Pastures, Conservation and Climate Action, Mongolia

Annual Report year 4 (01.04.2018-31.03.2019)

Submitted by: Mongolian Society for Range Management (MSRM); Professor D. Dorligsuren; Uilst, D., project coordinators.

Submitted on 14th October 2019

Approved 24th January 2020

Summary

Project overview	
Reporting period	April 2018-March 2019
Geographical areas	3 herder community (*heseg*) areas at sites across Mongolia: i) Hongor Ovoo *heseg*, Ikh Tamir *soum* (district), Arkhangai *aimag* (region) (36,756ha) ii) Ikh Am *heseg*, Undurshireet *soum*, Tuv *aimag* (18, 241 ha) iii) Dulaan Khairkhan *heseg*, Bogd *soum*, Bayankhongor *aimag* (22,485ha)
Technical specifications in use	Technical Specification as set out in Part G of approved PDD (20/8/2015) and linked to Plan Vivo Climate Benefit Quantification Methodology 'Carbon sequestration through improved grassland and natural resources management in extensively managed grasslands' Version 1 (Annex 8, PDD)

Project indicators	Historical (Year 1 April 2015-March 2016; Years 2 and 3 April 2016-March 2018)	Added/ Issued this period (April 2018-March 2019)	Total
No. smallholder households with PES agreements	0	0	0
No. community groups with PES agreements (where applicable)	3	0	3
Approximate number of households (or individuals) in these community groups	174 (year 1) 124 (years 2 and 3)	0	124
Area under management (ha) where PES agreements are in place	77482	0	77482
Total PES payments made to participants (USD)	9493.50	70291.50	79785.00
Total sum held in trust for future PES payments (USD)	0	52630.40	52630.40
Allocation to Plan Vivo buffer (tCO_2) (including this issuance)	4,793	6,932	11,725
Maximum Saleable emissions reductions (tCO_2)	92,769	0	92,769
Saleable emissions reductions tCO2)	65,582	25,092	90,674
Unsold Stock at time of Submission (PVC)			62,129
Plan Vivo Certificates available for future issuance			**70,659**
Buffer credits available for future allocation (after current issuance)			**0**
Plan Vivo Certificates (PVCs) issued to date			**20,015**
Plan Vivo Certificates requested for issuance in this period			**20,000**
Total PVCs issued (including this report)			**40,015**

Part A: Project updates

A1 Key events

Participating herder groups (heseg) continued to show their commitment to the project through successful implementation of planned activities across a range of pasture management, livelihood and conservation issues. As in Years 2 and 3, they even conducted activities over and above those planned in the PDD to include additional conservation and livelihood support activities, as specified in Section E, below. Sales of certificates continued to increase above levels in Years 2 and 3. Project site visits by prospective purchasers, who were able to meet with participating herders directly, were also important milestones in Year 4 and translated into subsequent sales. Proceeds from certificate sales (less agreed MSRM management costs of 30%) continued to be distributed across the participating project sites, to be allocated to activities as agreed by the herder groups (heseg) themselves.

In Year 4, these funds were primarily used by herder groups to create mutual funds able to offer members low interest loans for critical activities such as winter preparations, marketing of livestock products and seasonal movements throughout the year.

A2 Successes and challenges

As noted in the Year 2/3 report, the continued functioning of the project and commitment of herders to it is a significant success in itself, given that this is the first of its kind in Mongolia. An even greater indicator of success is that at the end of this Phase 1 commitment period (April 2015 - March 2019), coinciding with the end of Year 4, all participating herder groups expressed a strong desire and commitment to continue with PCCA into Phase 2 (April 2019 onwards). This is despite the originally unfamiliar nature of the funding model, based on reward in exchange for delivery against mutually agreed targets, and the quite slow progress of certificate sales. The latter did, however, improve in Year 4, as indicated in Table 6, with some major sales to new purchasers. Good pasture yields in summer 2018 compared to 2017 reduced the need for many participating herders to make long distance *otor* movements, and facilitated compliance with pasture management plans and stocking rates, as did relatively high prices for livestock products, which encouraged offtake for sale. As in Years 2 and 3, extensive biodiversity monitoring proved a challenge at some sites, as specified in Sections B and E, below, due to financial constraints. Nonetheless, participating *heseg* at all sites were active and successful in taking on new roles in governance and decision-making for conservation, as well as in conducting targeted monitoring of key sites and species.

A3 Project developments

As stated in previous Annual Reports, the project validator did not submit any formal CARs. However, he did make the following observations in the Validation Report, which we took as points for action:

1. '*Herder groups require additional training required on several topics according to the specifics of the herder groups. For example, technical training on planting tree among the herder group that represent desert steppe environments'*. This observation was made in reference to requirements

for permanence (Item 2.4, Validation Report). As noted in the Year 2/3 Annual Report these points for action were discharged by MSRM training for heseg on tree seedling production and planting before the main planting season in 2016. They were also discharged by further trainings on pasture degradation and ways to reduce this, on rotational pasture use and on carbon sequestration throughout Years 2-4.

2. '*MSRM need to provide continued training and ensure that herders and local officials are gaining knowledge from land management techniques*'. This observation was made in reference to requirements for monitoring (Item 2.7, Validation Report). In response, as noted in the Year 2 and 3 Annual Report, MSRM instituted further training in land management techniques for *heseg* members in 2016, and 17, and also in 2018. Training was also conducted with local officials, concerning collaboration with herders, making agreements with them and supporting herders' cooperation and collective action.

Table 2: Progress against corrective actions

Document	Corrective action	Activity against this
Validation Report	**Section 2.4: Permanence** Observation by Validator: additional training required according to the specific planned actions of the herder groups (e.g. tree planting)	MSRM provided further ongoing training in specific activities with herder groups in Summer 2016 (May- September), 2017 and 2018 (Years 2, 3 and 4).
Validation Report	**Section 2.7: Monitoring** Observation by Validator: MSRM need to provide continued training and ensure that herders and local officials are gaining knowledge from land management techniques.	MSRM provided further ongoing training with herder groups in Summer 2016 (May- September), 2017 and 2018. Local officials were also invited to specific training events, and training materials and project outputs shared with all parties.

A4 Future Developments

Throughout Year 4, we worked with existing PCCA herder groups to determine whether and in what form they wish to continue the project across the existing areas. All 3 groups confirmed their wish and intention to move into a second commitment period, Phase 2, from April 2019. The details of this are as set out in the updated PDD document (2019 version 2).

Other major conservation organisations and government bodies active in Mongolia have shown interest in adopting the PCCA approach, which may result in it being rolled out to other areas and sites in the future. These discussions are currently ongoing.

Part B: Project activities

B1 Project activities generating Plan Vivo Certificates

The Technical specification is as set out in Part G of the approved PDD (20/8/2015) and linked to Plan Vivo Climate Benefit Quantification Methodology 'Carbon sequestration through improved grassland and natural resources management in extensively managed grasslands' Version 1 (Annex 8, PDD), hereafter referred to as TS1. This is linked to the development and implementation of new schedules for annual pasture use by the *heseg*, designed to reduce

grazing pressure and enhance carbon sequestration through enhanced seasonal mobility, and in some cases through reductions in stocking rates. This is as specified for each *heseg* in the PDD Annex 5 Management Plans. Modelled carbon reductions in Year 4 for each site are as specified in Section C, Table 4 below. A further indicator here, as set out in the Annex 5 Management Plans, was the percentage of herders who complied with the agreed schedule, with 90-100% required to do so for all sites in Year 4. In addition, as part of the project design, herder groups (*heseg*) each identified a range of other activities, not specifically related to carbon sequestration, against which progress was to be evaluated (see B2 below).

Table 3: Project activity summary

Name of technical specification	Area (Ha)	No herding households	No Community Groups
TS1	77,482 ha (total pasture areas for all three sites – see Project Indicators, above)	124	3

There have been no new technical specifications submitted to the PV Foundation for approval, nor are there any in development as part of Phase 1. The project has not expanded to new communities or geographical areas in this reporting period. However, an amended PDD is under submission for Phase 2.

B2 Project activities in addition to those generating Plan Vivo Certificates

The activities reported are those set out in the final PDD. These involve not only carbon sequestration through improved grazing management practices, but also specific activities linked to biodiversity conservation and livelihoods/ wellbeing. These are all specified in the site-specific management plans in Annex 5 of the PDD and summarised below. *Heseg* performance against agreed indicators and in relation to these activities is analysed in Section E.

For Hongor Ovoo heseg: In Year 4 of the project these entailed:

- Completion of activities for herder group partnerships for environmental protection, as set up in Year 1, with activities as agreed with local administration for Year 4;
- Repeat vegetation and bird surveys following ZSL methodology;
- Herders' increased participation in decision-making on environmental issues with herders' committee established and recognised by local administration in Year 1 and indicators in subsequent years as set by that committee;
- The planting of some 1000 saplings in soum forest areas by the end of Year 4, following establishment of a tree nursery by December of Year 2 (April 2016-end March 2017) and planting in Years 2 and 3;
- Repair of fences and winter shelters, with 5 fences/ shelters repaired in Year 4, in addition to those repaired in previous years;
- Collaborative production and marketing of local brand milk products, and following the establishment of a cooperative in Year 3, resulting in increased household income against 2015 baselines;
- Enhanced household income from gathering and sale of wild fruit and nuts;
- Combing of yak wool and delivery to markets, with enhanced household income from this source.

Monitoring results against these activities and associated indicators are summarised in Part E, Table 8.

For Ikh Am heseg: In Year 4 of the project these additional activities entailed:

- Protection of red deer, argali, marmot and Mongolian gazelle, with repeated manned surveys of target species by herders in Year 4[1]
- Protection of bushes at Ovootiin and cleaning area of rubbish on 3 occasions per year in Year 4, plus planting of additional 0.5ha;
- Repair of fences/ winter or spring shelters, with 10 fences/ shelters per annum;
- Collaborative production and marketing of milk and curd in season, with enhanced household income from this source against 2015 baselines;
- Production of felt and delivery to markets, with 250m felt produced and marketed in Year 4, linked to enhanced household income;
- Hay preparation, with hayfield established by end 2015 and increased % of households with adequate hay provision in Year 4 and in accordance with targets set in Year 1.

Monitoring results against these activities and associated indicators are summarised in Part E, Table 8.

For Dulaan Khairkhan herder group: In Year 4 of the project these additional activities entailed:

- Protection of argali, ibex and goitered gazelle, with manned surveys in each year;
- Protection of saxaul forest, with numbers of cut stumps decreased by >80% by comparison with 2015 baseline data by the end of Year 4;
- Repair of fences/winter or spring shelters, with 5 fences/ shelters in Year 4;
- Enhanced income through vegetable production in Year 4, following establishment of a greenhouse in Year 1;
- Hay preparation, with increased percentage of herders with adequate hay provision in Years 4, and according to targets developed in Year 1.

Monitoring results against these activities and associated indicators are summarised in Part E, Table 8.

Part C: Plan Vivo Certificate issuance submission

C1 Contractual statement

The project continues to be based on signed PES agreements with participants complying with all the minimum requirements stated in these agreements.

C2 Issuance request

The project requests the issuance of a further 20,000 certificates, already earned through activities in Years 1-4, to meet buyer demands. For Year 4, and as discussed in Section E below, despite some small increases in livestock numbers at the Hongor Ovoo and Dulaan Khairkhan sites, these were offset by higher pasture yields and greater mobility of herders. This resulted in carbon sequestration being achieved, albeit slightly below the maximum volumes initially modelled in the PDD for Hongor Ovoo and Ikh Am (see Annex 2 tables, this report). For Dulaan Khairkhan, overall modelled volumes slightly exceed those predicted in the PDD, as shown in Table 4 below, due mainly to higher than predicted herder mobility and/ or pasture yields in Year 4.

[1] The initial plan was for these to be supported by camera trap surveys by ZSL. However, as noted in the ZSL report, Annex 5 of Year 1 Annual Report, camera trapping proved to be less effective than transect surveys, and was thus omitted following Year 1.

In order to ensure the results are calculated very conservatively, the project will only issue credits in accordance with recorded (rather than predicted) grazing pressures, as can be seen below:

Table 4: Statement of tCO_2 reductions available for issuance as Plan Vivo Certificates based on activity for reporting period 04/18– 03/19

Area ID	Total Area (ha)	Maximum Total ER's (Yrs 1-4) acc. to CENTURY model	Maximum Saleable ER's (Yr 1-4)	Estimated % achieved (Yr 1-4)	Total ER's achieved (Yr 1-4) acc. to monitoring results.	Saleable Ers available for issuance (Yr 1-4)	ER's available for buffer contribution (Yr 1-4)	ER's Issued as PVCs (Yr 1-3)	Allocated to Buffer account (Yr 1)	Saleable ER's available for future issuances	ER's available for future buffer allocation
		a	b	c=a*100%	d	e=d* 80 or 90%	f=d* 10 or 20%	g	h	i=e-g	j=f-h
Hongor Ovoo	36756	51139	46025	51139 (100%)	49208	44287	4921	11011	1688	33276	3233
Ikh Am	18241	20055	16044	20055 (100%)	15884	12707	3177	2327	802	10380	2375
Dert (N/A for this commitment period)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Dulaan Khairkhan	22485	38375	30700	38375 (100%)	42100	33680	8420	6677	2303	27003	6117
Totals	**77482**	**109569**	**92769**	**109569**	**107192**	**90674**	**16518**	**20015**	**4793**	**70659**	**11725**

NB: Risk buffer allocations are different across the three sites (H.O. 10%, L.A. 20%, D.K. 20%)

C3 Allocation of issuance request

Table 5: Allocation of issuance request

Buyer name/ Unsold Stock	No. PVCs transacted	Registry ID (if available) or Project ID if destined for Unsold Stock	Tech spec(s) associated with issuance
PCCA (unsold stock)	*20,000*	*PCCA*	*TS1*
TOTAL			

C4 Data to support issuance request

Under the Management Plans in the PDD, evidence for carbon sequestration is through grazing pressure, movement patterns and stocking rates for each site and its different pasture types. Tables c and d for Hongor Ovoo and Dulaan Khairkhan are found in Annex 5 of the PDD, with equivalent tables for Ikh Am included as Table F1a (p.32) and F1c (p.34)in the main body of the PDD. The site specific Management Plans also show detailed plans for grazing pressure at each site year in year and how these are translated into carbon sequestration (based on Century modelling, as explained in the Technical Specification). Actual rates for Year 4 per site are summarised in C2, Table 4 above, with underpinning spreadsheets, based on PDD Annex 5, as set out in Annex 2 tables in this report.

At all sites, compliance with agreed grazing management practices and protocols was to be assessed on the basis of biannual self-reporting by the herder groups, subject to confirmation by MSRM. For Year 4 of the project, MSRM checked reported actions in August/ September, then again at the end of the year. As this was the final year of Phase 1 of PCCA, further monitoring and evaluation against 2015 socio-economic baselines and as set out in the PDD Table F2.2 (reproduced in Part E, below) was also undertaken in spring 2019. Overall, monitoring undertaken at the end of Year 4 was thus designed to monitor compliance with site specific Management Plans, and to confirm climate, livelihood and biodiversity benefits against PDD baselines.

Detailed tables of activities for each site, showing progress against agreed activities and indicators for Years 2 and 3, are included in Part E, Monitoring Results. MSRM's Annual Report for

Year 4 is included in Annex 1.

As highlighted in Table 8 in Section E, as well as the accompanying narrative, performance indicators relate not just to stocking rates and mobility and hence to carbon sequestration, but to a range of biodiversity conservation and livelihood support activities. The majority of these met or even exceeded targets and the carbon sequestration calculations have been updated accordingly.

Part D: Sales of Plan Vivo Certificates

D1: Sales of Plan Vivo Certificates

Table 6: Sales of Plan Vivo Certificates

Invoice Date	Date of receipt by MSRM	Vintage	Buyer	No of PVCs	Price per PVC ($)	Total sale amount ($)*	% received by participants *
		2015-2016	CLevel	50			70%
		2015-2016	ZeroMission	2500			70%
		2015-2016	ZeroMission	500			70%
		2015-2016	ZeroMission	1000			70%
		2015-2016	CLevel	140			70%
		2015-2016	ZeroMission	700			70%
		2015-2016	ZeroMission	1653			70%
		2015-2016	ZeroMission	328			70%
		2015-2016	CLevel	50			70%
		2015-2016	*myclimate*	*13094*			*70%*
		2016-2017	*myclimate*	*6906*			*70%*
				26921			

*Pricing reported for internal monitoring purposes only and is removed from the final published document.

The amount received by participants takes into account the 30% allocated to MSRM for management, monitoring and reporting (calculated after deduction of any bank and PV issuance fees).

Part E: Monitoring results

E1: Ecosystem services monitoring

Monitoring results for all sites and against the full range of indicators (ecosystem services, socioeconomic and environmental/ biodiversity) and in relation to red, orange and green 'traffic light' indicators (Section K of PDD) are set out in Tables 7a & b, below.

Table 7a: Summary of Carbon Sequestration (Years 1-4 inclusive)

(For futher details, see: Annex 2d, 2e, 2f of 2018 -19 AR)			C Seq. (tCO_2e) p.a. at different grazing pressures				C Seq. (tCO2e) based on recorded grazing pressure at each site				
Site	Pasture type	Season	30%	40%	50%	> 50%	Yr1	Yr2	Yr3	Yr4	Total Yrs 1-4
i) Hongor Ovoo	Riparian Meadow	Spring/summer/fall	1723	812	23	0	1723	1723	1723	1723	
	Riparian Meadow	Summer	2725	1764	981	0	2725	2725	2725	2725	
	Mountain Meadow	Winter	990	466	304	0	304	466	990	990	
	Mountain Meadow	Summer/fall	1198	560	-52	0	-52	560	1198	1198	
	Mountain Meadow	Winter/spring	2175	2130	2060	0	2060	2175	2175	2175	
	Mountain Steppe	Fall	1241	682	199	0	199	1241	1241	1241	
	Mountain Steppe	Summer/fall	1153	418	-84	0	-84	1153	1153	1153	
	Mountain Steppe	Winter/spring	2470	2029	1271	0	2470	2470	2470	2470	
			13675	**8861**	**4702**	**0**	**9345**	**12513**	**13675**	13675	**49208**
ii) Ikh Am	Riparian Meadow	Spring	988	466	13	0	0	13	466	466	
	Mountain Steppe	Spring	628	227	46	0	0	46	227	227	
	Mountain Steppe	Winter	4302	3534	2213	0	0	2213	2213	2213	
	Steppe	Spring	1354	490	100	0	0	490	490	490	
	Steppe	Winter	4102	3369	2110	0	0	2110	2110	2110	
			11374	**8086**	**4482**	**0**	**0**	**4872**	**5506**	**5506**	**15884**
iv) Dulaan Khairkhan	Mtn Desert Steppe	Winter/spring	4973	4086	2559	0	4973	4973	4973	4973	
	Mtn Desert Steppe	Fall	3021	1660	485	0	3021	3021	3021	3021	
	Desert Steppe	Winter/spring	986	357	72	0	986	986	986	986	
	Desert Steppe	Fall	1545	849	248	0	1545	1545	1545	1545	
			10525	**6952**	**3364**	**0**	**10525**	**10525**	**10525**	**10525**	**42100**
									Total (Yrs 1-4)		**107192**

Table 7b: Summary of Overall Monitoring Results (Year 4)

Site and 'Traffic light'[1] indicator status	Activities & Indicators (Year 4)	Expected result	Results Achieved
Hongor Ovoo heseg			
1.Pasture management (carbon sequestration)	*Year 4*: Annual pasture use schedule developed and implemented, with grazing pressure equivalent to modelled carbon sequestration rates for different pasture types.	*Year 4:* At least 90-100% of households comply with schedule in summer/winter 2018. 5% reduction in livestock (sheep units) against baseline by end March 2019.	*Year 2: Heseg* leader reported full (100%) compliance with pasture use schedule re timing and periods of use of different seasonal pastures in heseg area, confirmed by MSRM through interviews. However, the target 5% reduction in livestock numbers (by sheep units) was not achieved in Year 4 by comparison with baseline. Average numbers and distances of movement p.a. have, however, increased by comparison with the baseline. Reasons and implications are examined further below.
2.BiodiversityConservation	*Year 4:* i) Herder group partnerships established through the project in Year 1 now undertaking activities to protect local environments.	*Year 4:* As per agreements/ MOU in place between herder groups & local administration and annual workplans agreed.	*Year 4:* Agreed activities for Year 4: to conduct forest clean up (specific targets and compliance highlighted below); protection from illegal cutting & collection and sale of wood waste.
	ii) Cooperation in groups for forest cleaning & protection.  *Collecting waste wood, Hongor Ovoo, 2018*	Cleaning of additional 2ha forest area by end of Year 4. Bird and vegetation surveys repeated on established forest patrol routes in summer of Year 4 (bird surveys ZSL, vegetation herder groups)	Neg Sanaa and Khaltar Angarkhai cooperatives conducted forest cleanup of total 2.5 ha in Year 4, exceeding target of 2ha. Training completed in Year 1. Unable to repeat formal surveys as planned due to funding constraints, but regular monitoring patrols instituted (see below).
	iii) Increased herders' participation in decision-making on environmental issues.	As per targets set by herder representative committee at the end of Year 1: these required herders to conduct forest patrols to monitor and protect the forest from illegal cutting trees in summer and fall.	Completed as planned. The five forest cooperatives "Shiree bulan", "Haluun us", "Haltar angarhai", "Neg sanaa", and "Ikh ulunt" have been actively working to do forest cleaning and protection according to the plan approved by local administration.

	iv) Nurseries and planting for enhanced provision of forest habitat for native species	*Year 4:* 1000 saplings planted in total over Phase 1 (2015-2019)  *Tree Nursery, Hongor Ovoo*	Additional 250 seedlings planted in 2018; 750 in total in Phase 1.
3. Socioeconomic activities	*Year 4* i) Repair of fences & winter/spring shelters  *Example newly built spring shelter, HO heseg, 2018*	*Year 4:* 5 fences/ shelters repaired by end March 2017.	*Year 4*: In 2018, this group fixed 9 winter and spring shelters, exceeding targets. They also built one new winter shelter.
	ii) Collaborative production & marketing of local brand milk products	*Year 4*: Collaboration on processing and marketing. Linked to enhanced HH income.	*Year 4:* Herders prepared and sold dairy products cooperatively. 20HH again participated in Lunar New Year Fair in Ulaanbaatar in 2019, representing the heseg as a whole, with each HH earning average 300,000tg. Products also sold through the aimag's dairy products trade fair. "Itgel Bayan Taihar" cooperative was established in Hongor Ovoo heseg in 2018 to help herders to sell raw materials and livestock products.
	iii) Gathering and sale of wild fruits and nuts	*Year 4:* Enhanced HH income against baseline.	*Year 4*: pine nuts and berries did not grow well in 2018 so HH were not able to gain an income from this source in Year 4 (although they did so in accordance with targets in previous years). In 2018 yak wool prices increased from 20,000-

	iv) Comb yak wool and deliver to markets	*Year 4:* Enhanced HH income against baseline	25,000 tg/kg. Heseg members combined their yak wool and sold 2.5 tonnes – exceeding previous years, & enhancing HH income.
Ikh Am Heseg			
1.Pasture management (carbon sequestration)	*Year 4*: Annual pasture use schedule developed and implemented, with grazing pressure equivalent to modelled carbon sequestration rates for different pasture types	*Year 4*: 90-100% of households comply with schedule in summer/winter 2018. 30% reduction in livestock (sheep units) against baseline by end March 2019 (end Year 4).	*Year 4: Heseg* leader reported 100% compliance in 2018. Confirmed by MSRM. However, 15% reduction in livestock numbers achieved in Year 4 by comparison with the baseline, rather than the 30% target. Reasons for this and implications are examined further below.
	Year 4: Dig hand wells	No specific target for Year 4.	No official target for Year 4. A deep water well was established in Chandman in 2018 with soum and heseg funds.
2.Biodiversity Conservation	*Year 4:* Protect red deer, argali and Mongolian gazelle	*Year 4*: Manned surveys repeated in summer of Year 4 (plus annual camera trap surveys ZSL	*Year 4*: Volunteer ranger Nyambuu patrolled in the area 5 times and located 2 possible poaches, who then left the areas. Other heseg members took turns to guard and patrol deer and antelope to protect from poachers every 45 days in spring 2018. In March and April 2019 these patrols took place every 30 days to guard deer from poachers who wanted to harvest deer horns. During the heavy snowfall in all parts of Undurshireet soum in December 2018, herders put a total of 100 packs of hay and 200 kgs of salt in grazing areas used by deer and antelope. (camera trap surveys not repeated, as reported in Year 1).
	ii) Protect bushes/trees at Ovootiin & clean area/ collect rubbish; planting of new areas.	*Year 4*: litter cleaning plus planting of additional 1ha	Garbage along the river banks was cleared as planned, with 4 tonnes being removed over the year. However, lack of funding precluded

			additional planting.
3.Socioeconomic activities	*Year 4:* i) Repair of fences & winter/spring shelters.	*Year 4:* 10 additional fences/shelters repaired by end Year 4.	*Year 4*: Achieved as planned: 2 families built new winter shelters and 8 fixed their shelters.
	ii) Collaborative production and marketing of milk and curd in season.  *Dairy products from Ikh Am PUG at the dairy products exhibition, 2018.*	*Year 4*: Enhanced HH income against baseline	*Year 4*: Herders made dairy products and sold them in their aimag's dairy product exhibition, in order to increase their household income. Since the start of the PV project products have been produced and sold more collaboratively, with additional families participating. Each HH earned some 1.26 million tg on average per year for Year 4.
	iii) Produce felt & deliver to markets.	*Year 4*: *Heseg* produces & markets 250m felt by end 2018. Enhanced HH income against baseline.	260m felt produced in Year 4. Processing of animal skin also continued using the small scale factory previously established.
	iv) Hay preparation	*Year 4*: Increased % HH with adequate hay provision.	*Year 4*: In 2018, each herder family prepared about 2500-4500 kg of hay on average, an increase of some 12 percent above the previous year.
Dulaan Kharkhain heseg			
1.Pasture management (carbon sequestration)	*Year 4*: Annual pasture use schedule developed and implemented, with grazing pressure equivalent to modelled carbon sequestration	*Year 4*: 90-100% of households comply with schedule in summer/winter 2018. 5% reduction in livestock (sheep units) against baseline by end	*Year 4*: *Heseg* leader reported full (100%) compliance with pasture use schedule in terms of timing and periods of use of different seasonal

	rates for different pasture types	March 2019.	pastures, confirmed by MSRM through interviews. However, 5% reduction in livestock numbers by comparison with the baseline not achieved. Reasons for this and implications are examined further below.
2.Biodiversity Conservation	*Year 4* i) Protection of argali, ibex & goitered gazelle.	*Year 4*: Manned surveys completed summer 2018, at baseline survey sites.	*Year 4*: Herders continue to protect wild sheep and goats in Ikh Bogd special protected area, as well as licorice plants and saxual (see below). Local wildlife conservation volunteer Togookhuu reported that the number of wild sheep and goat continues to increase since Year 1. (ZSL camera trapping equipment damaged; unusable).
	ii) Protection of saxaul forest. 	*Year 4*: no of cut stumps decreased by >80% compared to 2015 data.	*Year 4*: The protection of saxaul trees has been supported by the herders every year. In 2018, the number of new stumps decreased by 70%. Herders also campaigned for enactment of a ban on cutting through the Citizen's Representative Hural.
	iii) Plant sea buckthorn.	*Year 4*: no specific targets.	
3.Socioeconomic activities	*Year 4*		
	i) Repair of fences & winter/spring shelters.	*Year 4*: 5 shelters/ fences repaired.	*Year 4:* Herders built two winter shelters, one spring shelter and fixed two shelters; thus meeting the target.
	ii) Vegetable production.	*Year 4*: Enhanced HH income linked to vegetable production.	A water reservoir was built in Year 3. However, this was damaged by a flood in 2018 and herders used project funds to fix this.

	iii) Hay preparation	*Year 4*: Increased % HH with adequate hay provision	*Year 4:* each HH prepared 4-6000 kg hay (plus fodder, bran and salt)

N.B. The 'traffic light' system (red, orange and green dots) relates to the activity-based monitoring set out in Section K of the PDD, where green denotes the project is on track and all payments should be made in full; orange denotes that some activities have fallen short of targets and that corrective action(s) may be required; red denotes that project activities have fallen far short of requirements and corrective action is necessary.

For the majority of sites and across the range of indicators, most targets were met in Year 4, as indicated by the green status of 'traffic lights' for most activities. A number were even exceeded, with additional activities being undertaken. However, stocking rates were an issue in some cases, as specified below. Detailed livestock figures are presented in MSRM's annual report for Year 4 (see Annex 2, this report).

Hongor Ovoo: MSRM monitoring and reporting, supported by official soum level and herder group livestock census data, reveal a decrease in actual livestock numbers by comparison with the baseline; from 14095 in 2014/15 to 13804 in 2018/19, or in other words a decrease of 2%. This equates to a slight increase of 0.2% in sheep units over the course of PCCA Phase 1, but a decrease compared to 2017 figures. In summer 2018 pasture conditions were good by comparison with the previous year, resulting in higher pasture yields. Market prices for livestock products were also good, encouraging greater offtake and hence some reductions in livestock numbers by comparison with 2017. Predicted *dzud* in winter 2018 also encouraged herders to sell animals before the winter. Compliance with the pasture schedule meets the target (90-100% of HH for Year 4), with both average annual mobility of herding households and numbers of movements equal to or higher than planned in the PDD and by comparison with the 2015 baseline. As set out in Table 7a above, modelled volumes of carbon sequestration were achieved in Year 4, even though the target 5% reduction in livestock numbers (by sheep units) against the baseline was not met. This reflects the higher biomass (pasture yield) in Year 4, as measured in soum level statistics and compared to the baseline, in conjunction with the greater mobility of the herders. Further details and implications of this for issuance of certificates are as set out in Part C. Figures in Table 4 are derived using the Century model and technical specification set out in the PDD and these actual, rather than target, stocking levels and grazing practices. Data used for the three sites in Year 4 is presented in Annex 2.

For other activities and indicators Hongor Ovoo met and even exceeded the majority of goals, as summarised above and as indicated by a green 'traffic light' symbol. Significant successes continue to be noted in terms of enhanced herders' roles and activities in environmental governance and biodiversity conservation and livelihood/ risk management activities. Additional activities undertaken by the heseg included some vegetable production and engagement in eco-tourism, as well as production of hay and livestock fodder. These activities further supported livelihoods, food security and risk management.

Ikh Am achieved significant reductions in livestock numbers in 2018/19 compared to the baseline, although these did not meet the very ambitious 30% target set by the herders themselves. MSRM monitoring and reporting, supported by official soum level and herder group livestock census data, reveal a 15% decrease in livestock numbers (by sheep units) in Ikh Am and by comparison with the baseline. Despite good pasture conditions in 2018, high prices for livestock and livestock products, in conjunction with the project, acted as incentives for herders to sell more animals. The average number of seasonal movements per household has increased by 2018 as compared to the baseline (from average of 4 pa to 5.8, see Annex 2). Movement distances have declined on average by comparison with 2017 (from 200km/pa to 150km/pa), however, reflecting the lengthy *otor* movements undertaken by many households in 2017. Average movement distances for 2018/19 of 137km pa still far exceed baseline figures of 76 km pa. The combination of these factors means that some carbon sequestration, as modelled in the PDD and set out in more detail in Section C, were achieved in Year 4, albeit below the maximum modelled volumes. As set out in the PDD, for Ikh Am summer pastures are excluded from

modelling and calculations and have been so throughout Phase 1 of PCCA. These pastures are regularly subject to heavy stocking rates and typically used by many households outside Ikh Am, making calculation and management of these grazing pressures, plus any reduction in these, problematic within the scope of PCCA. Further details and implications of Year 4 grazing patterns in winter and spring pastures for issuance of certificates are as set out in Part C. As for Hongor Ovoo, the ERs in Table 4, Part C are derived using the Century model and technical specification set out in the PDD and the actual, rather than target, stocking levels and grazing practices in Ikh Am. Data used for the three sites in Year 4 is presented in Annex 2.

For other activities and indicators Ikh Am generally met or even exceeded targets, as indicated by 'traffic lights' and accompanying narratives in Table 7b, above. In addition, herders used PCCA funds to build a livestock washing basin and vaccinate and wash livestock to prevent the spread of disease. Environmental conservation activities were very successful, with many conducted over and above the targets set in the PDD. Herders continued to organise and take part in patrols to protect wildlife and provided fodder during harsh winters. Limited funds did however preclude additional planting or fencing of existing bushes/ planted areas at Ovootiin. Camera trap surveys for wildlife monitoring were discontinued following Year 1 in accordance with ZSL recommendations, and also following some vandalism of equipment here and at other sites (see Year 1 Annual Report, Annex 5). Risk management and livelihood support activities were very successfully discharged.

For Dulaan Kharkhain, livestock numbers (sheep units) are effectively unchanged against the baseline, following reductions in Year 3 and reflecting more favourable pasture conditions in Year 4. Despite this, carbon sequestration targets as modelled in the PDD and set out in more detail in Section C, were achieved due to variations in biomass and enhanced herders' mobility, both in terms of actual numbers and distances of movements per year by comparison with those predicted in the PDD. Further details and implications of this for issuance of certificates are as set out in Part C.

For other activities and indicators, Dulaan Kharkhain generally reached or exceeded goals. Environmental conservation and monitoring activities were discharged successfully on the whole, with protection of the saxaul forest as per targets set, planting of sea buckthorn and regular activities and surveys led by local conservation volunteers. As in Years 2 and 3, ZSL did not, however, repeat camera trap surveys, due to funding issues and vandalism of equipment. Livelihood support and risk management activities were also successfully discharged, excepting vegetable production, due to issues with water sources.

MSRM annual monitoring and progress reports are included in Annex 1, in support of the data presented against the agreed PDD indicators in Tables 7a & 7b, above.

For all three sites/ heseg the majority of indicators are green in Table 7b, above, showing that monitoring targets were achieved in full. Areas where targets have not been met in full are indicated by amber markers and summarised in Table 7b. As explained above, where these relate to livestock numbers/ stocking rates, smaller than planned reductions in numbers or slight increases may be due to a combination of factors, primarily good weather conditions supporting herd growth and survival. However, these were largely offset by good market prices, which for many herders incentivised offtake through sale of livestock and livestock products. Ultimately, as PV certificate sales develop, resultant income to herders is designed to contribute to

influencing the decision-making process away from increased herd sizes, even when pasture conditions are good. Pasture/ climatic conditions and market prices will always continue to influence herders' decision-making, However, PCCA has demonstrated that it has a role to play here in influencing decision-making and practices towards more sustainable ends.

E2: Maintaining commitments

In this period, all existing herder groups have maintained their commitment to the project (see section H1 for further details around participating households). All groups have also demonstrated their commitment through opting to enter into Phase 2 from April 2019.

E3: Socioeconomic monitoring

Monitoring indicators for Year 4 are as set out for each *heseg* in Section B1 and B2 above, and in Table 7b above. In addition, further socio-economic monitoring was undertaken against the 2015 baselines for a key set of parameters as set out in Table F2.2 of the PDD and reproduced below.

Table 8: Socio-economic indicators, Phase 1.

	HONGOR OVOO			IKH AM			DULAAN KHAIRKHAN		
	Baseline data (2015)	**2019 target**	**2019 actual**	**Baseline data (2015)**	**2019 target**	**2019 actual**	**Baseline data (2015)**	**2019 target**	**2019**
1) Livelihood diversification % hh with non-herding income sources	9.1%	30%	11.1%	0.0%	25%	0.1%	22.2%	65%	25.5%
2) Financial capital % hh with savings	18.2%	60%	51.3%	44.8%	75%	74.1%	40.0%	70%	78.6%
3) Household income % of hh with annual income > 3 million tg	13.6%	40%	94.9%	58.6%	80%	100%	66.7%	85%	92.9%
4) Mobility Mean heseg mobility (km/pa)	82	92	102	156	165	167	89	95	209
5) Income availability % hh spending >50% income on non-food expenditure	27.3%	50%	66.7%	65.5%	80%	78%	33.3%	65%	64.3%
6) Own life evaluation % of hh with 'good' or 'very good' own life evaluation score.	10.6%	50%	49%	20.6%	60%	52%	15.4%	55%	57.1%

As stated in the PDD, these key indicators for livelihood benefits were selected to fit with national

assessment criteria (e.g. in relation to poverty/ wellbeing issues) and also developed in conjunction with herders themselves. The predicted changes were based on current contexts in 2014/15, at the start of Phase 1, and extrapolation from these, based on secondary data and discussions with participating heseg. Results from the end of Phase 1 survey undertaken by MSRM in spring 2019 show that targets have been met or even exceeded for the majority of criteria, with livelihood diversification as the only exception. Of course income changes also reflect wider contexts such as market prices for livestock products and state subsidies, which are outwith the control of PCCA. Nonetheless, herders' narrative accounts highlight the importance of economies of scale and collective action under PCCA, as well as income and loans from sale of PCCA certificates in improving livelihoods. Herders also highlighted the important role of PCCA in prompting greater mobility and enhanced seasonal use of pastures.

E4: Environmental and biodiversity monitoring

Monitoring indicators for Year 4 are as set out for each *heseg* in Sections B1 and B2 above. B2 sets out biodiversity related activities and monitoring for each site over this period. These are also summarised in Table 7b, above.

End of Phase 1 data collected by MSRM in spring and summer 2019 further highlighted PCCA's contributions to environmental and biodiversity monitoring.

Specifically, ZSL researchers conducted a survey on the territory of ***Dulaan Khairkhan heseg*** in 2015 to count the number of wildlife in the area. They recorded 33 wild sheep (argali) and 12 ibex. Since then, heseg herders have regularly observed the wildlife such as wild sheep and deer and recorded their number. According to their observations, numbers have grown slightly over Phase 1, with 40-50 wild sheep and 20-25 ibex sighted at key locations in Year 4. Herder Togookhuu, a local ranger and volunteer stated:

"*For the last 5-6 years, I have been working to protect and save argali for our next generation. I am glad that number of these beautiful animals is growing…. I do not herd my livestock in the pasture where these wild animals reside. All of our herders work together to protect the wildlife. Recently, experts from the local Aimag Nature and Environment Agency visited the site. They said that they will install video cameras to register the number of rare animals. I told them that they should prohibit herders from building any winter and spring shelters in the area where the wild sheep and goats reside. Otherwise, those wild animals would not be able to come and will be forced to leave for other places. Every spring, I always prepare extra 20 packs of hay (400-500kg) to feed wild animals during harsh weather conditions*".

Furthermore, according to Dulaan Khairkhan herders, as a result of conservation efforts to protect the saxaul forest under PCCA, they have now stopped cutting and using saxaul trees for fuel. As a result, the number of young trees has grown significantly.

ZSL researchers also conducted a baseline wildlife survey on the territory of ***Ikh Am heseg*** in 2015. Since then heseg herders have been actively participating in monitoring and protecting wildlife. Specifically, in 2019 the local environmental inspector stated:

"*Our Ikh Am heseg has their own management plan for controlling illegal hunting. There are about 250 wild sheep, 200 deer, 20-30 marmots and some foxes, wolves and lynx in this area. Their number probably grows about 20-25% each year. Also, there are many kinds of birds and fish. We*

do not fish because we do not eat fish. But this spring we found many dead fish in the river. I think this is because of polluted water coming down from Ulaanbaatar city. Under the (PCCA) project guidance, our herders watch and protect our area. We use binoculars to monitor the sites".

During MSRM interviews in 2019, volunteer ranger and herder Nyambuu of Ikh Am PUG stated:

"We have wild sheep and deer. Their number has grown in the last 2 years. Specially, the number of deer is rapidly growing. Regular monitoring and patrolling activities help prevent illegal hunting. In some cases, old and weak wild sheep do not survive in harsh winters. In winters with heavy snowfall, we provide some salt and hay for them which seems to be helpful. We also protect our marmots, which are not big in numbers. In the case of illegal hunting, we tell the poachers to leave and report them to the local state environmental inspector. Our youth have not really (been) aware of environmental protection. We tell and teach them about the importance of protecting the wildlife".

In ***Hongor Ovoo heseg***, herder Batdelger and other local residents said: "*We have deer, wild boar, wolves, gazelles, foxes and many kinds of birds in our area".* Herders of Hongor Ovoo *heseg* established 5 environmental protection cooperatives to protect local forests. They signed a contract with the soum governor under which the herders would be responsible for protecting each mountain pass in their area. The forest cooperatives do forest cleaning, placing restrictions on collecting pine nuts and berries in the specified time period, patrolling and monitoring the forest, for example to prevent illegal logging, in collaboration with the local environmental inspector. They have also cleaned over 20 tonnes of garbage from a 20 km long area by the Ulunt river.

Overall, across the three PCCA sites, heseg herders have been very active in monitoring and patrolling key habitats and species. Available evidence indicates increases in key wildlife populations above pre Phase 1 baselines, although due to vandalism of camera equipment and funding constraints it was not possible to repeat all ZSL baseline surveys in full. Activities for habitat protection have been discharged in full by herders in most instances. As set out in PDD Section F3 (Ecosystem and Biodiversity Benefits), this habitat protection offers important benefits for conservation of key wildlife species, as do herders' activities to protect wildlife from illegal hunting and poaching. The latter are typically undertaken in agreement with local environmental officers and highlight the increased participation and leadership of herders in aspects of environmental governance under PCCA.

Further evidence for realisation of the Year 4 goals and targets is provided in the MSRM Annual Report (Annex 1) of this report.

Part F: Impacts

F1: Evidence of outcomes

As highlighted above and in Tables 7b and 8 in particular, PCCA Phase 1 has secured a range of specific impacts in relation to livelihoods, pasture use and management, carbon sequestration and biodiversity conservation.

Overall, during Phase 1 PCCA there have been positive changes in herders' perceptions and actions on environmental protection. As reported to MSRM by participating heseg in 2019, herders are more concerned with protecting pastures. Since PCCA started, herders have taken actions to try to limit the number of livestock according to the carrying capacity, to use pastures according to the agreed schedules, to rotate and rest pastures, protect wildlife, rivers and springs, establish water points, produce livestock products and raw materials, and increase sources of income from non-herding activities. Financial benefits from the sale of PV certificates have provided a further incentive for herders' commitment and actions, although it is notable that participating heseg committed to these actions before significant funds were received from sales. In post Phase 1 surveys undertaken by MSRM in spring and summer 2019, herders commented particularly on improvements in pasture use and collective action, as well as their own role in conservation and local environmental governance. Despite its unfamiliarity prior to PCCA, this ex post results-based payments approach has worked well with participating heseg, and they have remained committed to PCCA despite initially slow certificate sales. This also provides evidence of the importance of the collaborative approach taken from the initial development of PCCA and throughout Phase 1. This encompasses the co-development of all activities, goals and monitoring indicators between MSRM and herders from the outset. The hesegs' desire to continue into an extended Phase 2 from spring 2019 provides further evidence of the positive impacts of the project, including its novel elements.

In addition to these impacts, the project has been significant in a number of ways. As the first rangelands carbon project for the voluntary market in Mongolia, it has garnered significant attention and support from in-country policy makers, for example at a recent workshop in Ulaanbaatar in June 2019. International conservation bodies active in Mongolia have also expressed support for and interest in the PCCA approach. Thus wider policy impacts are emerging from PCCA and are expected to develop further during Phase 2.

Part G: Payments for Ecosystem Services

G1: Summary of PES by year

Table 9: Summary of payments made and held in trust

1. Reporting year (mm/yy – mm/yy)	2. Total previous payments (previous reporting periods)	3. Total ongoing payments (in this reporting period)	4. Total payments made (2+3)	5. Total payments held in trust	6. Total payments withheld
Year 1	0	0	0	0	0
Year 2	0	$302.30	$302.30	0	0
Year 3	$302.30	$9191.20	$9493.50	0	0
Year 4	$9493.50	$70291.50	$79785.00	$52630.40	0
TOTAL			**$79785.00**	**$52630.40 ****	**0**

*** Payments held in trust will be disbursed to the participants (herder groups) in the Spring of 2020 upon reviewing their work report and planned activities.*

All payments have been made in accordance with the PES agreements signed by participating heseg and as set out in the PDD.

Part H: Ongoing participation

H1: Recruitment

No further participants have been recruited during Phase 1 or specifically in Year 4. The numbers of households in each herder group are set out above. The number of participating heseg are unchanged, although numbers of households within those heseg decreased in Years 2 and 3 due to departure of 24 households from project areas, with the remaining difference being due to new census methods of recording households, which only include those with their own livestock herds (e.g. omitting dependent households without livestock). No further changes in the numbers of participants were noted in Year 4.

H2: Project Potential

We do not have a waiting list of other participants at this stage, as we have decided to complete the initial 4 year commitment period before opening the project to new participants. All three existing participating heseg have continued into a second commitment period. As noted other key organisations in Mongolia have expressed interest in adopting the PCCA approach and thus potentially extending it to new sites and herder groups.

H3: Community participation

For Year 4, evidence of community participation is summarised below.

Through a series of meetings with MSRM all members of herder groups have undertaken participatory management and planning activities in relation to the following main issues:

i. *Pasture use planning*;
ii. *Maintenance/ repair of winter and other shelters and hand wells;*
iii. *Cooperation in livestock/ raw material marketing, felt processing and dairy product manufacturing;*
iv. *Environmental protection/ conservation*

Specifically, in Year 4 a team from MSRM visited each of the three participating heseg. During these visits, herders were given ongoing training in pasture use planning, in order to develop pasture use strategies in accordance with carbon sequestration targets and modelling as set out in the PDD. These meetings were also used as opportunities to discuss the progress of the project; the development of activities agreed under the PDD, any issues or problems being encountered in meeting agreed targets and to answer any questions about the sale of certificates or carbon sequestration and modelling. Heseg furthermore discussed other options for use of funds from sale of PV certificates, with all opting to develop a micro loan fund with part of these proceeds. Heseg members also conducted their own informal meetings on numerous occasions throughout the year, but given the nature of these meetings, formal minutes are not kept. Evidence of activities completed is presented in Table 7, Section E, and in the MSRM reports in Annex 1.

Part I: Project operating costs

I1: Allocation of costs

For Year 4, MSRM costs in training and capacity building with participating *heseg* and in monitoring were met through their allocation of funds from PV certificate sales, and some external funding.

Table 10: Allocation of costs

Expense	Narrative	Amount (if possible in USD$)	Contribution from sale of PVCs	Contribution from other sources
Travel and Subsistence, plus staff time 2018/19; PCCA workshop June 2019 (MSRM staff)	Training, survey and monitoring work in countryside in 2018/19; including vehicle rental and staff costs; socio-economic surveys and interviews; in country management of project and Markit account; costs for PCCA workshop June 2019	$37820.10 USD (Staff cost - 17586 USD, travel and subsistence 11928.50 USD, workshop cost 3822.70 USD, other cost 4482.90 USD)	$4560.30	Pastoralism, Policy and Climate action Mongolia projects, through University of Leicester: $33259. 80 USD

Annexes

Annex 1. Monitoring results for issuance request

Results are presented in Tables 7a and b, Section E, above.

Further supporting information from MSRM Annual Report for Year 4 is also included below.

MSRM Year 4 Annual Report

1. Hongor Ovoo

The Hongor Ovoo herder group has been using the pasture according to the Five-Year Pastureland Management Plan until 2020 which was approved by the soum's Citizens' Representatives Khural in 2015. Although it was planned to reduce the number of livestock (converting all livestock into sheep units) by 5 % in 2018-2019 by comparison with the baseline, the number of livestock increased slightly by 0.2% due to the increase in number of sheep. However, this growth percentage is lower compared to the growth rate in previous years. The actual number of livestock has decreased by 5% in 2017 and by 2.1% in 2018 compared to 2014 (Table 1).

Table 1. Hongor Ovoo Heseg actual livestock numbers

Year	camel	horse	cattle	sheep	goat	Total
2014		880	2260	7120	3835	14095
2015		825	2450	7215	3824	14314
2016		1017	2697	8758	4237	16709
2017		906	2483	6590	3414	13393
2018		804	2432	7120	3448	13804

The weather conditions in 2018 were more favorable than 2017, so the pasture yield was 22% higher than in previous years. The number of livestock movements is similar to that of the previous year. In 2018, Mongolia's meat exports increased by 2.8 times due to increased prices of livestock and meat by 15-25%, which encouraged herders to sell more livestock. As a result, the number of livestock decreased in 2018. Herders also sold a large quantity of animals because of the expectation of dzud in the winter of 2018.

The average number of herders' movement increased by 39.4% in 2016, by 40.2% in 2016 and by 25% in 2018, while the average distance of movement increased by 92.3% in 2016, by 4.6 times in 2017 and by 3.1 times in 2018. Due to poor pasture yield caused by droughts in 2017, the herders moved more times and for longer distances. The weather conditions in 2018 were good, so the number and distance of moves reduced by comparison with 2017, although remain higher than baseline values.

All herders from HO heseg of Ikhtamir soum made seasonal movements and pasture rotations by 100 percent as planned.

As the year 2018 was relatively favorable compared to 2017, pasture yield and hay harvest were good. Each household harvested and prepared 3-4 tons of hay in average. Some herder families purchased 1-2 tons of green fodder, while some families collected horse dung, aspen tree leaves and stinging nettle and prepared

homemade livestock fodder. Each household prepared 100-400 kg of homemade livestock fodder in average and purchased 200-500 kg of salt. Herder N. Batdelger planted oats in 0.25 hectare of field near his winter camp and harvested 2 tons of green fodder, and herder O. Galbadrakh planted oats and harvested 1.5 tons of green fodder.

Picture 1: Collected aspen tree leaves and stinging nettle & harvested natural hay

Herder D.Erdenebat , Bulgantamir, B. Bukhbaatar built a new winter shelter. Nine families fixed their winter and spring shelters.
All herders of the group participated in developing the "Pasture use and protection plan" of 2017 and had it approved by the group meeting, and herders have been cooperating to protect and use the pasture properly. One forest cooperative protected a spring water source in "Bulag". The cooperative led by herder N. Batbaatar expanded its tree nursery and planted 200 larch seedlings. Five forest protection cooperatives had previously been established within HO heseg and signed an agreement with the soum governor and were issued a cooperative certificate. "Shiree bulan", "Neg Sanaa", "Ikh Ulunt", "Khaltar Angarkhai", "Khaluun Us" cooperatives developed plans for forest organization and forest management. The soum governor and the forest unit designated "Neg Sanaa" cooperative to do forest cleanup of an area of 1.5 hectares and "Khaltar Angarkhai" cooperative to do forest cleanup in area of 1 hectare.
"Neg Sanaa" cooperative collected 6 m3 of fallen trees, 9 m3 of brushwood and 1m3 of tree stumps and "Khaltar Angarkhai " cooperative collected 5 m3 of fallen trees, 7 m3 of brushwood and 3 m3 of tree stumps from the designated areas.
In 2018, ten families of HO planted potatoes and other vegetables on 1 hectare and harvested 5 tons of potatoes.
In 2018, pine nuts and berries did not grow well and herders could not earn income from this source.
Herders Sukhbaatar planted 100 seedlings of sea buckthorn and black currants in their summer camp.

In 2018, yak wool prices increased from 20,000 to 25,000 tugrugs per kg and the group herders combed their yak wool and sold 2.5 tons of yak wool.
In 2017 and 2018, the project funding of 12,155,000 MNT was transferred to HO heseg. The herders in the group discussed how to use the money at their group meeting and agreed to establish a mutual micro loan fund to lend money to their herders. Mongolian nomadic herders receive their income only twice a year; in spring from combing their goat cashmere and in autumn around October and November from selling their livestock. Herders do not have any other fixed income in other times of the year, so they frequently get loans from the bank. Over 90 percent of all herders take bank loans with a monthly interest rate of 2.5-3 percent for 3-9 months . Therefore, a mutual fund was created to meet this need. Since they received their first project funding in 2017 until now, they have issued loans of 12.2 million MNT with an interest rate of 2% per month (when bank interest is 2.5%) to 20 herders. The mutual fund increased by 771,200 MNT with loan payback. This way the project funding is being raised and used in a transparent way to inform and implement the project objectives, and accessible for all herders to use it for activities such as building and repairing animal shelters, preparing hay, making 'otor' movements, operating wells, selling livestock products at the soum center and centralized markets. accessible and transparent. Participants are also discussing about raising this fund by investing money from the group herders.

2. Ikh Am

According to the soum's land utilization plan, "Ikh Am" PUG of Undurshireet soum, Tuv aimag made a Pasture Use Agreement with the soum's land inspector based on the soum governor's order of September 12, 2017.
Although the number of livestock should be reduced by 10 percent in 2018-2019 against the baseline (by sheep units) according to the monitoring plan, it was reduced by 14.9 percent. While the number of livestock increased in previous years, it has declined in Year 4.

Table 2. Ikh Am Heseg actual livestock numbers

	Camel	Horse	Cattle	Sheep	Goat	Total
2014	0	1188	1143	10457	6960	**19748**
2015	18	1503	1337	11882	7677	**22417**
2016	29	1477	1377	13501	7574	**23958**
2017	26	1161	1005	10853	5798	**18843**
2018	2	809	985	10529	6046	**18371**

In 2018, although weather conditions were favourable, herders sold more livestock because prices of livestock and meat were higher than in previous years. This resulted in the reduction in total livestock numbers. Number and distance of seasonal movements have increased. The average number of seasonal movements per household has increased by 45%, average distance by 97.4% and the average distance of each movement by 36.1% respectively in 2018.

The heseg herders have been using pastures in seasonal rotation as scheduled.

The data on pasture yield was obtained from the pasture monitoring study by the soum meteorological station. Due to the drought in the summer of 2017, the pasture yield decreased by 41.5% compared to the previous year, but increased by 33.3% in 2018 because of the favorable weather contidions. This fluctuation affects the biomass utilization rate of the given year. Pasture yield and pasture carrying capacity are highly dependent on climatic conditions.

The summer and autumn grazing areas from Tsahirin Bulan to Ovootin Denj were rested, and vegetation such Mongolian grass and worm wood grew up to 20 cm tall. Pastures near winter shelters in Doloon Hudgiin Am and Dashgai were also left unused and rested for eight months which helped the pasture to restore to some extent.

A deep well was repaired in spring pasture in Suudlin Enger, with soum and some PCCA funds, which enabled about ten herder families to graze their livestock of about 8000 heads in that area.

Hay and fodder preparation: each household prepared 100-150 packs (1 pack of hay - 25 kg) or 2500-4000 kg of hay, 10 sacks (1 sack - 40 kg) or 400 kg of bran,

and pickled 500-1000 kg of leeks, stinging nettles, and stored horse dung.

The heseg herders have been taking actions to protect wildlife such as wild sheep, deer, and antelope. Due to the heavy snowfall in Undurshireet soum in 2018, wild animals were in the risk of dying from shortage of food, thus herders left 100 packs of hay and 2000 kg of salt in their grazing area in early December.

In order to protect wildlife including deer and antelopes from poachers, the heseg herders took turns to patrol and guard them every 45 days in fall. In spring, herders rotated every 30 days to patrol and guard deer from poachers who try to poach deer for their horns. These actions help wildlife to raise naturally.

The herders and the local administration officials cleaned up the garbage along the Tuul river banks and removed 4 tonnes of garbage.

Four families fixed their winter shelters.

The herders prepared dairy products and sold them at the their provincial dairy product exhibition. Every year, each household sells approximately 60 kg of butter, 25 kg of curd, 100 liters of milk, 25 kg of dried cheese, 120 kg of sour cheese and earn 1,260,000 MNT.

In 2017 and 2018, the project funding of 10,420,000 MNT was transferred to Ikh AM heseg. The herders in the group discussed how to use the money at their group meeting and agreed to establish a mutual micro loan fund to lend money to their herders. Mongolian nomadic herders receive their income only twice a year; in spring from combing their goat cashmere and in autumn around October and November from selling their livestock. Herders do not have any other fixed income in other times of the year, so they frequently get loans from the bank. Over 90 percent of all herders take bank loans with a monthly interest rate of 2.5-3 % for 3-9 months . Therefore, a mutual fund was created to meet this need. Since they received their first project funding in 2017 until now, they have issued loans of 10.4 million MNT with an interest rate of 2% per month (when bank interest is 2.5%) to 20 herders. The mutual fund increased by 1.4 million MNT with loan payback. This way the project funding is being raised and used in a transparent way to inform and implement the project objectives, and accessible for all herders to use it for activities such as building and repairing animal shelters, preparing hay, making 'otor' movements, operating wells, selling livestock products at the soum center and centralized markets. Participants are also discussing about raising this fund by investing money from the group herders.

3. Dulaan Kharkhain

According to the soum's land management plan, Dulaankhairkhan HG of Bogd soum, Bayankhongor aimag made a Pastureland Use Agreement with the soum land inspector based on the soum governor's order in 2017. The number of livestock (converted to sheep unit) increased in the previous years, but started declining in 2017. The livestock number reduced by 7.1% in 2017, and it slightly increased by 0.1% against the baseline in 2018.

Table 3. Dulaan Kharkhain actual livestock numbers

	Camel	Horse	Cattle	Sheep	Goat	Total
2014	201	85	65	531	3940	4822
2015	195	96	64	606	4383	5344
2016	230	111	73	719	4787	5920
2017	158	72	63	562	3864	4719
2018	202	91	47	528	4008	**4876**

One of the factors contributing to pasture improvement is the traditional rotational grazing. Due to the extreme weather conditions with droughts and dzuds in 2017, herders moved to remote pastures and the average distance of movements increased significantly by comparison with previous years. In 2018, the average distance of movement was about 160 km, less than in 2017 due to better pasture and weather conditions and hence less need for long distance otor migrations. Overall, average movement distances have increased from 84km (baseline) to 162km/pa over the duration of Phase 1 PCCA. Pasture yield, as measured by the soum meteorological station, increased by over 40% in 2018 compared to the previous dry year. This fluctuation affects the number and distance of movement, number of livestock, and biomass utilization rate. Pasture yield and pasture carrying capacity are highly dependent on climatic conditions.

The herders made seasonal movements and pasture rotations according to the Pasture Use Agreement. The heseg herders jointly developed a draft plan on pasture use for 2018 and had it approved at the group meeting. They renovated the water reservoir which was built in 2016. In 2017, they extended the water channel by two kilometers by collecting 50,000 MNT from each herder family to enhance the use of remote pastureland and reduce the grazing load of winter and spring pastures. In 2018, the water reservoir was damaged in the flood and 1.5 million MNT from the project funding was spent to fix it.

The herders renovated a well in Durulj.

All families prepared hay and fodder in adequate amount, 2-3 tons more than previous years.

The heseg herders made a plan to collectively protect saxaul trees and requested the Citizens' Representative Hural to ban cutting and using saxaul trees for fuel. As a result, saxaul forest is renegerating and new trees are growing. The numbers of stumps decreased by up to 80%.

Dulaankhairkhan HG herders continue to protect licorice plants and saxaul trees as well as wild sheep and goats in Ikh Bogd special protected area. The local wildlife conservation volunteer Togookhuu reported that the number of wild sheep and goats have increased since the previous year.

Dulaan Khairkhan HG herders jointly built two winter shelters, one spring shelters and fixed two winter shelters.

In order to increase the sales of livestock, to reduce animal diseases and to improve leather quality, the heseg herders collected 150,000 MNT from each family and built a livestock washing bath with size of 1.2x6 meters and 1.4 meters deep in 'Zadgai Am' and washed all their sheep and goats. They used blocks to build fence around the bath which are 18 and 32 meters long to keep the livestock and used cement to build one side of the fence.

Each household prepared 4-6 tons of natural hay, 200-500 kg of bran, 200-300 kg of salt, and 200-400 kg of handmade fodder.

Herders of Dulaankhairkhan HG has sold their camel wool, goat cashmere and other raw materials through their cooperative. Herders send their raw materials to their cooperative along with a note with their name, address and the amount of the raw materials, and receive their sales income from the cooperative.

In 2018, the heseg herders sold 11 tons of cashmere, 22 tons of wool and 4200 pieces of animal skin.

In 2017 and 2018, the project funding of 10,780,000 MNT was transferred to Dulaankhairkhan heseg. The herders in the group discussed how to use the money at their group meeting and agreed to establish a mutual micro loan fund to lend money to their herders. Mongolian nomadic herders receive their income only twice a year; in spring from combing their goat cashmere and in autumn around October and November from selling their livestock. Herders do not have any other fixed income in other times of the year, so they frequently get loans from the bank. Over 90 percent of all herders take bank loans with a monthly interest rate of 2.5-3 % for 3-9 months . Therefore, a mutual fund was created to meet this need. Since they received their first project funding in 2017 until now, they have issued loans of 10.8 million MNT with an interest rate of 2% per month (when bank interest is 2.5%) to 9 herders. The mutual fund increased by 777,000 MNT with loan payback. This way the project funding is being raised and used in a transparent way to inform and implement the project objectives, and accessible for all herders to use it for activities such as building and repairing animal shelters, preparing hay, making 'otor' movements, operating wells, buying gas for transporting their livestock products to sell at the soum center and centralized markets. accessible and transparent. Participants are also discussing about raising this fund by investing money from the group herders.

In 2018-2019, besides implementing activities specified in the monitoring plan, the HG herders plan to plant vegetable, livestock fodder, and trees using their newly built water reservoir. Herders are suggesting to purchase a small scale equipment to produce livestock fodder with bamboo, feather-grass, stinging

nettle and other plants which are abundant in their area.

Annex 2. Ongoing monitoring results for all participants

Monitoring results for Year 4 are summarised in Section E, Table 7a & 7b.

Further supporting information from MSRM Annual reports for Year 4 is also included as part of Annex 1, above.

Carbon modelling calculations are presented in the following tables. These underpin the figures for carbon sequestration achieved in Year 4, as presented in Section C, Table 4 of the main report.

Table Annex 2a: Hongor Ovoo, Ikh Tamir soum. Grazing Management Activity Description by Grazing Location

	Grazing location	Riparian meadow		Mountain meadow			Mountain steppe		
		spring/summer/fall	summer	winter	summer/fall	winter/spring	fall	winter/spring	summer/fall
	Year 4 (2018-19)								
	start of grazing season (dd/mm)	25-Mar-18	12-Jun-18	15-Oct-18	25-May-18	1-Nov-18	20-Aug-18	15-Oct-18	25-May-18
	end of grazing season (dd/mm)	20-Aug-18	1-Aug-18	25-Mar-19	1-Nov-18	1-May-19	15-Oct-18	25-May-19	15-Oct-18
	number of days grazing in location	148	50	161	160	181	56	222	143
	average number of moves (camps) in this location	6	3	3	6	3	3	4	5
	average number of sheep units grazing in this location	4940	8576	8343	1432	3901	3001	8060	2354
	area (ha)	1,483.5	2,651.2	4,639.4	786.4	2,169.1	1,647.9	4,481.8	1,292.6
	yield (kg DM ha)	832.7	808.94	1100	455.4	1100	455.4	1100	455.4
	total yield (kg DM)	1235310.5	2144669.8	5103307.0	358126.6	2386010.0	750435.4	4929980.0	588659.1
	estimation of sustainable carrying capacity								
	recommended biomass utilization rate (%)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	kg DM per sheep unit per day	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	number of days grazing for each plot in this location	25	17	54	27	60	19	56	29
	total no. Sheep unit that can be grazed to sequester carbon	10731.5	27574.3	20377.0	2877.8	8474.4	8614.7	19034.7	4410.5
		0.46	**0.31**	**0.41**	**0.50**	**0.46**	**0.35**	**0.42**	**0.53**

Table Annex 2b: Ikh Am, Undurshireet soum. Grazing Management Activity Description by Grazing Location

	Grazing Location	Riparian meadow	Mountain steppe		Steppe	
		Spring	Spring	Winter	Spring	Winter
	Year 4 (2018-19)					
	start of grazing season (dd/mm)	1-Mar-18	1-Mar-18	20-Nov-18	1-Mar-18	20-Nov-18
	end of grazing season (dd/mm)	10-Jun-18	10-Jun-18	1-Mar-19	10-Jun-18	1-Mar-19
	number of days grazing in this location	101	101	101	101	101
	average number of moves (camps) in this location	6	6	3	6	2

	average number of sheep units grazing in this location	6846.9	4397.5	11992.6	6938.2	6182.1
	area (ha)	851.7	703.3	7804.8	1517.1	7441.3
	yield (kg DM ha)	540	420	420	332	332
	total yield (kg DM)	459918.0	295386.0	3278016.0	503677.2	2470511.6
	estimation of sustainable carrying capacity					
	recommended biomass utilization rate (%)	0.4	0.4	0.5	0.4	0.5
	kg DM per sheep unit per day	1.4	1.4	1.4	1.4	1.4
	number of days grazing for each plot in this location	13	13	34	13	51
	total no. Sheep unit that can be grazed to sequester carbon	10408.3	6684.8	34773.9	11398.6	17471.8
		0.66	0.66	0.34	0.61	0.35

Table Annex 2c: Dulaan Khairkhan, Bogd soum. Grazing Management Activity Description by Grazing Location

	Grazing location	**Mountain desert steppe**		**Desert steppe**	
		winter/spring	**fall**	**summer/fall**	**fall**
	Year 4 (2018-19)				
	start of grazing season (dd/mm)	10-Nov-18	20-Aug-18	1-May-18	20-Aug-18
	end of grazing season (dd/mm)	1-May-19	10-Nov-18	10-Nov-18	10-Nov-18
	number of days grazing in this location	172	82	193	82
	average number of moves (camps) in this location	4	3	4	3
	average number of sheep units grazing in this location	4176	2337	644	1195
	area (ha)	9023	4010	1105	2051
	yield (kg DM ha)	210	273	273	273
	total yield (kg DM)	1894830.0	1094730.0	301665.0	559923.0
	estimation of sustainable carrying capacity				
	recommended biomass utilization rate (%)	0.3	0.3	0.3	0.3
	kg DM per sheep unit per day	1.4	1.4	1.4	1.4
	number of days grazing for each plot in this location	43	27	48	27
	total no. Sheep unit that can be grazed to sequester carbon	9442.7	8582.4	1339.7	4389.6
		0.44	0.27	0.48	0.27

Table Annex 2d: C sequestration per ha by pasture type under differing grazing pressures, Hongor Ovoo

Ikh Tamir Hongor Ovoo	Area (ha)	C per ha pa at 30% grazing pressure (with project)*	Total C pa for 30%	C per ha pa at 40% grazing pressure (with project)*	Total C pa for 40%	C per ha pa at 50% grazing pressure (with project)*	Total C pa for 50%
Riparian Meadow							
Mar- Aug	1485.3	1.1600	1723	0.5468	812	0.0156	23
May- Aug	2652	1.0274	2725	0.6652	1764	0.3699	981
Mountain Meadow							
Oct-Mar	4639.8	0.2133	990	0.1004	466	0.0656	304
May-Oct	786.4	1.523	1198	0.7123	560	-0.0664	-52
Oct-May	2169.1	1.0025	2175	0.9822	2130	0.9497	2060
Mountain Steppe							
Aug-Oct	1,647.9	0.7534	1241	0.4139	682	0.1209	199
May-Oct	1,292.6	0.8923	1153	0.323	418	-0.0652	-84
Oct-May	4,481.8	0.5512	2470	0.4528	2029	0.2836	1271

*Figures for C sequestration per ha for the different grazing pressures and pasture types are as derived from the CENTURY modelling (see Technical Specification in PDD). As part of the conservative approach taken here, grazing pressures exceeding 50% are considered not to sequester any carbon. Actual grazing pressures as calculated in Table Annex 2a above for the various pasture types in Years 2 and 3 are used in conjunction with the above rates per ha for these pasture types to calculate total carbon sequestered, as presented in Section C.

Table Annex 2e: C sequestration per ha by pasture type under differing grazing pressures, Ikh Am

Undurshireet Ikh Am	Area (ha)	C per ha pa at 30% grazing pressure (with project)*	Total C pa for 30%	C per ha pa at 40% grazing pressure (with project)*	Total C pa for 40%	C per ha pa at 50% grazing pressure (with project)*	Total C pa for 50%
Riparian Meadow							
Mar- June	851.7	1.1600	988	0.5468	466	0.0156	13
Mountain Steppe							
Mar- June	703.3	0.8923	628	0.323	227	0.0656	46
Nov-March	7804.8	0.5512	4302	0.4528	3534	0.2836	2213
Steppe							
Mar- June	1,517.0	0.8923	1354	0.323	490	0.0656	100
Nov-March	7,441.3	0.5512	4102	0.4528	3369	0.2836	2110

*Figures for C sequestration per ha for the different grazing pressures and pasture types are as derived from the CENTURY modelling (see Technical Specification in PDD). As part of the conservative approach taken here, grazing pressures exceeding 50% are considered not to sequester any carbon. Actual grazing pressures as calculated in Table Annex 2b above for the various pasture types in Years 2 and 3 are used in conjunction with the above rates per ha for these pasture types to calculate total carbon sequestered, as presented in Section C.

Table Annex 2f: C sequestration per ha by pasture type under differing grazing pressures, Dulaan Kharkhain

Bogd Dulaan Khairkhan	Area (ha)	C per ha pa at 30% grazing pressure (with project)*	Total C pa for 30%	C per ha pa at 40% grazing pressure (with project)*	Total C pa for 40%	C per ha pa at 50% grazing pressure (with project)*	Total C pa for 50%
Mountain desert Steppe							
Nov-May	9023	0.5512	4973	0.4528	4086	0.2836	2559
desert steppe							
Aug-Nov (1)	4010	0.7534	3021	0.4139	1660	0.1209	485
May-Nov	1,105.0	0.8923	986	0.323	357	0.0652	72
Aug-Nov (2)	2,051.0	0.7534	1545	0.4139	849	0.1209	248

*Figures for C sequestration per ha for the different grazing pressures and pasture types are as derived from the CENTURY modelling (see Technical Specification in PDD). As part of the conservative approach taken here, grazing pressures exceeding 50% are considered not to sequester any carbon. Actual grazing pressures as calculated in Table Annex 2c above for the various pasture types in Years 2 and 3 are used in conjunction with the above rates per ha for these pasture types to calculate total carbon sequestered, as presented in Section C.

Annex 3. Reallocation of commitments

n/a

Annex 4. Socioeconomic monitoring results

Again, these are reported in Table 7b.

MSRM's annual reports, which provide further details of herders' activities and successes, are included at Annex 1, above.

Annex 5. Conservation and monitoring results

These are reported in Tables 7a, 7b, referring to Annex 2.

Annex 6. Impacts

Monitoring results as reported in previous annexes and in Table 7.

Annex 7. Community meeting records (summary)

Meetings and training events with *heseg* members are described in Section H above.