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MAKING EXTENSION WORK FOR HERDERS

A participatory assessment of needs and opportunities for the Green Gold - Agricultural Extension Component (2013-2016)

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Executive Summary

The Agricultural Extension Component of the SDC-funded Green Gold project, Phase IV, aims to '*deliver useful knowledge and services to herders (f/m)'*. Implementation of the Component by a consortium consisting of The University of Queensland and the Association for Sustainable Rural Development, a spin-off of the Mongolian State University of Agriculture, started in November 2013 and will be completed in December 2016. The component involves two tiers of interventions: i) strengthening the Government-coordinated extension system of Mongolia, and ii) piloting of extension services for sustainable pastoral livestock production through the pastoral user group (PUG) system in the target areas of Green Gold. The PUG system consists of about 900 PUGs in 93 soums of Arkhangai, Bayankhongor, Bayan-Ulgii, Gobi-Altai, Khovd, Uws and Zavkhan aimags that are coordinated by Associations of PUGs (APUG) at the soum-level and Aimag Federations of PUGs (AFPUG) at the aimag level. In total, this system covers approximately 32 thousand herder households. The implementation strategy of the Extension Component is based on an interactive, participatory approach and works from the principle of *facilitation of access* to information, services, technologies, and learning and exchange opportunities. Local-level implementation of the Component is being piloted in 2014 in 26 soums of Khovd, Uws and Bayan-Ulgii aimags, which were selected through suggestions of the Green Gold PCU and AFPUGs in these three aimags prior to this study.

This study, which was conducted at the start of the Component implementation from December 2013 to April 2014, aims to provide diagnostic information to the Green Gold Agricultural Extension Component for designing a conceptual framework and implementation strategy that will engage herder households in the target areas in sustainable rangeland and livestock management, and consequently lead to improved livelihoods. The study uses a Participatory Needs and Opportunities Assessment approach, which enables understanding of the situation through the perspectives of stakeholders and provides implications for designing interventions for sustainable outcomes through enhanced capacities and effective stakeholder interactions.

The study methodology included stakeholder interviews, a herder survey and focus group discussions, in addition to a desk study and observations of local environments and resources. The stakeholder interviews were conducted with 42 persons representing major stakeholders in the agricultural extension system at central, aimag and soum levels, as identified in the initial implementation plan of the Extension Component and through desk study or suggestions by NAEC, MSUA and the PCU of the Green Gold project. The herder survey served the immediate purpose of identifying herders' assets, needs, perspectives and priorities for piloting extension services in the target areas of Green Gold, and was conducted with 161 herders in five soums in Khovd, Bayan-Ulgii and Uws aimags via individual interviews using a structured questionnaire combining information tables, open-ended questions, and scorecards with multiple choices. Complementing the above methods of data collection, 14 focus group discussions with a total 204 participants were organised. The participants included herders, representatives of APUGs and AHBUs in 26 soums, AFPUGs and DIAs in Khovd, Uws and Bayan-Ulgii aimags, and staff members of the Project Coordination Unit (PCU) of Green Gold.

Based on the analysis of all results, the study recommends the following focus areas of intervention for strengthening the Government extension system:

1. Facilitating stakeholder engagement for reforming the agricultural extension system;
2. Improving the collaboration between MSUA and NAEC;
3. Introducing extension education at MSUA; and
4. Demonstration of use of information and communication media in agricultural extension.

The Government extension system needs a conceptual reform that i) shifts the paradigm of agricultural extension from technology transfer to facilitation of participatory and collaborative processes for enabling agricultural producers to gain access to information, education,

research, services and markets, and to improve their knowledge and skills of production technology and business management, and ii) introduces clear and non-conflicting mandates at central, aimag and soum levels for systematic coordination and implementation of extension services. Facilitation of such a reform will require ongoing dialogue of stakeholders in the system, backed by demonstration of the changes suggested to the system through the extension pilot in Green Gold areas. An initial platform of multi-stakeholder dialogue can be established in the form of an Advisory Board of the Green Gold - Agricultural Extension Component, consisting of representatives of MIA, NAEC, MSUA, UN organisations, NGOs and private firms engaging in agricultural extension. The dialogue needs to be supported by measures for awareness building among decision-makers at different levels. The final output of the efforts to strengthen the Government extension system can be a master plan, for instance, for the period 2017-2021 based on perceived needs of stakeholders for improving the system as well as lessons learnt from the extension pilot of the Green Gold project.

The primary objective of strengthening the linkage between agricultural research and extension should be improved collaboration between MSUA and NAEC. Efforts to strengthen the collaboration of MSUA and NAEC should include facilitation of formal agreements, demonstration of research-extension linkage by the Green Gold – Agricultural Extension Component as well as initiation of collaborative activities of MSUA and NAEC. Formalisation of collaboration between the two organisations involves renewal of the existing Memorandum of Understanding for introducing i) the rationale of demand-driven extension service delivery by the Government extension system led by NAEC in collaboration with the national agricultural research system led by MSUA, and ii) a framework of collaboration that encourages MSUA to test, promote and commercialise research products through the Government extension system, and NAEC, DIAs and AHBUs to facilitate bottom-up initiatives for innovation pilots and on-farm trials with support of MSUA researchers. Collaborative activities of MSUA and NAEC can lean on demonstration of research-extension linkages in the extension pilot in Green Gold areas, and include co-development and co-implementation of research and extension projects.

Introduction of extension education at MSUA will enable the university to provide agricultural extension services at central, aimag and soum levels with agricultural specialists who are also trained in extension strategies and methods. Milestones of this intervention include training of MSUA lecturers in teaching extension methods and introduction of a mandatory module of agricultural extension in undergraduate programs of animal and crop sciences and agricultural economics. The module of agricultural extension should mostly build the capacity of the students to consult and communicate with different stakeholders, design and facilitate extension interventions, deliver training to herders and farmers, and help them implement on-farm trials.

Use of television, radio, videos and cell phones in extension services as a cost-effective option for reaching herders spread on vast territory of Mongolia should be piloted in Green Gold areas in order to demonstrate the benefits of these information and communication media for informing herders, disseminating extension messages and enabling herder exchange.

The study suggests the following focus areas of interventions for building capacities and structures for demand-driven extension services in Green Gold areas:

1. Training and engagement of Master Trainers at the aimag level;
2. Training and engagement of facilitators at the soum level;
3. Establishment of Herder Service Centres;
4. Facilitation of cooperation agreements between APUGs and soum governments; and
5. Strengthening herders' cooperatives.

Training of Master Trainers (ToMT) targets the aimag-level stakeholders AFPUGs and DIAs, aiming to build their capacity to coordinate soum-level extension activities. The ToMT emphasises the role of Master Trainers as mentors of soum-level extension staff, and employ of a balanced mix of technical contents and contents on communication and facilitation methods. The Master Trainers will be involved in regular follow-up training for gradually

building their facilitation and communication skills and technical knowledge. Main duties of Master Trainers include planning, monitoring and evaluation of soum-level extension services, and training and mentoring of facilitators at AHBUs and APUGs.

Training of Facilitators (ToF) aims to build capacity to deliver extension services at the soum level, and targets APUG and AHBU staff. The ToF will employ a mix of technical contents and contents on facilitation methods. Technical contents of the ToF should specifically target the ability of facilitators to train and support herders in application of concrete solutions and practices leading to sustainable improvements of rangeland and livestock management and herder livelihoods. Facilitation skills needed by the facilitators broadly include abilities to listen, facilitate transdisciplinarity, facilitate collective learning and actions, facilitate access and understand science and innovations for the target communities. The facilitators will need follow-up and refresher training for regular updating of their facilitation skills and technical knowledge. A facilitation team consisting of the head of APUG and the livestock expert or the rangeland expert of the AHBU needs to be established in each soum.

Herder Service Centres (HSC) as physical spaces for soum-level herder training and exchange activities and small-scale adaptive trials need to be established in each of the target soums of the extension pilot. In soums where Herder Training and Information Centres have been established by the Green Gold project they can be converted to HSCs, and in soums without such a facility HSCs need to be established at the Soum Governor's Bureau (SGB). The HSCs need to be equipped with a small demonstration plot with fodder crops and perennial grasses, equipment for field training, and training and information tools and items.

Soum-level pilot extension services in Green Gold areas need to be institutionalised through cooperation agreements between APUGs and SGBs so that APUGs are enabled to access resources of soum governments for use in in extension services and the extension services potentially sustain beyond the Green Gold Phase IV. Essential clauses of the cooperation agreements include acknowledgement of APUGs as main soum-level providers of extension services, definition of AHBUs as main collaborating partners of APUG-coordinated extension services, and agreement by the soum governments on the use of training facilities and equipment in possession of the soum government for learning and exchange activities of herders.

Given the necessity of strengthening APUG-coordinated herder cooperatives as a commercial pillar for the PUG-system to sustain beyond the Green Gold Phase IV, the Agricultural Extension Component should aim i) to enhance knowledge and skills of leaders of the herders' cooperatives, ii) to enhance the capacity of AFPUGs to support herders' cooperatives, and iii) to introduce a framework of AFPUG-coordinated training, advisory and exchange activities for herders' cooperatives. Activities suggested by the study include management and leadership training for leaders of herders' cooperatives and development of business plans for the cooperatives. While these activities need to be piloted by the Agricultural Extension Component, the responsibility for implementation of such activities needs to be gradually shifted to AFPUGs as primary aimag-level partners of APUG-supported herders' cooperatives.

Overall implications of this study for the piloting of extension services in the Green Gold areas include integration of the pilot in a framework for enhancing herder livelihoods and a content matrix of the pilot activities. The suggested framework for enhancing herder livelihoods is based on the conclusion that sustainable changes in herder communities require perception of problems addressed by Green Gold by herders as their challenges to their livelihoods, thus requiring extension services to be informed and guided by a framework that establishes herders as individuals with aspirations and livelihood goals while defining the role of extension services in creating opportunities for herders to achieve their goals. The content matrix of the extension pilot, on the other hand, defines rangeland management, sustainable herd management, fodder supply and feeding, and animal health, as primary content areas of the pilot and, in accordance with the results of the study, defines contents for building awareness, knowledge and skills, and individual and collective actions of herders, as well as access to inputs, services and markets and legislation by soum governments for enabling the actions.

The content matrix is mainly based on the results of this study, but it also includes contents for building management skills of herders in compliance with the framework for enhancing herder livelihoods.

The study recommends the following components for the extension pilot in Green Gold areas:

1. Training and engagement of herder advisors;
2. Facilitation of herder-to-herder exchange;
3. Facilitation of field-based learning of herders; and
4. Development and use of extension media and decision making tools.

PUG leaders and champion herders need to be trained as herder advisors to facilitate herder-to-herder exchange at the grassroots level, organise training and exchange events, and provide advice to herders e.g. on herd optimisation. Training of herder advisors should take place in spring and autumn, and technical contents of the training, while based on the content matrix of the pilot, should include season-specific topics as well. The training will also build communication and facilitation skills of the herder advisors.

Following their training, herder advisors should facilitate PUG-level exchange meetings for sharing the information and knowledge they have gained with the members of their PUGs. The meetings may also include brief training and information sessions by relevant service providers such as private vets and commercial insurers selling the index-based livestock insurance. The extension pilot should involve PUG-level exchange meetings at least twice a year. In addition, exchange meeting of PUGs needs to be organised at soum-level once a year for facilitating knowledge and experience sharing of PUGs within a soum. At the meeting, the PUGs will reflect on their achievements and failures in current year and plan collective actions as well as learning and exchange activities for next year. The meeting may also include training and information sessions by service providers as well as local governments.

Field-based learning of herders aims to build motivation and confidence of herders to apply sustainable practices of rangeland and livestock management, and involves two methods: learning by experimentation and learning through observation and experience sharing. For enabling herders' learning by experimentation, innovation pilots at the PUG-level are recommended. The pilots should demonstrate collective actions for application of sustainable practices of rangeland and livestock management, or creation of new knowledge for sustainable business development. Topics of primary importance for the innovation pilots include:

- Resting of rangelands;
- Hand-boring and maintenance of wells;
- Fencing and irrigation of haymaking areas, and mechanised haymaking;
- Biological and mechanical rangeland protection methods against rodents and grasshoppers;
- Preparation of green fodder and silage using rangelands plants;
- Forage cropping;
- Elementary processing of skin, wool, milk and meat;
- Stall feeding in winter; and
- Fattening of lambs and young steers.

Field days should be organised by facilitators for enabling herders learning from the knowledge created locally through the innovation pilots, and coordinated by the Master Trainers. Attendance of field days by herders who present potential adopters of the practices piloted should be encouraged e.g. through allocation of travel funds. They should be encouraged to visit the same sites at regular intervals.

The results of the study suggest the use of the following extension media and decision-making tools in the extension pilot:

- Facilitators' manual;

- Reference manuals;
- Product and supplier catalogues;
- Video documentation of innovation pilots;
- Household record sheets;
- Simulation games on rangeland and herd management;
- Newsletters; and
- Radio and television broadcasts.

Facilitators' manuals containing methodological guidance, backed by case examples, for facilitation of training and exchange events, participatory processes of innovation and action learning, and for development of extension materials should be provided to Master Trainers and facilitators as aids in facilitation of training and exchange events, and adaptive trials and innovation pilots.

Reference manuals containing practicable messages and reference information on sustainable livestock and rangeland management and management of livestock-based businesses should be provided to Master Trainers, facilitators and herder advisors as well as HSCs. The reference manuals will be published as a series consisting of volumes on specific subjects, including rangeland management, herd management, animal health, fodder preparation and animal nutrition, and entrepreneurship and collective actions of herders. The reference manuals can be used for self-education, in training and exchange events as well as herder-to-herder exchange.

Product and supplier catalogues of inputs and services for livestock production and equipment for processing of animal products should be provided to facilitators and herder advisors for facilitating access to inputs and services and providing advice to herders and herders' cooperatives. Due to its previous experience with preparation of similar catalogues NAEC is recommended for preparation of such product and supplier catalogues.

Video documentations of innovation pilots can be used in self-education of a larger number of herders. The videos should be distributed to all facilitators and herder advisors, and 10 copies of each video should be supplied to each HSC for lending to herders. The videos should also be used at PUG-level exchange meetings facilitated by herder advisors.

Record sheets for animal productivity, herd in- and off-takes, and household incomes and expenses should be piloted with at least 1000 herder households in 2014 and introduced in at least 5000 herder households representing around 15% PUGs in Green Gold areas by 2016. Analysis of the household records by facilitators and herder advisors will enable herders to make informed decisions on optimisation of their herd size and structure for maximising benefits within the carrying capacity of the rangelands. The records will also provide facilitators and the project team with empirical data on annual herd dynamics and enable implications for herders and local governments on optimisation of herd size and structure.

Simulation games are recommended for building awareness of herders of principles of sustainable pastoral livestock production and motivation to apply sustainable practices of rangeland and livestock management. Such games can be developed as role plays, apps for cell phones or board games, and used herder learning activities and herder-to-herder exchange at PUG and grass-root levels.

Issuing a newsletter for herders is an effective and cost-efficient option for communicating information and extension messages to a large number of herders. The newsletter can be issued on a monthly or quarterly basis. Contents of such a newsletter for herders can be as diverse as ranging from expert interviews to good practice notes prepared by herders and advice or lessons for herders in series.

Radio and television are effective channels of communicating messages for awareness building, whereas radio is increasingly losing its significance against television in areas except Bayan-Ulgii aimag. Television broadcasts are relatively expensive compared to other means of information transfer such as newsletters and video CDs, thus to be planned carefully and

advised rather for introduction in 2015 when video documentations of innovation pilots are prepared. Video documentations and information broadcasts targeting herders should be broadcasted on a TV-channel that is commonly watched by herders during these hours, such as TV9, and preferably start immediately after the 8 PM news. In Bayan-Ulgii, on the other hand, the lack of proficiency of many Kazakh herders in Mongolian language leads to limited effects of using television as an extension media. Instead, radio is widely used by Kazakh communities. Therefore, radio broadcasts were specifically requested by APUGs and the AFPUG in Bayan-Ulgii for communication of information and extension messages to Kazakh herders in their mother tongue.

The study recommendations the following strategies for ensuring gender-sensitivity of interventions:

- Overall gender balancing of beneficiaries;
- Gender-sensitivity of facilitation methods; and
- Supporting income diversification of herder women;

Due to the traditional dominance of men within herder households as well as the relatively weak community-level engagement of herder women that was revealed by the study a minimum quote of 30 percent for females among the beneficiaries is recommended. Strict compliance with this quote is particularly required for training and engagement of Master Trainers, facilitators and herder advisors, herder learning and exchange activities at PUG and soum levels, as well as for distribution of extension materials such as video CDs, household record sheets and newsletters.

Facilitation methods used in the extension pilot in Green Gold areas need to be gender-sensitive. An important consideration thereby is timing of activities. Considering the annual cycle and gender disaggregation of activities in herder households, the study identifies the periods from mid-May to mid-June and from mid-September to the end of November as most suitable for extension activities requiring active involvement of herder women. Also, gender-sensitivity in facilitation of training and exchange events should be further expressed through specific encouragement of women's participation in discussions, group work and exercises. This is best achieved through building of women's groups among the participants, or groups including women at 50 percent at least. A further strategy of ensuring women's involvement in the extension pilot is to allocate specific tasks e.g. keeping of household records to herder women.

An essential subject of the field-based learning strategy applied in the extension pilot should be income diversification of herder women through processing of milk, skin and wool processing, and manufacturing of felt items. Pilot processing units therefore need to should be established in each aimag as innovation pilots implemented by groups of herder women. In addition, training at the pilot processing units for enabling learning through observation and experience sharing should be offered to as many herder women as possible, whereas herder women already organised in groups or willing to form groups should be specifically encouraged to attend such events e.g. through allocation of travel funds.

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Abbreviations

ADB	Asian Development Bank
AEC	Agricultural Extension Centre
AFPUG	Aimag Federation of Pasture User Groups
AGB	Aimag Governor's Bureau
AHBU	Animal Health and Breeding Unit
APUG	Association of Pasture User Groups
DIA	Department of Industry and Agriculture
FGD	Focus Group Discussion
HSC	Herder Service Centre
ICT	Information and Communication Technologies
MIA	Ministry of Industry and Agriculture
MoU	Memorandum of Understanding
MSUA	Mongolian State University of Agriculture
NAEC	National Agricultural Extension Centre
NGO	Non-Governmental Organisation
PCU	Project Coordination Unit
PUG	Pasture User Group
R&D	Research and Development
SDC	Swiss Agency for Development and Cooperation
SGB	Soum Governor's Bureau
ToF	Training of Facilitators
ToMT	Training of Master Trainers

1. Introduction

1.1. Background

The 4th phase of the SDC-funded Green Gold project includes an Agricultural Extension Component with the mandate of *"Delivering useful knowledge and services to herders (f/m)"*. Implementation of the Component by the consortium of the University of Queensland (Australia) and Association for Sustainable Rural Development, a spin-off of Mongolian State University of Agriculture, started in November 2013 and will be completed in December 2016.

Expected outputs of the component include:

1. Framework of the Government Extension Service is streamlined.
2. Relevant extension messages and services are elaborated, tested and used.
3. Herders are reached via the PUG-system with relevant and tested extension messages.
4. Significant numbers of APUGs have cooperation agreements with the state extension service (AHBUs) at soum level.

The outputs imply two tiers of the Component, which can be formulated as:

- Strengthening the Government Extension System, and
- Piloting of extension services for sustainable pastoral livestock production through the PUG-system in the target areas of Green Gold.

The target group of the second tier of the Component consists of 32 thousand herder households structured in approx. 900 PUGs in 93 soums in Arkhangai, Bayankhongor, Bayan-Ulgii, Gobi-Altai, Khovd, Uws and Zavkhan aimags (Enkh-Amgalan, 2014). PUGs within each soum are coordinated by the APUG based at the soum centre and APUGs within an aimag are coordinated by the AFPUG based at the aimag centre. Hence, the PUG-system includes 93 APUGs coordinated by seven AFPUGs.

The implementation approach that was approved by SDC applies interactive, participatory methods and works from the principle of "facilitation of access" to information, services, technologies, and learning and exchange opportunities. Key elements of the implementation approach include:

- Stakeholder consultation, planning and evaluation workshops at central and aimag levels;
- Establishment, capacity building and mobilisation of Master Trainers at the aimag level;
- Establishment, capacity building and mobilisation of Extension Facilitator teams at the soum level;
- Design, establishment and facilitation of Herder Exchange Hubs at the soum level as physical spaces for training, adaptive trials, information access and herder-to-herder exchange to take place;
- Development and implementation of a herder learning strategy;
- Production and distribution of extension material and media; and
- Participatory monitoring and evaluation.

Local-level implementation of the Component is being piloted in 26 soums of Khovd, Uws and Bayan-Ulgii aimags, which were selected through suggestions of the Green Gold PCU and AFPUGs in these three aimags prior to this study, in 2014 (Appendix 1).

Initial awareness of extension services among herders in GG areas is very low. The baseline survey for the SDC cooperation strategy 2013-2016 revealed that, by July 2013, eighty-six percent of the surveyed herders were unable to express any opinion about agricultural extension services, largely due to lack of agricultural extension services in their areas (IRIM, 2013).

1.2. Concept of the study

This study aims to provide diagnostic information to the Green Gold – Agricultural Extension Component for designing a conceptual framework and implementation strategies that engage herder households in the target areas in sustainable rangeland and livestock management leading to improved livelihoods. Objectives of the study include:

- To assess needs and opportunities for strengthening the Government extension system in Mongolia and the extension and service system at the local level;
- To identify needs and priorities for effective piloting of extension services in the target areas;
- To inform gendered targeting of pilot interventions; and
- To identify risks to success and sustainability of the pilot, and scope risk prevention strategies.

The study uses the Participatory Needs and Opportunities Assessment (PNOA) approach, which enables understanding of situation through the perspectives of stakeholders and provides implications for designing interventions for sustainable outcomes through enhanced capacities and effective stakeholder interactions.

The study broadly consists of two parts: Analysis of the national agricultural extension system and Assessment of capacities, needs and priorities for piloting livestock extension services at local level. The analysis of the national agricultural extension system is largely based on institutional profiling of the system and stakeholder analysis. Assessment of capacities, needs and priorities for piloting livestock extension services at local level, on the other hand, is based on a situation analysis involving 26 soums in Khovd, Uws and Bayan-Ulgii aimags, which are targeted in the 2014 pilot of the Agricultural Extension Component and present a representative sample of the overall target areas of Green Gold.

1.3. Methods of data collection

In addition to desk study and observation of local environments and resources, the following methods of qualitative research were used in data collection:

- Stakeholder interviews
- Herders' survey
- Focus group discussions with herders
- Focus group discussions with APUG and AHBU representatives
- Focus group discussions with AFPUG and DIA representatives
- Focus group discussion with Green Gold staff

The methodology was developed in January 2014 and data collection was completed in March 2014. An initial report of the study was prepared in February 2014, a preliminary report in April 2014, and the final report was completed in July 2014.

1.3.1 Stakeholder interviews

Semi-structures interviews were conducted with 42 persons representing major stakeholders in the agricultural extension system at central, aimag and soum levels (Appendix 2). The stakeholders were partly identified in the initial proposal of the Extension Component[1] and partly identified through desk study or suggestions by NAEC, MSUA and the PCU of the Green Gold project.

The stakeholder interviews, complemented by desk study, served the following purposes:

[1] Reference to the initial plan of implementation in the bidding proposal submitted by the Consortium of UniQuest Pty Limited, the University of Queensland the Association for Sustainable Rural Development to SDC.

- To identify needs and opportunities for strengthening the national agricultural extension system;
- To scope needs and opportunities for strengthening the extension and service system at the local level;
- To scope options for improving herders' rangeland and livestock management practices and capabilities; and
- To scope needs and priorities for piloting extension services in the target areas of the Green Gold project.

Depending on the interviewee, the interviews consisted of individual discussions with each interviewee around a set of lead questions addressing one or several purposes/issues (Appendix 3). Each interview continued for approx. 30 minutes.

1.3.2 Herders' survey

Individual interviews using a structured questionnaire were conducted with 161 persons, all PUG-members, and including 75 females and 86 males, in the following soums in three aimags:

- Zereg soum, Khovd aimag (30 participants),
- Buyant soum, Khovd aimag (32 participants),
- Buyant soum, Bayan-Ulgii aimag (31 participants),
- Umnugobi soum, Uws aimag (32 participants), and
- Zuungobi soum, Uws aimag (36 participants).

The survey primarily served the immediate purpose of identifying needs and priorities for piloting extension services in the target areas of the Green Gold project. Specific objectives of the survey include:

- To build a socio-economic profile of herder households;
- To establish baseline for rangeland and livestock management approaches;
- To assess challenges to the pastoral herding system and options for improving sustainability of rangeland management from herders' perspective; and
- To explore herders' experiences with collective actions and extension services.

The questionnaire used a combination of information tables, open-ended questions, and scorecards with multiple choices (Appendix 4). It consisted of the following parts:

- Respondent and household information;
- Livestock management;
- Outputs and sales of livestock products
- Livestock risks
- Scorecard on rangeland management
- Scorecard on options for sustainable livestock management;
- Involvement in extension activities;
- Experience with collective actions; and
- Suggestions for extension services.

The interviews were conducted at soum centres in four soums, and at a bag centre in one soum. The questionnaire was first introduced to herders, and a trained enumerator then filled out the questionnaires through individual interviews. Each interview continued for approx. 20 minutes.

1.3.3 Focus group discussions

The study involved 14 focus groups, consisting of herders in five soums, representatives of APUGs and AHBUs in 26 soums as well as AFPUGs and DIAs in Khovd, Uws and Bayan-Ulgii aimags, and staff members of the Project Coordination Unit (PCU) of the Green Gold project. In total, 204 persons participated in the FGDs.

Focus group discussions with herders

Focus group discussions were conducted with 173 herders at the five soums involved in the herders' survey, including 161 herders who participated in the survey and 12 herders from Zuungobi soum in addition. The participants of the FGDs included 78 females and 95 females. The FGDs served the following purposes:

- To scope the existing extension and service system at the local level from herders' perspective;
- To explore herders' perceptions of options for improving rangeland and livestock management practices;
- To inform gendered targeting of pilot interventions;
- To identify herders' expectations on the pilot interventions; and
- To scope risks to success and sustainability of the pilot.

Each FGD with herders consisted of a morning and an afternoon session. The participants in each soum were divided in two groups of nearly the same size to attend either the morning of the afternoon session. Sub-sessions included Mapping and Reflection in the morning session and Visioning and Planning in the afternoon session (Appendix 5).

Focus group discussions with APUG and AHBU representatives

Following the FGDs with herders, half-day FGDs were conducted with APUG representatives from 25 soums and AHBU representatives from 26 soums targeted by the 2014 pilot of Agricultural Extension Component (Appendix 6). The FGDs complemented the stakeholder interviews, and served the following specific purposes:

- To assess capacities and existing and potential collaboration of APUGs and AHBUs to provide demand-oriented extension services for herders;
- To scope expectations of APGUs and AHBUs on the pilot interventions;
- To scope possible contributions APGUs and AHBUs to the pilot interventions; and
- To identify risks to success and sustainability of the pilot, and scope risk prevention strategies.

The FGDs were held at the centres of the five soums. Each FGD session started with project and participant introductions, and proceeded with discussion of needs, opportunities and possible risks for pilot interventions of the Agricultural Extension Component, and ended with collective formulation of expectations on the pilot by the participants (Appendix 7).

Focus group discussions with AFPUG and Aimag Government representatives

Half-day FGDs with representatives of AFPUGs and Aimag Governments in Khovd, Uws and Bayan-Ulgii were conducted in Khovd, Ulaangom and Ulgii. The participants mainly consisted of representatives of AFPUGs and DIAs, and Officers for Agriculture of the Aimag Governor's Bureaus in these aimags, but also included representatives of APUGs (Appendix 8).

The FGDs served the following specific purposes:

- To assess capacities and existing and potential collaboration of AFPUGs and DIAs to provide demand-oriented extension services for herders;
- To scope expectations of AFPUGs and DIAs on the pilot interventions;
- To scope possible contributions AFPUGs and DIAs to the pilot interventions; and
- To identify risks to success and sustainability of the pilot, and scope risk prevention strategies.

Each FGD started with project and participant introductions and presentation of the preliminary results of this study, and proceeded with identification of extension activities needed at soum-level, structured in the categories i) Activities of Herder Exchange Hubs at the soums level, ii) Field training, and iii) Improving information supply (Appendix 9). The

participants were also encouraged to define training needs for building capacities at the aimag level to coordinate soum-level extension activities.

Focus group discussion with Green Gold staff

Data collection was concluded with a FGD at the Green Gold office. Participants included:

1. Coordinator of the Green Gold project and the Collective Action component;
2. Coordinator of the Green Gold - Applied Research component;
3. Livestock expert of the Green Gold project;
4. Natural resource management advisor of Swiss Cooperation Office in Mongolia; and
5. Veterinary advisor/Project manager of the SDC-funded Animal Health Project.

The discussion was focused on extension contents for improving herders' rangeland and livestock management practices. The FGD started with presentation of a content matrix based on preliminary implications of the study, and resulted in adjustment of the content matrix to the overall priorities of the Green Gold project and for best collaboration and compatibility among the Green Gold components as well as between Green Gold and the Animal Health project.

1.4. Purpose and outline of the report

This report is primarily intended to inform the Green Gold - Agricultural Extension Component in designing pilot interventions during the three-year period of 2014 to 2016.

As an analytic document, the report may inform a wide range of stakeholders of feasible options for facilitating sustainable changes in the agricultural extension system towards increased access of herders to information, services, technologies, and learning and exchange opportunities. The focus areas of interventions in the extension system at central and local levels identified in this report may be useful in planning similar interventions and pilot actions by the Government of Mongolia and development agencies. Overall, the study may attract interests of stakeholders from different domains to the often neglected issue of improving agricultural extension services

The stud presented in this report piloted field application of the PNOA approach in Mongolia, and will hopefully stimulate further application of the approach, offering an initial methodological framework that can be advanced by studies to follow.

The report is structured in the following chapters:

- Chapter 1: Introduction

This chapter provides background information on the study, defines its concept and limitations, briefly outlines this report, and provides information on materials and methods used in the study.

- Chapter 2: Analysis of the Government extension system

This chapter provides an institutional profile of the Government extension system and participatory assessment of its performance, and discusses constraints in the system as well selected options for strengthening the system.

- Chapter 3: Assessment of herders' needs for extension services

This chapter profiles herders in the target areas of local interventions, explores their access to services, reflects their perceptions of challenges and options for sustainable livestock production as well as their aspirations for the future, which were captured through the herders' survey and FGDs with herders and concludes with a summary of perceived demands of herders for extension services.

- Chapter 4: Suggestions of stakeholders for piloting extension services

This chapter reflects the suggestions of central-, aimag- and soum-level stakeholders for contents and methods of pilot extension services in Green Gold areas, and for coordination of the pilot as well as collaboration and stakeholder engagement at central and local levels.

- Chapter 5: Summary of needs and opportunities for interventions

This chapter suggests options for improving the Government extension system, summarises needs, opportunities and priorities for piloting soum-level extension services in Green Gold areas, and reveals key opportunities for effectiveness and sustainability interventions.

- Chapter 6: Implications for the Green Gold – Agricultural Extension Component

Based on the findings of the study and within the framework and objectives of Green Gold – Agricultural Extension Component, this chapter suggests system- and local-level interventions for strengthening the Government extension system as well as for effective piloting of extension services in Green Gold areas, specifying purposes and methods and scoping anticipated outcomes of the interventions, and highlights gender-sensitivity of pilot interventions at the local level.

2. Analysis of the Government Extension System

2.1. Overview of the Government extension system

2.1.1 Development until 2014

Agricultural extension in some form had already been existing Mongolia since the 1960s, where a Department of Science, Best Practices and Advocacy with the mandate of advocating improved technologies and practices in agriculture was established within the Ministry of Agriculture. In addition, each agricultural research institute (Research institute of Crop Science, Research institute of Animal Husbandry and Institute of Pasture and Fodder Research) had a technology transfer unit. However, these structures were dissolved along with the political and economic changes that occurred in the beginning of 1990s.

By 1996, state-owned collective farms and kolkhozes had been dissolved, and the agricultural sector consisted of herder and farmer households and agricultural enterprises. It was then determined by the Asian Development Bank that Mongolia needs an institutionalised structure of agricultural extension. As a first step of establishing such a structure, ADB requested the Government of Mongolia to establish a head organisation of agricultural extension, preferably a National Crop and Livestock Extension Centre, with the mission *"to support the production and marketing activities of farmers and livestock herders by i) responding to their demands for advice related to their perceived problems and opportunities, and ii) by facilitating the development, diffusion and adoption of improved technology"* (Danagro A/S & Landell Mills, 1996).

The Government responded to this request by issuing the resolution No. 286/1996 for establishment of a 'Centre of Transferring Achievements of Science into the Agricultural Production' with the mission *"to provide, on a contractual basis, advice and brokering assistance to citizens and entities in application of scientific progresses and advanced technologies in agricultural production and for improving their skills to manage profitable agricultural production"* at the Ministry of Agriculture and Industry. The resolution defined that the Centre will use revenues from fee-based services and to partly cover its expenses. Furthermore, the resolution suggested allocation of regional mandates for provision of services of transferring scientific achievements into the agricultural production to regional branches of agricultural research institutes (Government of Mongolia, 1996).

Following the Government resolution 286/1996, the Centre of Transferring Achievements of Science into the Agricultural Production with six staff members was established at the Ministry of Agriculture and Industry in December 1996. It is not documented when exactly, but soon after its establishment the centre adopted its English title 'National Agricultural Extension Centre (NAEC)'. Since the Mongolian title of the centre did not change it was understood that the English word 'extension' basically refers to activities that facilitate adoption of technologies and recommendations developed by agricultural research institutions by agricultural producers.

The establishment of NAEC at Ministry of Agriculture and Industry involved a major controversy on collaboration of research and extension. The initial concept of ADB suggested embedding of extension activities in research projects carried out by research institutes of MSUA, and saw a National Crop and Livestock Extension Centre as a unit of Ministry of Agriculture and Industry that assists MSUA in coordination of research and extension activities, and facilitates channelling of training funds directly from the Ministry of Finance to MSUA in addition to research funds allocated by the Ministry of Science and Education (Danagro A/S & Landell Mills, 1996). However, the concept that was adopted by the Government established NAEC as a provider of advisory and technology transfer services, and assumed engagement of research institutes of MSUA in similar activities at the regional level, yet without defining any mechanism or funds for embedding extension in agricultural research. The suggested engagement of MSUA in the extension system would

soon be forgotten, and provincial and municipal structures of agricultural extension established without any involvement of MSUA.

Aimag-level agricultural extension services (AECs) (termed as *'Agricultural transfer centres'* in Mongolian) were established as internal units of Departments of Food and Agriculture with a combination of government and donor funds between 1999 and 2005. Major donors included the Asian Development Bank and the European Commission (through the TACIS program). By March 2005, AECs had been established in all 21 aimags.

In 2004, a mid-term program on development of the agricultural extension services was initiated by the Government. The program's main goals were to strengthen research-extension linkages, to improve extension education, and to introduce public-private partnerships in agricultural research and technology transfer (Radnaaragchaa, 2011). While these goals were not achieved and the program was not even monitored and evaluated, a significant achievement of the program or at least of the government initiative behind the formulation of that program was to integrate all efforts of development agencies to establish extension services under a single framework of National Agricultural Extension system. By 2011, the system consisted of NAEC, 21 AECs and agricultural extension managers in 175 soums out of 329 soums countrywide (MFALI, 2011).

All the initiatives to establish AECs in aimags and locate extension agents in soums had a major shortcoming by not creating specific public service positions for extension staff. Until 2014, AECs were embedded within Aimag Departments of Food, Agriculture and SME where an Officer for cooperatives and extension was responsible for providing extension services and coordinating soum-level extension activities. Following a structural reform, however, the DFASMEs became Departments of Industry and Agriculture (DIAs) without any extension staff in 2014, whereas the responsibility for cooperatives was shifted to Aimag Departments of Labour.

At the soum level, officers for agriculture were appointed as extension managers in addition to their regular employment until 2010. After the establishment of Animal Health and Breeding Units (AHBUs) in all soums within the framework of the Government program 'Mongolian Livestock' in 2010, the 3-person teams of AHBUs are supposed to provide extension services, whereas the officers for rangeland management, crop farming, cooperatives, SME and services bears the responsibility for coordinating such services.

Structural changes have also been faced by NAEC itself. By 2008, the Centre with its 13 staff members was still located within the Ministry of Food and Agriculture (MOFA). After the 2008 parliament elections, however, MOFA was expanded to Ministry of Food, Agriculture and Light Industry (MFALI), and NAEC merged with the Technology Transfer Centre, a unit of the meanwhile dissolved Ministry of Trade and Industry. NAEC's personnel included 31 members in 2010, and grew to 34 members in 2011. The expanded NAEC was mandated to not only coordinate and implement agricultural extension services, but also facilitate technology transfer in the light industry sector (MFALI, 2011). After the 2012 parliament election, MFALI was re-structured as Ministry of Industry and Agriculture. Accordingly, NAEC's mandate for extension and technology transfer now covers the sectors agriculture, light industry and heavy industry. Its personnel, however, has been reduced to 26 staff members by 2014.

However, NAEC still is the 'Centre for Transfer Transferring Achievements of Science into the Agricultural Production' with a clear focus on agriculture and emphasis on technology transfer. While its initial mission of providing fee-based advisory and technology transfer services has never become reality, NAEC has found its place in the agricultural sector as a partner of development cooperation, and provider of farmer training, host of agricultural fairs and conferences, and publisher of handbooks and manuals for farmers and herders.

The controversy around the linkage between research and extension is still persistent. Despite mutual efforts of NAEC and MSUA to strengthen their collaboration no institutionalised linkage between the two organisations has been established yet. Meanwhile,

MSUA has an own technology transfer unit named 'Centre for Innovation and Technology Transfer'.

2.1.2 Policy framework

The Government resolution No. 286/1996 that defined the mission of NAEC was not followed by policies and regulations of agricultural extension services. While specific policies on agricultural extension are still lacking, policies targeting agricultural development in general or livestock sector often include extension-related goals and activities, as summarized below.

'Food and Agriculture Policy of the Government' for the period 2003 to 2015 includes, under its focus are 8 – Science and education in agriculture, the goal of:

- 'Training of rural citizens and workers in practices for profitable management of their production, transfer in production and promotion of achievements of science, and improvement of methods and forms of knowledge dissemination' (Parliament of Mongolia, 2003).

The National Development Program based on the Millennium Development Goals of Mongolia includes, within its strategic goal of agriculture and food sector development during the period 2008 to 2015 under section 5 – Policy on economic growth and development, the goal of:

- 'Development of herders, transfer of progresses of science in livestock production and establishment of a system of informal education of herders in livestock management practices' (Parliament of Mongolia, 2008).

The 'Government Policy on Herders' for the period 2009 to 2015 includes the following strategic goals related to agricultural extension:

- (3.2.1) 'Development and quality improvement of veterinary and livestock breeding services and the service for transferring achievements of agricultural science' ;
- (3.3.4) 'Establishment and operation of a comprehensive base of information on herders, herder households, livestock production and markets, and supply of herders with information';
- (3.3.8) 'Establishment and development of training programs that match different levels of economic and business skills of herder households, and training and specialisation of trainers in all soums'; and
- (3.3.9) 'Establishment and strengthening of organisations for provision of herders' training, and facilitation of training activities including both basic training and advanced training on technology transfer and adaptation, innovation transfer etc. (Parliament of Mongolia, 2009).

The national program 'Mongolian Livestock' for the period 2010 to 2021 includes, within the overall goal of Improving the knowledge of livestock experts and herders and transferring advanced technologies in the production (3.1.3), the following specific goals:

- (3.1.3.2) 'Training of herders in traditional and advanced practices of pastoral livestock farming, and development and implementation of distant and local training programs for enabling herders to operate their businesses profitably'; and
- (3.1.3.3) 'Transfer, adaptation and diffusion of advanced technologies that meet the sector's demands' (Parliament of Mongolia, 2010).

The Action plan of the 1st phase (2010-2015) of 'Mongolian livestock' program includes, within the overall goal of Improving the knowledge of livestock experts and herders and transferring advanced technologies in the production (1.3), three areas of activity shown in Table 2.1. These areas of activity can be reformulated in a more understandable manner as i) Improving knowledge and skills of herders, ii) Strengthening technology transfer in agriculture, and iii) Improving quality of veterinary and livestock breeding services through demonstration and technology transfer.

Table 2.1: Extension activities included in the Action plan of the 1st phase of the 'Mongolian Livestock' program

Areas of activity	Period	Responsibility	Co-implementing organisations
1.3.2 Training of herders in traditional and advanced practices of pastoral livestock farming, and development and implementation of distant and local training programs for enabling herders to operate their businesses profitably	2010-2015	MFALI	MSUA, NAEC, Aimag Governors, International organisations
1.3.3 Transfer of results of livestock science, technology and innovation in production	2010-2015	MFALI	Ministry of Education, Culture and Science, NAEC, Aimag Governors and Governor of Ulaanbaatar
1.3.4 Establishment of demonstration units, professional teams and entities of veterinary and breeding services, and transfer of progresses of science and innovations in production	2010-2015	MFALI	Ministry of Education, Culture and Science, NAEC, Aimag Governors, Governor of Ulaanbaatar, and International organisations

Source: Government of Mongolia, 2010.

2.1.3 Institutional hierarchy and coordination

The Government extension system is a top-down structure with NAEC at the head, the AHBUs at the bottom, and DIAs in between (Fig.2.1).

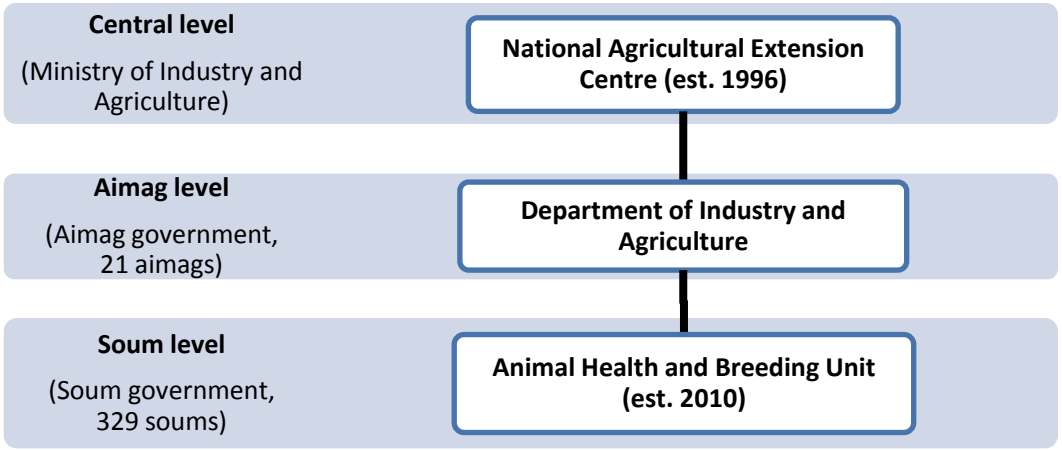


Figure 2.1: **Structure of the Government extension system in Mongolia**

A specific coordination mechanism covering all three levels of the Government extension system does not exist since aimag and soum governments do not receive budget specified for provision of extension services and NAEC has no mandate and budget of regular coordination of extension activities at aimag and soum levels. Nonetheless, this institutional hierarchy can be, at least theoretically, used in coordination of extension services across central and local levels. Coordination of aimag level activities by NAEC can be regulated through annual "Output delivery contracts" between the Minister of Industry and Agriculture and Aimag Governors, on which the activities of DIAs are based. Soum-level activities of AHBUs, on the other hand, are coordinated by DIAs and overseen by the Development policy division of Aimag Governor's Bureaus.

2.1.4 Collaboration with research

In its official statements, NAEC presents itself as a Government agency specialised in technology transfer in the agricultural sector, in close collaboration with agricultural research, and states having an "expert team" of 220 persons, mostly consisting of MSUA researchers. However, no activities that resulted in technology transfer have been reported so far, and it is unclear whether the expert team has carried out any activities. In September 2013, the new director of NAEC announced a new "team of advisors", consisting of 5 persons and led by Erdenebolor Baast, the former director of the Centre of Innovation and Technology Transfer of MSUA and current national team leader of the Green Gold – Agricultural Extension Component.

Involvement of researchers and experts in the Government extension system usually occurs through paid services of individuals as trainers or advisors in extension activities carried out either by NAEC itself or by DIAs and AHBUs, whereas such activities are, also at soum-level, carried out by NAEC and DIAs rather than by AHBUs.

NAEC and MSUA signed a Memorandum of Understanding in 2011. The focus area of the collaboration defined in the MoU is transfer of new technologies developed by MSUA through NAEC. It was NAEC's initiative to sign a MoU with MSUA, and the main intentions behind that initiative included the following:

- To secure MSUA's approval on NAEC's status as head organisation of the Government extension system (in order to avoid confusion among donors on whether not MSUA is the actual extension service provider at the central level);
- To include technology transfer activities to be conducted by NAEC in research and development projects implemented by MSUA; and
- To use the capacity of MSUA for developing a distant education system for farmers and herders.

While MSUA agreed with and signed the MoU, the only action that followed was the co-organisation of a fair on agricultural technologies in 2011.

Institutional collaboration between the Government extension system and agricultural research organisations led by MSUA does not function due to the following major reasons:

- MSUA is coordinated by the Ministry of Education and Science while the Government extension system is coordinated by the Ministry of Industry and Agriculture at central level and aimag and soum governments at the local level;
- MSUA is largely financed by itself, and unmotivated to share tuition fees of its students and research funds with NAEC or AECs at aimag and soum levels;
- Unlike a Government agency such as NAEC, MSUA is relatively decentralised, and the schools and institutes of MSUA, or even the subunits within these units are free to decide by themselves whether to collaborate with the Government extension system or not;
- Some of the so-called technology transfer activities, which mainly imply on-farm trials and promotion of new technologies, are already included in research projects of MSUA, and the researchers do not see a reason to involve an external body in conducting such activities.

In a final conclusion, the relationship between NAEC and MSUA is unbalanced: it is rather NAEC who needs the support of MSUA. While collaboration requires mutual contributions, NAEC is unable to contribute to a fruitful collaboration with MSUA. However, MSUA still seeks partnership with NAEC for strengthening its collaboration with MIA in order to create new opportunities such as development of large-scale R&D projects with funding by MIA, and to access donor funds within the reach of MIA.

2.2. Brief profiles of main actors in the Government extension system

2.2.1 National Agricultural Extension Centre

The current mission of NAEC was formulated in 2011 as “to increase the effects of human resources and introduce and transfer advanced technologies in the sustainable development of food, agriculture and light industry sectors that are based on properties of entities, enterprises and individuals, safe for human and nature, and highly profitable”. The main purposes of NAEC are to help agricultural producers and to involve them in implementation of government policies (MFALI, 2011).

NAEC currently has a staff of 26 members, and is structured in four divisions:

- Division of Administration and Management;
- Division of Project and Cooperation;
- Division of Training and Information; and
- Division of Science and Technology.

The strong conceptual emphasis of NAEC on technology transfer is already indicated by the Mongolian version of its name ‘Centre for Transferring Scientific Achievements into the Agricultural Production’ as well as its mission statement. However, this has not been translated into activities on the ground: given its strong dependence on donor support, which is usually linked to pro-poor development activities, NAEC has in fact been focusing its activities and resources on farmer training and publications for use in farmer training activities, in addition to occasional information and exchange events. In general, the Division of Training and Information is focused on farmer training and the Division of Science and Technology is rather responsible for publishing and event management.

Examples of publications of NAEC include:

- “Handbook of technology transfer” (2010);
- “Herder of the 21st century” handbook for herders (2011);
- “Catalogue of equipment for agriculture and processing industry” (2011);
- “Manual of extension workers” (2014).

Between 1997 and 2011, NAEC organised or co-organised (with AECs at aimag and soum levels) 2522 training events for over 124 thousand herders, farmers and farmer trainers, including both AEC and development project staff, in total. Training topics cover all areas relevant for livestock and crop production, depending on requests of funding agencies, and extension methods (MFALI 2011).

A major shortcoming in farmer training activities carried out by NAEC and AECs is lack of continuity. As implied above, donor funds for farmer training activities are usually linked to a development project, and carried out as once only activities rather than established as regular services. This is mainly caused by the common emphasis of development organizations on results that are measurable within a short period. Hence, development organizations merely use the Government extension system for achieving tangible short-term results, such as the number of herders trained, rather than actually contributing to the sustainability of the system itself.

The total budget of NAEC in 2013, provided by the Ministry of Industry and Agriculture, was approx. MNT 305 million or USD 170 thousand (Amponsah, 2013). The total amount includes an annual operational budget of approx. USD 20 thousand (interview with NAEC officer D.Davaadorj, February 2014). Given this limitation, NAEC is heavily dependent on donor support. Major development projects involving NAEC during the recent years include the JICA-funded “Enhancing the extension system for comprehensive crop-livestock management” project (2006-2013), the FAO-funded “South-south cooperation program” (2010-2012), and the AusAID-funded “Building the capacity of public extension services to effectively facilitate climate change adaptation in the livestock sector”.

2.2.2 Mongolian State University of Agriculture

Established in 1958, the Mongolian State University of Agriculture (MSUA) is the head organization of agricultural higher education and one of the largest life science research institutions in Mongolia. The mission of MSUA is *"to provide higher education and extension services focused on agriculture and rural development, and carry out research and technology development in agriculture"* (Mongolian State University of Agriculture, 2008).

Research and education areas of MSUA include:

- Livestock genetics and breeding;
- Animal nutrition;
- Veterinary medicine;
- Plant and crop science;
- Utilization and conservation and natural resources;
- Grassland and rangeland research;
- Biotechnology;
- Agricultural engineering;
- Agricultural and rural economics, and rural policy;
- Studies on ecology, forests, soil, water and environmental protection;

Main activities of MSUA are:

- To educate agricultural specialists through incremental training at Bachelor of Science (BSc), Master of Science (MSc) and doctoral (PhD) levels;
- To conduct research and technology advancement studies related to key issues of rural development, ecology and agricultural production;
- To offer specialized training on technical and professional aspects for rural producers and entrepreneurs, and conduct extension and technology transfer activities; and
- To participate in donor supported agricultural and rural development projects and programs.

MSUA has six research institutes and eight Schools with 36 departments and over 8000 undergraduate and over 1000 graduate students. The structure and position of MSUA in the existing framework of institutional environment in Mongolia are shown in Figure 2.2.

The research institutes are: Research Institute of Veterinary Medicine, Research Institute of Animal Husbandry, Research Institute of Plant Protection, and Research and Training Institute of Plant Science and Agriculture in Darkhan-Uul aimag.

In addition to the above schools located at the central campus of MSUA in Ulaanbaatar, there is a regional branch school of MSUA in Darkhan.

Research and Training centres of MSUA include:

- Centre for Innovation and Technology Transfer;
- Centre for Ecosystem Studies;
- Training and research centre "Nart-1" (with 142 hectares of experimental crop fields and housing for 300 students);
- Training and research centre "Nart-2" (with 35 hectares of experimental crop fields and housing for 80 students);
- Central Agropark in Ulaanbaatar;
- Livestock research and production farm (with 1500 heads of livestock);
- Research and production station of bee keeping in Batsumber soum, Tuv aimag.

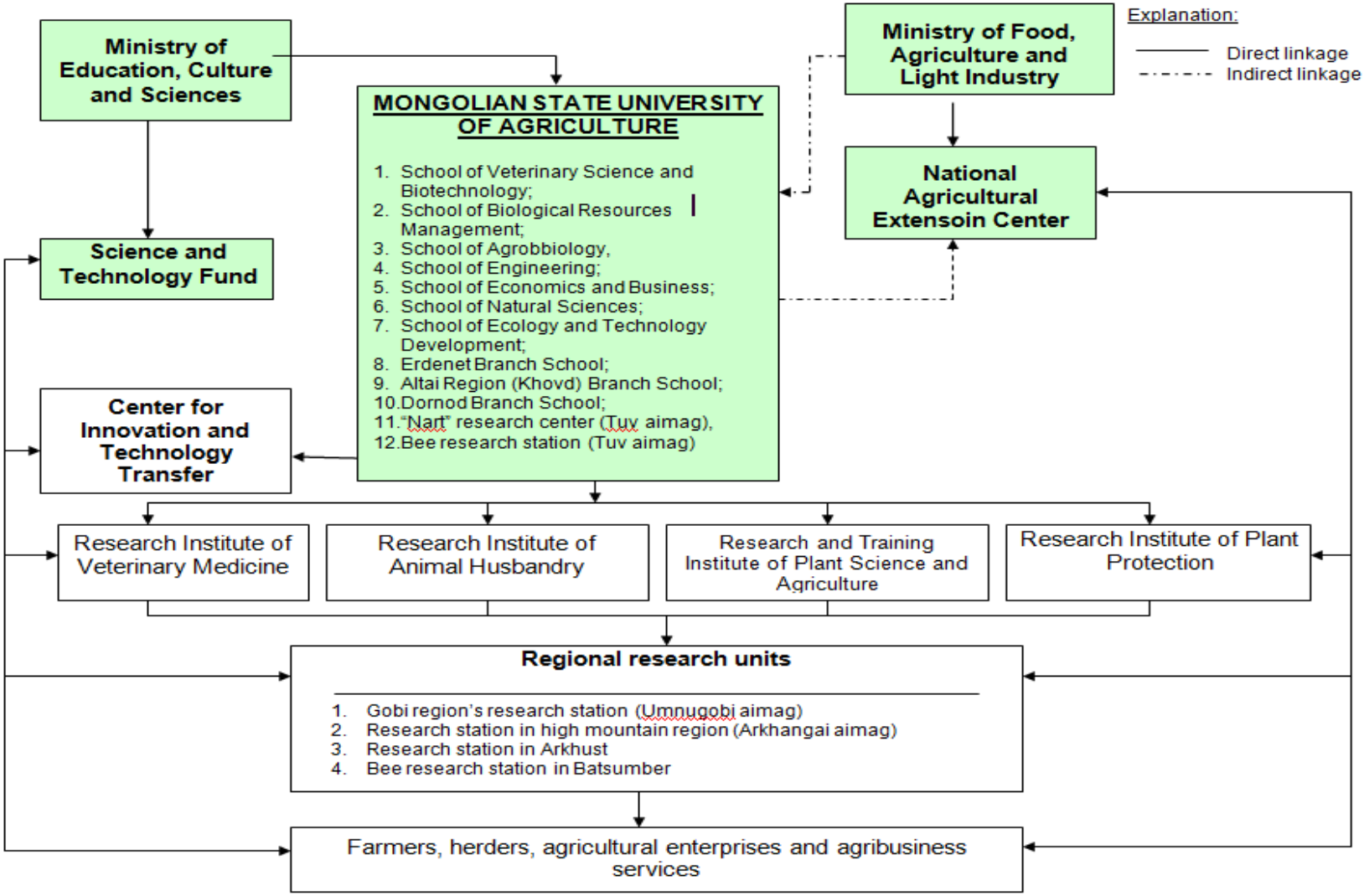


Figure 2.2: **Structure and institutional linkages of Mongolian State University of Agriculture**

2.2.3 Department of Industry and Agriculture

The DIA in each aimag is responsible for implementation of industry and agriculture policies at aimag level and coordination of policy implementation at the soum level. DIAs are external units of Aimag Governor's Bureaus, and primarily coordinated by the Development policy division of AGBs.

A DIA has a staff of around 25 members and is structured, after the structural reform in spring 2014, in the following four divisions:

- Division of Administration and Management;
- Division of Industry and Crop Production;
- Division of Livestock Production; and
- Division of Veterinary Medicine.

The AEC is not included as an official unit in the current structure of DIAs. However, in some aimags, one of the staff members, usually the specialist for food production or the specialist for crop farming, is additionally responsible for 'transfer of achievements of science'.

The DIA basically represents MIA at aimag level and carries out activities ranging from elaboration of policy documents to veterinary inspection of livestock and attestation of retailers of alcohol beverages. Agricultural extension activities are embedded in the activities of the Division of Industry and Crop Production and the Division of Livestock Production, and mainly include training, information and exchange seminars for herders, crop farmers and agricultural cooperatives, and agricultural fairs.

2.2.4 Animal Health and Breeding Unit

The AHBUs in each soum is responsible for implementation of industry and agriculture policies at soum level. AHBUs are internal units of Soum Governor's Bureaus, and coordinated by both the SGB in each soum and the DIA in each aimag. Coordination by DIA is regulated through output contracts between DIA and AHBU, which are based on the output contracts between DIA and the AGB and often specify tasks for each of the three staff members of each AHBU. Within a SGB, on the other hand, the Soum Governor approves operational plans of AHBUs, but the Head of SGB has immediate responsibility for AHBUs.

Each AHBU has a staff of three members at the following positions:

- Specialist for rangeland management, crop farming, cooperatives, SME and services;
- Specialist for animal health and food security; and
- Specialist for livestock production technology and breeding and registration.

AHBUs are usually located in an office room within the SGB. An important asset at disposal of each AHBU is a Russian mini truck provided in 2012.

Activities of AHBUs range from coordination of private vets within a soum to keeping records of breeding stock and facilitation of subsidies on wool and skin. While the specialist for rangeland management, crop farming, cooperatives, SME and services is also responsible for provision extension services, there are no regular extension services provided by AHBUs. The main extension activity of AHBUs is supply of information to herders, either through face-to-face contacts at the AHBU office of at herder households. Occasional farmer training is organised at soums in connection with a particular Government program (such as "Mongolian Livestock") or on initiative of MIA or DIA on a particular topic e.g. agricultural cooperative, but then the AHBUs mostly co-organises the event rather than receiving budget and facilitating the event on their own.

2.3. Summary of stakeholder perceptions of the system

Table 2.2: Summary of responses of interviews with central-level stakeholders of the Government extension system

Issue	MIA (3 persons)	NAEC (5 persons)	MSUA (6 persons)	Central-level NGOs (7 persons)
1. Current level of performance of the Government extension system	- Very weak to unsatisfactory, due to lack of policies, qualification of personnel and overall lack of personnel at local levels. - Given the lack of funds for extension services, it is actually difficult to expect results.	- Unsatisfactory due to lack of policies, funds, structure and personnel, and low awareness of aimag and soum governments leading to lack of funds for extension activities at local levels.	- Unsatisfactory, despite many projects and attempts to improve extension.	- Unsatisfactory, due to lack of personnel at local levels, lack of motivation and qualification of DIA and AHBU staff.
2. Current rate of coverage of extension	- 10-30% of farmers and less than 10% of herders.	- 10-15% of farmers and herders	- Probably 10%	- Up to 80% of herders (through breeding and veterinary services)
3. Options for improving the Government extension system	- Demonstration farms at NAEC and DIAs (based on agroparks); - Mid-term program on strengthening extension services; - Extension structure and personnel at DIAs; - Performance-based salaries for extension workers;	- Increase operational funds of NAEC; - Clarify the mandate of NAEC: coordination vs. implementation of services. Or become a training provider for local governors. - Ensure funds and permanent personnel for extension services at aimag and soum levels.	- Extension must be business-oriented and based on mutual responsibilities of service providers and farmers/herders; - Pluralist extension system with multiple providers of extension services is needed.	- Qualification of extension personnel; - Extension services should be provided by agricultural cooperatives to their members; - Policy support for extension services provided by NGOs;
4. Interventions urgently required	- Farmer training initiated by MIA should be organised by NAEC instead by MIA itself; - Link extension services and models piloted by development projects to the Government extension system.	- Coordination unit at MIA for agricultural extension; - Allocate extension tasks at soum level to zoo-technicians and crop experts of AHBUs (instead to only one person) - Awareness building through regular TV broadcasts by NAEC. - Increase awareness of extension services at DIAs and emphasise extension services in output contracts between MIA and DIAs.	- Identify needs for extension services, and design services that match needs on the ground. - Introduce policies on agricultural extension services.	- Learning from international experiences and good practices e.g. study tours in countries with well developed extension systems. - Regular TV-broadcasts about successful extension services in Mongolia for awareness building. - CT-based distant learning; - Stronger use of agroparks in extension.

2.4. Discussion of selected options for strengthening the Government extension system

2.4.1 Re-defining extension

If one would analyse a system that has failed to develop during a period of 18 years one would eventually assume that the concept that the system is based on might be unsuitable or confusing. Most of all, one would wonder if there is any concept. One would face this situation when analysing the Government extension system in Mongolia.

It is indeed a challenge to find out what extension means to Mongolians. While there is no official definition of agricultural extension there are several versions of Mongolian translation of the English term. The most commonly used one means agricultural technology transfer service, and translates back to English as *'agricultural transfer service'* or simply *'transfer service'*. Among others, the Ministry of Industry and Agriculture uses this term. Other common terms include *'training and transfer service'* and *'knowledge dissemination and transfer service'*. Many agricultural experts and researchers, however, prefer to simply use the English word *'extension'*.

The original perception in Mongolia was that extension means technology transfer. This is already implied by the Mongolian name of NAEC. However, since NAEC's main activity has been farmer training, the corrected perception now is that extension should be technology transfer in theory but in practice it is rather farmer training. At the end of the day, no one is quite sure what extension is.

We will realise that different forms of extension services already exist in Mongolia if we step out of the box and look around. Extension services or extension-related activities already take a significant proportion in the activities of DIAs and AHBUs. In addition, hundreds of agricultural experts are contracted by agribusiness firms and larger farms as advisors, and private firms such as suppliers of agricultural machines are promoting advanced technologies as a part of their marketing strategies, besides national and international NGOs implementing development projects with extension activities building essential components. The UB-based NGO Developing Solutions that is supporting livestock sector development in the impact areas of the Oyutolgoi mine in South Gobi through capacity building activities is another example of extension services outside the Government extension system. Similarly, the Korean-Mongolian joint-venture GATC has been training vegetable farmers and promoting new species and varieties of vegetables from Korea since 1993.

We have to acknowledge that a pluralist system of agricultural extension and advisory services is emerging in Mongolia without much political support. A major benefit of service pluralism is that it results in competition among providers, which in turn leads to overall improvement and higher professionalism of services provided. However, a pluralist system based on competition among service providers also has a major disadvantage: it will primarily serve better positioned farmers and agribusiness firms rather than herders, who are poor in majority.

In a final conclusion, despite the engagement of the private sector in agricultural extension it is only the Government extension system that can reach the majority of herders and farmers in Mongolia. On the other hand, the Government extension system will not be able to keep up with the increasing professionalism of private sector providers since it is not difficult to assume that a highly qualified agricultural expert would prefer a MNT 2-million monthly salary at a private consulting firm to a MNT 300 thousand salary at an AHBU. Hence, in order to be sustainable, attempts to strengthen the Government extension system should be aware of the limits of the system and emphasise functions not requiring the level of professionalism that research organisations or the private sector can provide. The Government extension system should aim for feasible goals, and expectations on the performance of DIAs and AHBUs should be realistic.

While development of a new concept of extension would be beyond the scope of this study, below are some considerations for “feasible goals and realistic expectations” at different levels of the existing Government extension system.

At the **central level**, NAEC’s mandate urgently needs to be clarified as this would be the first step of strengthening the whole system. NAEC has to face the truth that its main activity has always been to conduct training and the ambition of ‘transferring achievements of science into the agricultural production’ is not only unrealistic, but it also builds a barrier between research and extension. Furthermore, farmer training costs much less if organised by AHBUs under coordination of DIAs than by NAEC officers travelling around the country. Hence, NAEC’s main focus should be placed on training and supporting of DIAs’ personnel in coordination of services. In this regard, the suggested mandate for NAEC is to train and support Master trainers at aimag level. This would also include distant training of Master trainers via video conferences, and distribution of manuals for Master trainers and AHBU staff, and resource materials for preparing manuals for herder/farmer training.

The **aimag level** is an empty space for actual service provision as the aimag centre is not a separate territorial unit and there are only soum-level users but no aimag-level users of extension services. Hence, DIAs’ main task in the Government extension system should be to coordinate and support extension services at regional (i.e. inter-soum) and soum levels. Concrete activities might include training of AHBU personnel in extension methods, preparation and distribution of training manuals to AHBUs, and supporting AHBUs in facilitating access of herders and farmers to experts, services, inputs and markets at the aimag level, and coordination of pilots and demonstration trials at regional level. Distant training of herders and farmers via TV and radio should, if considered necessary, organised by DIAs as well since location-specific contents prepared by DIAs offer more value to the users than contents prepared by NAEC, and there are TV and radio studios in each aimag.

At **soum level**, AHBUs should be actual providers of extension services. Provided that regular support and guidance by DIAs is ensured, AHBUs may conduct periodical training of herders and farmers, provide advice to them, and help them gain access to information, education, research, services and markets at aimag and central levels. However, besides the qualification of AHBU personnel, a main limitation of soum-level extension services is their rate of coverage. Assumed inability of AHBUs to reach all herders and farmers in a soum is not only an issue of budget restriction, but it also relates to the mobility of herders. Hence, a lower tier in the extension system is required. In the Government system, the next lower level after soum will be the bag. But even the herders within a bag are located far apart from each other. Therefore, the extension system should be connected to at least one representative per group of herder households located together (such as a *khot-ail*). In areas where there are herder cooperatives and herder groups, including PUGs in Green Gold areas, such structures could be used in channelling information and advice to a large number of herders.

This section started with an introduction of how extension is perceived in Mongolia, and aims to suggest a new definition of extension. As briefly explored above, extension relates or should relate to activities at soum and herder group levels while NAEC and DIAs should take on supporting and coordinating roles in the Government extension system. Based on these considerations, and suggestions of Birner et al. (2009) and Christoplos (2010), we suggest the following definition:

"Extension services are services that facilitate participatory and collaborative processes through which agricultural producers gain access to information, education, research, services and markets, and improve their knowledge and skills of production technology and business management".

This definition highlights the role of extension services in facilitation of access and opportunities for farmers and herders. With regard to the Government extension system, the obvious logic of this perspective is recognition of the limited capacity of AHBUs in terms of both budget and qualification of personnel. While allocating the task of farmer/herder training

to AHBUs, the definition does not expect AHBU staff to be highly qualified experts, but encourages them to facilitate the access of herders and farmers to the expertise that is not locally available. On the other hand, the definition highlights “participatory and collaborative processes” in recognition of the fact that, besides the overall maxim of participation and collaboration in any kind of extension services, many herders already possess valuable indigenous knowledge that only needs to be shared with other herders through herder-to-herder exchange facilitated by AHBUs.

2.4.2 Building political will to support the Government extension system

Improvement of the Government extension system will require availability of Government funds for extension services, thus political awareness to support the system. Such awareness is not given; it has to be built yet.

Some stakeholders interviewed in our study suggested that directors of DIAs need to be well motivated to request funds for extension services from the MIA, and allocate such funds to the AHBUs. Others suggested that it should be an initiative of MIA to define extension services in the output contracts with DIAs. These suggestions may work in some cases. However, the goal is to improve the national system in the long-term rather than celebrating a successful year of extension in a certain aimag. The first lesson learned from experiences with national programs such as the Third Virgin Land Campaign or the Mongolian Livestock Program that were or being successfully implemented in contrast to dozens of other programs that only exist on paper is that a successful program is usually initiated either by the Parliament or the Prime Minister. Of course, MIA can and rightfully does suggest new initiatives to the Parliament or the Prime Minister, but Government funds are only approved for a selected number of such proposals.

Therefore, initiatives to secure political will to strengthen the Government extension system should reach highest levels of political decision making, and support by the Parliament or the Prime Minister is essential for channelling public funds to the system. This conclusion is, if not already logical enough, supported by the fact that hundreds of seminars and thousands of hours of exchange and discussion by domestic and international experts, researchers, MIA and NAEC officials, extension managers of aimags and soums, herders and farmers during the last 18 years have not resulted in any form of sustainable improvement in the Government extension system. We should eventually realise that decisions in the governance system of Mongolia are always directed from top to down.

What is needed for building political will to support the Government extension system is a dialogue that involves parliament members and reaches the Prime Minister. For such a dialogue to start on the right path, a concept of extension that is understandable for a Mongolian without proficiency in English language and background knowledge of extension theory is fore mostly needed. Such a concept might be based on the suggestions in the previous section.

2.4.3 Increasing the coverage of extension services

The option of reaching a large number of herders through community structures within a soum has already been discussed in section 2.4.1. In addition to this approach, there are two options that need to be considered: involvement of private sector and use of ICT.

In accordance with the definition suggested in section 2.4.1, ABHUs need to, in addition to providing training and information services, facilitate access of herders and farmers to services needed but not provided by the AHBUs themselves. Such services might also include extension services provided by the private sector. Fodder suppliers, for example, would be willing to provide advice on animal nutrition to herders in order to sell their products. Insurance companies would be very interested to give advice on herd management to herders who bought their products. Herder cooperatives, especially ones that are trying out new businesses such as processing of livestock outputs, might be interested in hiring a

technical advisor as well. Access to such services is usually initiated by either the supply or the demand side, but it can also be facilitated by a third party, which could be the AHBU, whereas DIAs may support AHBUs to establish linkages to services available at the aimag level or in Ulaanbaatar.

The next option is use of information and communication media for overcoming the “tyranny of distance”. Already at the present, TV and radio broadcasts, video records and cell phone messages can be used for supplying information to herders throughout the country. For the near future, we may imagine a "herder tablet", which herders can use for record keeping, engaging in online (learning) networks and many other useful purposes.

2.4.4 Introducing extension education

Most stakeholders interviewed in our study agreed that qualified personnel are essential for a well-performing Government extension system in Mongolia and qualification of extension staff should comprise both basic academic education and advanced training for staff already working at NAEC, DIAs and AHBUs.

As most employees of DIAs and AHBUs as well as NAEC are graduates of MSUA, training of extension personnel should start at MSUA. A special undergraduate degree on agricultural extension is not necessary since extension work requires competences of multiple disciplines rather than being a certain form of service provided by one “extension specialist” at each AHBU.

MSUA did indeed pilot extension modules at different schools between 2004 and 2008 through stimulation by the CIDA-supported project “Training for Rural Development”. However, the lecturers themselves were not educated to teach agricultural extension methods and interpreted extension in different ways; as a tool of marketing, an approach to management consultancy, overall term for adult education, or a sub-discipline of engineering science, whereas the module was taught to 2nd grade students at the age of 18 to 20 who were only starting courses specialised for their intended professions after a year of refreshing their secondary school knowledge. A standardised module of agricultural extension was not introduced, and the pilot ceased in 2009, along with the anticipated end of the project “Training for Rural Development” in 2010. Nevertheless, MSUA gained some experience with teaching agricultural extension, and the project enabled two lecturers of MSUA to attend a 3-month training course on extension methods at the University of Saskatchewan in Canada. One of those lecturers still works at MSUA (School of Economics and Business).

Extension education at MSUA should fore mostly train students majoring animal and crop sciences and agricultural economics in communicating with different stakeholders, developing extension messages, training herders and farmers, and helping them implement on-farm trials. Such a module should be mandatory for 3rd or 4th grade students.

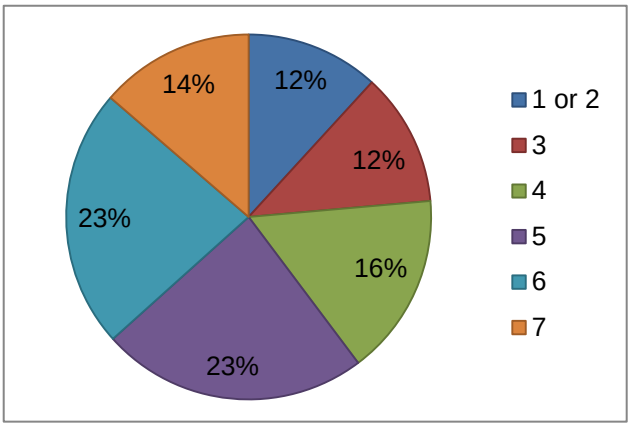
Short-term or modular training of extension personnel at NAEC, DIAs and AHBUs, on the other hand, should be differentiated by level, as suggested in section 2.4.1. AHBU personnel should be regularly trained by Master Trainers at DIAs, and the Master Trainers should be trained by NAEC. NAEC itself needs a pool of highly qualified trainers, which may include MSUA experts. At both NAEC and DIA levels, standardised curricula of the training need to be introduced.

2.4.5 Strengthening the linkage between research and the Government extension system

It is often mistaken that MSUA is incompetent to introduce its research results into commercial production. However, most crop varieties and livestock breeds developed by MSUA researchers, just to name a few examples of those research results, are in active use today and many on-farm trials are implemented by MSUA researchers on a continuous basis. Hence, MSUA is not attracted to the current NAEC wanting to transfer achievements of science into the agricultural production and asking MSUA to help them in doing so. On the

other hand, MSUA would be keen to collaborate with a reformed NAEC that offers a powerful channel for testing, promotion and commercialisation of MSUA products through a viable network of DIAs and AHBUs in all aimags and soums of Mongolia, and with no ambition of competing with research organisations, as indicated in section 2.4.1. Furthermore, NAEC may provide MSUA, or MIA as one of the main sources of research budget for MSUA, with technology needs assessments.

The Government extension system should establish linkages to private firms and NGOs conducting agricultural research in addition to MSUA, and engage them in extension services on the ground. DIAs and AHBUs should also actively coordinate and facilitate initiatives of farmers and herders to conduct pilots and on-farm trials with support by researchers or in active collaboration with them. In this fashion, research can be not only linked with but also embedded in extension, as extension activities are often embedded in research projects.



3. Assessment of herders' needs for extension services

3.1. Socio-economic profile of surveyed herders

3.1.1 Demography

The herders surveyed most commonly live in five- or six-member households. The largest household consists of 12 members, in contrast to four one-member households (Figure 3.1).

The statistically average household consists of 4.84 members, including 2.35 males and 2.49 females. It also includes 2.58 members of the working age of 16 to 60 years, 2.06 children under 16 years and 0.2 seniors above the age of 60. The slightly higher share of females is particularly obvious among children under 16. The working-age population, however, includes more males than females (Table 3.1).

Table 3.1: Age and gender distribution of household members (N=161)

Figure 3.1: Number of household members (N=161)

Measures	0-15 years			16-60 years			>60 years			Total numbers		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Total number	148	184	332	216	199	415	15	18	33	379	401	780
Average number/HH	0.92	1.14	2.06	1.34	1.24	2.58	0.09	0.1	0.20	2.35	2.49	4.84
Percentage	19%	24%	43%	28%	26%	53%	2%	2%	4%	49%	51%	100 %

3.1.2 Education and experience

All 161 respondents were literate and had some level of education: 64 percent completed high school and 36 percent did not complete the high school, mostly quitting after primary school. Twenty respondents possess a university or a vocational degree as teacher, vet, electrician, economist, carpenter, tractor driver, accountant, zoo-technician, social scientist and construction machinery operator. In addition, six respondents were qualified drivers.

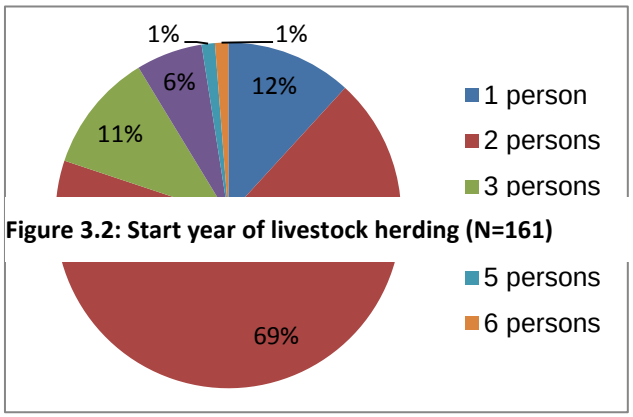


Figure 3.2: Start year of livestock herding (N=161)

The largest share of the respondents became herders between 1990 and 1994, while those who started herding after 1999 take a slightly higher share than those who had been herding before 1990. The herders who claimed that they had been engaging in livestock herding before 1990 used to be members of *negdels,* which were herder cooperatives with specialized production units and specialists and inputs provided by the state. The responses indicate a slow-down of start-ups in livestock herding after 2004 (Figure 3.2).

3.1.3 Employment

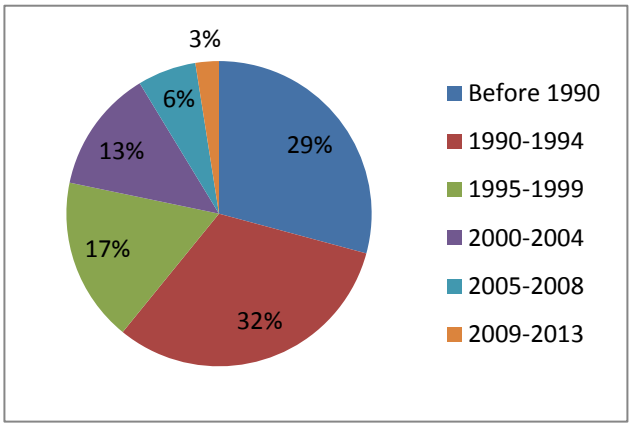
Most households have two persons, usually the spouses, engaged in livestock herding on a permanent basis. Households with more than four "herders" are rarely found (Figure 3.3).

In addition to herding, 16 households have one, and two households have two persons supporting their households through regular off-farm employment. These off-farm employees consist of five teachers, three nurses, two Bag governors, two vets, a Head of Bag Citizens Khural, a Bag physician, a driver, a vet, and, a cook, a technical assistant of Soum government, and an "assistance herder", who is employed and paid by another household.

Figure 3.3: Number of households members engaged in livestock herding on a full-time basis (N=161)

3.1.4 Herd size and structure

The total number of animals of all 161 households was 34933. Goats, with a 48.2% share, presented the majority while sheep, cattle, horses and camels contributed 39%, 7.5%, 4.5% and 0.9%, respectively. Goats were also the most common animal: 158 out of 161 respondents have goats. On the other hand, camels are relatively rare: 118 out of 161 respondents have between 1 and 3 camels.



The total number of animals, converted into sheep head (sh) equivalents[2], was between 13 and 1917 sh per respondent. The largest share of the respondents fall in the herd size category of 101 to 300 sh, followed by herders with 301 to 500 sh and those with 501 to 1000 sh. Relatively few herders possess more than 1000 sh or less than 51 sh. The statistically average

[2] Conversion into sheep head equivalents: 1 sheep=1 sh, 1 goat=0.9 sh, 1 cattle=6 sh, 1 camel=5.7 sh, 1 horse=6.6 sh.

household has a herd of 217 heads or 351 sh, including 104 goats, 85 sheep, 16 cattle, 10 horses and 2 camels (Table 3.2).

The largest herd of 1917 sh was found in Buyant soum of Khovd aimag and consisted of 350 goats, 150 sheep, 110 cattle and 120 horses. The smallest herd of 13 sh, on the other hand, was found in Zuungobi soum of Uws aimag and consisted of 6 goats and 8 sheep. The herder who owns this small herd lives with his parents, and his animals are herded within his parents' herd.

3.1.5 Rate and survival of offspring

The share of offspring in the total herd of was 39% for goats, 38% for sheep, 32% for cattle, 24% for horses and 17% for camels, respectively. It seems that, given the relatively mild winters of recent years, the survival rate of offspring ranged between 90 and 94 percent (Table 3.3).

3.1.6 Animal losses of last three years

The overall loss of animals was below 10% for the majority of the respondents, and less than 5% on average for herds larger than 300 sh. Small herders with less than 100 sh seem to suffer relatively high animal losses. Most animal losses occur between February and April (Table 3.4).

Table 3.2: **Structure of surveyed households by herd size in sheep heads (N=161)**

Measures	Herd size categories					
	Up to 100 sh	101-300 sh	301-500 sh	501-1000 sh	More than 1000 sh	Total
N	26	65	39	22	9	161
Percentage in total households	16%	40%	24%	14%	6%	100%
Average herd size in sh	48	189	398	699	1331	351
Average number of animals, total	33	130	257	453	631	217
Goat	20	71	129	188	283	104
Sheep	9	46	98	214	207	85
Cattle	2	7	15	28	98	16
Horse	2	5	11	19	42	10
Camel	-	1	4	4	-	2

Table 3.3: **Offspring survival in the period 2011 to 2013 (N=161)**

Measures	Herd size categories					
	Up to 100 sh	101-300 sh	301-500 sh	501-1000 sh	More than 1000 sh	Total
N	26	65	39	22	9	161
Average number of animals, total	33	130	257	453	631	217
<u>Offspring 2011:</u>						
Survived	13	40	64	89	177	76
Not survived	2	5	5	11	4	6
<u>Offspring 2012:</u>						
Survived	13	44	72	103	169	82
Not survived	1	5	5	9	16	7
<u>Offspring 2013:</u>						
Survived	16	50	81	114	156	89
Not survived	1	5	4	10	32	8
Mean rate of offspring survival in 2011-2013	91%	90%	94%	91%	91%	92%

Table 3.4: **Animal losses in the period 2011 to 2013 (N=161)**

Measures	Herd size categories					
	Up to 100 sh	101-300 sh	301-500 sh	501-1000 sh	More than 1000 sh	Total
N	26	65	39	22	9	161
Average number of animals, total	33	130	257	453	631	217
Losses 2011:						
Large animals	-	1	3	2	8	2
Sheep and goats	3	7	9	17	10	8
Total	3	8	12	19	18	10
Losses 2012:						
Large animals	1	2	2	2	11	2
Sheep and goats	3	7	8	16	12	9
Total	4	9	10	18	23	11
Losses 2013:						
Survived	-	1	2	2	7	2
Sheep and goats	5	7	8	18	13	9
Total	5	8	10	20	20	11
Mean animal loss rate 2011-2013	12%	6%	4%	4%	3%	5%

3.1.7 Winter preparedness and supplementary and stall feeding

The respondents were asked to reflect on their preparedness for minimizing energy losses of animals in cold seasons. Warm shelters, supplementary feeding in autumn and provision of hay and fodder for winter feeding were assumed to be among the most effective measures of winter preparedness.

About three of four respondents perceive their winter shelters warm enough to protect the animals from the cold (Figure 3.4). Moreover, most herders warm up their winter shelters each year (Figure 3.5). Warming up of winter shelters involves repairs of walls, and continues with measures of drying the ground in winter. Roofs are usually only available at wooden shelters, which are relatively rare in Khovd and Bayan-Ulgii aimags.

Supplementary feeding for fattening of animals in autumn seems uncommon. Only about a half of the respondents confirmed to do so (Figure 3.6).

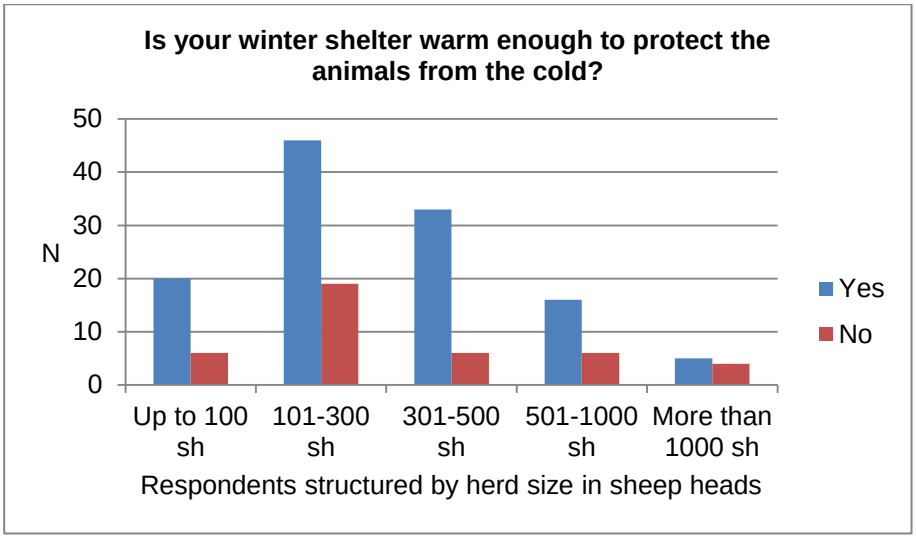


Figure 3.4: **Responses on winter preparedness: Assessment of winter shelters (N=161)**

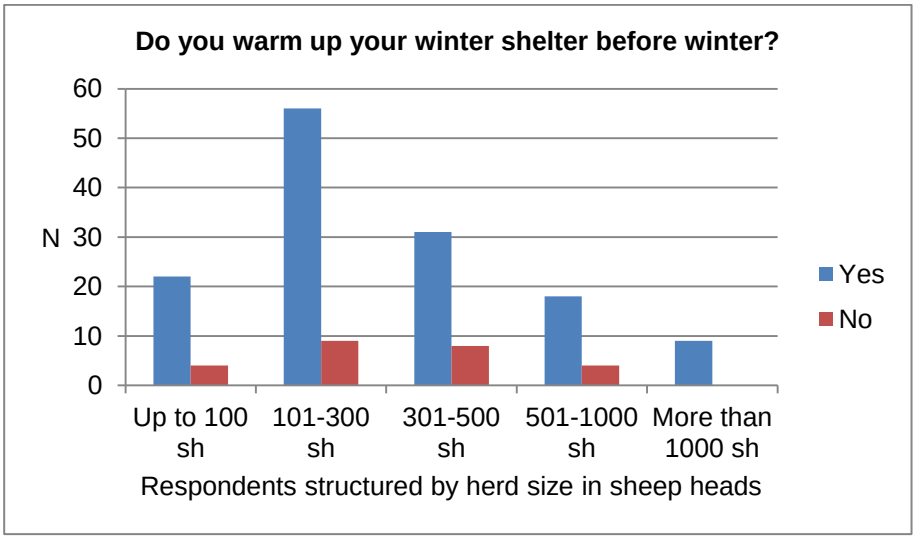


Figure 3.5: **Responses on winter preparedness: Warming up of winter shelters (N=161)**

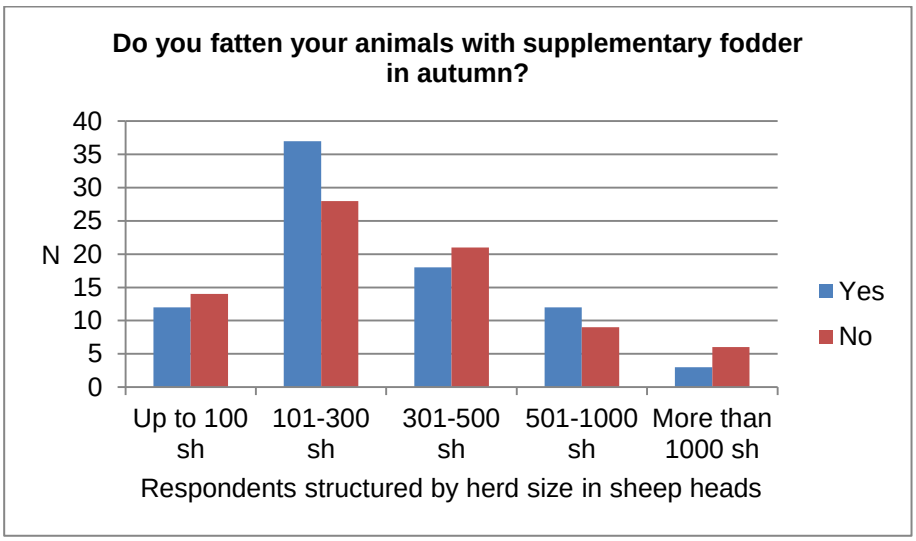


Figure 3.6: **Responses on winter preparedness: Supplementary feeding in autumn (N=161)**

An overwhelming majority of the respondents confirmed that they make hay themselves (Figure 3.7). In addition, two thirds of the respondents purchase hay and commercial fodder for supplementary winter feeding. Unfortunately, a slight majority of the herders with less than 100 sh do not buy any supplementary fodder (Figure 3.8).

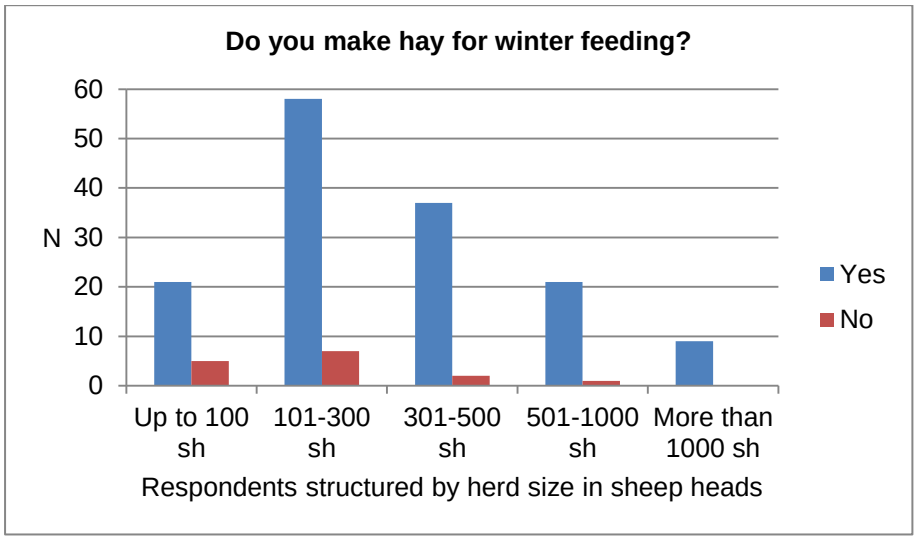


Figure 3.7: **Responses on winter preparedness: Haymaking (N=161)**

The average amount of hay provision for winter feeding is 4 tons for herders with up to 300 sh, 5 tons for herders with 301 to 500 sh, 8 tons for herders with 501-1000 sh, and 10 tons for herders with more than 1000 sh.

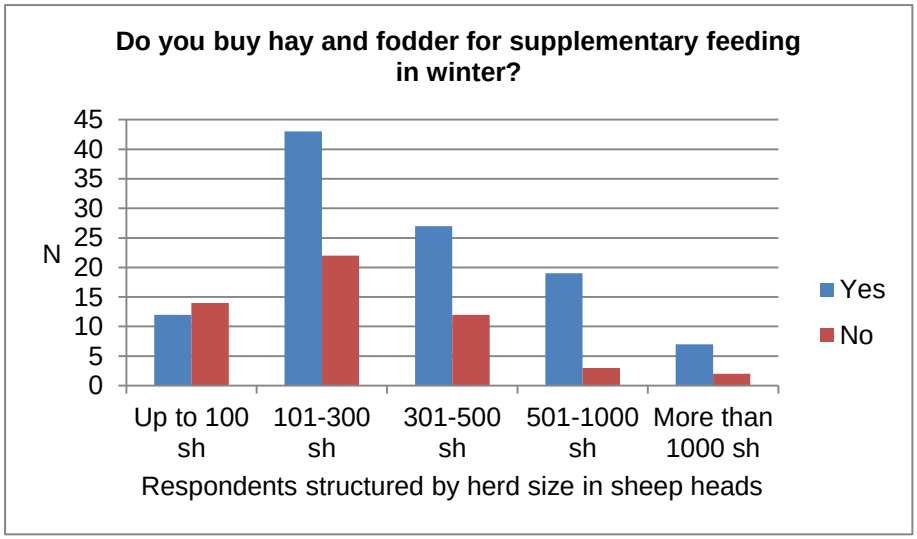


Figure 3.8: **Responses on winter preparedness: Purchase of hay and fodder (N=161)**

Supplementary hay feeding in winter, although not on a daily basis, is applied by 158 out of 161 respondents. In addition, bran is used by 87% by the respondents as a supplementary winter fodder. The average provision of bran is estimated at 300 kg for herders with 100 sh, 500 kg for herders with 101-300 sh, 500 to 1000 kg for herders with 301-500 sh, 1000 to 1500 kg for herders with 501 to 1000 animals, and 1500 to 2000 kg for herders with more than 1000 sh.

Three respondents from Khovd aimag, and three respondents from Zuungobi soum of Uws aimag confirmed that they also use locally grown green fodder in winter feeding. The provision per household is between 120 kg and 2 tons.

Stall-feeding is applied by a slight majority of the respondents during extreme cold or stormy days of winter and spring (Figure 3.9).

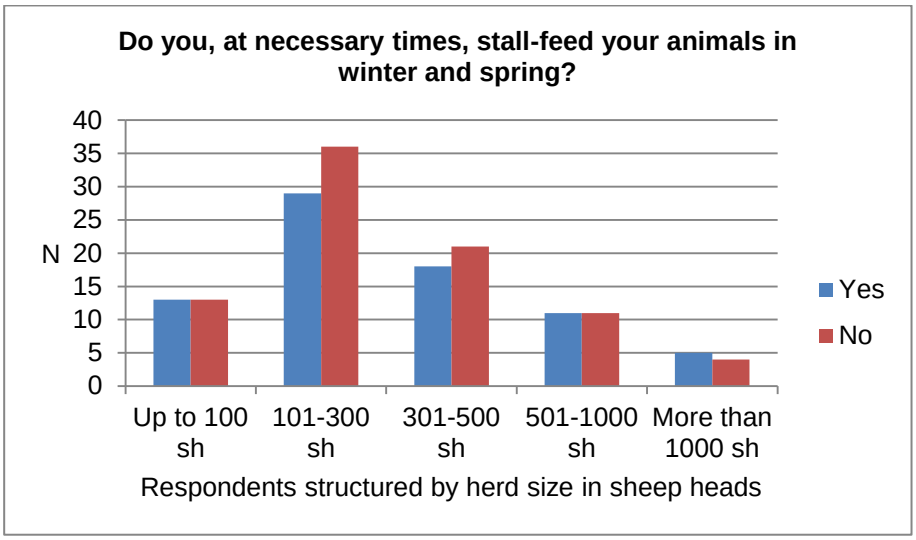


Figure 3.9: **Responses on stall feeding (N=161)**

3.1.8 Livestock productivity

Maximum carcass weight of lambs and sheep were found in Zuungobi soum, home to the *Bayad* breed of sheep. Maximum milk yield, on the other hand, was found in Byuant soum of Khovd aimag, where crossbred cows are mixed in native cattle herds (Table 3.5).

Table 3.5: **Responses on average outputs of main raw materials of livestock origin (N=161)**

Raw material	Unit	Min.	Max.	Mean
Wool and cashmere				
Sheep wool	kg per head	0.8	2.0	1.37
Cashmere wool	kg per head	0.2	0.8	0.35
Camel wool	kg per head	3.0	8.0	4.63
Meat and milk				
Sheep carcass	kg per piece	20	50	32
Lamb carcass	kg per piece	15	35	21
Goat carcass	kg per piece	18	30	25
Steer carcass	kg per piece	140	280	230
Horse carcass	kg per piece	130	320	235
Cow milk	litres per cow and day	0.5	4.0	2.38

3.1.9 Sales and revenues of livestock outputs

According to 142 valid responses, an average herder household with 367 sh sells 12 sheep, 7 goat 1 steer and 1 horse carcasses, 127 kg sheep wool and 38 kg cashmere per year (Table 3.6). In addition to these main outputs, 21 respondents sell 20-400 kg *aaruul*, 3 respondents sell 200-600 litres of cow milk, 2 respondents sell 10-20 kg cream, and 2 respondents sell home-made butter.

Table 3.6: **Annual sales and consumption of main outputs of livestock (N=142)**

Measures	Herd size categories					
	Up to 100 sh	101-300 sh	301-500 sh	501-1000 sh	More than 1000 sh	Total
N	18	60	35	20	9	142
Average number of animals, total	48	191	404	686	1331	367
Meat, piece						
Sheep carcass						
Sold	2	7	14	26	23	12
Consumed	4	9	14	15	12	11
Steer carcass						
Sold	-	1	1	1	6	1
Consumed	1	1	1	1	2	1
Goat carcass						
Sold	6	5	8	7	14	7
Consumed	2	6	7	5	7	6
Horse carcass						
Sold	-	-	1	-	3	1
Consumed	-	-	-	1	-	-
Wool and cashmere, kg						
Sheep wool						
Sold	24	71	156	231	372	127
Consumed	1	1	-	4	-	1
Cashmere						
Sold	12	28	44	63	84	38
Consumed	-	-	-	-	-	-

Total revenues of livestock outputs, including subsidies on wool and skin[3], range from MNT 1.9 million to MNT 23.2 million at 2013 wholesale prices (Table 3.7).

[3] Subsidies: MNT 2000 per kg wool, MNT 3000 per piece of sheep and goat skin and MNT 15000 per piece of cattle, camel and horse skin.

Table 3.7: **Estimated annual revenues of livestock outputs (N=142)**

Measures	Herd size categories					
	Up to 100 sh	101-300 sh	301-500 sh	501-1000 sh	More than 1000 sh	Total
N	18	60	35	20	9	142
Number of animals, sh	48	191	404	686	1331	367
Mutton*						
Amount sold, kg	64	224	448	832	736	384
Price†, MNT 1000/kg	5.0	5.0	5.0	5.0	5.0	5.0
Revenue, MNT 1000	320	1120	2240	4160	3680	1920
Beef*						
Amount sold, kg	-	230	230	230	1380	230
Price, MNT 1000/kg		6.0	6.0	6.0	6.0	6.0
Revenue, MNT	-	1380	1380	1380	8280	1380
Goat meat*						
Amount sold, kg	150	125	200	175	350	175
Price, MNT 1000/kg	4.0	4.0	4.0	4.0	4.0	4.0
Revenue, MNT	600	500	800	700	1400	700
Horse meat*						
Amount sold, kg	-	-	235	-	705	235
Price, MNT 1000/kg			3.5		3.5	3.5
Revenue, MNT			822.5		2467.5	822.5
Sheep wool, kg						
Amount sold, kg	24	71	156	231	372	127
Price, MNT 1000/kg	2.2	2.2	2.2	2.2	2.2	2.2
Subsidy, MNT/kg	2.0	2.0	2.0	2.0	2.0	2.0
Revenue, MNT 1000	100.8	298.2	655.2	970.2	1562.4	533.4
Cashmere, kg						
Sold, kg	12	28	44	63	84	38
Price, MNT 1000/kg	65	65	65	65	65	65
Revenue, MNT 1000	780	1820	2860	4095	5460	2470
Sheep and goat skin						
Delivered, piece	14	27	43	53	56	36
Subsidy, MNT 1000/p	3.0	3.0	3.0	3.0	3.0	3.0
Revenue, MNT 1000	42	81	129	159	168	108
Large animal skin						
Delivered, piece	1	2	3	3	11	3
Subsidy, MNT 1000/p	15	15	15	15	15	15
Revenue, MNT 1000	15	30	45	45	165	45
Total revenue	1857.8	5229.2	8931.7	11509.2	23182.9	7978.9

* Numbers of carcasses converted into meat weights using mean values in Table 3.5.
† Average wholesale prices of 2013.

3.1.10 Total income

Based on estimated revenues of livestock outputs in Table 3.12 and responses on additional incomes, the total the annual incomes of herder households are estimated in the range between MNT 4 million and MNT 25 million. The average herder household attains an annual income of MNT 9.2 million (Table 3.5).

The share of cash incomes from livestock products in total cash income is 48 percent in herder households with up to 100 sh, stabilizes in the range between 80 and 90 percent in herder households between 101 and 1000 sh, and reaches 94% for households with more than 1000 sh. On average, 87% of total cash income is obtained from sales of livestock outputs.

The relatively low share of livestock related incomes in households with less than 100 sh confirms the inability of a small herd at current productivity levels to provide for a household and reveals the significance of additional sources of incomes such as herding others' livestock against wage, regular or seasonal off-farm employment, e.g. at construction sites, for households with smaller herds.

Table 3.8: **Adjusted estimation of annual cash income of herder households (N=142)**

Measures	Herd size categories, given in sheep heads					Mean
	Up to 100	101-300	301-500	501-1000	1001-2000	
Number of households	18	60	35	20	9	142
Herd size in sh	48	191	404	686	1331	367
Total cash income	4.0	6.1	10.1	12.9	24.7	9.2
Revenue of livestock outputs	1.9	5.2	8.9	11.5	23.2	8.0
Other cash incomes	2.1	0.9	1.2	1.4	1.5	1.2
Share of cash income from livestock in total cash income	48%	85%	88%	89%	94%	87%

3.1.11 Overview and gender disaggregation of herder household activities

The busiest season for herders is spring. Spring begins with delivery of animals in February, and herders need to watch for every pregnant animal, help the new-born ones suckle, and feed weaker animals with supplementary hay and fodder as bran. Weaker animals are exposed to non-infectious diseases, and most animal losses occur in spring anyway. Wolves are also most hungry in spring. Mandatory vaccination of animals starts in April. Furthermore, shearing and combing of horses, camels and goats already start in late April. Some herders start *otor* grazing (grazing in fresh and usually remote areas) in May for recovering the animals. The season requires equally tremendous amounts of work by men and women.

The summer starts with moving to the summer grazing area and shearing of sheep wool in June. Women are busy with milking and milk processing while men's main responsibility is *otor* grazing. Summer is also a season of festivals, where many male herders train their horses for races. Dipping of animals continues up to mid-summer.

Most herders move to their autumn camps by late August. The whole season of autumn is a period of preparing for winter. Hay for winter feeding is made, usually by men and by hand, in August and September, and men continue *otor* grazing in September for fattening their animas. Felt is made and hide and fur are hand-processed for warm clothing and other

purposes in the household. This is followed by repairs of shelters at autumn, winter and spring camps. Then there is another round of mandatary vaccination of animals in autumn. A typical women's activity in late autumn is to sew winter clothes for household members and blankets (*nemnee*) for cattle.

In late October, but mostly in the beginning of November, herders move to their winter camps. On-going activities in winter include cleaning up of shelters and supplementary feeding of animals.

While most activities in herder households involve both men and women there are some activities that either men or women take the main responsibility for. Typical men's activities include *otor* grazing in summer and autumn, haymaking in autumn, shelter repairs in autumn and winter and trimming the mane of horses. Men also tend to engage stronger than women in trades, including both the sales of their own products and purchases of inputs such as fodder. Typical women's activities, on the other hand, include milking and milk processing in summer, sewing of winter clothes and animal blankets in autumn, feeding in winter as well as cleaning up of shelters in winter, spring and autumn. In addition, women engage in tending their children and housework such as cooking and cleaning more than men.

Overall, the labour of men and women in herder households is more or less balanced. Both are busiest in spring. In summer, men's work is relatively flexible while women's business with milking and milk processing has to comply with strict schedules. In autumn, haymaking by men is another scheduled activity while women become more flexible in organising their work after sending their children to schools at soum centre and colleges at urban centres.

The period between late autumn and early winter, usually between late-September and late-November, is considered by the herders as the least busy period. Although herders are never entirely free of work, the activities in this period are relatively less urgent, and herders are relatively flexible to organise their work.

3.1.12 Distance from soum centre

Distance from soum centre: While the exact number of locations of herder households within a year is highly variable, the traditionally established pattern distinguishes between winter, spring, summer and autumn locations of herders. Summer and autumn locations are chosen most carefully since these are the seasons of building resilience in animals against the harsh winter. Thus, herders move as far as needed in summer (Table 3.9). Winter camps, on the other hand, protect the animals from the cold wind and are usually located relatively close to the soum centre. Spring and autumn camps lie somewhere in between. In areas with large numbers of livestock and high pressure on rangelands such as Buyant soum in Khovd aimag, however, many herders have abandoned their spring camps and prefer to stay at the winter camps through the spring until summer, knowing that someone else's animals have already grazed the areas around their spring camps during the winter.

Table 3.9: Distance from soum centre (in km)

Season	Min.	Max.	Mean
Winter	0	110	30-40
Spring	0	150	30-40
Summer	4	200	45-55
Autumn	0	160	30-40

Figure 3.10: **Illustration of herder household activities in different seasons by herders in Umnugobi soum, Uws aimag (the sequence is from summer up-left to spring down-right)**

The below figure illustrates the positions of a herder household in Buyant soum of Bayan-Ulgii aimag during different seasons of a year, and the distances between these positions. In May and June, this household is located at its spring camp 20 km west from the soum centre. The autumn camp is around 40 km from the spring camp, and 50 km from the soum centre. The family spends about 2.5 summer months from late June to mid-September in the area between these camps. In November, they move from their autumn camp to the winter camp located 50 km south-east from the soum centre and 15 km from the bag centre. The haymaking area is between their winter camp and the soum centre (Figure 3.11).

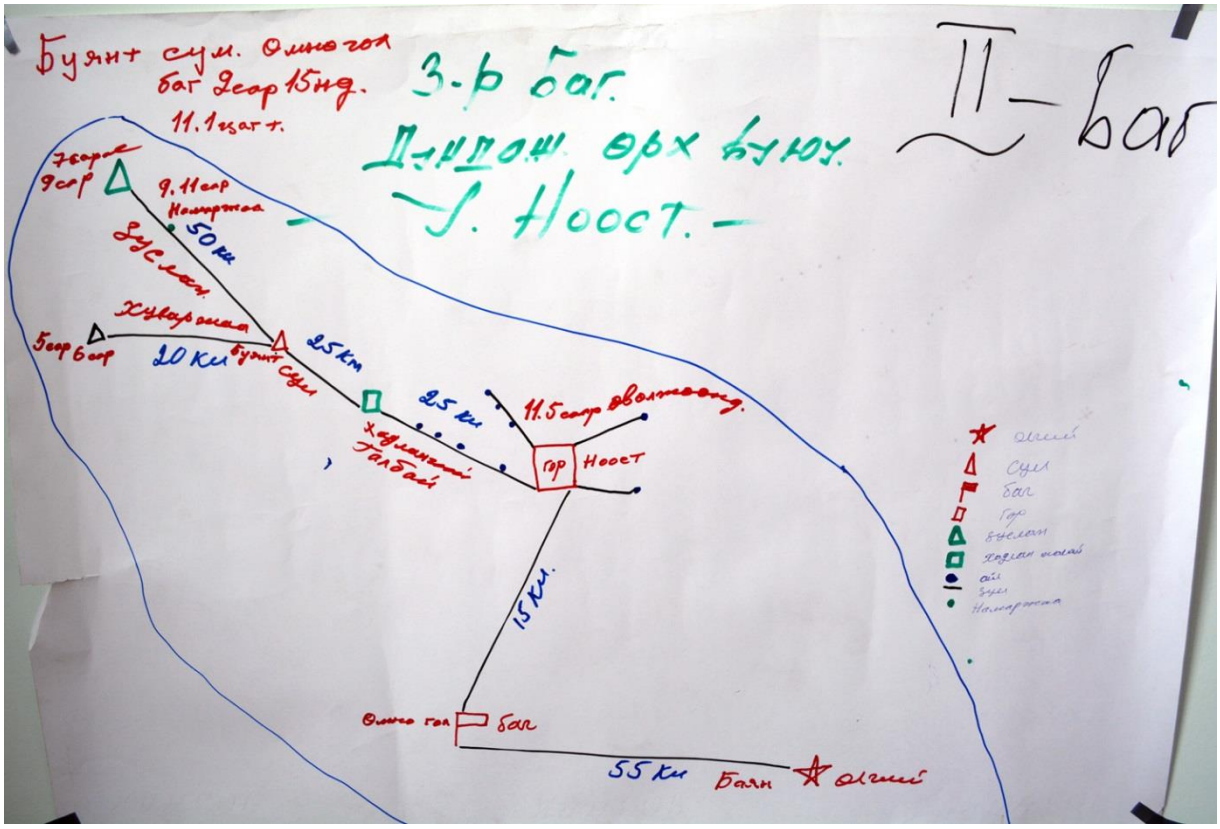


Figure 3.11: **Map of locations in different seasons of a herder household in Buyant soum, Bayan-Ulgii aimag**

3.1.13 Availability of vehicles, and information and information devices

Most herders possess motorbikes, and about a third of the respondents possess cars. Cell phones are regularly used. Most households possess televisions, which also receive radio signals. Only 35% of the respondents possess radios (Figure 3.12).

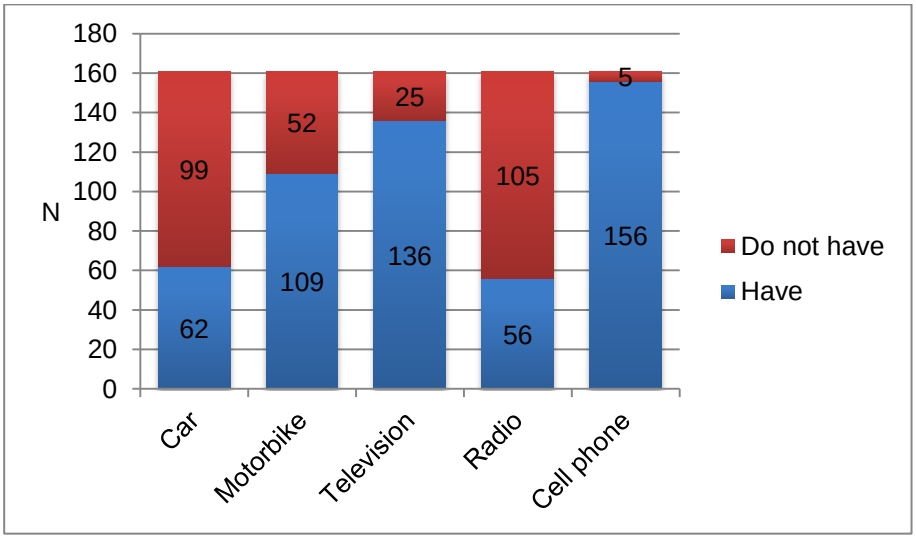


Figure 3.12: **Availability of cars, motorbikes and information and communication devices (N=161)**

3.1.14 Local services provided to herders

Besides banks and primary units of medical services, regular service providers for herders at soum-level include the soum and bag governments (incl. AHBUs), and the private vets.

Regular livestock services provided by the soum governments through AHBUs include:

- Livestock census in winter;
- Survey of offspring survival in spring;
- Reception of applications for subsidies on wool and skin;
- Coordination and/or implementation (implementation by AHBUs usually depends on availability of private vets) of mandatory vaccination of animals in spring and august;
- Coordination and/or implementation or dipping and laxation of animals in summer;
- Digging of wells (subject to budget availability) in summer; and
- Pilots and trials on improving animal breeds in autumn; and
- Monitoring of winter preparedness of herders.

Most soums have private vets at a density of one per two bags. However, in about 20% of the soums in the study areas, vets are rather located at soums and have difficulties to reach herders in remote areas.

Bag citizens khurals (official meetings) are organised once per season: usually in November, March, June and September. The number of participants ranges between 30 and 60. The majority of participants of such official meetings is male. The herders participated in our Focus group discussions were unable to name particular reasons for women to not attend such meetings: it simply has always been that official meetings are attended by men rather than women. However, once per two or three years, the soum government organises a women herders' meeting.

3.2. Perception of challenges to livestock herding

3.2.1 Reasons of animal losses

The surveyed herders most commonly consider animal health issues as the major reason for animal losses. Herders are concerned about not only infectious but also non-infectious diseases such as loss of gestation during winter, acute diseases caused by parasitic insects and poisonous plants, and damages of teeth (Figure 3.13).

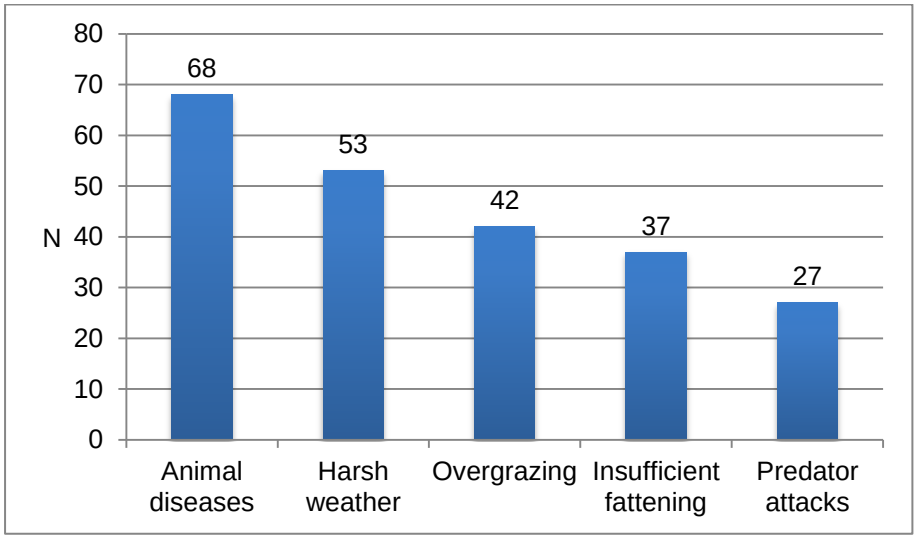


Figure 3.13: **Top five perceived reasons of animals losses (N=161)**

The second perceived reason for animal losses was harsh weather in winter and spring, which often leads to the extreme condition known as *zud*.

The next perceived reason for animal losses was reduced availability and vegetation of rangelands due to overgrazing. The respondents explained that while overgrazing is mainly caused by lack of strict regulations on rangeland rotation, it is also accelerated by uncontrolled increase of goats and miscommunication among herders.

Fattening of animals in summer and autumn is an essential winter preparedness strategy. Non-use of traditional fattening methods such as *otor* grazing by many herders, in combination with reduced rangeland vegetation, often leads to animal losses in winter and spring.

The fifth top reason for animal losses is increasing risk of predator attacks. The respondents reported a significant increase of wolves during the recent years. In addition, several herders lost animals to snow leopards, which are protected by law from hunting.

Further perceived reasons of animal losses include animal theft, lack of supplementary fodder, lack of labour forces, lack of warm shelters, reduction of rainfalls, animals getting stuck in mud and swamp and shortage of water supply.

3.2.2 Overall assessment of overgrazing and its impacts

The respondents were asked to assess and prioritize some known rangeland-related issues with a scorecard. In total, 160 responses were evaluated.

Seventy-one percent of the respondents strongly or partly agreed that the carrying capacity in their soums is exceeded by the number of livestock. Overall, the responses indicate strong awareness of overgrazing among herders. Yet, there remain 20 percent of the respondents who disagree with overgrazing and 9 percent that are uncertain (Figure 3.14).

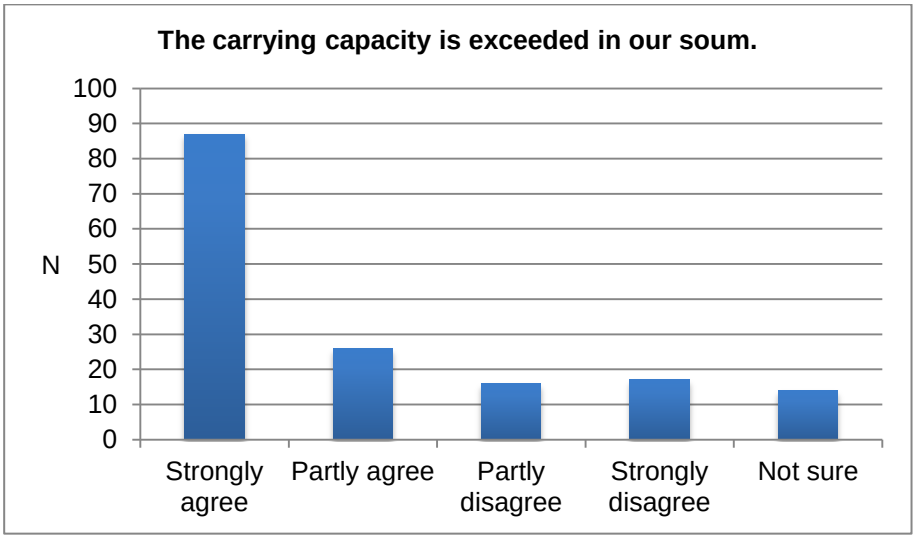


Figure 3.14: **Scorecard response: Assessment of overgrazing (N=160)**

When provided with several pre-identified challenges relating to rangeland degradation, the respondents expressed highest consensus on the challenge of decreasing vegetation, and least agreement on difficulty to graze on snowy areas in winter. The latter issue had been suggested by a MSUA-researcher as an indicator of rangeland degradation since thickness of snow is felt by animals stronger on degraded rangelands.

The respondents also widely agreed that the spring vegetation of rangelands increasingly delays and the rangelands are becoming less nutritive, hence often not enabling sufficient fattening of animals in autumn, which is an essential for surviving winter and spring (Figure 3.15).

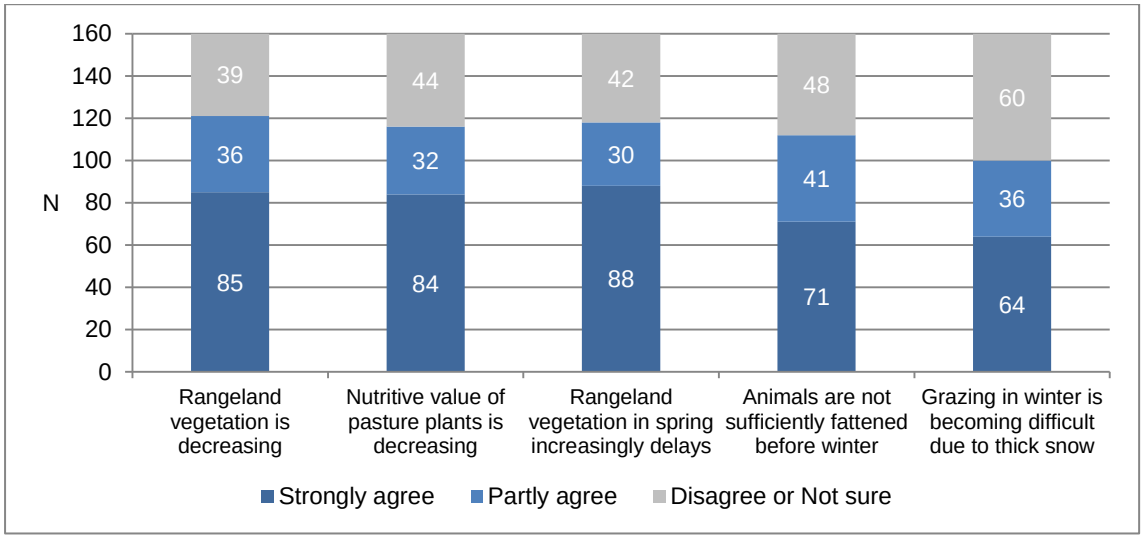


Figure 3.15: **Scorecard response: Assessment of rangeland-related challenges (N=160)**

3.2.3 Causes of rangeland degradation

A slight majority of responses identified climate change as the major reason for rangeland degradation. Compared to 79% that shared this view, 75% and 72% agreed rangeland degradation is caused by increase of animals, and inappropriate herding methods, respectively (Figure 3.16).

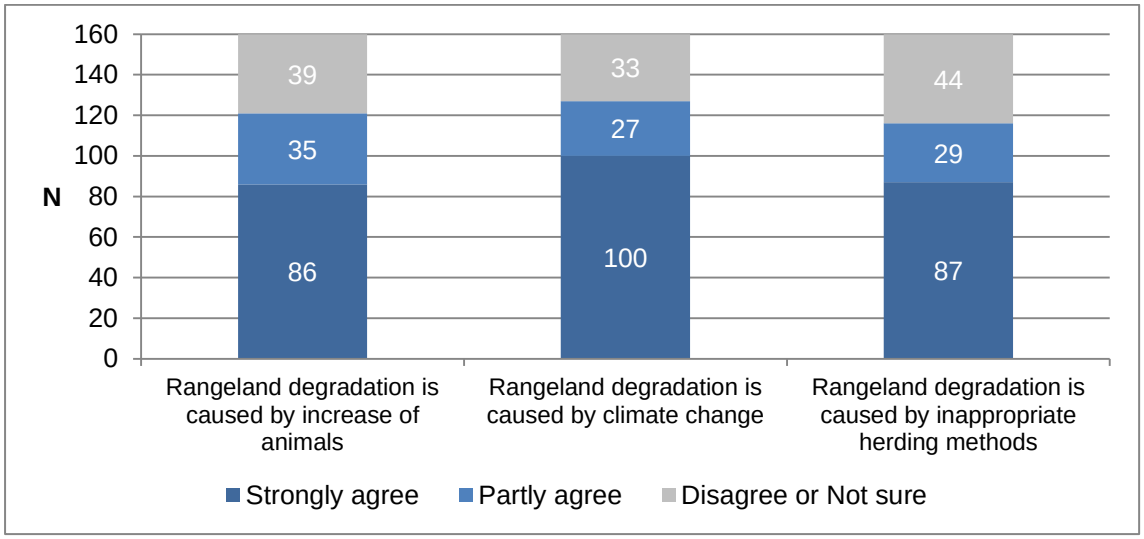


Figure 3.16: **Scorecard response: Assessment of suggested causes of rangeland degradation (N=160)**

3.3. Perception of options for sustainable livestock production

3.3.1 Options for reducing livestock risks

Five major options for reducing animal losses and risks to the productivity of animals, as identified by the respondents, are shown in Figure 3.17. Some of these options involve interrelated targets and measures, as briefly explained below.

The risk reduction option of highest priority is to improve animal health. This option involves the following targets:

- Improve quality of and access to veterinary services, ensure one vet in each *bag*;

- Increase coverage and frequency of vaccination and preventive screening of animals;
- Improve availability of veterinary drugs;
- Improve herders' knowledge of animal health;
- Introduce prevention methods and therapies against mites and poisonous plants.

The second option is to improve livestock herding methods. This option addresses the issue of insufficient fattening of animals in summer and autumn in the first place, but also includes the following additional targets and measures:

- Increase responsibility of herders for their animals and for themselves;
- Improve knowledge and skills of herders;
- Establish regular *otor* grazing;
- Improve animal breeds and;
- Establish regular culling of old and non-productive animals.

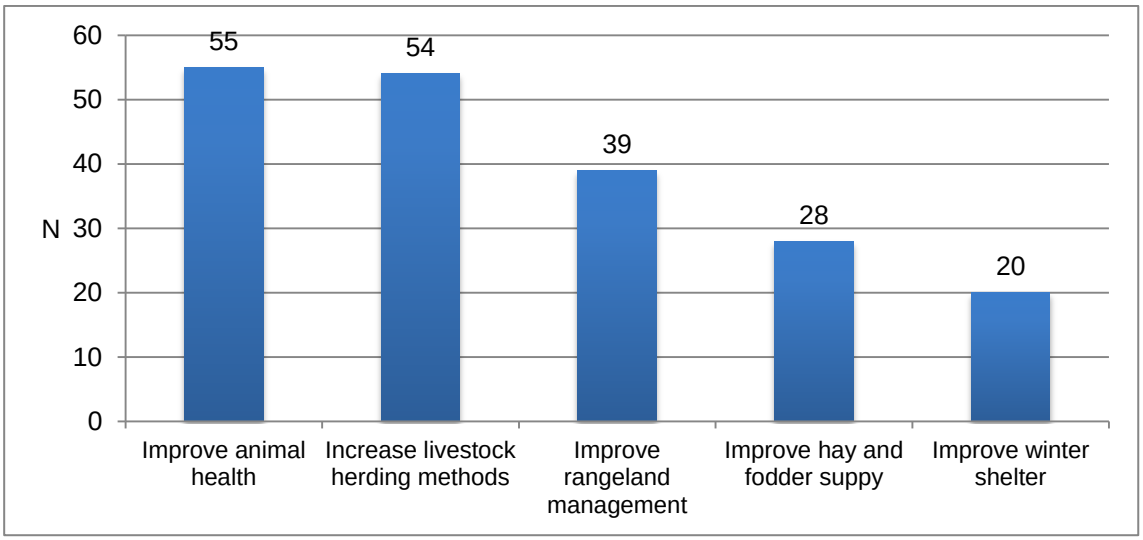


Figure 3.17: **Top five options for reducing risks of livestock production (N=161)**

The next option is to improve rangeland management. This option involves the following targets and measures:

- Introduce rotational grazing by area and season in accordance with carrying capacity;
- Protect spring grazing areas particularly;
- Improve herders' knowledge on rotational grazing;
- Define *otor* areas;
- Increase carrying capacity e.g. through rehabilitation and rejuvenation of rangelands;
- Protect rangelands from desertification e.g. with forest strips;
- Conduct regular assessments of carrying capacity and herders' surveys on rangeland use;

The perceived need for improving hay and fodder supply implies the following measures:

- Increase local haymaking;
- Protect and improve haymaking areas;
- Apply supplementary feeding on a regular basis in winter and spring.

The option of improving winter shelters targets reduction of the loss of metabolic energy in animals due to cold weather in winter and spring. An "improved shelter" should sufficiently protect animals from snow and storms and have a surface as dry and warm as possible.

Additional Reponses include protection against animal theft (6 responses), hunt of wolves and snow leopards (6 responses), reduction of livestock (3 responses) and extension of the

spring break of school so that children can be helping their parents during the period of delivery.

3.3.2 Options for improving the sustainability of livestock production

Scorecard responses on seven pre-defined options for increasing the sustainability of livestock herding indicate that, in principle, the respondents agree on the importance of all seven options. The most attractive options, however, included establishment of regular intra-herd selection, which involves culling of non-productive animals, improvement of livestock genetics e.g. through crossbreeding, and increase of water supply (Figure 3.18).

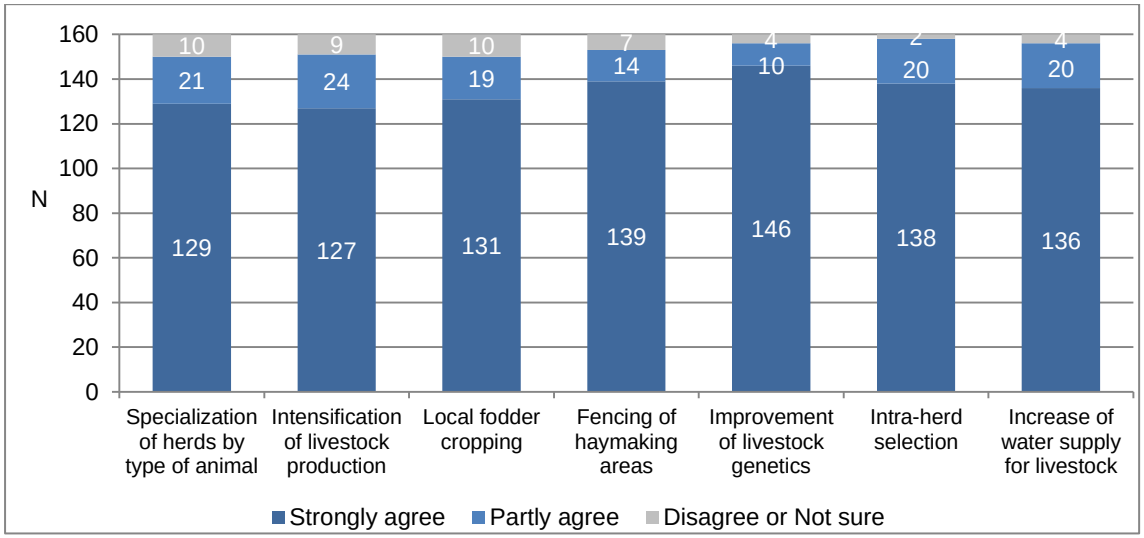


Figure 3.18: **Scorecard response: Assessment of suggested options for improving livestock management (N=160)**

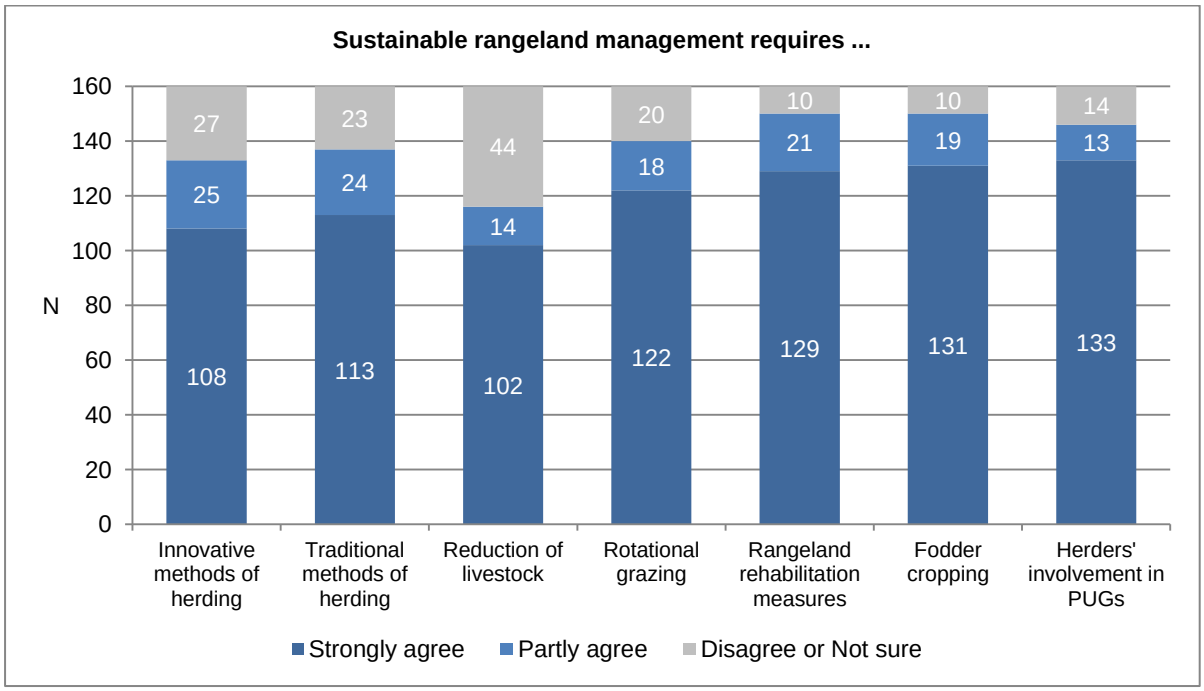


Figure 3.19: **Scorecard response: Assessment of suggested causes of rangeland degradation (N=160)**

3.3.3 Requirements of sustainable rangeland management

Among seven pre-defined requirements of sustainable rangeland management the respondents identified increased fodder supply through local fodder cropping and rehabilitation of degraded rangelands as the most important ones. Also, herders' involvement in the PUG-network was seen as an essential requirement. Furthermore, animal herding methods need to be improved through innovative and traditional approaches, and rotational grazing schemes should be strictly followed. The option to reduce livestock, on the other hand, found least resonance among the respondents (Figure 3.19).

3.4. Vision for 2016

Our FGDs with herders included a visioning exercise, in which the participants were asked to draw maps of herder households and their soums in a desired state of development that, however, is achievable by 2016. The exercise aimed to identify perceived needs of changes at herder household and soum levels. As an example of the outcomes of that exercise, the maps prepared by herders in Zuungobi soum, Uws aimag, are presented and desired changes indicated by the maps are explored below.

Figure 3.20 maps the assets of a herder household in 2016. The winter camp illustrated top right in on map includes the herder's house that is supplied with electricity and heat by a photovoltaic system. A truck and a motorcycle are parked in front of the house. There are two roofed shelters and a fattening yard for the animals, and a shed for hay and fodder storage.

The summer camp is illustrated on the bottom left of the map. The herder would live in a ger, and next to the ger is a dairy processing plant in a small house. Other facilities include a milking yard, a motorised well and a crop field. The field is divided in three sections: vegetables, sea buckthorn and forages. The dairy processing plant owned by this family is assumed to process milk from 22 households that are members of the herders' group "Nogoon khudag" (Green well).

The gers on the top left of the map simply illustrate the locations of the herder household in spring and autumn: there is no need for additional facilities at spring and autumn camps. Along the river that flows in the valley between the autumn and winter camps there is a fenced haymaking area.

The map indicates three significant changes desired by the herders. The first is intensification of the pastoral livestock farming system. Intensification strategies illustrated in include supplementary feeding, young animal fattening, forage cropping and fenced haymaking. These changes will require improved knowledge of herders along with increased capital intensity of the system, and most probably also reduction of stock in winter since the number of animals needs to in the balance with the inputs e.g. the amount of forages harvested.

The second change indicated by the map is the desire of herders for a comfortable winter residence. The herder wants to live in a winter house with electricity and heating. In fact, winter houses of herders are increasingly becoming popular in the Eastern aimags of Mongolia, and herders in Western aimags are not only informed of this development, but also motivated to adopt this innovation.

The third change indicated by the map is diversification of herders' incomes through complementary business operations such as dairy processing and vegetable and sea buckthorn production.

Overall, the herders' vision for 2016 is one of intensification of livestock herding, increased incomes and improved comfort of living. The herder of the future is more than a pastoralist: he is an entrepreneur who manages several complementary business operations in addition

to his main business of semi-pastoral livestock farming. Some of the current herders will be able to achieve this level of entrepreneurship while some others will need to be employed as “assistant herders”, in full-time positions or as part-time employees besides to their own livestock herding businesses at smallholding level. For this vision to become reality, herders will need external support and enabling policies at central and local levels. Most importantly, herders will need knowledge and skills, and increased access to inputs and services in order to lead the changes they desire.

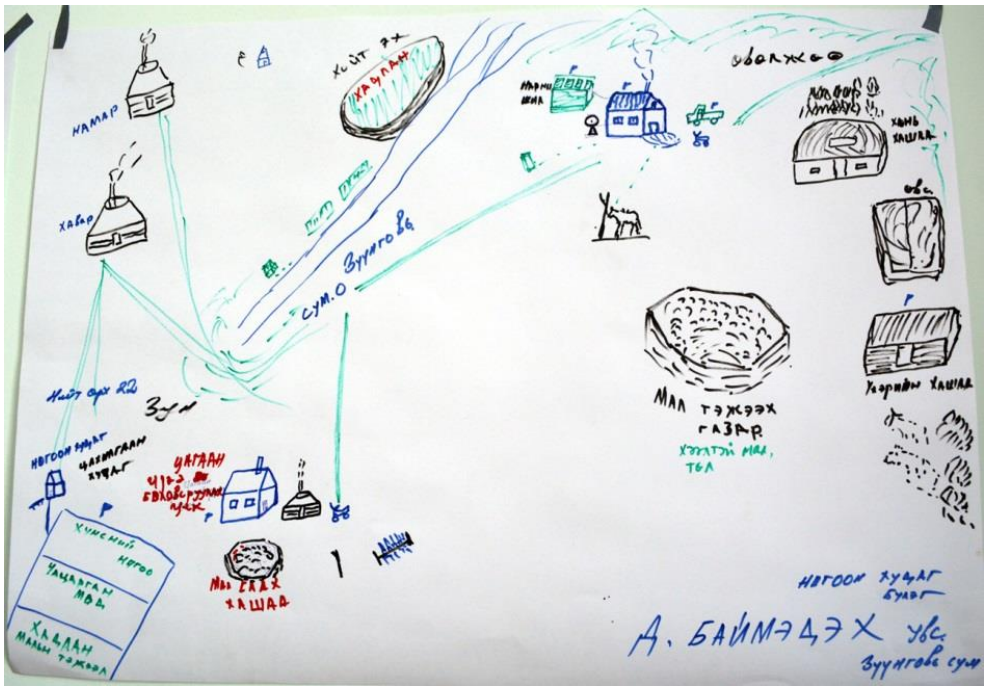


Figure 3.20: **Map of a herder household in a desired state of development to be achieved by 2016**

The soum-level map for 2016, on the other hand, is fore mostly focused on rangeland management. Most importantly, areas for winter and summer grazing as well for *otor* grazing need to be defined. Also, winter grazing areas for use by herders from neighbouring soums have to be clearly defined. Other changes indicated by the map include forage cropping on meadows, establishment of an irrigation system, increased availability and adequate distribution of wells and operation of a fodder plant at the soum centre (Figure 3.21).

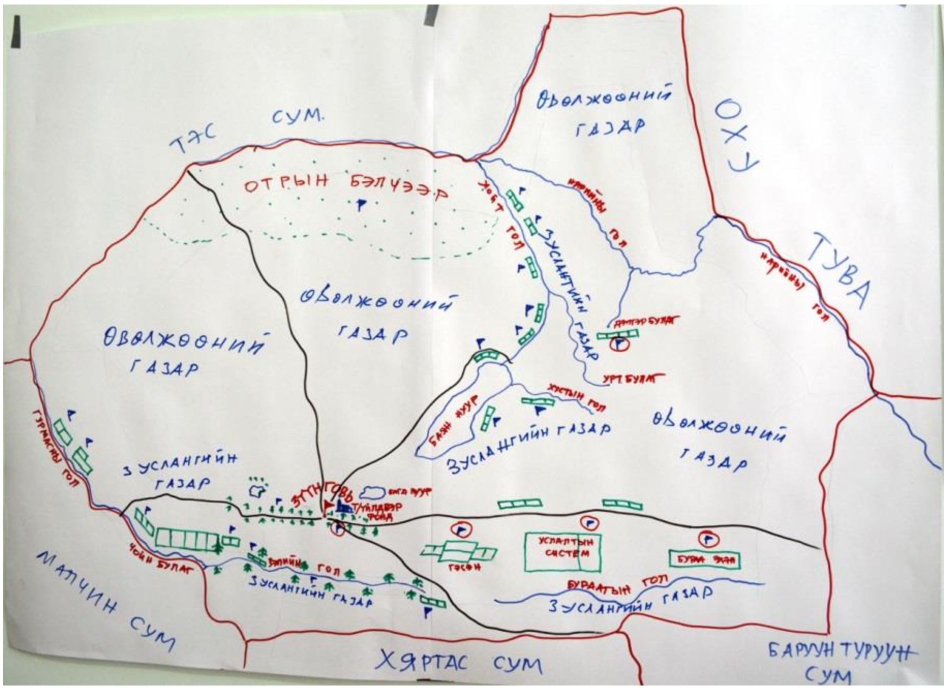


Figure 3.21: **Map of Zuungobi soum in a desired state of development to be achieved by 2016**

3.5. Perceived demands for extension services

3.5.1 Extension contents

Content areas most demanded by herders include entrepreneurship of herder households, practice and approaches of livestock herding and rangeland management (Figure 3.22; Table 3.15).

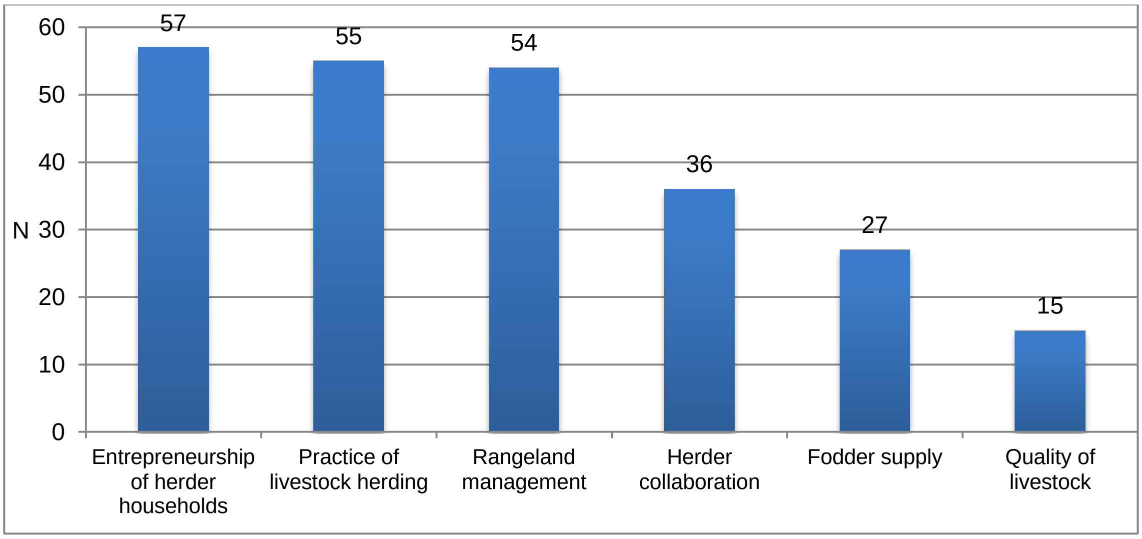


Figure 3.22: **Content areas of extension services as suggested by respondents (N=87)**

Table 3.10: **Extension contents suggested by the respondents (N=161)**

Content areas

Improving entrepreneurship of herder households	Improving the practice of livestock herding	Improving rangeland management	Strengthening herder collaboration	Improving fodder supply	Improving the quality of livestock
Contents					
- Sustainable management of livestock herding businesses; - Economy of herder house-holds; - Marketing of livestock out-puts; - Adding value to livestock outputs e.g. through milk and wool processing; - Development of side businesses e.g. sewing and fruit and vegetable growing.	- Traditional methods of herding such as *otor* grazing; - Methods of intensified live-stock farming; - Herd management; - Animal health; - Prevention of animal losses; - Improving livestock productivity; - Maintenance, repair and re-habilitation of wells.	- Rangeland mapping; - Understanding and implementing rangeland rotation plans (at *bag* level); - Fertilisation of rangelands; - Protection of rangelands (win-ter and spring grazing areas in particular) e.g. through forest strips; - Rehabilitation and rejuvenation of rangelands.	- Understanding importance of collaboration; - Ability to work in teams; - Establishment of cooperatives; - Establishment of PUGs; - Leadership and management of cooperatives and PUGs.	- Fodder cropping; - Haymaking; - Protection of haymaking areas; - Feeding for rehabilitation of weakened animals.	- Intra-herd selection and culling of non-pro-ductive animals; - Herd im-provement with breeding sires e.g. *Bayad* or *Sutai* rams.

3.5.2 Extension methods

Most desired extension methods include facilitation of collective actions and facilitation of exchange among herders, followed by facilitation of access to inputs (Figure 3.23). The methods are briefly explored below.

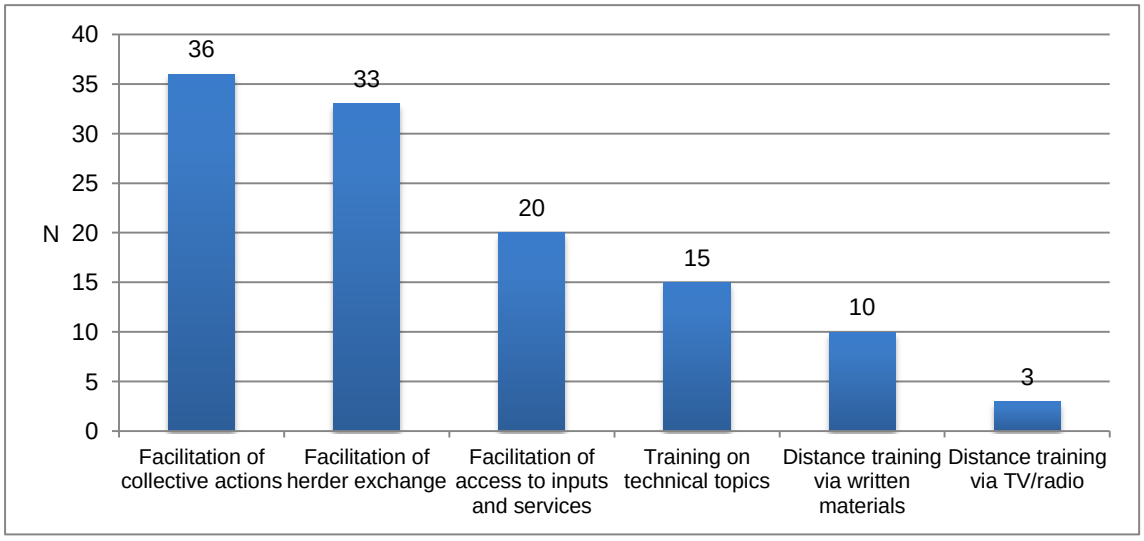


Figure 3.23: Extension methods suggested by the respondents (N=63)

Facilitation of collective actions: The respondents suggested that this method should aim to both facilitate collective actions where they do not exist and support collective actions where they exist. Possible activities include community meetings and workshops, training on team building and teamwork ability, targeted training of and support to leaders or potential leaders of herder groups and cooperatives, demonstration of collective actions as well as logistical

and financial support to initiation of collective actions or expansion of existing groups and collective actions.

Facilitation of herder exchange: Activities suggested by the respondents include quarterly exchange meetings at soum and bag levels, consultation meetings of senior herders, consultation meetings of young herders, and exchange meetings of senior and young herders.

Facilitation of access to inputs and services: Increased access is most needed to water and veterinary services. Further suggestions include allocation of livestock to young herders on loan and increase of breeding sires.

Training on technical topics: This method comprises both classroom training and field training, whereas most respondents do not have any experience with field training. Classroom training, the known type of training, should preferably take place at bag centres.

Distance training via written materials: This method comprises distribution of newspapers/newsletters and manuals with technical contents for herders.

Distance training via TV/radio: Three out of 63 responses in total were in favour of using TV or radio broadcasts in distance training.

3.5.3 Willingness to pay for extension services

The survey attempted to determine the "Willingness to Pay" of herders as a measure of perceived or anticipated importance of extension services. However, the questionnaire specifically asked for their willingness to pay a contribution rather than the full service fee. The results indicate that most herders are willing to contribute indeed, and the optimal amount of user fee for extension services should be around MNT 10 thousand per month or MNT 120 thousand per year (Figure 3.24).

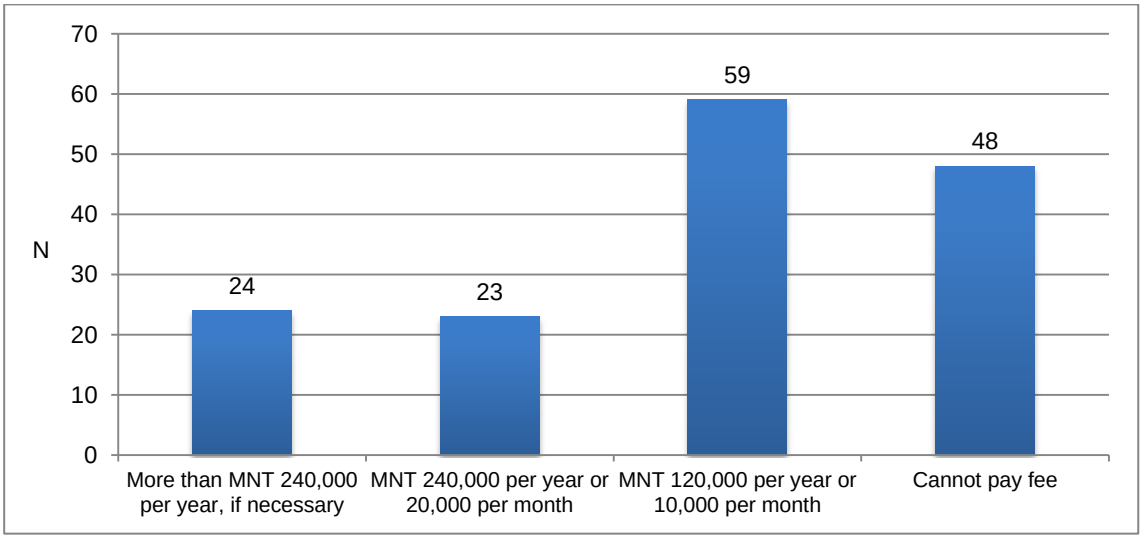


Figure 3.24: **Willingness to pay user fee for extension services (N=154)**

3.5.3 Requests of herder women for support

The herder women participated in our survey and FGDs suggested that extension services should specifically address their need for income diversification through the following activities:

- Dairy processing by equipment;
- Primary processing of skin and wool, and manufacturing of felt items;

- Sewing of *deels* and other traditional clothes, particularly for winter, hats and shoes, and e.g. household utilities e.g. blankets.

These commercial activities promise complementary incomes to herder women, and seasonal in accordance with the availability of raw materials. Dairy processing takes place in summer and early autumn (June to October), while manufacturing of felt items and sewing should take place in winter (November to February). Spring, on the other hand, is the most critical season of livestock herding, and as such would not allow herder women to engage in non-herding activities.

Furthermore, the above activities need to be carried out by groups of herder women. Optimal size of of a group is estimated at 3-5 members for a dairy processing unit, and 5-10 members for a skin and wool processing as well as a sewing unit.

Suggested forms of support include allocation of equipment (possibly on loan), or facilitation of credits, facilitation of herder women's groups and training of group members. Training should preferably take place at pilot units.

4. Suggestions of Stakeholders for Extension Pilot in Green Gold Areas

4.1. Extension contents

Suggestions for focus areas (or extension contents) of the extension pilot in Green Gold areas were collected from different stakeholders through an iterative process. In the first stage, an initial matrix of contents based on the preliminary results of the stakeholders' interviews and the herders' survey was prepared. The initial matrix was discussed at a FGD with the Green Gold – Project Coordination Unit, and a second version was developed. This version suggested the following content areas for the extension pilot, and identified topics of priority for each content area:

- Sustainable rangeland management;
- Sustainable herd management;
- Fodder supply and feeding;
- Animal health; and
- Sustainable business models.

The second version of the content matrix was then discussed with representatives of DIAs, AFPUGs, APUGs and AHBUs, and specific contents within each topic were identified, as presented in Tables 4.1 to 4.5.

Table 4.1: **Summary of contents suggested to the Green Gold – Agricultural Extension Component for improving rangeland management in Green Gold areas**

Topics of priority	Extension contents
Planning and regulation of rangeland use at soum and PUG levels	- Growth cycles and carrying capacity - Negative impacts of overgrazing - Impacts of resting - After crossing the threshold, rangelands cannot be restored through over-seeding - Participation of herders in land use planning - Hand mapping of PUG-level rangeland use
Assessment and M&E of carrying capacity	- Photo point monitoring of rangelands
Water supply	- Hand-boring of wells - Maintenance of wells - Protection of water sources - Water supply of reserve rangelands
Protection against rodents and insects	- Biological and mechanical methods against rodents and grasshoppers

Table 4.2: **Summary of contents suggested to the Green Gold – Agricultural Extension Component for improving herd management in Green Gold areas**

Topics of priority	Extension contents
Herd off-take	- Culling of non-productive animals - Off-take of male animals - Herd replacement with breeding stock - Observation and assessment of animals
Species composition	- Overall knowledge of species composition - Index-based livestock insurance
Improving animal genetics	- Establishment of breeding stocks - Establishment of sire stock of sheep and goats - Intra-herd selection - Crossbreeding with breeds with high productivity - Introduction of breeding animals in herds
Collective herding	- Collective herding at PUG and cooperative levels - Khot-ail herding system

Table 4.3: **Summary of contents suggested to the Green Gold – Agricultural Extension Component for improving fodder supply and feeding in Green Gold areas**

Topics of priority	Extension contents
Preparation of hand-made fodder	- Collection of nutritious wild plants - Preparation of green fodder - Silage making - Provision of natural salt
Forage cropping	- Alfalfa cropping - Oat and barley cropping for green fodder - Maize cropping for semi-intensive livestock farming - Silage making - Forage harvesting
Storage and transportation of forages	- Storage and transportation of alfalfa - Storage and transportation of green fodder
Proper feeding	- Composing feed rations for animals of different species, sex and age - Supplementary feeding during cold seasons - Young animal fattening
Increasing hay supply	- Fencing, irrigation and fertilisation of haymaking areas - Proper timing of haymaking - Mechanisation of haymaking - Drying and storage of hay
Preparation of mixed fodder	- Quality and composition of raw materials - Preparation of mixed fodder by machine and by hand

Table 4.4: **Summary of contents suggested to the Green Gold – Agricultural Extension Component for improving animal health in Green Gold areas**

Topics of priority	Extension contents
Prevention of animal diseases	- Contracting vets for prevention measures - Regular inspection of animal health - Disinfection of winter and spring camps - Vaccination - Dipping
Animal housing in winter and spring	- Improved design of shelters - Maintenance and repairs of shelters - Preparation of floor dung - Removal of floor dung
Diagnosis and therapy of animal diseases	- Dipping and laxative therapy - Basic knowledge of diagnosis - Basis knowledge of curing non-infectious diseases - Rehabilitation of weakening animals - Traditional methods of therapy
Rangeland hygiene	- Disinfection of areas in the nidus of infectious diseases - Removal of animal corpses

Table 4.5: **Summary of contents suggested to the Green Gold – Agricultural Extension Component for introducing and supporting sustainable business models in Green Gold areas**

Topics of priority	Extension contents
Record keeping and economic analysis of herder households	- Household record keeping - Economic analysis of herder households based on records
Management of herders' cooperatives	- Involvement in agricultural commodity exchange - Access to government subsidies on wool and skin - Strategic planning - Business planning - Leadership and management - Membership and collective actions
Semi-intensive livestock farming	- Technology of semi-intensive livestock farming - Management and marketing of semi-intensive livestock farms
Processing of livestock outputs	- Milk processing - Primary processing of wool and skin - Primary processing of meat

4.2. Extension methods

Suggestions of central- and local-level stakeholders for extension methods to be applied in pilot interventions in Green Gold areas are summarised in table 4.6.

Table 4.6: **Summary of extension methods suggested to the Green Gold – Agricultural Extension Component for piloting extension services in Green Gold areas**

Objective	Methods
Research and technology transfer	- Conducting applied research - Transfer of sustainable technologies developed by domestic researchers
Building awareness of herders of sustainable practices of rangeland and livestock management	- Distribution of newsletters, magazines and manuals - Distribution of messages via public media and cell phone networks (SMS) - Field training of herders - Demonstration of improved winter housing of animals
Building awareness of authorities and officials at soum level of sustainable practices of rangeland and livestock management	- Building awareness of decision makers of principles and practices of sustainable rangeland management - Training of land managers at soum governments in principles and practices of sustainable rangeland management
Facilitation of self-sustaining development of herder communities based on herders' initiatives	- Facilitation/introduction of participatory processes of sustainable use of rangelands and in allocation of funds from the Soum Development Fund and the Local Development Fund - Support to establishment of herder groups, civil unions and cooperatives - Financial support to initiatives to protect rangelands, fence and irrigate haymaking areas and increase availability of rangeland wells
Improving the access of herders to services	- Facilitation of contracting of veterinary services by herder groups - Support to establishment of artificial insemination services in rural areas - Linking herders to the processing industry and exporters of livestock outputs
Improving the access of herders to inputs	- Allocation/facilitation of soft loans to herders - Establishment of breeding stocks at soum-level - Establishment of demonstration units for processing of livestock outputs, forage cultivation and fodder production - Linking herders to exporters of livestock outputs
Introduction and improvement of regulations for rangeland management	- Introduction of mechanisms for allocating rangelands around winter and spring camps to herder groups - Introduction of Social and Environmental Impact Assessments of rangeland management practices - Monitoring and improvement of rangeland use plans at soum, bag and PUG levels

4.3. Coordination and stakeholder engagement

4.3.1 Suggestions for overall coordination of the pilot and stakeholder engagement at the central level

Representatives of MIA expressed concerns about the effectiveness of the pilot due to targeting of selected soums in several aimags, and suggested targeting of all soums in one aimag instead. By targeting a whole aimag, the pilot would be comprehensively evaluated at

PUG, soum and aimag levels, thus better enabling effective dialogue on continuation of the pilot with Government funds beyond the project implementation period.

Another concern of MIA and NAEC representatives addressed the primary targeting of the PUG-system in the Green Gold project. The advice to the Green Gold –Agricultural Extension Component was to use the pilot as an opportunity to build the capacity of DIAs and AHBUs as aimag- and soum-level actors in the Government extension system to effectively coordinate and provide extension services to herders in the long-term. In particular, the pilot should highlight and strengthen the role of AHBUs as primary providers of extension services.

Given the focus of the Government on supporting herders' cooperatives, MIA representatives also suggested herders' cooperatives as primary targets of the pilot. This approach would be more effective than attempts to reach every herder or targeting of PUGs, of which members already are or will be integrated in the Government-supported structure of herders' cooperatives.

Active engagement in the pilot was requested by NAEC, MSUA and NAMAC. NAEC offered engagement in the pilot through publication of brochures, manuals and catalogues for herders, and requested support in strengthening NAEC's involvement in applied research and technology transfer. Similarly, MSUA suggested that its researchers can be involved in the pilot as domestic consultants and research studies and trials can be implemented by the research institutes and schools of MSUA. NAMAC, on the other hand, considers rural cooperatives as the main providers of extension services in the future, and offered collaboration with the Green Gold –Agricultural Extension Component in strengthening herders' cooperatives in Green Gold areas as well as in building the capacity of herders' cooperatives to provide extension services to their members.

4.3.2 Suggestions for coordination and collaboration at aimag and soum levels

Recommendations of representatives of central-level stakeholders (MIA, NAEC, MSUA and national NGOs) for coordination of the pilot and stakeholder engagement at local levels include:

- Intensive and ongoing collaboration with aimag and soum governments;
- Regular training of DIA and AHBU staff in coordination and implementation of extension services;
- Offering incentives to DIA and AHBU staff for providing effective extension services to herders and herders' cooperatives;
- Supporting initiatives to provide commercial extension services to herders e.g. as complementary services to input supply;
- Training and engagement of experienced herders with the ability of informing herders and facilitating collective actions as herder advisors;
- Establishment of demonstration facilities e.g. agro-parks for field-based training of herders;
- Emphasis on increasing the participation of herders in decision-making at bag and soum levels; and
- Facilitation of local Government funds available at Local Development Funds and Soum Development Funds for implementation of rangeland use plans.

Suggestions for collaborative engagement of the PUG-system, involving AFPUGs, AHBUs and PUGs, and the Government extension system, involving DIAs and AHBUs, were collected from representatives of APUGs, AFPUGs, DIAs and Development policy divisions of AGBs in Bayan-Ulgii, Khovd and Uws aimags, and integrated into a framework of collaborative engagement of the PUG-system and the Government extension system. The framework profiles AFPUGs as aimag-level coordination units and APUGs as main

implementation units of the pilot while highlighting the role of DIAs in professional backstopping and linking to Government services and the role of AHBUs as implementing partners of APUGs (Table 4.7).

Table 4.7: **Suggested framework of collaborative engagement of the PUG-system and the Government extension system in coordination and implementation of extension pilot in Green Gold areas**

Engagement at aimag level	
Aimag Federation of Pasture User Groups	Department of Industry and Agriculture
- Development of work plans of extension activities to be carried out by APUGs in collaboration with APUGs - Coordination, monitoring and evaluation of extension services provided by APUGs and AHBUs - Regular supply of information required for effective implementation of extension services by APUGs in collaboration with AHBUs - Establishment of extension service centres in soums	- Provide professional expertise and services to APUGs and AHBUs for provision of extension services - Training and seminars for AHBUs and APUGs and herders - Supply of information on Government policies and support for herders to APUGs and AHBUs - Linking Government funded soum-level services such as rodent control and veterinary services to the pilot; - Preparation of extension materials e.g. manuals for AHBUs and herders;
Engagement at soum level	
Association of Pasture User Groups	Animal Health and Breeding Unit
- Operation of extension service centres; - Classroom training of herders at extension service centres - Demonstration of new practices and approaches and field-based training of herders - Supply of extension media to herders. - Support to herders' cooperatives coordinated by APUGs.	- Professional advice to APUGs and PUGs; - Co-facilitation of herder training and exchange events; - Linking Government-coordinated events e.g. training, seminars and agricultural fairs to the pilot; - Supply of information on government policies and support for herders to APUGs and PUGs; - Borrowing of a small truck to the APUG for use in provision of extension services.

The collaborative engagement of AFPUGs and DIAs at the aimag level was suggested to mainly occur through collaboration of staff from both organisations trained in coordination and facilitation of extension services by the Green Gold – Agricultural Extension Component. Nonetheless, the DIA-staff might need confirmation by the Director of DIA for engaging in the pilot in case the timing of their active engagement in the pilot conflicts with other duties of their regular positions at DIAs.

On the other hand, engagement of APUGs and AHBUs in the pilot at the soum-level will strongly require formal agreements between the APUG and the SGB on behalf of AHBU that would acknowledge APUGs as main providers of extension services and AHBUs as collaborating partners of APUGs, and define the services to be provided through their collaborative engagement.

5. Summary of Needs and Opportunities for Interventions

5.1. Needs for interventions

5.1.1 Interventions in the Government extension system

This study identified the following focus areas of interventions for strengthening the Government extension system:

- Conceptual reform in the Government extension system that involves the following changes in the system:
  - Shift of the paradigm of agricultural extension from "transfer of achievements of science into the agricultural production" to "facilitation of participatory and collaborative processes through which agricultural producers gain access to information, education, research, services and markets, and improve their knowledge and skills of production technology and business management".
  - Introduction of clear and non-conflicting mandates at central, aimag and soum levels for systematic coordination and implementation of extension services e.g. by clearly defining the responsibility of AHBUs to provide extension services, the role of DIAs in coordination of extension services provided by AHBUs, and the mandate of NAEC to train and support of DIAs' personnel in coordination of extension services.
- Establishment of a multi-stakeholder platform of dialogue for building the political will to support the system by channelling public funds for coordination and implementation of extension services.
- Stronger involvement of the private sector in provision of extension services e.g. in the form of complementary services to input supply or contracting of technical experts by herder cooperatives.
- Emphasis of AHBUs on facilitation of herder-to-herder exchange within existing community structures such as cooperatives, herder groups, PUGs and khot-ails;
- Use of ICT in increasing the access of herders and farmers to information and learning and exchange opportunities;
- Integration of extension education in undergraduate programs in animal and crop sciences and agricultural economics at MSUA;
- Strengthening the linkage of the Government extension system to MSUA as well as private firms and NGOs conducting agricultural research by introducing a framework of collaboration that enables research institutions to test, promote and commercialise their products through the network of the Government extension system, and discourages NAEC, DIAs and AHBUs to conduct research by themselves while encouraging them to facilitate bottom-up initiatives for innovation pilots and on-farm trials with support by researchers.

5.1.2 Interventions for building capacities and structures for demand-driven extension services

The study identified the following focus areas of interventions for building capacities and structures for demand-driven extension services in Green Gold areas:

- Building the capacity of AFPUGs to coordinate extension services provided by APUGs in collaborative engagement with AHBUs;
- Strengthening the capacity of DIAs to engage in coordination and implementation of extension services by AFPUGs and APUGs as aimag-level Government partner and professional backstopping unit;
- Building the capacity of APUGs and AHBUs to engage in provision of extension services to herders through the PUG-system;
- Establishment of APUG-operated soum-level extension centres for herder learning and exchange activities;

- Facilitation of cooperation agreements for extension services between APUGs and SGBs (on behalf of AHBUs), which institutionalise the pilot by defining APUGs as main providers of extension services and AHBUs as collaborating partners of APUGs, and specify services to be provided through their collaborative engagement;
- Strengthening the leadership and management capacities of herders' cooperatives coordinated by APUGs.

5.1.3 Activities and contents for piloting demand-driven extension services

The study suggests the following focal activities for demand-driven extension services in Green Gold areas:

- Operation of soum-level extension centres as physical spaces for herder learning and exchange activities;
- Training and engagement of herders experienced and respected within their communities as herder advisors for leading sustainable exchange at the grass-root level and and facilitating collective actions of herders;
- Facilitation of community meetings of herders facilitated by APUGs and herder advisors as platforms for informing herders and facilitating collective actions;
- Field-based training as the main strategy of building the motivation and confidence of herders to apply sustainable changes;
- PUG-level innovation pilots for demonstrating collective actions for application of sustainable practices of rangeland and livestock management, or for creation of new knowledge for sustainable business development;
- Supporting gender-sensitive income diversification in herder communities;
- Supply of APUG and AHBU staff engaging in provision of extension services with manuals containing applicable messages on facilitation techniques as well as sustainable livestock and rangeland management and management of livestock-based businesses;
- Use of video, newsletters and radio broadcasts in communication of information and extension messages to herders; and
- Introduction of household record sheets in herder households as controlling and decision-making tools, enabling individual advice by APUGs and herder advisors on herd management.

Extension contents identified by the study for the the pilot in Green Gold areas are summarised in Table 5.1.

Table 5.1: **Focal contents identified for pilot extension services in the Green Gold areas**

Sustainable rangeland management	Sustainable herd management	Feed supply and feeding	Animal health	Sustainable business models
Planning and regulation of land use at soum and PUG levels - Growth cycles and carrying capacity - Negative impacts of over-grazing - Impacts of resting - After crossing the threshold, rangelands can't be restored through over-seeding - Participation of herders in land use planning - Hand mapping of PUG-level rangeland use Assessment and M&E of carrying capacity - Photo point monitoring of rangelands Water supply - Hand-boring of wells - Maintenance of wells - Protection of water sources - Water supply of reserve rangelands	Herd off-take - Culling of non-productive animals - Off-take of male animals - Herd replacement with breeding stock - Observation and assessment of animals Species composition - Overall knowledge on species composition - Index-based livestock insurance Improving genetics - Establishment of breeding stock - Establishment of sire stock of sheep and goats - Intra-herd selection - Crossbreeding with breeds with high productivity - Introducing breeding animals into herds Collective herding - Collective herding at PUG level - *Khot-ail* herding system	Preparation of hand-made fodder - Collection of nutritious wild plants - Preparation of green fodder - Silage making - Provision of natural salt Forage cropping - Alfalfa cropping - Oat and barley cropping - Maize cropping - Silage making - Forage harvesting Storage and transportation of forages - Alfalfa - Green fodder Proper feeding - Composing feed rations for animals of different species, sex and age - Supplementary feeding during cold seasons - Young animal fattening -	Disease prevention - Contracting vets for prevention measures - Regular inspection of animal health - Disinfection of winter and spring camps - Vaccination - Dipping Improving winter and spring housing - Improved design of shelters - Maintenance and repairs of shelters - Preparation of floor dung - Removal of floor dung Diagnosis and therapy of animal diseases - Dipping and laxative therapy - Basic knowledge of diagnosis - Basis knowledge of curing non-infectious diseases - Rehabilitation of weakening animals - Traditional methods of therapy	Record keeping and economic analysis of herder households - Household record keeping - Economic analysis of herder households based on records Management of herders' cooperatives - Involvement in agricultural commodity exchange - Access to government subsidies on wool and skin - Strategic planning - Business planning - Leadership and management - Membership and collective actions Semi-intensive livestock farming - Technology of semi-intensive livestock farming - Management and marketing of semi-intensive livestock farms Processing of livestock outputs - Milk processing - Primary processing of wool and skin - Primary processing of meat
Protection against rodents and insects - Biological and mechanical methods against rodents and grasshoppers		Increasing hay supply - Fencing, irrigation and fertilisation of haymaking areas - Proper timing of haymaking - Mechanisation of haymaking - Drying and storage of hay Preparation of mixed fodder	Rangeland hygiene - Disinfection of areas in the nidus of infectious diseases - Removal of animal corpses	

Sustainable rangeland management	Sustainable herd management	Feed supply and feeding	Animal health	Sustainable business models
		- Quality and composition of raw materials - Preparation of mixed fodder by machine and by hand		

5.2. Key opportunities for effectiveness of interventions

5.2.1 Stakeholder linkages and networks

System reforms strongly require awareness and commitment of the stakeholders in the system, which need to be built through a dialogue backed by demonstration of the changes suggested to the system in the practice. The status of MIA as the national partner of the Swiss Cooperation Agency in coordination of the Green Gold project already presents a key opportunity for initiation and facilitation of such a dialogue while the extension pilot in Western aimags can effectively serve the dialogue with practical demonstration of contents, processes and structures needed in the Government extension system. These opportunities enable the Green Gold – Agricultural Extension Component to establish a multi-stakeholder platform for reforming the system.

The Green Gold project also maintains close linkages to various development projects at carried out at national and regional levels. Green Gold partners of particular significance for the Agricultural Extension Component include the SDC-funded Animal Health project and the Index-Based Livestock Insurance Project, which is meanwhile largely taken over by the Government and domestic insurance companies.

The network of PUGs established by Green Gold presents an effective community structure for embedding facilitated processes of herder-to-herder exchange in the extension pilot. Also, the structure of AFPUGs and APUGs at aimag and soum levels, which is coordinated by the Green Gold - Collective Action component, offers an institutional platform for piloting extension services.

Another opportunity for the Green Gold – Agricultural Extension Component is the linkage of the project team to NAEC and MSUA. The international team leader of the component successfully co-implemented an AusAID-funded project for building the capacity of AHBUs in Khovd aimag to provide extension services to herders with NAEC. The national team leader of the component was involved as local consultant in this project. He is also senior advisor to NAEC. MSUA, on the other hand, is currently co-developing a project with the University Queensland to introduce a graduate program for rural development, and the project development process involves communication with the project team of the Green Gold – Agricultural Extension Component. Hence, the project team is in a position to capitalise on the existing partnership and ongoing communication with the national-level partners NAEC and MSUA in order to intervene in the Government extension system.

5.2.2 Availability of domestic expertise

Offering the largest pool of domestic experts, MSUA is an essential partner for the Green Gold – Agricultural Extension Component. In addition to research facilities and experts in various disciplines of agricultural science, MSUA possesses some expertise with theory and practices of extension services (cf. section 2.4.4). Furthermore, the Polytechnical college in Khovd, which was a branch of MSUA until 2010 and still maintains close linkage to MSUA, offers local experts in animal and crop sciences.

In comparison with MSUA, NAEC's expertise in technical issues of rangeland and livestock management is limited: most of its staff members are fresh graduates of MSUA. However, there are staff members who have gained valuable experiences in facilitation of farmer and herder training and preparation of extension media such as manuals and catalogues and training videos for herders. In addition, four NAEC officers were trained by experts of the University of Queensland in facilitation methods and coordination of extension services in 2013. Hence, NAEC is an effective partner in building the capacity of DIAs and AHBUs to coordinate and deliver extension services, and preparation of extension media.

Another valuable resource for extension services is the expertise of local experts, farmers and herders in application of sustainable practices of rangeland and livestock management.

Older herders tend to have more experience with traditional methods of livestock herding, which are still relevant for addressing current challenges such as overgrazing and animal health issues. Also, in areas where former state farms and kolchoses piloted innovative practices of agriculture we can find many of the former employees whose knowledge with those innovations e.g. forage cropping or improving of animal breeds, can still be useful today. Therefore, the extension pilot in Green Gold areas should actively seek local expertise for use in herder learning and exchange activities, not only due to the fact that some expertise is locally available but also because local expertise can fit more precisely to the local conditions than the expertise of UB-based experts.

5.2.3 Personnel and facilities of implementing partners at aimag and soum levels

The AFPUGs in Khovd, Uws and Bayan-Ulgii aimags have permanent positions of extension officers, who can coordinate the extension pilot in their aimags. At the soum level, many APUGs are located within Herder Training and Information Centres, which were built by Green Gold and include a training room and an accommodation room in addition to the APUG office. Such centres are available in 19 out of 26 target soums of the 2014 pilot of the Green Gold – Agricultural Extension Component.

The aimag-level government partners DIAs and AHBUs offer personnel for engaging in coordination and delivery of extension services in collaboration with AFPUGs and APUGs, in addition to their technical expertise, and the AHBUs offer their small trucks for use in extension services. Furthermore, SGBs are in position to provide training and conference rooms at soum and bag centres for herder learning and exchange activities.

5.2.4 Motivation and assets of herders

The results of the herders' survey reveal that herders are keen to be involved in extension services, whereas most desired forms of assistance include facilitation of exchange and collective actions of herders. Furthermore, the expressed willingness of herders to pay a small user fee for extension services, while not to be taken explicitly, indicates potentials for partial or full commercialisation of some of the services piloted (cf. 3.5.3).

The survey also indicates that most herder households in Green Gold areas possess motorcycles and cell phones and televisions are available in almost every herder household. Overall, it can be assumed that most herders do not have difficulties to attend learning and exchange events within their soums, and cell phones and televisions can be effectively used for dissemination of information and extension messages to a large number of herders, whereas television can also receive radio broadcasts.

Further assets of relevance for the extension pilot include human resources, education and experience and financial resources of herders. The survey reveals that herders commonly live in five- or six-member households, including two adult members engaged in livestock herding on a full-time basis, thus indicating the availability of at least one person per household that can be actively involved in extension services. All herders are literate and have some level of education. Herders with university or vocational school degrees are not uncommon. Furthermore, some 80% of the herders have no less than 15 years of experience with livestock herding.

A critical asset of herder households is the cash income. The Statistical Yearbook 2013 estimates the regular cash expenditure of an average rural household at MNT 6 million (NSO, 2013). Our survey indicates that a slight majority of herder households in our target areas have cash incomes barely reaching or below this threshold, thus lacking the capacity to invest equity capital in desired intensification of their livestock businesses. This issue, however, presents an opportunity for facilitation of collective actions at the same time: the fact of many herders being unable to initiate changes on their own already reveals the need to combine resources – be they non-financial such as physical assets and labour – in order to improve their farming systems and eventually, their livelihoods.

6. Implications for the Green Gold – Agricultural Extension Component

6.1. Implications for strengthening the Government extension system

6.1.1 Facilitating stakeholder engagement for reforming the agricultural extension system

The need to facilitate a conceptual reform in the agricultural extension system has to be addressed through ongoing dialogue of stakeholders in the system, backed by demonstration of the changes suggested to the system through the extension pilot in Green Gold areas. The core changes suggested include:

- Re-definition of agricultural extension as "facilitation of participatory and collaborative processes through which agricultural producers gain access to information, education, research, services and markets, and improve their knowledge and skills of production technology and business management".
- Introduction of clear and non-conflicting mandates at central, aimag and soum levels for systematic coordination and implementation of extension services.

An initial platform of multi-stakeholder dialogue can be established in the form of an Advisory Board of the Green Gold - Agricultural Extension Component, consisting of representatives of MIA, NAEC, MSUA, and NGOs and private firms engaging in agricultural extension. The Advisory Board will need to be introduced into its dual function: supporting the Green Gold - Agricultural Extension Component in piloting extension services in Green Gold areas, and initiating a conceptual reform in the Government extension system. The second function may require engagement of Board members representing the key stakeholders MIA, NAEC and MSUA beyond their advisory role.

The dialogue needs to be supported by measures for awareness building among decision-makers at different levels e.g. through exchange and consultation meetings at central and aimag levels, and dissemination of information and messages via public media.

The final output of efforts of the Green Gold - Agricultural Extension Component for strengthening the Government extension system can be a master plan e.g. for the period 2017-2021 based on perceived needs of stakeholders for improving the system as well as lessons learnt from the extension pilot of the Green Gold project, to be co-developed by the Advisory Board with involvement of a wide range of stakeholders at central, aimag and soum governments. The following milestones are suggested:

- A first draft of the Master plan is prepared in collaboration with relevant stakeholders in the national agricultural extension system by the end of 2015;
- The final version of the Master plan is drafted, ratified at a national conference and submitted central and aimag governments by the end of 2016.

6.1.2 Improving the collaboration between MSUA and NAEC

The primary objective of strengthening the linkage between agricultural research and extension should be institutionalised and ongoing collaboration between MSUA and NAEC. Efforts to strengthen the collaboration of MSUA and NAEC should include facilitation of formal agreements, demonstration of research-extension linkage of in the extension pilot of Green Gold – Agricultural Extension Component as well as initiation of collaborative activities of MSUA and NAEC.

The following milestones are suggested:

- Collaboration between MSUA and NAEC is formalised by the end of 2014;
- Collaborative activities of MSUA and NAEC are initiated by the end of 2015.

Formalisation of collaboration between the two organisations will need to occur through renewal of the existing the Memorandum of Understanding, which has failed to stimulate actions. A new version of the MoU needs to be based on mutual agreements of the two organisations, and should include the following focal issues:

- The rationale of demand-driven extension service delivery by the Government extension system led by NAEC in collaboration with the national agricultural research system led by MSUA;
- Framework of collaboration that encourages MSUA to test, promote and commercialise its research products through the network of the Government extension system, and NAEC, through its local partners DIAs and AHBUs, to facilitate bottom-up initiatives for innovation pilots and on-farm trials with support by MSUA researchers.

Collaborative activities of MSUA and NAEC can lean on demonstration of research-extension linkages in the extension pilot in Green Gold areas, include co-development and co-implementation of research and/or extension projects, and involve decision makers at central and aimag levels. Facilitation of such initiatives will require mobilisation of institutional linkages of the Green Gold project and the Agricultural Extension Component to a wide range of stakeholders at different levels.

6.1.3 Introducing extension education at Mongolian State University of Agriculture

The goal of integrating extension education at MSUA is to enable the university to provide agricultural extension services at central, aimag and soum levels with agricultural specialists who are also trained in extension methods.

The following milestones are suggested:

- Lecturers nominated by MSUA are trained in teaching extension methods in 2014;
- A mandatory module of agricultural extension is introduced in undergraduate programs of animal and crop sciences and agricultural economics at MSUA in 2015.

The module of agricultural extension should fore mostly build the capacity of the students to communicate with different stakeholders, develop extension messages, train of herders and farmers and help them implement on-farm trials. The module should be mandatory for 3rd or 4th grade students.

Involvement of the lecturer of the School of Economics and Business, who had attended a training course on extension methods at the University of Saskatchewan in 2009, in the efforts to introduce extension education at MSUA is essential. She should be hired as a consultant by the Green Gold – Agricultural Extension Component to co-develop the curriculum and readers of the module.

6.1.4 Demonstrating use of information and communication media in agricultural extension

Television, radio, DVDs and video CDs and cell phones present effective and tools of extension for disseminating information and messages to large number of herders. The extension pilot in Green Gold areas should demonstrate the use of these information and communication media for the purposes of informing herders, disseminating extension messages and enabling herder exchange.

Distant training via video documentation and use of cell phone messages for information supply can be introduced on a large geographical area at relatively low costs. Use of television and radio broadcasts, on the other hand, should be considered by necessity (e.g. for communicating messages to the Kazakh minority in their mother tongue) and cost-efficiency in comparison with alternative extension media such as newsletters.

Cell phones can be used for not only information supply via SMS, but also testing apps such as simulation games that inform herders of solutions for sustainable herd and rangeland management.

6.2. Implications for building capacities and structures for demand-driven extension services in Green Gold areas

6.2.1 Training and engagement of Master Trainers at the aimag level

Reflecting on the current lack of a capacity building structure within the agricultural extension system of Mongolia, the study suggests to the Green Gold – Agricultural Extension Component a training framework consisting of the following two components for building the capacity of implementing partners at aimag- and soum-level to coordinate and implement extension services:

- Training of Master Trainers at the aimag level, and
- Training of Facilitators at the soum level

The Training of Master Trainers (ToMT) will aim to build capacity to coordinate soum-level extension activities at the aimag level and the participants need to be nominated by AFPUGs and DIAs. The ToMT needs to emphasise the role of Master Trainers as mentors of soum-level extension staff, and employ of a balanced mix of technical contents in alignment of the content matrix of the pilot (cf. 5.3.1) and contents on communication and facilitation methods. The recommended minimum duration of the ToMT is five days.

The Master Trainers should be involved in regular follow-up training workshops and exercises aiming to gradually build their facilitation and communication skills and technical knowledge, which they need to pass on to APUG and AHBU staff engaged in the extension pilot. The main duties of Master Trainers should include:

- Planning of extension services (at the soum level);
- Training and mentoring of extension personnel of AHBUs and APUGs;
- Monitoring and evaluation of extension services.

6.2.2 Training and engagement of facilitators at the soum level

The Training of Facilitators (ToF) should aim to build capacity to deliver extension services at the soum level, and target APUGs and AHBUs. As in the case of ToMT, the ToF will employ a mix of technical contents and contents on facilitation methods. The recommended minimum duration for the ToF is four days.

Technical contents of the ToF should specifically target the ability of facilitators to train and support herders in application of concrete solutions and practices leading to sustainable improvements of rangeland and livestock management and herder livelihoods rather than aiming for overall qualification of the facilitators in technical subject matters.

Facilitation skills needed by the facilitators can be broadly structured into the following abilities:

- Ability to listen;
- Ability to facilitate transdisciplinarity;
- Ability to facilitate collective learning and action;
- Ability to facilitate access;
- Ability to understand science and innovations relevant for the target communities.

The facilitators will need follow-up and refresher training for regular updating of their facilitation skills and technical knowledge.

Ideally, a facilitation team consisting of the head of APUG and the livestock expert or the rangeland expert of the AHBU should be established in each soum.

6.2.3 Establishment of Herder Service Centres

Herder Service Centres as physical spaces for soum-level herder training and exchange activities and small-scale adaptive trials need to be established in each of the target soums of the extension pilot. This had already been suggested in the initial proposal of the project team. The only modification in the initial concept is replacement of the term “Herder Exchange Hub” with the term “Herder Service Centre”, which was suggested by implementing partners of the extension pilot at aimag and soum levels, and is indeed more understandable in Mongolian.

In 2014, the extension pilot targets 26 soums in Khovd, Bayan-Ulgii and Uws aimags in 2014. In 19 out of these 26 soums, there are Herder Training and Information Centres established by the Green Gold project that can be converted to HSCs. In the remaining 7 soums, HSCs need be established at SGBs: the APUGs in these soums are already provided with office rooms at SGBs.

The HSCs needs to be equipped with the following facilities and items:

- Small demonstration plot for fodder crops and perennial grasses;
- Equipment for field training, such as:
  - Laptop
  - Motorcycle (where not already available)
  - Power generator
  - Loudspeaker
- Training tools and items:
  - White board or Flipchart easel
  - Paper/carton models of animal shelters
  - Stationery
  - Other items to be specified e.g. herbaria of nutritive vs. poisonous rangeland plants
- Information tools:
  - Information board
  - Shelf for information materials

APUGs in 25 out of the 26 target soums of the 2014 extension pilots have already been provided with basic office equipment comprising a personal computer, a printer, a projector and a digital camera by Green Gold. Hence, the Green Gold - Agricultural Extension Component only needs to provide these items to one soum (Must soum of Khovd aimag).

6.2.4 Facilitation of cooperation agreements with soum governments

Soum-level pilot extension services in Green Gold areas need to be institutionalised through cooperation agreements between APUGs and SGBS so that APUGs are enabled to access resources of soum governments for use in in extension services and the extension services potentially sustain beyond the Green Gold Phase IV.

Essential clauses of such agreements include the following:

- APUGs are accepted as the main soum-level providers of extension services for herders;
- AHBUs are defined as main collaborating partners of APUG-coordinated extension services;
- The staff members of AHBUs, who have completed Training of Facilitators, are mandated with engagement in APUG-coordinated extension services within their regular duties;
- AHBUs are allowed to provide their vehicles (Russian small truck) for use in delivery of extension services;
- Soum governments agree on the use of training and meetings rooms at soum and bag centres for learning and exchange activities of herders.

6.2.5 Strengthening herders' cooperatives

Both within the Green Gold team and across the PUG-system as well as among the Government partners of Green Gold such as MIA, NAEC and aimag and soum governments it is widely agreed that the PUG-system as a multi-layer structure of not-for-profit civil society organisations needs a commercial pillar in the form of for herder cooperatives supported or coordinated by APUGs in order to sustain beyond the Green Gold Phase IV. The need to strengthen herder cooperatives supported by APUGs is addressed from different perspectives by different components of Green Gold: the main perspective of the Agricultural Extension Component should be one that aims:

- To enhance knowledge and skills of leaders of the herders' cooperatives on management and leadership of cooperatives;
- To enhance the capacity of AFPUGs to support herders' cooperatives;
- To introduce a framework of AFPUG-coordinated training, advisory and exchange activities for herders' cooperatives.

Activities suggested to the Green Gold – Agricultural Extension Component for strengthening APUG-supported herders' cooperatives include:

- Management and leadership training for leaders of herders' cooperatives; and
- Development of business plans for herders' cooperatives.

While capacity building activities for strengthening herders' cooperatives will need to be piloted by the project team of the Green Gold – Agricultural Extension Component, the responsibility for implementing of such activities needs to be gradually shifted to AFPUGs as primary aimag-level partners of APUG-supported herders' cooperatives. Services of AFPUGs may include:

- Management and leadership training for leaders of herders' cooperatives; and
- Advice to herders' cooperatives for planning and execution of collective business operations.

6.3. Implications for piloting extension services in Green Gold areas

6.3.1 Framework of enhancing herder livelihoods

Extension services need to be oriented to demands of their users. Efforts of the Green Gold – Agricultural Extension Component to facilitate sustainable changes in herder communities will only be successful if herders perceive the problems addressed by Green Gold such as overgrazing as challenges actually faced by themselves rather than by a certain project or their soums and aimags. Hence, the extension pilot in Green Gold areas needs to be informed and guided by a framework for enhancing herder livelihoods that establishes herders as individuals with aspirations and goals for improving their livelihoods while defining the role of extension services in creating opportunities for herders, such as improved knowledge and skills and improved access to information, technologies, inputs, services and markets, to achieve their goals. The framework shown in Figure 6.1 also highlights management skills such as planning and decision-making as essential elements of the entrepreneurship capacity of herders.

6.3.2 Content matrix of the pilot

The content matrix in Table 6.1 specifies contents for building awareness, knowledge and skills, and individual and collective actions of herders as well as access to inputs, services and markets and legislation by soum governments for enabling the actions. The matrix is based on the results of this study, but it also includes contents for building management skills of herders in compliance with the framework for enhancing herder livelihoods that was introduced in section 6.3.1.

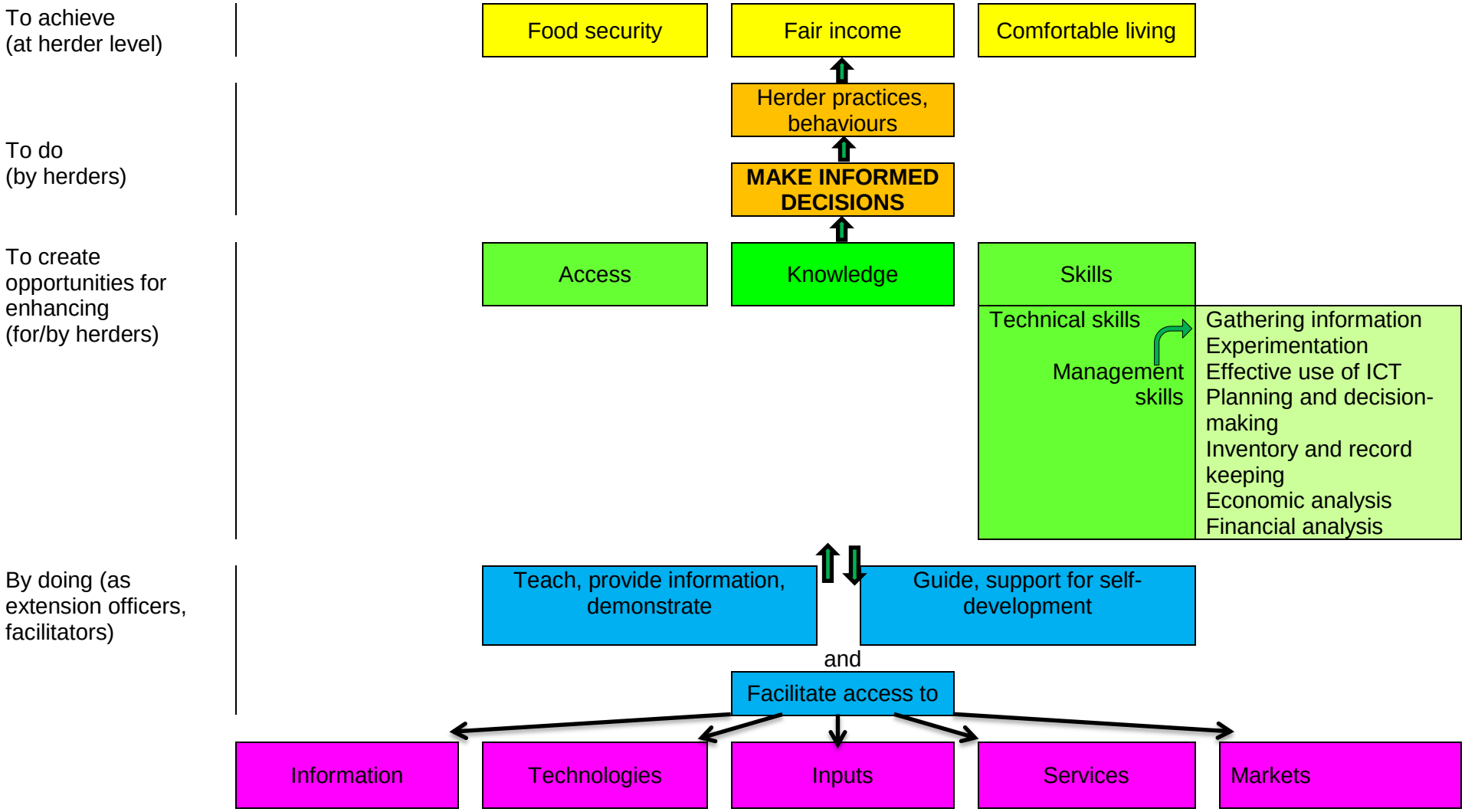


Figure 6.1: **Framework of action levels towards enhancing herder livelihoods**

Table 6.1: **Content matrix of the extension pilot in Green Gold areas**

Content areas / Implications	Sustainable rangeland management	Sustainable herd management	Fodder supply and feeding	Animal health	Entrepreneurship and Cooperatives
Build awareness	- Growth cycles and carrying capacity of rangelands - Impacts of overgrazing - Impacts of resting and rotational grazing	- Benefits of optimising herd size and composition - Benefits of animal breeding measures	- Possibilities for increasing local supply of fodder - Benefits of stall feeding in cold seasons	- Transmission paths of infectious diseases - Favourable and non-favourable conditions on rangelands and in shelters for appearance of diseases	- Benefits and approaches of informed decision-making - Options for income diversification - Benefits of collective actions and herder cooperatives
Build knowledge and skills	- Methods and limitations of restoring overgrazed areas - Rangeland mapping - Protection of water sources	- Observation and assessment of animals - Basics of animal breeding - Planning herd composition - Basic skills of animal breeding	- Preparation of fodder and silage using local resources - Cropping of annual and perennial forages - Forage harvesting and conservation - Composing feed rations for animals of different species, sex and age	- Identification of animal diseases - Application of basic treatment methods - Proper storage and use of veterinary drugs, pesticides and disinfectants - Rehabilitation of weakening animals	- Planning and management of actions and investments - Risk management - Record keeping of herd dynamics, animal productivity, incomes and expenses - Basic methods of economic and financial analysis - Establishment and management of cooperatives

Content areas / Implications	Sustainable rangeland management	Sustainable herd management	Fodder supply and feeding	Animal health	Entrepreneurship and Cooperatives
Facilitate actions	Collective actions: - Photo point monitoring of rangelands - PUG-level planning of rangeland use - Rotational grazing - Boring and maintenance of wells - Biological and mechanical methods against rodents and grasshoppers	Individual actions: - Herd selection and off-take of male and non-productive animals - Herd replacement with breeding stock - Crossbreeding for improving resilience and productivity of animals Collective actions - Introducing breeding animals into herds - Collective herding at PUG and khot-ail levels	Individual actions: - Preparation of hand-made fodder and hay silage - Provision of natural salt - Stall feeding during cold seasons Collective actions: - Forage cropping - Fencing and irrigation of haymaking areas - Conservation of hay, green fodder and silage	Individual actions: - Disinfection of winter and spring shelters - Improvement and maintenance of winter and spring shelters - Preparation and removal of floor dung Collective actions: - Removal of animal corpses on rangelands	Individual actions: - Keeping and analysis of household records Collective actions: - Young animal fattening - Semi-intensive livestock farming (in peri-urban areas) - Processing of milk, wool and skin - Elementary processing of meat - Mixed fodder production
Facilitate access to inputs, services and markets	- Water supply on rangelands	- Breeding stock at soum or PUG level - Index-based livestock insurance	- Forage seeds and - Fencing materials - Machinery and irrigation equipment for cropping and haymaking - Commercial fodder	- Veterinary services for regular inspection, vaccination and dipping, and treatment of diseases - Veterinary drugs, pesticides and disinfectants	- Agricultural commodity exchange - Government subsidies on wool and skin
Legislation by soum governments	- Approval of land use plan at soum level and rangeland use plans at bag and/or PUG level		- Permissions for using, fencing and irrigation of cropping and haymaking areas		

6.3.3 Training and engagement of herder advisors

Herder-to-herder exchange at the grassroots needs to be primarily facilitated herder advisors consisting of PUG-leaders and champion herders, whereas PUG-leaders themselves are considered as champion herders as well since they were selected by their community members to lead PUGs.

Herder advisors should be trained by facilitators in each soum, with support of aimag-level Master Trainers and using contents provided by domestic experts, twice a year: in late spring and autumn, preferable in June and October. Technical contents of the training will be based on the content matrix of the pilot, whereas season-specific topics will be included in either of the spring and autumn training. Relevant topic for the autumn training, for example, will include herd selection before winter and supplementary feeding in winter and early spring.

In addition to technical topics, the training will include sessions for building the skills of the herder advisors to facilitate herder-to-herder exchange, organise training and exchange events as well as to provide advice to herders e.g. on herd optimisation based on analysis of herder household records.

6.3.4 Facilitation of herder-to-herder exchange

Immediately after each Training of Herder Advisors, the herder advisors should facilitate PUG-level exchange meetings for sharing the information and knowledge they have gained at the training with the members of their PUGs. The meetings may also include brief training and information sessions by relevant service providers such as private vets and commercial insurers selling the index-based livestock insurance. The extension pilot should involve PUG-level exchange meetings at least twice a year: in spring and autumn.

In addition, exchange meeting of PUGs needs to be organised at soum-level once a year for facilitating knowledge and experience sharing of PUGs within a soum. At the meeting, the PUGs will reflect on their achievements and failures in current year and plan collective actions as well as learning and exchange activities for next year. The meeting may also include training and information sessions by service providers as well as local governments. The most suitable period for the soum-level exchange meeting is October-November.

6.3.5 Facilitation of field-based learning

Field-based learning aims to build motivation and confidence of herders to apply sustainable practices of rangeland and livestock management, and involves two methods: learning by experimentation and learning through observation and experience sharing. For enabling herders' learning by experimentation, innovation pilots at the PUG-level are recommended. The pilots should demonstrate collective actions for application of sustainable practices of rangeland and livestock management, or creation of new knowledge for sustainable business development. Each pilot should be set-up and conducted by one PUG, with 5 to 20 herders learning the practice by implementing it. In accordance with the content matrix of the pilot, subjects of innovation pilots should primarily include:

- Resting of rangelands;
- Hand-boring and maintenance of wells;
- Fencing and irrigation of haymaking areas, and mechanised haymaking;
- Biological and mechanical rangeland protection methods against rodents and grasshoppers;
- Preparation of green fodder and silage using rangelands plants;
- Forage cropping;
- Elementary processing of skin, wool, milk and meat;
- Stall feeding in winter; and
- Fattening of lambs and young steers.

Field days should be organised for enabling herders learning from the knowledge created locally through the innovation pilots. Field days should be implemented by the facilitators, but coordinated by the Master Trainers at the aimag-level as they need to be attended by herders from different soums. Travel funds provided by the project specifically need to target herders who present potential adopters of the practices piloted. Herders who can fund their travel by themselves should be encouraged to attend field days as well. Herders should be encouraged to visit the same sites at regular intervals.

6.3.6 Extension media and decision making tools

The results of the study suggest the use of several extension media and decision-making tools in the extension pilot as briefly explored below.

Facilitators' manual

Master trainers and facilitators should be provided with a manual on communication and facilitation methods for the following purposes:

- Facilitation of for herder training and exchange events at soum and PUG levels;
- Facilitation of adaptive trials and innovation pilots; and
- Facilitation of field training.

Accordingly, the manual should contain methodological guidance, backed by case examples, for facilitation of training and exchange events, participatory processes of innovation and action learning, and for development of extension materials.

Reference manuals

Master trainers, facilitators and herder advisors as well as HSCs need to be provided with reference manuals containing practicable messages and reference information on sustainable livestock and rangeland management and management of livestock-based businesses, in a form easily understandable by non-professionals and communicable to herders.

The reference manuals should be published as a series consisting of volumes on specific subjects. In accordance with the content matrix of the extension pilot, essential subjects include rangeland management, herd management, animal health, fodder preparation and animal nutrition, and entrepreneurship and collective actions of herders.

The reference manuals can be used for the following purposes:

- Self-education of Master Trainers, facilitators and herders;
- Facilitation of herder training and exchange activities at soum and PUG levels;
- Facilitation of adaptive trials, innovation pilots and field training of herders;
- Advice to herders and herders' groups and cooperatives; and
- Informal herder-to-herder exchange.

Product and supplier catalogues

For facilitating access to inputs and services and providing advice to herders and herders' cooperatives, facilitators and herder advisors need to be supplied with product and supplier catalogues of inputs and services for livestock production as well as equipment for processing of animal products. Preparation of such catalogues can be contracted out to NAEC, who already prepared a product and supplier catalogue of equipment for processing of animal products in 2011.

Video documentation of innovation pilots

Since only a limited number of herders can be involve in implementation of innovation pilots and field days, video documentation of the pilots should be prepared for self-education of a larger number of herders. Such educational videos should be distributed to all facilitators and herder advisors, and 10 copies of each video should be supplied to each HSC. Herders then

can watch the videos at the HSCs, or borrow them to watch at home or in khot-ail level learning groups. In addition, the videos should be used at PUG-level exchange meetings facilitated by herder advisors.

Household record sheets

Record sheets for animal productivity, herd in- and off-takes, and household incomes and expenses should be piloted with at least 1000 herder households in 2014 and introduced in at least 5000 herder households representing around 15% PUGs in Green Gold areas by 2016. Expected outcomes of the household record sheets are:

- Herders are enabled to make informed decisions on optimisation of their herd size and structure for maximising benefits within the carrying capacity of the rangelands.
- Facilitators and project team are informed about annual herd dynamics through empirical data and able to develop implications for herders and local governments on optimisation of herd size and structure.

The sheets are best published as valuable items so that herders do not ignore them, for example as a notebook with a small calculator inside and empty pages for note taking e.g. when attending meetings.

The following procedure is suggested for use of the record sheets:

1. Herder advisors distribute the record sheets and explain how to fill out the sheets
2. Herders fill out the record sheets
3. Herder advisors help herders fill out the analytic sheets, if necessary
4. After filling out the analytic sheets, each household is informed about options for optimising herd size and structure for increasing profitability.
5. Facilitators in each soum borrow the sheets from a stratified sample of 50 herder households representing different herd size classes in equal proportions, and type in and consolidate the sheets in MS Excel.
6. Facilitators submit the Excel files to Project team directly or via Master Trainers
7. The sampled sheets are used for controlling, monitoring and analytic purposes by the project team

Simulation games on rangeland and herd management

The extension pilot is advised to introduce simulation games in herder learning activities and herder-to-herder exchange at PUG and grass-root levels for building awareness of herders of principles of sustainable pastoral livestock production and motivation to apply sustainable practices of rangeland and livestock management. Simulation games can be developed in different formats: as role plays, apps for cell phones or board games.

While the games need to be developed by professionals, the study suggests preferred use of simple materials such as stones and ankle bones for consideration.

Newsletters

Information and extension messages can be effectively and cost-efficiently communicated to a large number of herders through monthly or quarterly newsletters. Possible contents of such a newsletter for herders include:

- Information about recent and current activities of Green Gold (covering all components)
- Interviews with experts, herders and local governors;
- Articles on practices of sustainable rangeland and livestock management;
- Market information;
- Advice to herders;
- Essays and good practice notes submitted by herders;
- Photo stories of herders;
- Series of lessons for herders;
- Contents for entertainment (such as poems, crosswords etc.)

- Ads by input suppliers.

Radio and television broadcasts

Radio and television are effective channels of communicating messages for awareness building, whereas radio is increasingly losing its significance against television due to the possession by most herders of satellite receivers enabling reception of all domestic channels.

Herders regularly watch weather forecasts, news and movies on television. The usual time of watching TV is after the supper i.e. between 8 and 10 PM. Video documentaries and information broadcasts targeting herders should be broadcasted on a channel that is commonly watched by herders during these hours, such as TV9, and preferably start immediately after the 8 PM news.

However, television broadcasts are relatively expensive compared to other means of information transfer such as newsletters and video CDs, thus to be planned carefully and advised rather for introduction in 2015 when video documentations of innovation pilots are prepared.

Television broadcasts would have relatively limited effects in Bayan-Ulgii aimag, where the majority of herders are Kazakhs with difficulty to understand Mongolian. Hence, even when possessing televisions many Kazakh herders are simply unable to comprehensively understand the language of broadcasts in Mongolian language. Therefore, radio is still widely used by Kazakh herders in Bayan-Ulgii, and radio broadcasts were specifically requested by APUGs and the AFPUG in Bayan-Ulgii for communication of information and extension messages to the communities of Kazakh herders in their mother tongue.

6.4. Implications for gender-sensitivity of interventions

6.4.1 Overall gender balance of beneficiaries

Herder households are traditionally dominated by men. Also, community-level engagement of male herders tend to stronger than that of female herders and specific meetings of women herders organised by soum governments already imply that regular community meetings of herders are rather for men (cf section 3.1.14). These facts undermine the importance of gender balancing among beneficiaries of the Green Gold – Agricultural Extension Component. On the other hand, at an implementation period of only three years, the Component shall set realistic expectations on improving gender equality in herder communities. Hence, a minimum quote of 30 percent for female beneficiaries is recommended. Strict compliance with this quote is particularly required for training and engagement of Master Trainers, facilitators and herder advisors, herder learning and exchange activities at PUG and soum levels, as well as for distribution of extension materials such as video CDs, household record sheets and newsletters.

6.4.2 Gender-sensitivity of facilitation methods

In addition to women's quote among the beneficiaries, facilitation methods used in the extension pilot in Green Gold areas need to gender-sensitive. An important consideration thereby is timing of activities. Both men and women in herder households are busiest in spring, especially in early- to mid-spring. From June to September, women are busy as well with milking and milk processing at strict schedules. After preparing their children for school start in early September, herder women are relatively relaxed, or at least their schedules are relatively flexible until December. Extension activities requiring active involvement of herder women are therefore most effective in the periods from mid-May to mid-June and from mid-September to the end of November.

Gender-sensitivity in facilitation of training and exchange events should be further expressed through specific encouragement of women's participation in discussions, group work and

exercises. This is best achieved through building of women's groups among the participants, or groups including women at 50 percent at least.

A further strategy of ensuring women's involvement in the extension pilot is to allocate specific tasks to herder women. An example of such tasks is keeping of household records.

6.4.3 Supporting income diversification of herder women

An essential subject of the field-based learning strategy applied in the extension pilot is income diversification of herder women through processing of milk, skin and wool processing, and manufacturing of felt items. Pilot units for mechanic processing of milk, wool and skin should be established in each aimag as innovation pilots implemented by groups of herder women. Optimal size of a group is estimated at 3-5 members for a dairy processing unit, and 5-10 members for a skin and/or wool processing unit. Implementation of such pilots may require qualification of group members e.g. at vocational schools in aimag centres.

As in the case of field days, training at the pilot processing units for enabling learning through observation and experience sharing should be offered to as many herder women as possible. However, herder women already organised in groups or willing to form groups should be specifically targeted by travel funds supplied by the pilot.

Herder women willing to adopt the practices piloted should be encouraged to do so, and facilitators should facilitate their access to expertise and professional support, and credits and other inputs as well as markets for their products. Support to herder women may also be integrated in the support to herder cooperatives e.g. if the business plan of a cooperatives includes commercial activities to be carried out by a group of herder women.

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Appendices

Appendix 1. Target areas of the pilot operation of the Agricultural Extension Component in 2014

No.	Aimag	Soum
1	Khovd	Bulgan
2		Buyant
3		Chandmani
4		Darvi
5		Durgun
6		Duut
7		Mankhan
8		Must
9		Myangad
10		Tsetseg
11		Zereg
12	Uws	Baruunturuun
13		Davst
14		Naranbulag
15		Tarialan
16		Tes
17		Ulgii
18		Umnugobi
19		Undurkhangai
20		Zuungobi
21	Bayan-Ulgii	Altai
22		Bayannuur
23		Buyant
24		Tolbo
25		Tsengel
26		Ulaankhus

Appendix 2. Participants and purposes of stakeholder interviews

No.	Organization/Category	Interviewees	Purposes of interviews
1	Ministry of Industry and Agriculture	3 persons, representing: - Department of Coordination of policy implementation in the livestock sector; - Department of Monitoring, evaluation and internal auditing; and - Department of Strategy and policy planning.	- To scope needs and opportunities for strengthening agricultural extension system at national and local levels; - To scope options for improving herders' rangeland and livestock management practices and capabilities.
2	National Agricultural Extension Centre	5 persons: - Vice-director; - Head of the Training and Information Department; - Head of the Department of Science and Technology; - Extension staff (x2)	
3	Mongolian State University of Agriculture (incl. Research Institute of Animal Husbandry)	6 persons: - Vice-rector for Research; - Training manager of the Centre for Innovation and Technology Transfer; - Rangeland specialist; - Livestock breeding researcher; - Livestock nutrition researchers; - Intensified livestock farming specialist.	
4	Central-level NGOs	7 persons, representing: - National Association of Mongolian Agricultural Cooperatives; - Mongolian National Cooperatives' Association; - Association of Livestock Breeders; - Cooperative of Private Veterinary Services; - Association of Multipliers of Fodder Crop Seeds; - Mercy Corps Mongolia; - CHF Mongolia.	
5	Local Governments (in 3 aimags)	11 persons: - Officer for Agriculture of Aimag Governor's Bureau (x3); - Director of (Aimag) Department of Industry and Agriculture (x3) - Soum governor (in 5 soums of 3 aimags)	- To identify needs and opportunities for strengthening the extension and service system at the local level; - To scope options for improving herders' rangeland and livestock management practices and capabilities; - To scope needs and priorities for pilot extension services in the target areas.
6	Aimag-level NGOs (in 3 aimags)	6 persons, representing: - Aimag Federation of Pasture User Groups (x3) - World Vision in Khovd aimag; - Mercy Corps in Khovd aimag; - Index-Based Livestock Insurance Project in Khovd aimag.	
6	Local private sector representatives	4 persons: - Baruun Mongol International LLC (meat processor in Khovd aimag) - Private vets in 3 soums of 3 aimags	
		42 persons in total	

Appendix 3. Lead questions of stakeholder interviews

№	Purpose	Lead questions
1	To identify needs and opportunities for strengthening the agricultural extension system at the national level	- What policies and regulations, institutions, social and economic progresses and institutional linkages shape the agricultural extension system as it is today? - What organisations do you work with in extension or extension-related activities? Please specify purpose and strength of your interaction with each partner as well as communication strategies, channels and tools. - What is the current level of involvement of your organisation or persona in the agricultural extension system at national and local levels? - How is your organisation impacted by the performance of extension services? - How would you assess the current performance of the AES and what concrete challenges and opportunities do you recognize in the system? - What percentage of the target clientele (herders/farmers) do you think the extension services cover? - How do you consider the overall potential agricultural extension services for helping herders improve rangeland and livestock management, and the ultimately, the long-term sustainability of their livelihoods? - What changes do you wish in the agricultural extension system and what would be their impacts on the performance of the system?
3	To identify needs and opportunities for strengthening the extension and service system at the local level	- What are the strengths of the current extension system at aimag and soum levels? And what are the weaknesses? - How would you expect a local-level structure of extension services targeting herders to be designed? - How can agricultural extension services effectively facilitate sustainable approaches and adaptive changes in the livestock sector? - What knowledge and skills do soum-level staff of AHBUs and APUGs need to coordinate and provide extensions services to herders? - What organisations at the aimag level would be able to coordinate and provide guidance to soum-level extension services? - What services at the soum level should herders' access be improved to?
4a	To scope options for improving herders' rangeland and livestock management practices and capabilities	- What are the key challenges and opportunities for current approaches or rangeland and livestock management, particularly in Western aimags? What needs to be improved and how? - What capabilities and attitudes do herders need for sustainable rangeland and livestock management?
4c	To scope needs and priorities for piloting extension services in the target areas	- What forms and contents of extension services do herders in the target aimags of Green Gold need? Please explain. - What organisational arrangements would you suggest for piloting local extension services by Green Gold? - What are your concrete expectations on extension services to be piloted in Green Gold Phase IV? - What resources for establishing/mobilising extension services would your organisation be able to contribute? How could you collaborate with the Extension component of Green Gold Phase IV?

Appendix 4. Questionnaire used in the herders' survey

Herders' survey

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1. Respondent and household information

Your name:	
Name of the head of household (if different from above):	
Soum and bag:	
Year of starting livestock herding:	
Has the head of household completed secondary school (yes/no)?	
University or vocational school degree and profession of the head of household, if available:	

Number of male members of households		Number of female household members	
Between 0-15 years of age		Between 0-15 years of age	
Between 16-60 years of age		Between 16-60 years of age	
Older than 60 years of age		Older than 60 years of age	

Employment of household members	
Number of household members permanently engaged in livestock herding	
Occupations of household members employed elsewhere:	
1.	
2.	
3.	

Annual household income	Amount in MNT
Total	...
Of which: income from livestock	
Salaries and wages	
Pension and social benefits	
Other incomes	

Please state if you possess the following vehicles and media? (put X if available)

Car |__| Motorcycle |__|

Television |__| Radio |__| Mobile phone |__|

Please estimate the distance of your location to the soum centre in kilometres? (by season)

Winter: _____ Spring: _____ Summer: _____ Autumn: _____

Are you member of one or more of the following forms of group? (put X where applicable)

Cooperative |__| Civil union |__| Herder group |__| Pasture user group |__|

2. Livestock management

Number of animals	Sheep	Goat	Cattle	Horse	Camel
Total					
Of which offspring					

Offspring survival	2011	2012	2013
Survived			
Lost			

Winter preparedness	Yes	No
Is your winter shed war enough to protect the animals from the cold?		
Do you warm up the shed before winter?		
Do you fatten your animals with fodder in late autumn?		
Do you prepare hay for winter feeding?		
Do you buy hay or other types of fodder for winter feeding?		

If you grow forages or buy fodder, please state estimated amounts of each type of fodder per year.

_____
_____

_____
_____

_____
_____

Do you stall-feed your animals during critical periods in winter and spring?

Yes |__| No |__|

If yes, when and for how long?

_____
_____

Please state (put X where applicable) how often you use fodder in winter and spring

Type of fodder	Regularly	Only when necessary	Do not use
(Natural) hay			
Bran			
Concentrate other than bran			
Mineral fodder			

3. Outputs and sales of animal products

Outputs of sheep and goats	Sheep wool, kg	Cashmere, kg	Sheep carcass, kg	Lamb carcass, kg
Average yield per head				
Outputs of large animals	Steer carcass, kg	Horse carcass, kg	Lactation yield of cows, l	Camel wook, kg
Average yield per head				

Annual sales and consumption of livestock outputs	Unit	Amount sold	Amount consumed	Income, MNT 1000
Sheep carcass	piece			
Steer carcass	Piece			
Goat carcass	Piece			
Horse carcass	Piece			
Sheep wool	Kg			
Cashmere	Kg			
Milk and dairy products	Kg			
(Other) …..	...			
…..	...			

If you process animal products, please estimate gross and marketed amounts of processed products per year.

_____
_____

_____
_____

_____
_____

4. Livestock risks

Animal losses	2011	2012	2013
Number of large animals lost			
Number of sheep and goats lost			
Total number of offspring lost			

Please state top three reasons for animal losses:

1.
_____
_____

2.
_____
_____

3.
_____
_____

Months in which most animal losses occur: _____

Please share your opinions on possibilities for reducing livestock risks.

_____
_____

_____
_____

5. Scorecard on rangeland management

Please state how much you agree or disagree with each of the following statements at the following scale:

5 = fully agree 4 = partly agree 3 = partly disagree

2 = strongly disagree 1 = not sure / do not know

1	Stock density in our soum exceeds the carrying capacity	
2	Rangeland vegetation in our soum is decreasing	
3	Nutritive value of rangeland plants is decreasing	
4	Rangeland vegetation in spring increasingly delays	
5	The animals are not sufficiently fattened before winter	
6	Grazing in winter is becoming difficult due to thick snow cover	
7	Rangeland degradation is caused by increase of animals	
8	Rangeland degradation is caused by climate change	
9	Rangeland degradation is caused by inappropriate herding methods	
10	Sustainable rangeland management requires: *Innovative methods of livestock herding*	
11	Traditional methods of livestock herding	
12	Reduction of livestock	
13	Rotational grazing	
14	Rehabilitation of rangelands	
15	Fodder cropping	
16	Herders' involvement in Pasture User Groups	

6. Scorecard on options for sustainable livestock management

Please state how much you agree or disagree with each of the following statements at the following scale:

5 = fully agree 4 = partly agree 3 = partly disagree

2 = strongly disagree 1 = not sure / do not know

1	Specialisation of herds by type of animals	
2	Intensification of livestock production	
3	Promotion of intensive livestock farming	
4	Improvement of herders' knowledge and skills	
5	Local fodder cropping	
6	Fencing of haymaking areas	
7	Improvement of livestock breeds	
8	Intra-herd selection and culling of non-productive animals	
9	Collective actions of herders in groups and cooperatives	
10	Increase of water supply for livestock	

7. Involvement in extension services

Please provide information on training and facilitation activities that you attended during the last 3 years.

(If you need more space, please use backspace of the form or extra sheet)

Name of activity/event	Date	Duration (days)	Location	Organizer
Training/seminar				
Research trial/Field day				

Have you benefited from services/activities that are not listed above but helped you learn useful things, improved your access to information, experts and markets, or facilitated collective actions of herders? If yes, please briefly state below.

_____
_____

8. Experience with collective actions

Have you participated in any collective action of herders, faciliated by either herders themselves or a project or organization? If so, please provide information on the collective action.

Name of action:

_____
_____

Start date: _____End date: _____

What activities were conducted?

_____
_____

What outcomes were achieved?

_____
_____

How many herders did participate? _____

Who initiated the action? _____

Who facilitated the action? _____

Who paid for the expenses of the action? _____

9. Suggestions for extension services

Please rank the following purposes and methods of extension services by usefulness at a scale from 1 (useless) to 3 (very useful).

Purpose of service	Score	Type of service	Score
Improving livestock herding practices		Classroom training on technical topics	
Improving entrepreneurship of herder households		Field training on technical topics	
Facilitation of herder exchange		Distance training via TV or radio	
Facilitation of collective actions		Distance training via written materials	
Facilitation of access to inputs and services		Information service	
Improving rangeland management		Advisory service (for individual herders or herders' groups)	

Please suggest additional purposes and/or types of extension services?

_____
_____

_____
_____

_____
_____

Please list three most important topics of training, information or advisory services for improving livestock and rangeland management approaches.

1._____
_____

2._____
_____

3._____
_____

Please list two innovative approaches of technology or management that should be fore mostly introduced for improving livestock and rangeland management, and entrepreneurship of herder households.

1._____
_____

2._____
_____

Please estimate the amount of funds you would be able to contribute to the expenses of training, information and advisory services, provided that the services meet your individual requirements and result in economic benefits for you. Choose (X) from options below.

More than MNT 240 thousand per year, if necessary |__|

Around MNT 240 thousand per year of 20 thousand per month |__|

Around MNT 120 thousand per year or 10 thousand per month |__|

I cannot contribute MNT 120 thousand per year |__|

Thank you very much for supporting our attempts to improve training, information and advisory services for herders by participating in this survey.

****

Appendix 5. Agenda of focus group discussions with herders

No.	Subsession	Activities
Morning session (9.00-13.00)		
1	Mapping	**Step 1**. The participants are divided in 2 groups and develop 2 maps: • Soum map, showing locations of herders, services and facilities across different seasons; • Herder household map: one typical herder household will be mapped by location, assets and social networks. **Step 2**. To each map, a schedule of activities and events of/for herders will be created. At herder household level, all major livestock-related activities of a herder household will be scheduled. To each activity or event on either schedule the responsible stakeholder/person and participants will be specified. **Step 3**. Discuss the following: • Current level of access of herders to information, training, inputs, services and technologies; • Current approaches and methods of rangeland and livestock management; • Gender-sensitivity of tasks at herder household level; • Gender equality in participation in community level activities and events.
2	Reflection	**Step 1**. The participants are divided in two groups. One group identifies a recent successful case of innovation or collective action for improving rangeland or livestock management. The other group identifies an unsuccessful case. Each group describes the cases, and determines drivers for success and reasons for failure. **Step 2**. Discuss the following: • What weaknesses and challenges in the current approach of rangeland and livestock management are you already aware of and what other challenges are you suspecting? • What opportunities do you see for improving rangeland and herd management, livestock productivity and herders' incomes? **Step 3**. The facilitator summarizes key challenges and opportunities, and examines whether the lists are complete.
Afternoon session (14.00-18.00)		
3	Visioning	**Step 1**. The facilitator presents key findings of the mapping and reflection sessions. **Step 2**. The groups are asked to draw and present soum and herder household maps in a desired state of development by 2016.
4	Planning	**Step 1**. Identify desired changes The groups define changes at soum and herder household levels that are required for achieving the vision by 2016. Such changes may include introduction of new approaches and technologies or improvement of access and capacities. **Step 2**. Prioritise Among the desired changes already identified the participants identify those that could create favourable conditions for the other desired changes to occur. **Step 3**. Scope assistance needed The participants are asked to define inputs, services and activities needed for each prioritised change to occur, and scope the need for external assistance. The facilitator then briefly explains where the extension services to be piloted in Green Gold Phase IV could be helpful through indirect assistance and facilitating functions. **Step 4**. Discuss the following • Do you have any experiences with formal extensions services or services with similar functions? What are the strengths and weaknesses of those services? • What are your concrete expectations on extension services for helping you achieve your visions by 2016? • How should extension services be designed and function so that they can exist beyond the project?

No.	Subsession	Activities
		Step 5. The facilitator concludes the afternoon session by summarizing the key findings.

Appendix 6. Participants of focus group discussions with APUG and AHBU representatives

Aimag	Number and location of FGDs	Number and soums of participants		
		Representatives of Associations of Pasture User Groups	Representatives of Animal Health and Breeding Units	Total number
Khovd	2 (Zereg and Buyant soums)	10 (Bulgan, Buyant, Chandmani, Darvi, Durgun, Mankhan, Must, Myangad, Tsetseg, Zereg)	11 (Bulgan, Buyant, Chandmani, Darvi, Durgun, Duut, Mankhan, Must, Myangad, Tsetseg, Zereg)	21
Uws	2 (Umnugobi and Zuungobi soums)	9 (Baruunturuun, Davst, Naranbulag, Tarialan, Tes, Ulgii, Umnugobi, Undurkhangai, Zuungobi)	9 (Baruunturuun, Davst, Naranbulag, Tarialan, Tes, Ulgii, Umnugobi, Undurkhangai, Zuungobi)	18
Bayan-Ulgii	1 (Ulgii town)	6 (Altai, Bayannuur, Buyant, Tolbo, Tsengel, Ulaankhus)	6 (Altai, Bayannuur, Buyant, Tolbo, Tsengel, Ulaankhus)	12
Total	5	25	26	51

Appendix 7. Agenda of focus group discussions with APUG and AHBU representatives

Duration	Topic
15 minutes	Introduction of the Green Gold - Agricultural Extension Component
1 hour	Introduction of capacities, activities and collaboration of APUGs and AHBUs represented by the participants
15 minutes	Tea break
1.5 hour	Discussion of: • Extension contents of priorities for each soum • Extension methods • Organisation set-up, structure of extension services at the soum-level • Collaboration between the Agricultural Extension Component and APUGs and AHBUs • Possible risks to success and sustainability of the pilot operation of the Agricultural Extension Component
1 hour	Formulation of expectations on pilot interventions of the Agricultural Extension Component

Appendix 8. Participants of focus group discussions with AFPUG and Aimag Government representatives

Aimag	Organisation and position of participants	Number of participants
Khovd	Aimag Federation of Pasture User Groups, Executive director	7
	Aimag Federation of Pasture User Groups, Extension officer	
	Association of Pasture User Groups of Buyant soum, Head of APUG	
	Association of Pasture User Groups of Must soum, Head of APUG	
	Aimag Governor's Bureau, Officer for agriculture	
	Department of Industry and Agriculture, Crop farming specialist	
	Department of Industry and Agriculture, Rangeland specialist	
Uws	Aimag Federation of Pasture User Groups, Executive director	5
	Aimag Federation of Pasture User Groups, Extension officer	
	Association of Pasture User Groups of Turgen soum, Head of APUG	
	Aimag Governor's Bureau, Officer for agriculture	
	Department of Industry and Agriculture, Livestock specialist	
Bayan-Ulgii	Aimag Federation of Pasture User Groups, Extension officer	20
	Aimag Federation of Pasture User Groups, Accountant	
	Association of Pasture User Groups of Bugat soum, Head of APUG	
	Association of Pasture User Groups of Buyant soum, Head of APUG	
	Association of Pasture User Groups of Sagsai soum, Head of APUG	
	Aimag Governor's Bureau, Officer for agriculture	
	Department of Industry and Agriculture, Livestock specialist	
	Department of Industry and Agriculture, Specialist for cooperatives and extension	
Total	25	20

Appendix 9. Agenda of focus group discussions with AFPUG and Aimag government representatives

Duration	Topic
15 minutes	Introduction of the FGD and participants
1 hour	Brief introduction of 2014 work plans of AFPUGs, DIAs Aimag Governments represented by the participants
45 minutes	Presentation and discussion of: • Operation plan of the Agricultural Extension Component for 2014 • Preliminary results of the PNOA
1.5 hours	Discussion of extension activities needed at the soum level, comprising: • Activities of Herder Exchange Hubs • Field training of herders; and • Activities for improving herders' access to information
30 minutes	Identification of training needs for building aimag-level capacities to coordinate extension activities at the soum level