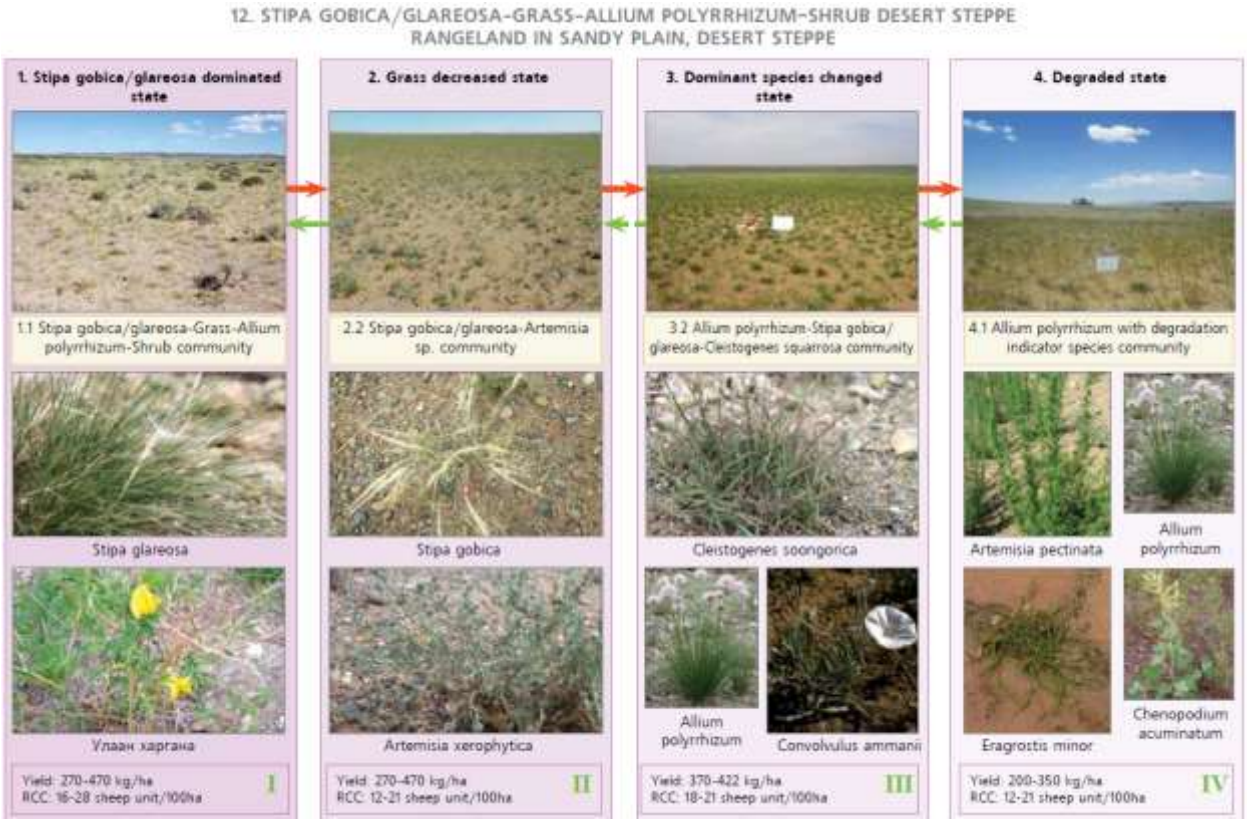
Since 2015, with the support of Green Gold Project, all herder households of Chandmani soum are organized into 5 Pasture User Groups (Figure 11) and signed Rangeland Use Agreements with the Soum government. In 2017 rangeland health photo monitoring spots are installed in each of the 4 seasonal rangelands of all 5 PUGs.

Figure 8: State Transition model of the Stipa gobica/ glareosa dominated rangeland.



According to state and transition model of the Stipa/gobica/glaresa-Grass-Allium Polyrrhizum-Shrub steppe rangelands, potentially it has following 4 different states such as i) Stipa gobica/glareosa dominated state; ii) Grass dominated state; iii) Dominant species changed state and iv) Degraded state (Figure 3).

All important information of this rangeland community such as key dominant species, average yield and the resilient carrying capacity are in the STM chart that is used as a road map to identify which state the rangelands were when they signed the Rangeland use agreements with soum governor, in other words in the baseline years, 2017 in our case. This baseline information is used in monitoring and assessment of the grazing management impact annually whether the state has stabilized, improved to better state or degraded.



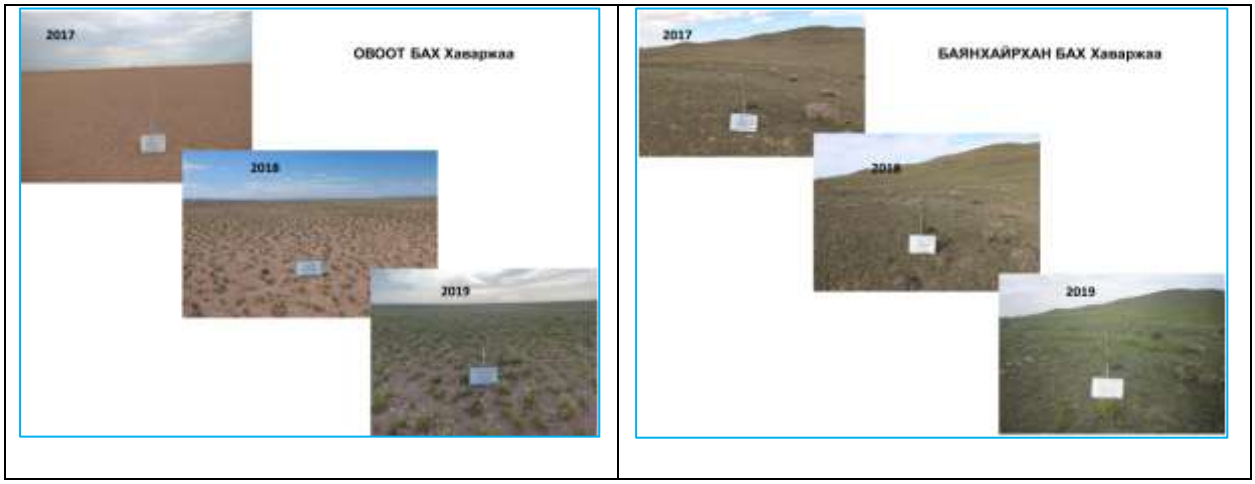
According to research experiments keeping degraded rangeland in the closure carried out in Chandmani soum for over 5 years show that with improved rotational grazing and reduced grazing pressure for up to 3 years rangelands within ranges of recovery classes I-III recover.

Figure 9. As experimental exclosures in Chandmani soum shows, slightly to moderately degraded rangeland has a high potential to recover if the grazing pressure is reduced.

Based on progress of experimental exclosures demonstration, herders understood well about the doubled role and needs of rotating in both dry and good years and started to raise the possibilities to make rotations within the growing season.

As a result of continues training and awareness raising on the consequences of rangeland degradation, potentials to recover due to reduced grazing pressure, Chandmani soum herders are taking more and more active part in improved grazing management plan recommended by Soum Rangeland Management Working Group and Soum Association of PUGs.

Figure 10. Photo monitoring results of recovery of summer rangelands due to improved rotational grazing



There is common mistake that many herders underestimate the role and impact of rotational grazing especially in this region, a continuous grazing pressure through whole spring or summer in dry years, damages the soil surface and has a risk to be easily eroded which is common in this dry, windy region. Because of high vegetation cover in good years with good rainfall, some herders do not rotate their rangelands as needed. Due to lack of experience many herders skip the opportunity to restore their rangelands, they do not know that combination of proper management and good climatic conditions produce doubled results in recovery instead of high cover mainly from non-palatable annuals.

In 2019, Green Gold Project and Mongolian National PUG Federation used Soft loan as an additional means to enforce rotational grazing and stocking rate management in the rangelands heavily degraded. Recommended rotational grazing scheme was included in the Responsibility agreement to rest heavily degraded winter and spring rangelands in critical situation within dates agreed. According to the report from Soum Rangeland management Working Group, and all herders benefited from soft loans fulfilled their responsibilities as per seasonal rotational grazing plan for 2019 and 2020 moving out and in at exact dates. On a few cases in first year of project herders from neighboring soums were grazing without permission in winter rangelands freed from grazing pasture for resting from April till November. Soum Association of PUGs and soum government has negotiated with governors of neighboring soums and baghs to move out and agreed to respect agreed seasonal grazing boundaries.

According to the baseline measurements in Figure 5, the stocking rate was relatively balanced in fall and spring rangelands, however, the rate exceeded carrying capacity by 3-6 times in summer and winter. Therefore, the Rangeland Use Agreements included following two measures in summer and winter rangelands:

1) Increase frequency of rotational grazing and maintain appropriate stocking rate in summer and winter rangelands depending on the level of degradation to allow recovery time for the plants.
2) Reduce animal number gradually to adjust into current carrying capacity of rangelands.

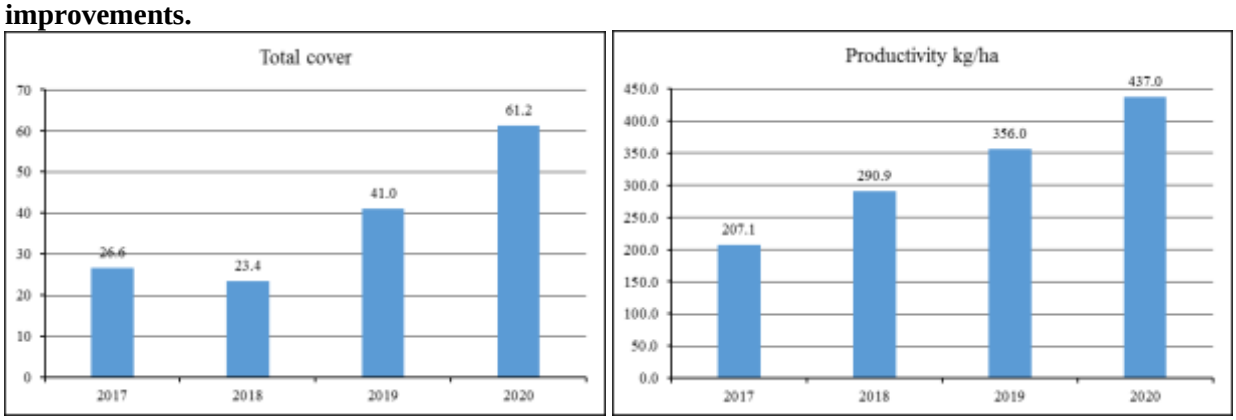
As a result of consistent resting during critical vegetation period and reducing grazing pressure on heavily degraded rangelands, the rangeland health in Chandmani soum was stabilizing in 2019 and had significant improvement quantitatively and qualitatively in 2020.

Total cover and productivity are the primary indicators that respond well to management changes. These two indicators in Chandmani show evidence of rangeland health improvement. According to grazing impact monitoring data of PUGs since 2017-is the baseline year entered in the state data base at the ALAMGC, total cover and productivity of rangelands has improved (Figure 6). The increase in total cover and productivity improves the habitat and seed beds that support the recovery for other plants, especially for

palatable grasses. As a part of rangeland management plan for 2019-2020, there was added one provision in the soum RM regulation that herder families when they move to fall rangelands and back through spring rangelands, not allowed to stay more than 2 days in the corridor/ spring rangelands which have all been implemented.

Vegetation cover and productivity are a short-term indicator that define the recovery class and the carrying capacity. As figure 6 describes, compare to the 2017 a baseline year, the total cover increased by 2.3 times and the productivity increased by 2.1 times that means a good amount of resource. In stand point of management, this resource can be used for the short term measures such as lamb fattening and restoration of ecosystem functioning instead of increase of livestock number as many herders do.

Figure 11. The primary indicators of the recovery: total cover and productivity show steady improvements.

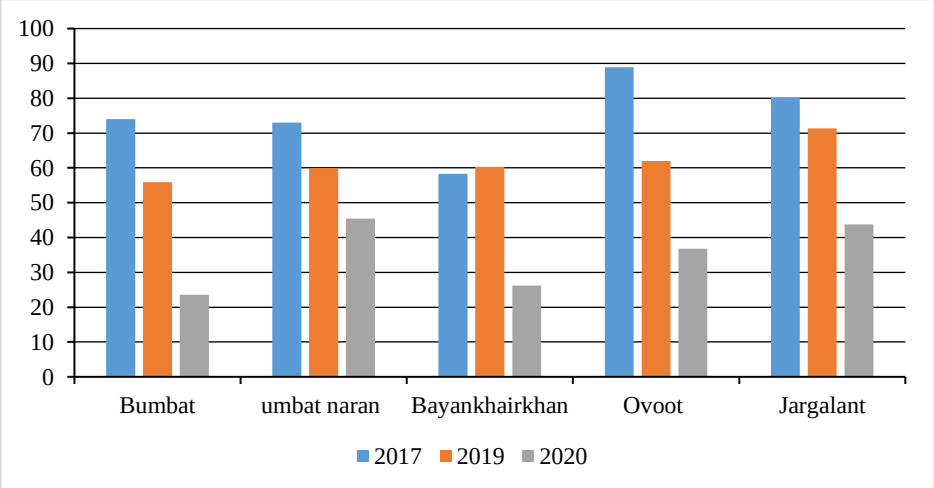


Due to the vegetation cover increase, the bare soil coverage decreased significantly. Bare soil has decreased by 1.6-3.1 times in recent 4 years that improves the following services of rangeland ecosystems like

- Stability of the soil surface
- Protection from wind and water erosion
- Supporting the carbon storage & sequestration and decrease the emission.

According to literatures on potential carbon sequestration in rangeland through better grazing management, countries with similar ecological condition with desert steppe in Mongolia were able to increase the carbon sequestration up to 2.71 ton per hectare in one year. So, herders in Chandmani except maintaining the carbon emission, able to increase the sequestration which is a great contribution for programs addressing the decrease the greenhouse gas emission.

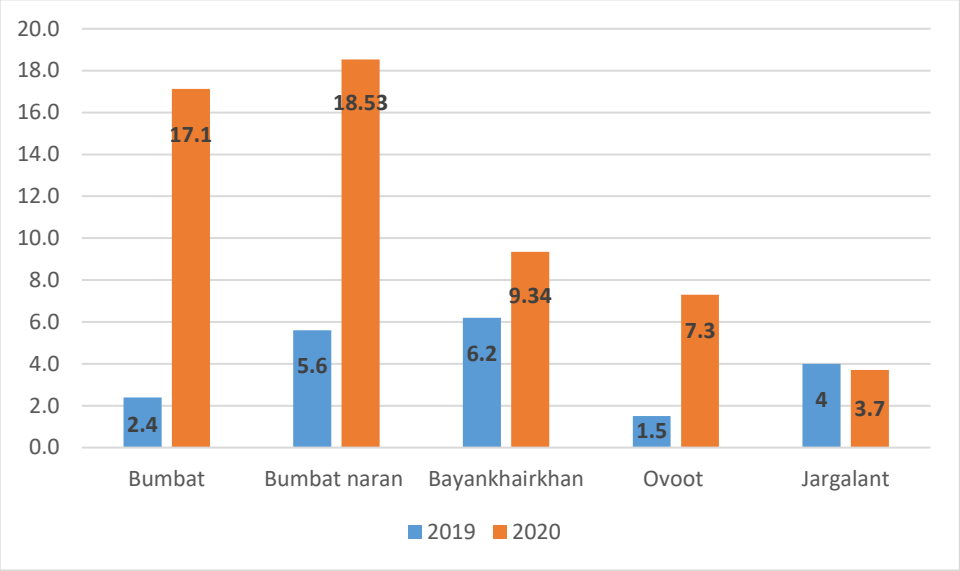
Figure 12. Reduction of bare soil that is an important indicator of the rangeland ecosystem services



Stipa spp. are well known plant, herders call them as a Mongol grass (Mongol uvs) and Narrow grass (nariin uvs). Abundance of Stipa is the key indicator of rangeland health and rangeland ecosystem functioning that

responds to more management changes. Stipa spp. that is very resistant to grazing and able to be recovered after long time period once the grazing pressure is at appropriate level.
In case of Chandmani soum that located in the desert steppe region, there is consistent level of relatively high cover of Stipa (Figure 8) and is sign of improved rangeland health.

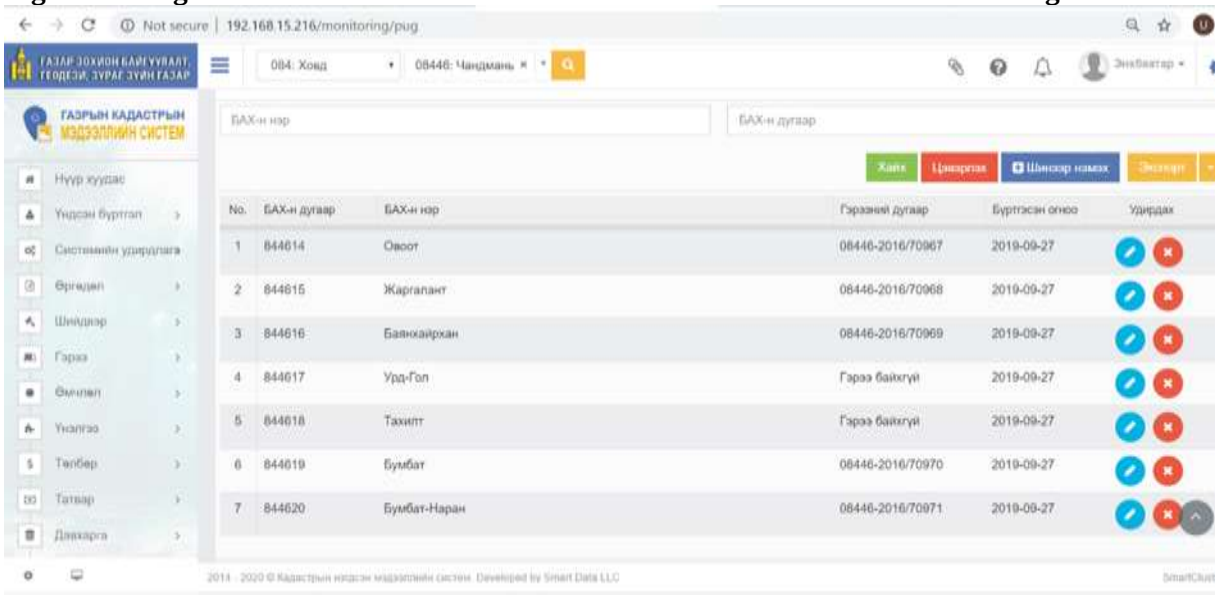
Figure 14. Increase in Stipa spp. Cover



According to figure 8, cover of Stipa spp is increased by up to 14.9 percent. Due to adjustment of grazing pressure for continuous years cover of Stipa spp. was stabilized in 2019 and further increased in 2020, because of i) Stipa plant was able to go through all over phases of growth and development and could seed; ii) the seed bank in the soil benefited the grazing pressure reduction and germination rate was high.

Since all beneficiaries (herder families) of Green loan project, all of 5 PUGs in Chandmani have a long-term user right that is officialized by the Certificate (Figure 9), enforcement and impacts of RUAs and annual rangeland management plan annually assessed by photo monitoring results and recovery class maps (Figure 10).

Figure 15: Registration table of the PUGs RUA in the ALAMGC national land management database

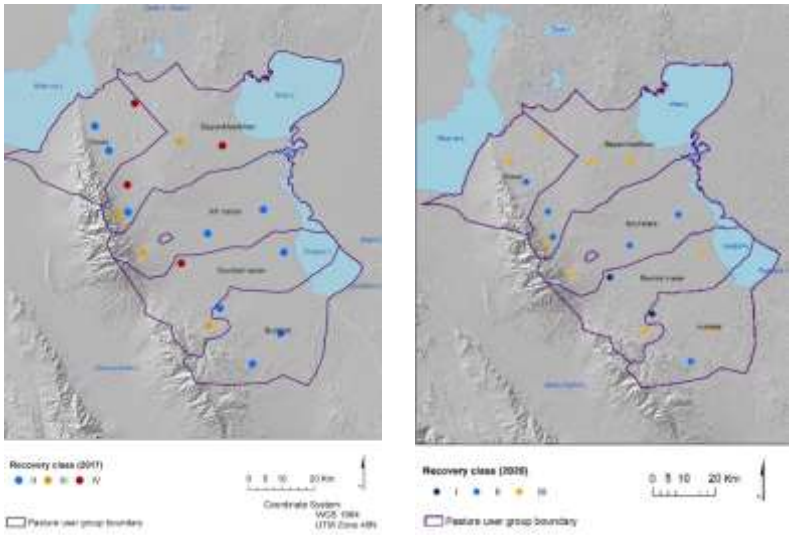


Land management Data base at the ALAMGC enables soum land managers in cooperation with the Soum Association of PUGs to provide recommendation to PUGs a) to plan their rotational grazing and stocking rate in accordance with rangeland productivity and degradation; b) monitor the enforcement and

implementation; c) monitor grazing impact on rangelands, and d) enforce RUAs. In 2020 following grazing management recommendations were provided:

1. When herder families move to fall rangelands and back through spring rangelands, not allowed to stay more than 2 days in the corridor/ spring rangelands.
2. Follow the rotational grazing plan per PUGs.
3. Not to increase the stocking rate in good years, leave the increased productivity for supporting the fixing and strengthening of ecosystem functioning.

Figure 16: Photo monitoring spots in PUG seasonal rangelands assigned by colors representing the level of recovery capacity.



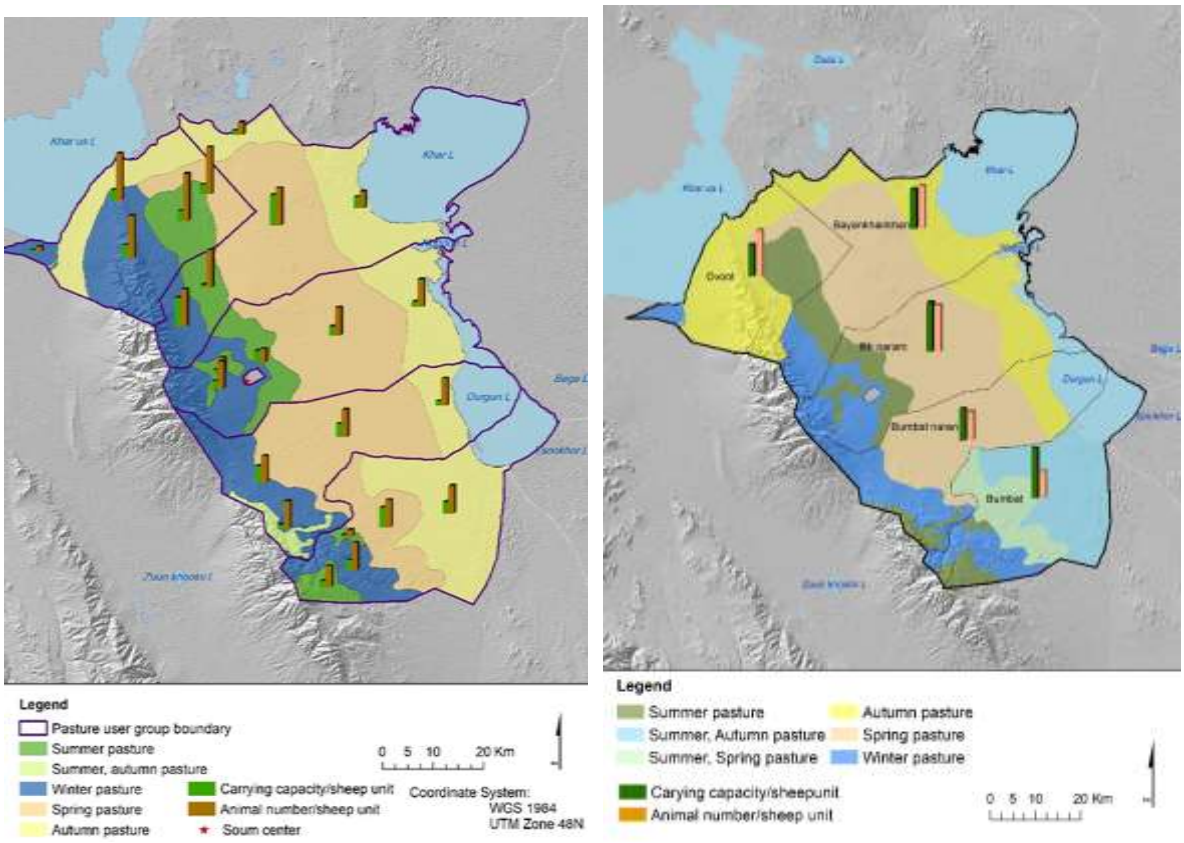
According to the recovery class dot map for 2020, state of rangeland health in Chandmani soum is improved and compare to the, 2017 a baseline year, especially the winter rangeland health state had a great improvement and shifted to upper state (Table 1). In other words, 12 percent of rangelands recovered from Class 2 to Class 1, healthy state and the 24 percent that was close to the threshold to the desertification, recovered to the Class 3.

Table 4. Rangeland assignment by Recovery classes

Recovery classes	Rangeland health and recovery	**Assignment of rangelands, %**	
		2017	**2020**
Class I (Dark blue)	Reference conditions (non-degraded) or requires 1-3 growing seasons for recovery from minor changes.	-	**12**
Class II (Light blue)	May be rapidly recovered (3-5 growing seasons)	52	**35**
Class III (Orange)	May take 5-10 growing seasons to recover; many ecosystem services lost	24	**53**
Class IV (Red)	Local loss of key plant species, invasion of noxious plant species, or alteration of hydrology that is unlikely to be recovered for over a decade to many decades without intensive interventions	24	-
Class V	Extensive soil loss, accelerated erosion rates, or salinization. Ecosystem services have been lost and it is usually impractical to recover them (often regarded as true desertification).	-	-

Due to the improvement of rangeland health and well increased rid off rate of animals that was higher than previous years; the ratio of stocking rate and carrying capacity had a very positive change (Figure 17).

Figure 17. Ratio of the current stocking rate and carrying capacity by PUGs



Grazing impact monitoring and stocking rate maps enable herders to plan their rotational grazing and stocking rate in relation to rangeland health and avoid concentration of livestock in degraded rangelands and allow regeneration period for the plants.

These monitoring results used in assessment of herders responsibility, enforcement of the RUA and Responsibility agreement. So, herders are assigned and classified to following 3 levels;

1. Responsible herder having a healthy pasture because of proper grazing management
2. Responsible herder with stabilized pasture because of changing of improved grazing management
3. Not responsible herder having a pasture that is further degraded
4. Based on photo monitoring results of 2020, the all HFs of Green Loan project were assigned by the Responsibility criteria and the 12 percent assigned as "*Responsible herder having a healthy pasture because of proper grazing management*" and 88 percent as "*Responsible herder with stabilized pasture because of changing of improved grazing management*".

d) Reduced stocking rate

Reducing stocking rate is the second important measure to restore degraded rangelands and maintain sustainable use in the long run. It was included in the Responsibility agreement signed with the beneficiary herder families.

Stocking rate reduction plan per each of the PUGs with reference to rangeland carrying capacity was estimated using herd size management software developed by researchers of Department of Agro-Ecology from the Mongolian University Life Science within Green Gold Project (Figure 13). This software is designed to plan herd size and composition for 5-10 years and monitor implementation with following indicators: livestock type, age, sex, productivity of meat, cashmere and wool production.

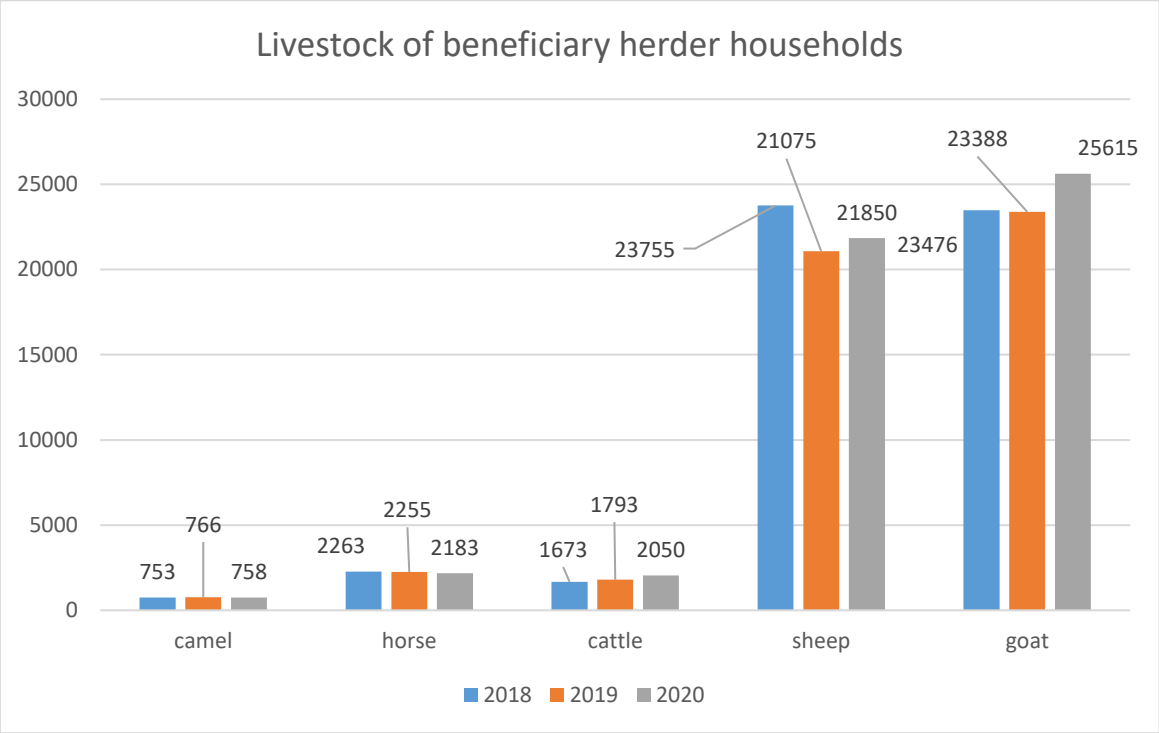
Picture 1: Manual for running herd size management software adjustment

All beneficiary herder households and local livestock experts were trained to use the software. All PUGs applying software in the planning of herd size management to better manage stocking rate and livestock sales.

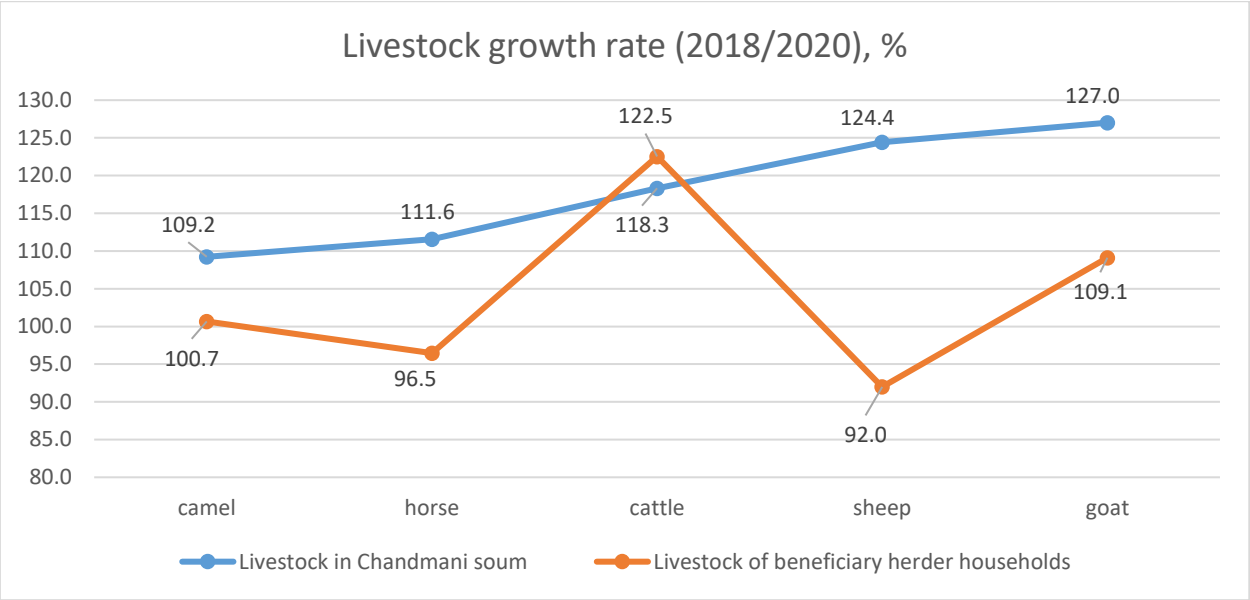
In the Responsibility Agreement, beneficiary herder households have agreed to reduce herd size a minimum by 10%. In order to monitor, reduction of herd size all livestock for sale was ear tagged.

According to field monitoring conducted in November 2019, all beneficiary herder households have reduced herd size as agreed in the Responsibility agreement on average by 16%. This is monitored with Digital Veterinary Certificate in the Animal Health traceability system on which processing plants are also registered. The ear tags make it possible to track the livestock sold through use of unique codes for each animal. These codes allow consumers and retailers access to the medical history of the animal and origin in other from which PUGs, Bag, Soum and Aimag.

Figure 18. Number of beneficiary herders' livestock (2018-2020)



According to 2020 livestock census, number of livestock in Chandmani soum has increased by 51.2 thousand heads on all types from baseline of 2018. As total number of livestock in Chandmani soum has increased by 24.8 percent in 2020 compared to the baseline, the increase for beneficiary herders was only 1.0 percent and this is almost 25 times less than the soum average. This result indicates increased responsibility of beneficiary herders with a very positive indicator on reduction of animals fulfilling their contractual responsibility.



With the assistance of herd size reduction software all PUGs have developed herd size reduction plan for 5 years (2019-2023) which is attached to the Rangeland use agreement and monitored.

a) Bumbatnaran PUG

Types	2019		2020		2021		2022		2023	
	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd
Sheep	11750	48.7%	11133	48.9%	10553	49.2%	10005	49.5%	9495	49.8%
Goat	10270	42.5%	9578	42.1%	8925	41.6%	8323	41.2%	7768	40.7%
Cattle	955	4.0%	904	4.0%	858	4.0%	813	4.0%	775	4.1%
Horse	1008	4.2%	948	4.2%	891	4.2%	838	4.1%	793	4.2%
Camel	168	0.7%	188	0.8%	202	0.9%	217	1.1%	235	1.2%
Totally	24151		22751		21429		20196		19066	

a) Ikh naran

Types	2019		2020		2021		2022		2023	
	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd
Sheep	17126	38.9%	16222	38.8%	15383	37.8%	14590	37.9%	13839	37.9%
Goat	22308	50.7%	21033	50.3%	20774	51.0%	19374	50.3%	18066	49.5%
Cattle	1475	3.4%	1400	3.3%	1328	3.3%	1258	3.3%	1197	3.3%
Horse	1580	3.6%	1488	3.6%	1401	3.4%	1319	3.4%	1239	3.4%
Camel	1513	3.4%	1652	4.0%	1846	4.5%	2000	5.2%	2160	5.9%
Totally	44002		41795		40732		38541		36501	

b) Ovoot

Types	2019		2020		2021		2022		2023	
	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd
	13154	28.9%	12446	29.1%	11800	29.4%	11206	29.7%	10656	29.8%
Sheep	27151	59.7%	25273	59.2%	23569	58.7%	22007	58.3%	20551	57.5%
Goat	2316	5.1%	2184	5.1%	2068	5.1%	1889	5.0%	1889	5.3%
Cattle	2259	5.0%	2119	5.0%	1998	5.0%	1886	5.0%	1787	5.0%
Horse	632	1.4%	675	1.6%	721	1.8%	783	2.1%	848	2.4%
Camel	45512		42697		40156		37771		35731	

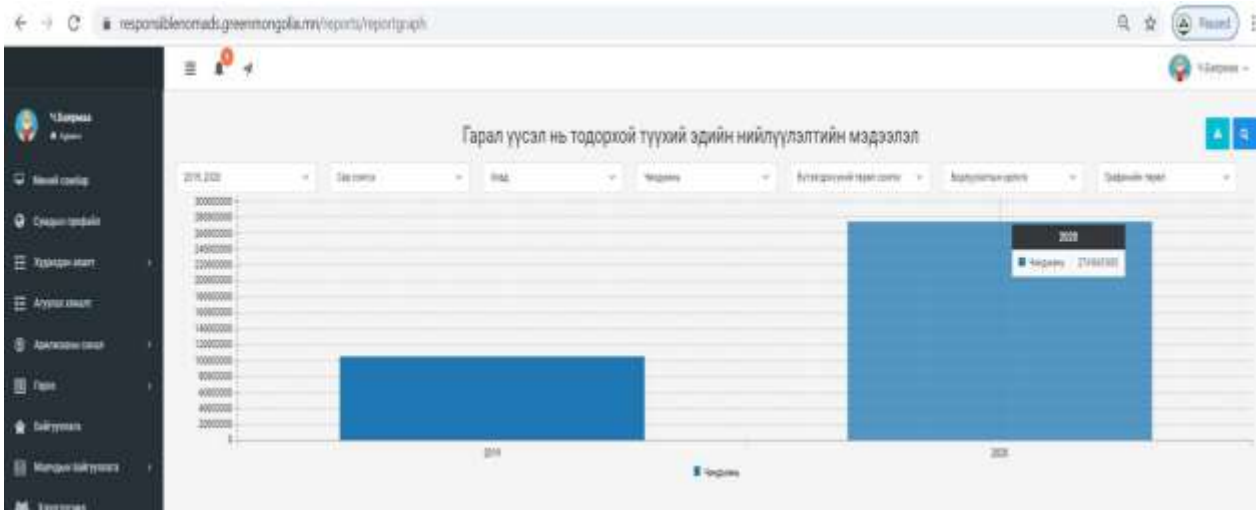
c) Bumbat

Types	2019		2020		2021		2022		2023	
	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd
	13400	44.5%	12668	44.8%	12035	45.2%	11404	45.5%	10863	45.8%
Sheep	14606	48.6%	13608	48.2%	12708	47.7%	11845	47.2%	11072	46.7%
Goat	576	1.9%	545	1.9%	517	1.9%	492	2.0%	467	2.0%
Cattle	1306	4.3%	1225	4.3%	1153	4.3%	1084	4.3%	1030	4.3%
Horse	194	0.6%	211	0.7%	229	0.9%	253	1.0%	281	1.2%
Camel	30082		28257		26642		25078		23713	

d) Bayankhairkhan

Types	2019		2020		2021		2022		2023	
	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd	number	% in total herd
	5997	34.3%	5727	34.4%	5461	34.8%	5085	35.0%	4778	35.2%
Sheep	10218	58.4%	9702	58.2%	9044	57.7%	8322	57.3%	7727	56.9%
Goat	791	4.5%	755	4.5%	716	4.6%	691	4.8%	652	4.8%
Cattle	477	2.7%	467	2.8%	442	2.8%	424	2.9%	410	3.0%
Horse	8	0.0%	8	0.0%	8	0.1%	10	0.1%	12	0.1%
Camel	17491		16659		15671		14532		13579	

Chandmani soum herders had taken measures not to increase the animal number by planning not to have offspring for the last 2 years depending on the rangeland condition. However, the enforcement rate of five PUG herd reduction plan for 2020 has been reported as 41 percent. Sales of meat and live animals could not hit the target due to disruptions in the tourism sector and the export of meat has deteriorated as well, caused by border closures. Meat processing factories and meet exporters faced the challenge of revenue reduction of 80% due to the restriction caused by the pandemic disease having negative influence for the sales of meat by herders. After 2 years regulation for the number of animals, herders had received offspring in 2020 with better rangeland condition and capacity.
Sales of cooperatives made through Responsible Nomads traceability system.



e) Local government support for improved rangeland management

Chandmani soum Government has been supporting Green Pasture soft loan project and has been active stakeholder for the enforcement of this project. Local Government has established Rangeland Use Agreement with PUGs and one of the main conditions of the RUA is to introduce planned rotational grazing management to reduce grazing pressure on heavily degraded rangelands. Seasonal movement of herders has become a tradition in the soum and herders follow this schedule every year according to the bagh Citizens Khural decision. Bagh Governors, soum Land management and rangeland specialists are responsible for the enforcement and monitoring for resting and freeing heavily degraded rangelands from animal grazing during critical regeneration time.

Moreover, there is an increasing investment of herders and local government on rangeland management issues such as forage planting, hay making, improved rotational grazing management, rehabilitation of wells and improving animal productivity. In 2018-2020, beneficiary herders and local government total investment counts at 300 million. In the figure below shows investment of soum government budget on supporting herders to improve animal quality, hay making and well rehabilitation. For instance, herder and local government prepare around 1500 tons of hay and fodder at the soum level for winter preparedness every year.

For the implementation of the Livestock Tax Law has been approved by Parliament in 2020, Chandmani soum Citizens Representative Khural issued a resolution to impose MNT 600 tax per goat and MNT 400 for all other types of animals. This new regulation would be an important economic incentive for the reduction of animals to keep the proper carrying capacity.

f) Animal health

Healthy animals are the key both for sustainable herding and to reduce risks. In the responsibility agreement, all beneficiary herder households three requirements have been requested to fulfill for animal improved health to increase marketability of the livestock.

In the Responsibility Agreement for herders benefited from soft loan and following conditions were requested.

1) To establish veterinary service agreement with soum veterinary units

All herder families in the Chandmana soumhas veterinary service agreement with soum veterinarians. Although agreement is established it has been difficult to monitor if the services has been provided and quality of the services. In order to address this issue Green Gold Project has developed in cooperation with the General Authority of Veterinary Services (GAVS) has developed animal health traceability system within Responsible Nomads. The system registers all veterinary services provided to the animal from its birth. With this, it is possible to trace animal health status and monitor quality of services provided. The main objective is to assist soums and aimags free of animal diseases to enjoy better market access thus better premium price for herders and cooperatives.

Chandmana soum is one of the 15 soums selected to introduce the animal health traceability system. In 2019, Green Gold Project in cooperation with the GAVS has provided skills training to soum veterinarians and herders and provided all necessary basic equipment (Table 6).

Table 5: List of equipment provided

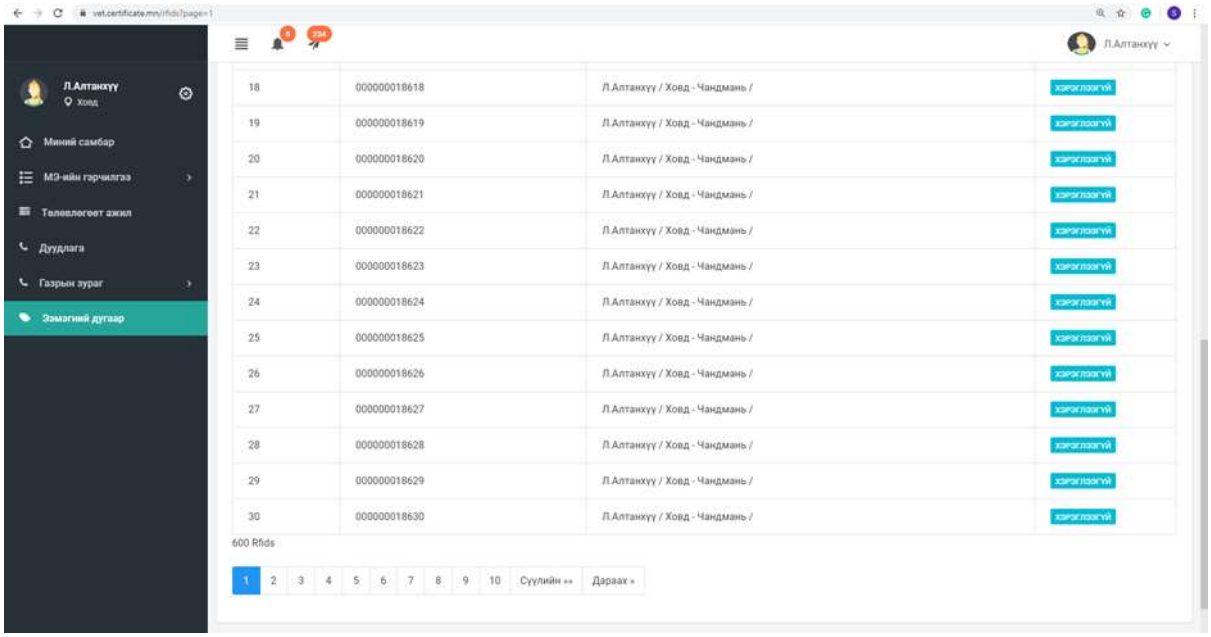
№	Equipment	Measuring units	Pieces	Unit price	Total value
1	Emergency diagnosis kit for soum veterinarians	package	1	732,000	732000
2	Animal dipping motopump	pieces	1	1,280,000	1280000
3	Phyto sanitation container	pieces	1	310,000	310000
4	Ear tag RFID reader	pieces	1	1,620,000	1620000
5	Mobile printer	pieces	1	240,000	240000
6	Ear tag fixer	pieces	2	15,000	30000
7	RFID ear tags	pieces	900	2,400	2160000
8	Drug residue detector with 100 pieces rapid test	pieces	1	2,400,000	2400000
9	Computer	pieces	2	1,100,000	2200000
10	Color printer	pieces	1	386,667	386667
	Total value	**11358667**			

Picture 7: Training for soum veterinarians

3) To register all livestock planned to be sold in the Agreement in the system.

All beneficiary herder families have ear tagged all livestock to sell with RFID (printed with individual code). Ear tag number is translated into bar code to be put on all pieces of meat from the livestock sold to the processing plant. With the hand phone application customers may check the origin and health of the meat purchased. If customer would like to know more detailed information about the health history of the livestock, they may enter into customer section of the traceability database and check. As of December 2019, all 97 herder families ear tagged livestock for sale and gave information to Soum Veterinarian to register in the system to monitor the health status, services provided to the animal.

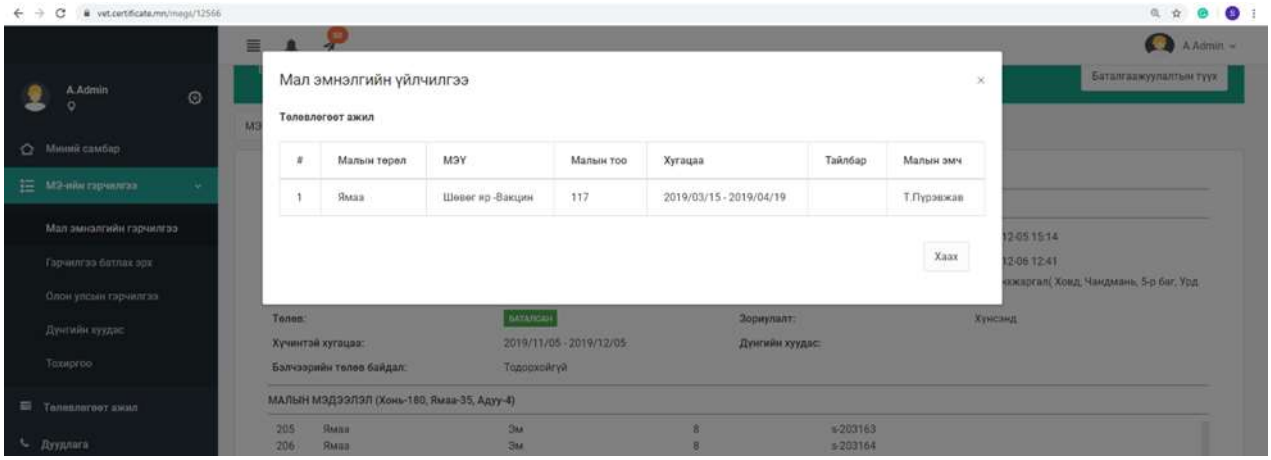
Picture 8: Livestock is registered with their ear tag

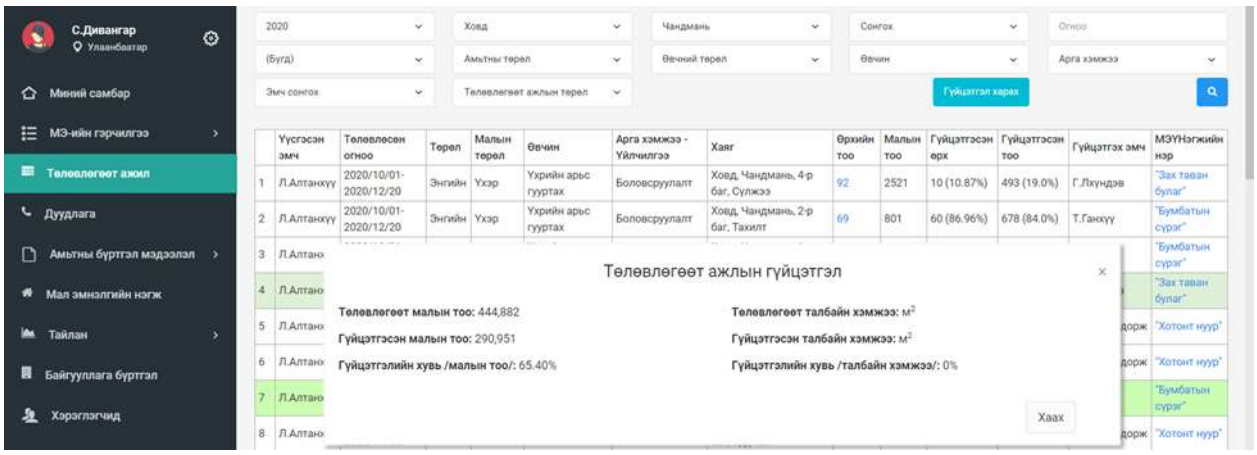


4) Soum private veterinarians and veterinary inspector enter information as per health status of the animal and veterinary services provided.

With the support of skills training provided to work on the animal health traceability system and agreement reached with Soum government to ensure that livestock is provided with all routine veterinary services and quality check, soum veterinarians have recorded all data into the system. This data is attached to individual code in the ear tag of the animal and recorded in the system to allow soum veterinary inspector to issue unique veterinary health certificate to the owner of the livestock as well as buyer.

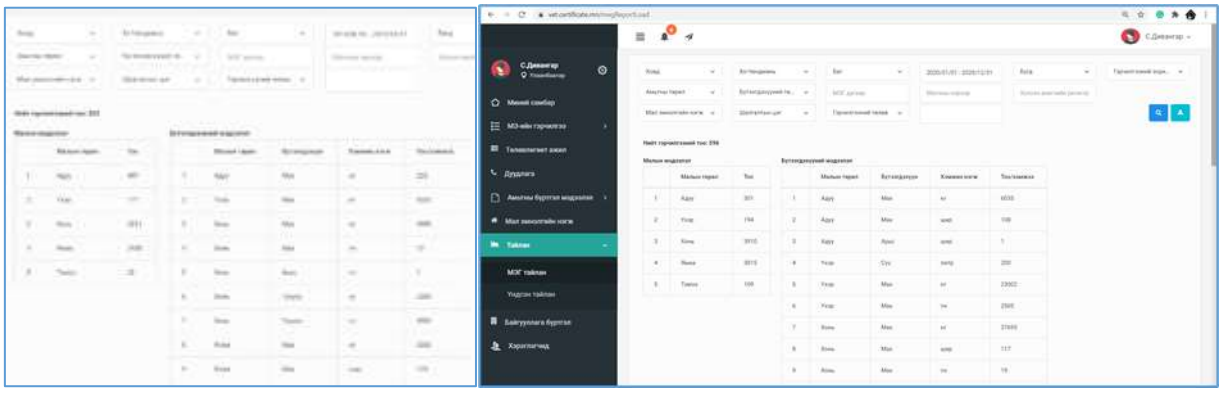
Picture 9: Eag tag code also show veterinary services provided to the animal





The system produces a report on each of the livestock sold entailed all information on health status and veterinary services provided. Based on this report along side health status, buyers can identify if there is drug residual in animal body. This is the most demanded quality indicator for meat by customers. One of the advantage of the livestock of the system is to give guarantee to customers on the quality of meat with all data and information recorded for each of the livestock.

Picture 9: Animal health report the system prints on digital veterinary health certificate



In total, Chandmani soum veterinarians issued 205 veterinary certificates in 2019 and 596 in 2020. The three-fold increase in the reporting period compared to the previous year shows that the responsibility of herders and veterinarians has improved and the interest in using the MAHIS has increased. On the other hand, it shows that the amount of livestock products supplied to the market by the soum has increased. See the table below for more details.

Table 5. Number of animals and meat marketed between 2019-2020

	2019	2020		2019	2020	
	Animal origin products			Number of animals		
Horse /heads/	=	=	=	407	448	74.0 %
Cattle /heads/	=	=	=	177	371	109.6 %
Sheep /heads/	=	=	=	3433	6811	121.0 %
Goat /heads/	=	=	=	3488	9357	153.3 %
				7694	16987	
Horse meat /kg/	252	22035	8744.0 %	2	147	=
Beef /kg/	5530	26497	479.2 %	37	177	=
Mutton /kg/	67389	58021	86.1 %	3369	2901	=
Goat meat /kg/	31900	83124	260.6 %	2127	5542	=
Total	=	=		11838	16987	143.5 %

The table above shows the following changes.

- The total number of livestock sold on the market with electronic veterinary certificates increased by 43.5 percent compared to the previous year.
- Compared to the previous year, the number of live goats sold on the market in 2020 increased by 53.3 percent and the amount of goat meat increased by 160.6 percent.
- In the previous year, horses were sold live on the market, but in 2020, they preferred to be slaughtered locally and sold for meat.
- Sales of mutton decreased by 13.9 percent and sales of live sheep increased by 21.0 percent.

In general, the total number of livestock in the soum has increased from the previous year, but sales of small livestock, especially goats, which have a strong impact on pastures, have increased dramatically.

5. Findings and Discussions

- ❖ All 97 beneficiary herder families have fulfilled their duties agreed in the Responsibility agreement signed at the onset of the project. The basis the Green Gold Project and Mongolian National Federation has laid down made it possible to introduce and implement the Methodology of Responsible Nomads system in a relatively short time.
- ❖ During feasibility study of the project it was found out that almost every single herder family has a loan from Khaan Bank. In order to get loan from Green Pasture project herder families had to fully pay back the loan from Khaan Bank. Half of the herder families were able to pay back Khaan Bank loans with their own means and half not. Therefore, it was agreed with Khas bank that they may some part of the loan to pay back Khaan Bank Loan. 46 out of 97 herder families have used 3-32% of soft loans to pay back Khaan bank loans with much higher interest rate (2-2.5% a month) to qualify for Green Pasture project loans.
- ❖ During field monitoring, herder families have provided a feedback that they live within two main source of income cashmere sales in spring and autumn sales of meat and in between depend on Khaan Bank loans to cover their cash shortages. By the time they collect cashmere and meat money, they need to pay loan back with interest rate. These loans are used to fill gaps in every needs of the family such as food, fuel, children school fee and medical expenses. Longer period and longer payment interval of Green Pasture project has allowed to make investment on some priority issues for livestock and rangeland management such as rehabilitation of animal shelters, fencing hay making area, forage planting and buying high quality breeding livestock.
- ❖ From data collected within Green Gold project and Mongolian National PUG Federation working for about 5 years in Chandmana soum, it is concluded that because of specifics of the ecological condition-dry semi desert region, the recovery of the degraded rangelands takes longer time period. It depends on good combination of proper management and rainfall. During these years with improved grazing management, 47% of total rangelands of soum mainly winter and summer grazing areas have improved and the state of health has moved up in the recovery class.
- ❖ However, 35% percent of rangelands, mostly spring rangelands suffer from heavy level of degradation without any or very little evidence of recovery. Due to ecological conditions and old grazing management pattern in Chandmana soum, spring rangelands has much higher grazing pressure because it locates between the other seasonal rangelands for several times a year as herders move to fall rangelands and back.
- ❖ Overall Rangeland health is stabilizing in Chandmana soum and herders organized into PUGs and established Rangeland use agreement are able to enforce rotational grazing management and stocking density. However, as livestock number has increased significantly in the past 20 years will take time to reduce. According to animal census in the past 5 years growth rate has stabilized and even decreasing herders started to control animal breeding as there are not enough rangelands. Majority of herders are keen to not to increase herd size to reduce or stabilize while increasing productivity and income per head. This led to milk goats and sheep and improve quality of products and find new markets. Responsible Nomads raw material traceability aims to provide incentive herders to improve quality of their raw materials to improve market access and value, and gain better income.
- ❖ During field monitoring it was found out that herders who increased a herd size is mainly to apply for the aimag outstanding herder award and recognition where the number of animals is assessed as one of the main indicators for the honored herders. Herders cannot be blamed as they want the Government to assess their achievement and long-lasting labor result, whereas Government policy

itself encourage the increase of animal numbers. It reminds the urgent need and lack of the proper and strong Government policy.

- Buyers and customers bought livestock with traceability information and verified through Responsible Nomads have paid at the least 10% high price and expressed to have long term partnership. However, number of livestock supplied through system was only limited to beneficiary herders from Green pasture project in 2019. Field training and capacity development of herders and local specialists takes time specially with data quality, collection and entry and maintenance.
- Apart from meat, traceable cashmere was sold to Goyo company from Chandmana soum. First time ever Goyo company bought cashmere of Chandmana soum quality of which is qualified for their requirement. Red goat from Chandmana soum is known to have a good quality cashmere in the region and there is potential to supply high quality and sustainable produced cashmere verified through Responsible Nomads system.
- Green Gold and Mongolian National PUG Federation has no budget for the Green Pasture project and all training and capacity development work was done as a part of other project activities. However, it is proven that soft loan has a great potential to become of the economic incentive for herders to reduce quantity of livestock rather focus on quality and productivity within carrying capacity of rangelands for sustainable use. It is shown implementation of Responsibility agreement that 100% of benefited herder families showed the commitment and fulfilled all requirements agreed upon issuance of the soft loan.
- Grasslands/rangelands in Mongolia biggest source of carbon sequestration as it makes almost 70 percent of total land territory whereas forest constitute 8%. Majority of carbon is contained in the strong root system and with increasing rangeland degradation, the capacity of grasslands to absorb carbon diminishes.
- Based on the results and lessons learned from the Green Pasture project Green Gold project and Mongolian National PUG Federation is keen to expand cooperation with Khas bank and even to use Responsible Nomads platform to develop loan products to incentive herders to ensure sustainable use of their rangelands and safeguard other natural resources.