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IMPLEMENTATION COMPLETION AND RESULTS REPORT

TF099143

ON A

GRANT

IN THE AMOUNT OF US\$11.0 MILLION

TO

MONGOLIA

FOR THE

MONGOLIA LIVESTOCK AND AGRICULTURAL MARKETING PROJECT (P125964)

September 28, 2018

Agriculture Global Practice
East Asia And Pacific Region
[Click here to enter text.](#)

CURRENCY EQUIVALENTS

(Exchange Rate Effective September 28, 2018)

Currency Unit = Mongolian Tugriks (MNT)

MNT 2516 = US\$1

FISCAL YEAR

July 1 - June 30

ABBREVIATIONS AND ACRONYMS

AI	Artificial Insemination
ANFBC	Animal Nucleus Flock Breeding Center
EIRR	Economic Internal Rate of Return
ELS	End Line Survey
EMP	Environmental Management Plan
FMD	Foot-and-Mouth Disease
FIRR	Financial Internal Rates of Return
GAFSP	Global Agriculture and Food Security Program
GoM	Government of Mongolia
ICR	Implementation Completion and Results Report
ILBLSP	Integrated Livestock-based Livelihoods Support Program
LAMP	Livestock and Agricultural Marketing Project
M&E	Monitoring and Evaluation
MIS	Management Information System
MoIA	Ministry of Industry and Agriculture
MoFALI	Ministry of Food, Agriculture, and Light Industry
NCB	National Competitive Bidding
NFSP	National Food Security Program
NLP	National Livestock Program
NSO	National Statistical Office
NPV	Net Present Value
PAD	Project Appraisal Document
PDO	Project Development Objective
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PSC	Project Steering Committee
PVU	Private Veterinary Unit
SCF	Standard Conversion Factor
SMEs	Small and Medium Enterprises
TSP	Technical Service Provider
VABU	Veterinary and Animal Breeding Unit

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TABLE OF CONTENTS

DATA SHEET	ERROR! BOOKMARK NOT DEFINED.
I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES.....	6
A. CONTEXT AT APPRAISAL	6
B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)	9
II. OUTCOME	10
A. RELEVANCE OF PDOs	10
B. ACHIEVEMENT OF PDOs (EFFICACY)	11
III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME.....	20
B. KEY FACTORS DURING IMPLEMENTATION	21
IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME ..	23
B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE	24
C. BANK PERFORMANCE	26
D. RISK TO DEVELOPMENT OUTCOME	27
V. LESSONS AND RECOMMENDATIONS	28
ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS.....	30
ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION.....	43
ANNEX 3. PROJECT COSTBY COMPONENT	45
ANNEX 4. EFFICIENCY ANALYSIS.....	46
ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS ...	56
ANNEX 6. SUPPORTING DOCUMENTS (IF ANY)	58



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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P125964	Mongolia Livestock and Agricultural Marketing Project
Country	Financing Instrument
Mongolia	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Mongolia	Ministry of Food, Agriculture and Light Industry

Project Development Objective (PDO)

Original PDO

The Project Development Objective is to improve rural livelihoods and food security in selected aimags and soums through investments in enhancing productivity, market access and diversification in livestock-based production systems.

PDO as stated in the legal agreement

The Project Development Objective is to improve rural livelihoods and food security in selected Aimags and Soums through investments in enhanced productivity, market access and diversification in livestock-based production systems.

**FINANCING**

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
TF-14820	11,000,000	10,950,483	10,950,483
Total	11,000,000	10,950,483	10,950,483
Non-World Bank Financing			
Borrower	490,000	0	0
Total	490,000	0	0
Total Project Cost	11,490,000	10,950,483	10,950,483

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
04-Jun-2013	05-Feb-2014	19-Apr-2016	31-Jan-2017	31-Dec-2017

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
20-Apr-2016	4.57	Change in Results Framework Change in Components and Cost Change in Loan Closing Date(s) Reallocation between Disbursement Categories Change in Implementation Schedule

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Substantial



RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	21-Jun-2014	Moderately Satisfactory	Moderately Satisfactory	1.00
02	05-Dec-2014	Moderately Satisfactory	Moderately Satisfactory	1.08
03	26-Jun-2015	Moderately Unsatisfactory	Moderately Unsatisfactory	1.82
04	11-Oct-2015	Moderately Unsatisfactory	Moderately Unsatisfactory	2.93
05	21-Mar-2016	Moderately Satisfactory	Moderately Satisfactory	3.93
06	24-Jun-2016	Moderately Satisfactory	Moderately Satisfactory	5.59
07	06-Nov-2016	Moderately Satisfactory	Satisfactory	6.59
08	21-May-2017	Satisfactory	Satisfactory	8.89
09	29-Oct-2017	Satisfactory	Satisfactory	11.00

SECTORS AND THEMES

Sectors

Major Sector/Sector (%)

Agriculture, Fishing and Forestry 51

Agricultural Extension, Research, and Other Support Activities 25

Fisheries 13

Livestock 13

Industry, Trade and Services 49

Agricultural markets, commercialization and agri-business 49

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3) (%)



Private Sector Development	105
Jobs	100
Enterprise Development	5
MSME Development	5
Finance	15
Financial Infrastructure and Access	5
MSME Finance	5
Finance for Development	10
Agriculture Finance	10
Human Development and Gender	10
Gender	10
Urban and Rural Development	60
Rural Development	60
Rural Markets	60
Environment and Natural Resource Management	9
Environmental Health and Pollution Management	9
Air quality management	3
Water Pollution	3
Soil Pollution	3

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. Mongolia is a landlocked country with an area of 1,569,000 km². With a population of just over 2.7 million, it is the third most sparsely populated country in the world. The country has a continental climate characterized by long and extremely cold winters. Temperatures range from as low as -45°C on the steppe in winter to 45°C in the Gobi Desert in summer. Livestock-based agriculture has been a backbone of society and is regarded as a special sector in the Mongolian economy for years. In 2010, the agricultural sector accounted for 15 percent of gross domestic product and provided livelihood bases for about 40 percent of its population, of which more than 85 percent depended on livestock production. The livestock-based industry contributed to around 10 percent of all export revenues, next to the mining industry. The country with less than 3 million population had more than 43 million livestock and the livestock sector consisted almost entirely of nomadic pastoralism. There were large numbers of households that existed around the poverty level. The proportion of people living in poverty was 29.8 percent in 2011, with rural poverty estimated at 33 percent.

2. In 1990, the country began simultaneous economic and political transformations moving from collective socialism to the market economy. The disruptions in institution mechanisms and service delivery systems during economic transition caused long-lasting changes to the agricultural production, food industry, and rural livelihoods in the country, leading to large-scale rural migration to urban centers. At that time, the Government also followed production-led strategies for the livestock industry largely focusing upon poverty and vulnerability in the herding sector. The industry's support system, primarily a state-led service provision such as publicly managed livestock breeding programs, collapsed following the transition and needed systemwide upgrading. Urbanization and changing demand patterns were expected to drive change in the livestock industry, including links between producers and markets. To modernize the industry, a strategic shift to market-led approaches was necessary for fixing the fragmentation in supply chains that severely limited its growth potential, with several reinforcing measures along the supply chain: a trace-back system for each animal, animal breeding and genetic improvement, animal nutrition and feeding regime, and animal health. This project was aimed at strengthening those links and the World Bank's role in the project is a rational expansion of the World Bank's portfolio in the livestock sector, which till then focused more on pasture land in the case of the Sustainable Livelihoods Project and risk management in both the Sustainable Livelihoods Project and Index-based Livestock Insurance Project and much less on production and marketing issues. As herders were able to focus interventions in pasture lands and some livelihood options beyond consumption of their household, the importance of improving production and productivity as well as market development for livestock produce in both local and international markets was felt by both, the Government and the herders.

3. In preparing the Global Agriculture and Food Security Program (GAFSP) proposal, the Ministry of Food, Agriculture, and Light Industry (MoFALI) consulted with stakeholders, including donors and nongovernmental organizations and identified five key areas which include (a) underdeveloped agro-industries and value chains that remain stagnant and have not improved herder incomes, (b) inadequate income and diet diversity due to herders' limited capacity to develop their livelihood bases other than



herding animals, (c) undermined veterinarian services, which lead to slow responses to infectious animal diseases and constrain effective veterinary service and disease surveillance, (d) collapse of the breeding system resulting in lower livestock productivity partly due to inbreeding, and (e) lack of winter fodder that reduces livestock productivity and increases the risk of livestock mortality during *dzud*.

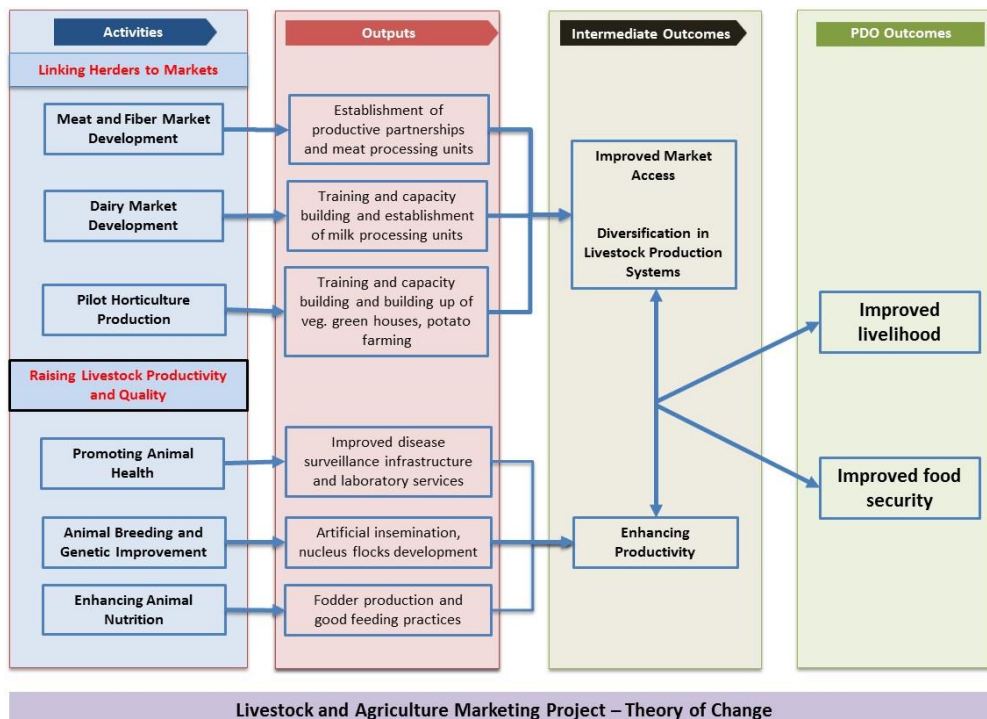
4. These priority issues were then in line with the National Food Security Program (NFSP) and the National Livestock Program (NLP) frameworks which propose to develop a livestock production system that is adaptable to changing climatic, ecological and social conditions and create an environment where the sector is economically viable and competitive in the market economy to provide a safe and healthy food supply to the population, deliver quality raw materials to processing industries, and increase exports.

5. The Livestock and Agricultural Marketing Project (LAMP) was financed by a specific investment grant with the International Development Association (the World Bank) acting as trustee and supervising entity of the GAFSP. The grant is in an amount of US\$11 million to assist in financing the project for four years.

Theory of Change (Results Chain)

6. **Problem statement and Solution offered.** The collapse of the state-led service delivery systems and poor market access coupled with fragmentation of livestock markets have trapped poor herder households in a low investment, low productivity, and low-income cycle. For improving the rural livelihoods and food security outcomes of poor herder households in selected *Aimags* and *Soums*, the project design brought together the twin strategies of *livestock-agriculture integration* and *value chain approaches*. The results chain and theory of change are graphically represented in figure 1.

Figure 1. Results Chain





7. Livestock productivity improvements largely thrive on intensification of livestock-agriculture integration, for example, feed or forage crops, hay cultivation for winter preparation, pastureland improvements, and so on. Leveraging economies of scope from this link, introduction of high-value agriculture crops (such as vegetables and fruits) creates twin possibilities of providing attractive alternative livelihood options for women, young farmers, and vulnerable households and increasing the awareness and availability of vegetables and fruits, contributing to diet diversity and improved nutrition for women and children. On the other hand, the value chain approach seeks to address closely linked constraints in delivery of livestock services (animal health, animal breeding, genetics, and nutrition); market access; and price-quality relationships in an integrated manner resulting in improved livelihood incomes.

8. The proposed theory of change, aligned to the project development objective (PDO), aimed to provide a balance between the hardware and software components of the strategy as well as between private and public investments with a view to informing the larger NLP. Accordingly, the project interventions, outputs, intermediate results, and the desired outcomes are in line with the development objectives. It should be noted that the theory of change and the graphic above were reconstructed by the ICR team based on its interpretation of the original design, as the graphic on theory of change was not explicitly required in the PAD during project preparation.

Project Development Objectives (PDOs)

9. The PDO was to improve rural livelihoods and food security in selected *Aimags* and *Soums* through investments in enhanced productivity, market access and diversification in livestock-based production systems.

Key Expected Outcomes and Outcome Indicators

10. By unpacking the PDO we have two objectives: improved livelihoods and improved food security. The theory of change demonstrates that these two objectives can be achieved through (a) enhancing productivity, (b) diversifying livestock-based production systems, and (c) improving market access. The three are closely intertwined and mutually complement each other to ensure maximum impact. The demonstration of these integrated, market-driven approaches in a small geographic area (pilot) were intended to support pro-poor income growth and nutrition diversification through the production of horticultural products at the household level and in the process, provide successful intervention models for the Government of Mongolia (GoM) to replicate through the NLP.

11. The expected key performance indicators against which results will be measured are

- (a) Number of intended and actual direct beneficiaries, disaggregated by gender;
- (b) Increase in household income from livestock and in selected cases horticultural products;
- (c) Share of marketed products going through contracts and established companies;
- (d) Percentage of increase in output of livestock products (meat, milk, wool, cashmere); and
- (e) Change in per capita consumption of various food ingredients, disaggregated by gender and vulnerable groups



Components

12. The project consisted of three main components: (a) Linking Herders to Markets, (b) Raising Livestock Productivity and Quality, and (c) Project Management. Project activities were directed to multipurpose herder cooperatives within the selected *Soums*. These cooperatives were provided with advisory (extension) services in the areas of health and nutrition—including fodder production and improved breeds to improve the condition of animals to increase milk and meat as well as fiber production. Assistance for establishing livelihoods, especially in horticulture, and some access to markets, have also been provided to cooperatives, including those for poor and vulnerable households.

Component 1: Linking Herders to Markets (US\$6.26 million at appraisal, US\$4.23 million actual)

13. The objective of this component is to create productive partnerships by linking producers of livestock products (meat, fiber, milk, and horticultural products) to markets and diversifying the sources of income and household nutrition. The component also supported the traceability of products for participating herder cooperatives. The objective has been achieved through three specific subcomponents (a) Meat and Fiber Market Development, (b) Dairy Market Development; and (c) Pilot Horticulture Production.

Component 2: Raising Livestock Productivity and Quality (US\$4.23 million at appraisal, US\$4.98 million actual)

14. This component aims to ensure productivity increases and quality products for the markets. Support has been provided through extension services in the areas of animal health, nutrition, breed improvement, and feeding to improve the productivity of the five traditional species (sheep, goat, horse, cattle/yak, camel) within the seminomadic production system through breeding, feeding, and animal health. The target groups for support were the herder groups participating in Component 1 to ensure complementarity and synergy. It was composed of three subcomponents: (a) Promoting Animal health, (b) Animal Breeding and Genetic Improvement, and (c) Animal Nutrition.

Component 3: Project Management (US\$1.00 million at appraisal, US\$1.74 million actual)

15. This component supported the coordination of project activities and the fiduciary functions of the Project Implementation Unit (PIU) established by the MoFALI. The PIU was staffed and equipped to enable it to effectively carry out these activities. This component also financed incremental staff, consultants, operating costs, technical assistance, training, monitoring and evaluation (M&E) activities and impact assessments, information dissemination, and annual audits.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

16. The project was restructured once to (a) extend the project closing date by 11 months, from January 31, 2017, to December 31, 2017; (b) reallocate proceeds among the existing categories and (c) revise the project indicators and targets in the Results Framework. However, there was no change in the PDO, project components, and implementation arrangements.

Rationale for Changes and Their Implication on the Original Theory of Change



17. The project's midterm review by the World Bank was undertaken in April 2016. Restructuring of the project included minor changes in the Results Framework and some reallocation of the grant proceeds to provide additional resources for M&E.

- (a) **Extension of closing date.** The project extension was necessitated because of the delays in project effectiveness and starting of project implementation and help in finalizing the full implementation and delivering on all the expected results/PDOs. The project lost almost two years out of its original four years of implementation because of delays in effectiveness, changes in the original list of *Soums*, and the substantial delays in the engagement of technical service providers (TSPs) for field activities to start. These factors all contributed to the very slow start of implementation of field activities and the reporting on key performance indicators.
- (b) **Outcome indicators.** The PDO and the PDO--level results indicators remained unchanged too, except for the revision of the target value for Outcome Indicator 3 'share of marketed products going through contracts and established companies', which was rationalized from 100 percent to 30 percent. The target value of this outcome indicator was probably not thought through carefully at appraisal. Thirty percent seemed a more reasonable expectation considering that this was a new way of doing business and the project would do well in first introducing the use of contracts and established companies for opening new marketing avenues. While a formal contractual arrangement might have been a good vehicle for the livestock value chain, the structure of the project permitted investments in outputs like dairy without partnership arrangements. Likewise, investments in horticultural activities were targeted to poor households, established growers, and processors. These interventions were not really driven by the establishment of productive partnerships. As such to have a target of 100 percent for marketed output that would be sold through contractual arrangements or to the established companies was probably not realistic. The revision of this particular target to 30 percent from the appraisal target of 100 percent was a correction to better capture the reality of the project activities.
- (c) **Intermediate indicators.** Other revisions of the Results Framework were minor with a view to making it more realistic. Four intermediate indicators were removed or merged, because these were not measurable in the nomadic context or could result in double-counting for the same intervention (as in the case of several indicators on training) and some targets were also increased (for those which have already exceeded original targets).
- (d) **Reallocation of proceeds.** Reallocation of grant proceeds at midterm review was made to better reflect the actual demand of project interventions. The reallocation from 'unallocated' category was made to increase the amount for subgrants for demonstrating the impacts for herders and enhancing operating costs.

II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating (Rating: High)



18. The project remained highly relevant to both the Government livestock sector development strategy and the World Bank partnership priority throughout the project implementation and at completion. The project was designed to address the priority areas as contained in the Country Partnership Strategy (FY2013–2017), which emphasizes building a sustained and diversified economic base and addressing continued vulnerabilities in rural areas. The rapid expansion of the country's economy, driven by the mining boom, raised concerns that income inequality would increase and that rural areas could be left behind. The development of the livestock sector to support rural communities is an important aspect in addressing these inequalities.

19. The project also addressed the key issues in line with the NFSP and the NLP frameworks, which include

- (a) Formulating a favorable legal, economic, and institutional environment for sustainable development and good governance;
- (b) Improving animal breeding services and increasing the productivity and production of competitive, high-quality, and biologically clean products and raw materials;
- (c) Raising the veterinary service standard to international levels and protecting public health;
- (d) Developing livestock production that is adaptable to climatic, environmental, and ecological changes with strengthened risk management capacity; and
- (e) Developing targeted markets, establishing processing and marketing structures, and accelerating economic turnover through an incentive system.

20. The current relevance of the project is also reconfirmed by the ongoing preparation of a follow-on National Livestock and Agriculture Commercialization Project, which is being built upon the lessons and good practices generated by LAMP. More importantly, the project gains remain relevant under the current Country Partnership Strategy of the World Bank in Mongolia for “building a sustained and diversified basis for economic growth and employment in urban and rural areas, most especially for creating more opportunities in the rural economy for enhanced livelihoods.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome (Rating: Substantial)

21. The assessment of PDOs has been organized around each objective (measured by outcome indicators) and indicated in the PDO statement. Specifically, the assessment was conducted in three dimensions: (a) internal M&E results as shown in the Results Framework, (b) independent external evaluation carried out by a private research firm funded by GAFSP, with close technical due-diligence by the task team, and (c) component-wise implementation assessment in line with its contribution to the achievements of specific outcomes.

Achievement of Outcome as Shown in Internal M&E Results (Results Framework) and Independent External Evaluation as Mandated by GAFSP



22. In line with the GAFSP requirement, the external impact evaluation of the project using counterfactual analysis was conducted. A stratified random sampling process was used for the end line survey (ELS) and each stratum was weighted according to the (a) coverage of beneficiaries at *Aimag/Soum* levels and (b) size of livestock (and by size of land holding for horticulture households). The sample size was 1,800 with 900 households in treatment areas and another 900 households in control *Soums*. The survey results were corroborated with the findings from the key informant interviews. In addition, the PIU initiated annual household surveys to capture results from implementation back-to-back with the Government’s own annual livestock census, which was the core of the project’s M&E system.

23. At the completion of the project, both evaluation data sets drew converging conclusions that the project had achieved all the target values of all the five outcome indicators. Their respective evaluations are summarized in table 1.

Table 1. Evaluations of Outcome Indicators

Indicator	Results by Internal M&E	Results by External Evaluation
Objective/Outcome 1: Targeted coverage		
Number of intended and actual direct beneficiaries, gender disaggregated. Target: 8,110	13,684 direct beneficiaries, which is 69 percent higher than the target of 8,110, through a combination of investment, capacity-building, and information dissemination activities. Project records show 44:56 female-to-male ratio of beneficiaries (6,083 female, 7,601 male). Women’s participation was higher than expected, particularly for training and critical activities such as horticulture and fodder production.	Not covered.
Objective/Outcome 2: Improved livelihoods and diversification of livestock production system		
(GAFSP) Increase in household income from livestock and in selected cases horticultural products. Target: 20 percent	As the latest household survey results suggest, on average, the program increased the income of beneficiary households by more than MNT 3.0 million from livestock production and MNT 150,000 from horticulture production resulting in a total percentage increase of household income of 78 percent and 903 percent, respectively.	Overall, income increased by 44.3 percent. Compared to the baseline value, the annual household income from livestock increased by 88 percent and that from horticulture activities increased by 875 percent. These increases for treatment households was higher than control households by 27 percent higher from livestock and 274 percent from horticulture.
Objective/Outcome 3: Enhanced market access		
Share of marketed products going through contracts and established companies Target: 30 percent	Shares of marketed outputs, that is, meat, milk, wool, green fodder, hay, and potatoes (items agreed at midterm review) have reached 45 percent, 37 percent, 42 percent, 53 percent, 31 percent, and 50 percent respectively, overachieving the target of 30 percent.	Share of livestock products marketed through contracts was 57 percent (oral contracts contributing 43.1 percent and written contracts contributing 14.2 percent) of the produce. Likewise, 61.6 percent of horticulture produce was marketed through contracts and established companies (written contracts contributed to 8.8 percent



Indicator	Results by Internal M&E	Results by External Evaluation
		and oral contracts contributed to 52.8 percent). The share of livestock products marketed through contracts for treatment households was 7 percent more than the control group, while this difference was 25 percent for horticulture products.
Objective/Outcome 4: Enhanced productivity		
<p>Percentage of increase in output of livestock products (meat, milk, wool, cashmere) Target: 20 percent</p>	<p>Household survey results indicate highest percentage increase in cashmere output (66.8 percent) and the lowest in milk (20.1 percent). Wool and meat output increase were recorded at 25.2 percent and 37.2 percent, respectively. All figures exceed the target of 20 percent. A study by the Animal Nucleus Flock Breeding Center (ANFBC) showed that the amount of cashmere production increased from 260 grams to 400 grams per goat. At the same time fineness of the cashmere improved from 16.5 microns to 14.8 microns.</p>	<p>Average annual total output of meat was increased by 52 percent compared to the baseline value, which is 33 percent for milk, 22 percent for wool, and 48 percent for cashmere. Compared to control households those increases were substantially high, except for cashmere. Meat output was higher by 59 percent, milk output was higher by 395 percent, and cashmere output was higher by 10 percent, but wool production was lower by 1 percent when compared to the control households.</p>
Objective/Outcome 5: Improved food security		
<p>(GAFSP) Change in per capita consumption of various food ingredients, disaggregated by gender and vulnerable groups. Target: 5 percent</p>	<p>Consumption of key food items has increased by 18.75 percent on average. The LAMP household survey indicates 14 percent and 11 percent increase of horse meat and milk consumption, while carrot and sea buckthorn berry consumption increased by 25 percent for the medium household. Within the surveyed households, intake of the abovementioned items among women increased by 14.3 percent, 14.4 percent, 33.3 percent, and 50 percent respectively. The results for vulnerable households show an increase of 14 percent, 5.9 percent, 16.6 percent, and 10 percent, respectively.</p>	<p>The ELS shows increases in treatment households' per capita consumption of horse meat (47.6 percent), milk (36.6 percent), carrot (20.8 percent), and sea buckthorn (2.3 times) indicating improved nutrition and diet diversification. Consumption of additional food items such as potato, meat, sugar, and sweets were also observed to back up the assumption. It also reported that household food consumption became more diverse, including foods such as vegetables, pork, and chicken. Using the Household Diet Diversity Score measure, most households were in the high diversity group (treatment 67.3 percent and control 58.9 percent).</p>

Outcome Assessment by Component

24. LAMP activities under the components aligned closely with the PDO and there was a balance between provisions with public good characteristics and private sector investments. The project in its entirety and its individual components that formed the core of positive advances in agricultural value chains development and were piloted/demonstrated by the project, were fully achieved. LAMP



successfully achieved its development objectives in addressing constraints in market access, price-quality relationships, and livestock production (animal health, animal breeding, genetics, and nutrition). The results of the integrated, market-driven approaches exercised by the project in the 15 *Soums* provided models that the GoM has decided to replicate and scale up through its current and planned initiatives. In line with the causal relations between project interventions and the achievement of the PDO as shown by the theory of change, assessment of contribution by component to the achievements of specific outcomes is highlighted in the following paragraphs.

Component 1. Linking Herders to Markets

25. This component created productive partnerships by linking producers of livestock products (meat, fiber, milk, and horticultural products) to markets and diversifying sources of income and household nutrition. It also supported traceability of products for participating herder cooperatives. As such, the component directly contributed to the PDO outcome of (a) improved market access and (b) diversification in livestock-based production systems.

Case 1: Productive Partnerships in Meat Processing - Altain Surleg Nuruu LLC, Gobi-Altai

Problem. Small herders find it difficult to market their livestock at remunerative prices largely because of information asymmetry, long distances to organized markets, high transaction costs, and the exploitative behavior of local middle men.

Solution. LAMP facilitated productive partnerships between Altain Surleg Nuruu LLC, a meat exporter, and 350 local herders for regular supply of quality livestock for meat processing in Gobi-Altai Aimag. The company exported about 350 tons of meat to China during 2017. The project provided grant support of MNT 350 million (US\$145,000) against a total investment of MNT 1,150 million (US\$470,000) for expanding the plant capacity to slaughter up to 800 heads of small ruminants per day and upgrading processing technology and logistics infrastructure (freezer rooms, climate-controlled store houses, reefer vans, and so on). Under the arrangement, herders received technical advice on safety standards and support for improving livestock quality, besides price premiums for improved quality.



Links. The herders participating under the partnership are also linked to a local private veterinary unit (PVU) supported by LAMP. The *Aimag*-level laboratory provides health certification for the animals brought for slaughter.

Impact. The company slaughtered nearly 24,000 small ruminants during 2017 resulting in a 25 percent increase in unit value realization for 350 herder households due to quality premiums and savings in transaction cost. This translates into an aggregate increase of MNT 480 million (US\$192,000) in the first year of partnership. In addition, the enterprise provides full-time employment for 12 persons and part-time

employment for nearly 60 persons, when running on full capacity

Future outlook. Altain Surleg Nuruu LLC signed contracts for meat exports to Hong Kong and is negotiating with importers in Turkey and Iran to export meat in 2018. The company has plans to diversify its product offering by producing dumplings, sausages, and heat-treated products.

26. **Assessment.** Under the meat, fiber, and dairy subcomponents, 129 beneficiary entities (coops) were supported involving a total of 29 subprojects, amounting to US\$3.3 million. The subprojects included meat production, wool cleaning and processing, milk processing units, potato farming, and greenhouse vegetable production. This yielded a good foundation for productive partnerships throughout the selected



value chain. Matching grants served as a catalyst for cooperatives and agribusiness enterprises to leverage their private capital and commercial bank loans to deepen their service offering and enter into productive partnerships (formal contracts) with herder households. Micro grants delivered against production/business plans helped vulnerable groups build their productive assets and diversify livelihoods.

- (a) Meat and Fiber Development: A meat processing facility in Gobi Altai has started to export their meat products and has plans to further expand its demand for meat from the local herders. Besides promoting industrial processing of meat and meat products, the subprojects promoted product quality standards at the *Aimag* and *Soum* levels to improve sales. Marketing hubs, beyond the rural areas, were also established in Ulaanbaatar.
- (b) Pilot Horticulture Production: A total of 68 subprojects on horticulture, worth US\$1.2 million, have been disbursed and have directly benefitted 3,978 individuals from 787 households. More importantly, this included 203 female-headed households with less than the national average number of animals and 858 households with incomes below the minimum income level. In addition, 1,167 unemployed people were covered by the project, of which 610 or 52 percent are women. Horticulture production, aside from increasing household income and improving food security and diet diversification, also contributed to solving environmental issues, which fostered rehabilitation and development of green areas in the *Aimags* and *Soums*.

Component 2. Raising Livestock Productivity and Quality

27. This component strengthened the provision of advisory (extension) services in the areas of animal health and nutrition (including fodder production). It provided improved breeding animals to herder cooperatives to enhance livestock productivity and quality of meat, milk, and fiber production within the context of a seminomadic production system. It focused on supporting the NLP (2010), upgrading health services and disease surveillance, and strengthening the foot-and-mouth disease (FMD) and brucellosis control campaign. The breeding program aimed at improving the economic traits of animals, while preserving indigenous sheep and cashmere goat breeds consistent with the National Law on Genetic Resources. As such, the component directly contributed to the PDO outcome of enhanced productivity.

28. **Assessment.** Matching grants provided against business/service delivery plans helped herder households to access livestock services. Extension materials (several of them in digital format) were prepared and shared through capacity-building sessions and social media. LAMP also undertook collaborative research on Brucellosis surveillance for breeding, cost-benefit analysis of lamb feeding rations, and cashmere goat and sheep breed improvement.

- (a) Promoting Animal Health: The project strengthened the disease surveillance infrastructure and laboratory services; cold chain vehicles for ensuring vaccine quality; and front-end delivery of veterinary and breeding services by supporting 8 *Aimag*-level veterinary divisions, 15 *Soum*-level veterinary and animal breeding units (VABUs), 40 PVUs, and 6 buffer zones check points, with the total investment of US\$0.8 million. The project demonstrated, for the first time, that with the use of refrigerated vehicles for drugs and vaccine transportation, temperature and humidity could be controlled, thus ensuring the quality of vaccines delivered right up to the herder level.



- (b) Animal Breeding and Genetic Improvement: 41 subprojects, with a total investment of US\$1.4 million, procured 6,635 heads of breeding young sires and rams which resulted in 15 percent to 20 percent increase in productivity. The project established 20 male flocks and 19 nucleus flocks and initiated efforts to increase their number based on intensive usage of modern biotechnological methods such as artificial insemination (AI) and embryo transfers. The screening of livestock, in 2017, showed that 33.2 percent of ewes and 27.5 percent of does met selection standards for breeding, representing an increase of 11.4 percent and 8.1 percent, respectively, over 2015.
- (c) Animal Nutrition: The project also invested in 24 subprojects on animal nutrition with an investment of US\$1.7 million resulting in (a) fodder development of over 1,014.9 ha producing 1,050 tons of green fodder and 465 tons of natural hay and (b) production of 125 tons of mineral bricks and 14 tons of salt bricks.

Case 2: Animal Breed Improvement - Animal Nucleus Flock Breeding Center, Zavkhan

Problem. Low livestock productivity partly because of the collapse of the breeding services delivery and resultant inbreeding.

Solutions. Leveraging the technical capacity of ANFBC, Zavkhan, for collaborative research and a pilot



methodology was developed for expanding the coverage of nucleus flocks in the project area and enabling genetic improvement of the herds based on continual selection from a putatively genetic superior population. LAMP financed the ANFBC MNT 200 million (approximately US\$80,300) for procuring and distributing high-quality animals for breeding purposes. The ANFBC also undertook collaborative research for cashmere goat and sheep breed improvement of 'Sartuul' and 'Zavkhan

Buural' breeds.

Impact. The ANFBC was able to increase its coverage by 80 percent by engaging with 540 herders for breed improvement when compared to their service capacity of 300 herders. These herds also saw an increase in good quality animals during the project period by 26.1 percent when compared to previous years. On the productivity front, the research shows significant increase in productivity. For instance, the quantity increase of cashmere produced by livestock of targeted herders was almost 53 percent, while the quality of cashmere measured in terms of the thickness of the fiber also improved to 14.8 microns compared to the national average of 16.5 mm. This translates into an increase in the average cashmere income generated per livestock by 41 percent (considering both the increase of weight and the value of decrease of microns).

Caveat. The duration left in the project was too short to see the results of the additional step of genetic selection.

Component 3. Project Management

29. This component supported the coordination of project activities, including M&E, impact assessments, information dissemination, and the fiduciary functions of the PIU established by the Ministry of Industry and Agriculture (MoIA). The PIU was supported by consultants, who were equipped to enable it to effectively carry out these activities.



30. **Assessment.** The PIU was responsible for day-to-day activities of the project under the overall guidance of the assigned Director General in the MoFALI, reporting technical and financial progress to the Project Steering Committee (PSC) semiannually. The project’s comprehensive M&E system had a positive impact on the overall efficiency and effectiveness of the project, which provided timely data and analysis for identifying implementation bottlenecks while generating robust evidence for reporting results around the theory of change. The project piloted several novel approaches, such as (a) extension service delivery through public-private partnerships, (b) deployment of risk capital in the form of matching grants, and (c) livelihoods and incomes needing professional facilitation at the local level. The PVUs and TSPs supported both the delivery of animal health care services and other extension services, organizing cooperatives and helping them develop business plans for raising investments from the project and local banks. The key organizing principle of the project organization was to facilitate partnerships between agribusiness and producers and incorporate local government offices as crucial partners in the implementation process. The experience gained by them in the implementation of the project greatly contributed to the drafting of the new Animal Health Law and Animal Breeding Law.

C. EFFICIENCY

Assessment of Efficiency and Rating

Rating: Substantial

31. A cost-benefit analysis was conducted to reassess the project’s economic viability at the Implementation Completion and Results Report (ICR) stage using the same approach as at project appraisal. The project has generated a variety of benefits, including (a) increase of productivity of livestock products (especially for mutton and cashmere for benefits of the breeding interventions); (b) efficiency gains in processing, marketing, and transporting value-added products; (c) reduced losses and mortality of animals due to improvement in breeding and animal health services; and (d) reduced risks due to improved techniques of protecting livestock against severe weather conditions (*dzud*) and improved techniques in animal nutrition. Project costs are those that are incurred during project implementation, including production tools and equipment; labor costs; raw materials; utilities (water, electricity, and heating); and maintenance costs.

32. In line with the Project Appraisal Document (PAD) analysis and review of the actual project activities, the subproject models cover the following major areas: (a) small-scale slaughterhouse; (b) milk processing units; (c) wool cleaning factory; and (d) vegetable production, processing, and marketing. Depending on the types of project activities, models have been based on the implementing entities, which are cooperatives, small and medium enterprises (SMEs), and individual herders.

33. The total net present value (NPV) of the net benefit of the project was calculated at MNT 32,842.4 million (US\$13.5 million), with an economic internal rate of return (EIRR) of 35 percent. As shown in table 2, the EIRRs for the individual subprojects and the project as a whole are all higher than the opportunity cost of capital (12 percent), which confirms that the project was economically viable.

Table 2. Economic Internal Rate of Return (ERR) of Project Activities



Component	Models	EIRR (percent)	
		At Appraisal (PAD)	At Completion (ICR)
1. Linking Herders to Markets	1. Meat production: Slaughterhouse	56.0	57.9
	2. Meat storage	—	25.3
	3. Wool cleaning and processing	77.0	33.1
	4. Milk processing units: dairy	74.0	13.2
	5. Potato farming	—	23.9
	6. Greenhouse (cucumber and tomato)	—	13.9
	7. Sea buckthorn	—	24.2
	8. Mixed vegetable	100.5	49.1
2. Raising Livestock Productivity and Quality	9. Reducing livestock loss due to diseases	—	94.5
	10. Increasing productivity of sheep and goat meat	—	
	11. Increasing productivity of wool and cashmere	—	
	12. Oat	—	22.3
	13. Oat and hay	—	61.7
	14. Mixed fodder	14.0	19.9
	15. Mineral bricks	-	31.6
Overall		42.0	35.0

34. Other critical benefits of LAMP were strengthening animal health and breeding capacities both in *Soum* and *Aimag* levels through investing in laboratory equipment, vehicles, high-value nucleus flocks for small ruminants, capacity building, and so on. The annual total benefit of reducing livestock loss and improving livestock productivity of meat and hair was calculated at MNT 4,561.1 million (US\$1.87 million) with an EIRR of 94.5 percent and an NPV of MNT 26,110 million (US\$10.7 million).

35. **Implementation efficiency.** The project implementation was slower in the initial period because of procedural challenges in hiring TSPs and, consequently, delaying preparation of business plans, approval, and implementation of subprojects. Frequent turnover and transitions in project leadership also contributed in part to inefficiencies. However, it should be noted that the project efficiency was noticeably improved particularly during the late stage of implementation, resulting in the achievement of the PDOs and virtually full disbursement of loan proceeds within the revised closing date.

36. Based on results of the efficiency analysis and the project administrative efficiency, the rating on project efficiency is Substantial.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

37. Based on the evaluation, the project’s relevance has been rated High for the project’s full convergence with the priorities in the World Bank Country Partnership Strategy for Mongolia for FY2013–2017 both, at the appraisal and ICR stages. Its efficacy has been rated Substantial considering its satisfactory achievement of the PDOs and efficiency has been rated Substantial for its profitability and long-term significant benefits. As such, the overall outcome rating is Satisfactory for the project.



E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

38. Ensuring gender equality was among the priority issues addressed by the project. Women in Mongolia are not considered to be disempowered in both business and everyday life. However, proper balance in implementation of the project with regard to gender equal participation and making sure that beneficiaries have equal access to all the project interventions was adequately considered. The project developed a Social Participation and Gender Mainstreaming Strategy. It was reviewed and endorsed at a regular PSC meeting in February 2015, before the actual launch of project interventions in the field upon completion of TSPs' selection and their dispatch to *Soums* for adoption.

39. Orientation training materials in line with the Social Participation Gender Mainstreaming Strategy were developed and disseminated to the project staff, TSPs, local government officials, and other stakeholders. To adequately implement the strategy, local focal points on gender and social participation were selected in *Soums* (*Soum* social affairs officer). They were appointed as members of the *Soum* Steering Committee to ensure female participation in the subprojects and provide them with priority access to horticulture microgrants. A total of 13,684 people benefited from LAMP, of which 6,083 or 44 percent were female beneficiaries. Among the total beneficiaries of 68 microgrants that supported livelihood and food security, 1,368 were women and 1,092 were men.

Institutional Strengthening

40. The project worked with the newly formed VABUs strategically to build their capacity within their established mandate, while using subcontracting and informal groups for the delivery of services, especially extension services. The herder groups and/or cooperatives owned nucleus herds, while male breeding flocks were owned and managed by breeding cooperatives affiliated with private veterinarians.

41. The project developed and implemented a capacity-building program consisting of a series of training packages, that reached beneficiaries in all *Soums*, on cooperative development, organizational structure, accountability, and reporting. These training sessions complemented one-on-one capacity building provided by *Soum*-based TSP consultants to actual beneficiaries who received investments. This combined approach was designed mainly for beneficiaries of microgrants in horticulture and matching grants in nutrition/fodder production because they were composed of lower-income and less-experienced cooperatives, which were partly newly established. The institutional capacity of the cooperatives and SMEs that received matching grants in meat, dairy, and fiber was also strengthened. The project focused on creating market links for them within *Aimags* and with Ulaanbaatar and introducing the concept of value chain. Several partnership agreements in meat and fiber were signed among the beneficiary entities. This laid a foundation for better access to markets beyond individual *Soums* and *Aimags* that ultimately supported the institutional capacity of cooperatives and SMEs.

Mobilizing Private Sector Financing

42. The project leveraged private investment in the livestock sector and established partnerships with the private sector in extension and veterinary service. The private sector demand-driven activities had a central role in project design and implementation. The inclusion of partnerships between the private sector processors and herder groups were facilitated by a service provider. The PVUs and the TSPs



supported both the delivery of animal health care services and other extension services, organizing cooperatives and helping them develop business plans for raising investments from the project and local banks. The project was quite successful in facilitating productive (public-private) partnerships for both livestock productivity enhancement and income diversification of herder households. Forage investments were tied to market opportunities for meat, dairy, and fiber. Effective national animal health care delivery requires appropriate division of responsibilities and an effective partnership between public and private veterinary service providers. The project, through introduction of its matching grant scheme, successfully managed to mobilize significant private investments at the local level. The most critical aspect of this process was mobilization of financing from rural cooperatives and SMEs. Conservative estimates put the leveraged financial resources from private sector, cooperatives, and individuals at a minimum of US\$7 million, which is about twice the amount of matching grants invested in value chain development.

Poverty Reduction and Shared Prosperity

43. The project had a specific subcomponent, Pilot Horticulture Production, to deal with poverty reduction among vulnerable households. Microgrants up to US\$10,000 were provided to groups of low-income female-headed households, unemployed persons, or herders who owned less than the national average number of animals. These microgrants were effectively targeted at poor and vulnerable people to help them produce vegetables and fruits to diversify their income sources and nutrition. The proper combination of physical assets provided, and capacity building made a real change in their performance. The *Soum* social affairs officer was a member of each *Soum* Coordination Committee to ensure priority access for vulnerable groups to microgrants.

44. As presented in the earlier section on gender, the project financed 68 microgrants. Among the beneficiaries of microgrants, 1,167 were unemployed and 610 were unemployed women. To boost their knowledge and capacities, the beneficiaries received training in horticulture, fodder nutrition, and processing vegetables into ready-to-eat products like pickles. Increased public awareness and understanding on livelihoods, social welfare and food security status of households living under minimum subsistence level and need for shared prosperity was reached.

45. Besides microgrants, the project has invested in specific initiatives to support animal health; animal breeding; animal nutrition; and processing of meat, dairy, and fiber. All initiatives targeted the improvement of the livestock operations environment, which resulted in impacts for all people in the project area, including vulnerable households which have limited number of livestock. Better services delivered by veterinarians, breeders, processing cooperatives, and SMEs had a positive impact on the livelihoods of vulnerable groups through a spillover effect. Faster and more efficient services also laid the foundation for higher-quality and safer livestock-based products.

Other Unintended Outcomes and Impacts

Not Applicable.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

46. **Setting priorities right.** The GAFSP was designed in close consultation with the MoIA and stakeholders (including donors and nongovernmental organizations). Five key areas were identified to be



addressed. These priority issues were in line with the NFSP and the NLP framework (see Section 1.A. Context).

47. **Innovations in project design.** The project design adopted a value chain approach for the livestock sector development, linking animal breeding, animal health, and animal nutrition activities within the same *Soums*. It has proven that the coordinated interventions are effective and efficient and informed the national policy and recently enacted Animal Health Law and Animal Breeding Law. More importantly, considerations for market demand were factored in to ensure ready markets for improved livestock production.

48. **Results Framework and M&E.** Overall, the Results Framework was sound with PDO indicators aligned with operational objectives. Some indicators and the targets could have been realistic considering the nomadic and pastoral livestock systems contexts, which were later rationalized during restructuring. The M&E was, however, properly designed with baselines and clear targets. Methodologies, frequencies, and responsibilities for data collection to evaluate the achievement of the PDOs were clearly defined and followed through during implementation.

49. **Adequacy of risk and mitigation measures identification.** Critical risks on project implementation capacity and sustainability and private sector involvement were adequately identified and the corresponding mitigation measures were integrated in the project design. The overall project risk was rated Moderate after mitigation measures were identified for all risks, which were rated either Substantial or Modest.

B. KEY FACTORS DURING IMPLEMENTATION

(a) Factors Subject to Government Control

50. The Government set up the PSC, provided policy advice, and oversaw implementation to ensure coordination across three components of LAMP. The committee's composition changed during the project implementation on many occasions. The project coordinator served as secretary to the PSC and was responsible for implementation of the board's decisions.

51. The MoFALI established a Technical Working Group to provide technical experts from the ministry to assist in project implementation. The Technical Working Group convened, as needed, for cases where technical aspects of project interventions required specific expertise beyond capacities of the PSC and the PIU.

52. The GoM had, during project implementation, adopted key strategic documents to guide and support agricultural development and improve national food security, including the extension of the NLP and in 2015, the Parliament adopted the new national 'State Policy on Food and Agriculture'. More recently, in September 2016, the new Government issued the Government Action Plan 2016–2020, where livestock and crop agriculture play a central role, that initiates the 'Healthy Food – Healthy Mongolian' national program as an umbrella campaign for several programs that placed strong focus on (a) livestock and agriculture competitiveness and export; (b) sustainable rangelands management and climate change; (c) bringing veterinary services up to international norms and standards; and (d) establishing a favorable tax, legal, and business environment for agriculture.



53. Unfortunately, the project lost almost two out of the four years because of delays in effectiveness. Furthermore, the engagement of TSPs required for field activities were also delayed substantially. The slow start up of implementation was also because of the changes to the pilot *Soums* (letter from the GoM dated May 28, 2014), which seriously affected the commencement of field activities and the reporting on key performance indicators.

54. Project implementation was also negatively affected by the reorganization in the management of the executing agency (MoFALI). Over the course of project implementation, six ministers and five state secretaries oversaw project implementation. Each change in project oversight and management caused delays in decision making and processing of the technical and financial documents. The longest delays were associated with changes in the PSC's chairmanship in 2015 and 2016 and the signatory authorization in 2016, that lasted 4, 3, and 3.5 months, respectively.

55. Changes in the political leadership also posed risks of shifting priorities away from attaining the original objectives. At times there were attempts to shift the focus of the project to non-planned activities. Consultations with the World Bank helped avoid such shifts and this took a lot of time and caused delays in project implementation.

(b) Factors Subject to Implementing Agency Control

56. **Dedication and professionalism of the PIU contributed to good project implementation.** The PIU was staffed with well-qualified technical and project management specialists and carried out its activities. The PIU successfully mobilized local government offices as key partners in facilitation of productive partnerships. The PIU contributed to the successful implementation of innovations such as extension services delivery through public-private partnerships (with the TSPs and PVUs) and provided professional facilitation for income-generating practices for livelihood improvement. The PIU, by sharing the good practices gained by the project, contributed to the formulation of the recently enacted Animal Health Law and Animal Breeding Law.

57. **Adequate financial management, safeguards mechanisms, and M&E system were in place during the project implementation.** The PIU made efforts to ensure that all project interventions were consistent with the fulfillment of the PDOs (including synergy of components). The PIU led the preparation of the Project Implementation Manual (PIM), Matching Grants Manual, Environmental Management Plan (EMP), Social Participation and Gender Mainstreaming Strategy, and Communication Strategy. The use of the guidelines ensured comprehensiveness and thoroughness of the M&E System.

58. **A participatory approach was adopted in designing and implementing the project activities.** Male and female community members were consulted in the identification, selection, and the implementation of the proposed subprojects. Attention was paid to identifying capable women's groups (formal and informal) during the recruitment process. Additionally, needs assessments identified special requirements for training and technical support needed by women's groups, and the training programs were tailored accordingly.

59. **Procurement and the management information system (MIS) could have been managed better.** During the project implementation, the PIU should have standardized the procurement procedures, instead of creating different bid evaluation committees for different procurement packages, which



resulted in inefficiency and inconsistency in the decision-making process. The project MIS should have been better maintained at the completion of the project.

(c) Factors Outside the Control of Government and/or Implementing Entities

60. The outbreak of FMD in the project sites at the later stage of project implementation impaired the free movement of animals/animal products, thus negatively affecting breeding and fodder production under the project.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

61. The project followed the guidance provided by the M&E plan, prepared by the GAFSP Steering Committee,¹ with some adaptation for the technical assistance and capacity development nature of the project. The M&E design was in line with the theory of change, outlining how the project activities of each component would contribute to achieving the PDO. The core design of the M&E system included implementation progress and performance review through the MIS, external baseline studies, surveys, and impact assessments. Evaluation was envisaged using internal (annual household surveys) and external evaluation and the conduct of independent and external baseline, midterm, and ELs.

Implementation

62. The overall responsibility for project monitoring, evaluation, and reporting rested with the PIU. The day-to-day duties were carried out by an M&E officer at the PIU who worked closely with the *Soum* coordinator in each *Soum*. M&E training was provided for the specific monitoring tasks to be fulfilled.

63. Implementation progress and performance were assessed in line with the indicators identified in the Results Framework and were supplemented by detailed project management reports and financial management reports in a format agreed upon with IDA. Baseline studies, surveys, and impact assessments were carried out for project activities at specified times. Evaluation was carried out using internal evaluation and independent external impact evaluation.

64. **Internal evaluation.** The PIU M&E officer coordinated all project evaluation activities based on the performance indicators of the results-based monitoring and evaluation framework. The PIU management carried out its own assessment at various stages of project implementation and consolidated the findings in an Annual Report. A comprehensive evaluation report was provided by the PIU at project completion. The PIU also organized periodic workshops inviting key project stakeholders to discuss and consolidate their views and findings for the preparation of the Annual Reports and the final evaluation report.

65. **Independent external impact evaluation.** All GAFSP projects are required to undergo an independent evaluation of implementation. The objective of the independent impact evaluation is to examine fully the achievements of the PDOs, the level of income generation, and food security. The GAFSP

¹ <http://www.gafspfund.org/gafsp/content/monitoring-and-evaluation>.



signed an agreement with the Development Impact Evaluation Initiative to carry out a baseline survey for GAFSP projects and Mongolia agreed to this additional support (which was financed by the GAFSP and was outside the US\$11 million allocated for the project). The midterm review evaluation and end line survey were conducted by an independent Mongolian private research firm.

Utilization

66. The comprehensive M&E system of the project had a positive impact on the overall efficiency and effectiveness of the project, which provided timely data and analysis for identifying implementation bottlenecks, while generating robust evidence for reporting results around the project's theory of change. The unique arrangement for the M&E system calibrated the results for a fair and rigorous assessment of implementation and completion.

67. As part of the progress and process monitoring activities, the PIU organized regular field visits and organized mid-year meetings and annual M&E meetings to discuss the implementation challenges and capture knowledge and learning. The use of geo-referencing of MIS data and annual household surveys (since 2014) were key innovations in M&E. The geo-referencing allowed project management to have an overview of locations for demonstrations, male flocks, nucleus flocks, forage sites, horticulture sites, permanent veterinary yards, and beneficiaries' locations on the map. The annual surveys leveraged the national census data collection methodology during winters to capture incremental data for the critical indicators in the Results Framework.

Justification of Overall Rating of Quality of M&E

Rating: Substantial

68. Overall M&E is rated 'Substantial' based on (a) a generally satisfactory design with a clearly structured theory of change (the design provides for the causal links between project intervention and PDO-level outcomes); (b) generation of baseline data before start of project implementation and conduct of midterm and end line surveys, as planned; (c) good implementation arrangements with both internal and external M&E; and (d) effective utilization of M&E data to identify and address implementation issues.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

69. **Environmental and social safeguards.** The project triggered two safeguard policies: Environmental Assessment (OP 4.01) and Pest Management (OP 4.09). Therefore, an EMP was devised and approved by the World Bank before project effectiveness. Overall, the environmental impacts associated with the project were considered limited.

70. The project's EMP implementation performance has been rated Satisfactory. This finding was confirmed during the midterm review when a safeguards mission was undertaken from May 7 to 20, 2016, by the World Bank and during the implementation support mission undertaken from September 12 to 22, 2017, when the mission carried out field visits and the team's environmental specialist reviewed implementation on-site.

71. During project implementation, a PIU specialist, with adequate background and skills, was assigned with the tasks to cover the environmental safeguards issues. Training on environment safeguards was executed by the PIU specialist and a hired national trainer on two levels: (a) training of trainers (from



the TSPs) that trained beneficiaries (cooperatives and SMEs) and (a) training of stakeholders at the national and local levels (*Aimag* and *Soum* environmental safeguard inspectors). Training courses targeted all aspects of liquid and solid waste management under sectors covered by LAMP, that is, meat, dairy, fiber, nutrition, and horticulture in accordance with the EMP. The ultimate objective of the training courses was to ensure the adequate mainstreaming of environmental protection measures in the development and implementation of subprojects under LAMP.

72. Beneficiary entities in meat, dairy, and fiber, whose proposals envisioned certain construction activities and were deemed to potentially trigger OP 4.01, were requested to undertake an environmental assessment (either generic or detailed) depending on the scale of their expected operations. This requirement was incorporated in the Grants Manual and adherence to it was closely monitored by the project. Only those applicants meeting this requirement were declared eligible for matching grants in addition to eligibility criteria set forth in the Grant Agreement and Grants Manual. A special clause on compliance with the EMP, including a Pest Management Plan was incorporated in Tripartite Agreements signed with each of the beneficiary entities. No usage of pesticides was foreseen and revealed at the nutrition and horticulture subprojects given the limited scale and value of production. Thus, the Pest Management (OP 4.09) safeguard policy was not triggered.

73. **Social safeguards.** The project did not trigger any social safeguard-related policies. There was no resettlement nor was any land acquisition required during the project life. Also, there was no presence of ethnic minorities in the project areas. The project performance was satisfactory in key social development issues such as inclusion of vulnerable groups and in the gender and citizen's engagement fronts. LAMP targeted project interventions, particularly microgrants to female-headed households and vulnerable households. A vulnerable household was defined as 'a household with herd size less than 100 animals, whose household head is illiterate, with disabled household members, and/or having lower income than subsistence level'. The project developed a gender mainstreaming strategy to incorporate gender issues in project implementation and results management.

74. A total of 13,684 people benefited from LAMP, of which 6,048 or 44 percent were female beneficiaries. The project supported 787 vulnerable households through microgrants, out of which, 203 were female-headed households. These microgrants effectively targeted poor and vulnerable people to help them produce vegetables and fruits to diversify their income sources and nutrition. Besides microgrants, the project invested in specific interventions for enhancing service delivery in the areas of animal health, animal breeding, animal nutrition, and processing of meat, dairy, and fiber.

75. The project systematically engaged citizens and stakeholders through half-yearly reviews for improving project efficiency and effectiveness. Nearly 58.2 percent of the participating households have reported satisfaction in delivery of veterinary services compared to 49.1 percent by the control group (SICA ELS Report). The project did not have a dedicated grievance handling mechanism but leveraged the ministry's own grievance and accountability systems at the *Aimag* and *Soum* levels.

76. **Financial management.** In compliance with fiduciary requirements, the required interim financial reporting and annual audit reports were submitted to the World Bank on time and all the project audits were unqualified. Supervision missions regularly reviewed project accounts and procedures to ensure compliance with fiduciary requirements. Financial management assessment was carried out during preparation and concluded that, with some actions taken to strengthen the project's financial management capacity, the financial management arrangements were satisfactory based on the project's



minimum requirements. A Financial Management Manual was prepared to guide project implementation. World Bank supervision missions regularly reviewed the project financial management procedures being followed in the project to ensure that fiduciary requirements were being complied with at all levels. Although the World Bank's missions initially noted some financial management weaknesses, such as insufficient and incomplete supporting documents for expenditures and lack of systematic accounting records, the PIU took these issues seriously and remedial actions were taken to resolve the problems.

77. **Procurement.** As assessed during project preparation, the key risks associated with the project procurement was inexperience of the implementing agency in handling World Bank investment operations and its unfamiliarity with the World Bank's procurement procedures. To mitigate the risks, the prior planned mitigation measures were undertaken. For example, intensified procurement training sessions were conducted by the World Bank for key staff of the PIU and the ministry and a user-friendly and detailed Project Operational Manual was developed. However, in the initial phase of the project implementation, procurement processing was slow. The reasons were largely the risks identified at project preparation as mentioned earlier and frequent changes of the decision-making officials at the ministry. The PIU was staffed with competent members, including a procurement officer. Though the project hit the ground running, it required significant support from the World Bank. One of the challenges faced was the establishment of different bid evaluation committees for different procurement packages of the project leading to involvement of too many layers in the decision-making process. In some instances, the World Bank had to return the contract award recommendations because the justifications provided for rejecting the lowest bidders were inadequate. All the planned project contracts were implemented and were concluded before the project closing date. Procurement physical verification and technical compliance reviews were conducted several times during the supervision missions. In all cases, the equipment and machinery inspected were found to be of adequate quality and used for the purposes intended.

C. BANK PERFORMANCE

Quality at Entry

78. The project design was guided by the findings of contemporary analytical work and a review of best practices during the technical missions in September and November 2011. It also drew on the positive experience gained under the Sustainable Livelihood Project as well as the work of the Swiss Development Cooperation (Green Gold Project), and U.S. Agency for International Development Mercy Corp business development projects in the Gobi Region. The major lessons learned relate to the need for private sector, demand-driven activities to have a central role in project design and implementation. Hence, the inclusion of partnerships between private sector processors and herder groups to be facilitated by a service provider. Forage investments were tied to market opportunities for meat, dairy, and fiber. Effective national animal health care in an environment dominated by private smallholders requires appropriate division of responsibilities and an effective partnership between public and private veterinary service providers.

79. Previous attempts at genetic improvement lacked sustainability due to lack of secure public funding. Hence, the project worked with private herders and only a small component (genetic analysis) would later require Government support. In horticulture, market orientation and storage facilities to extend the marketing season were important.



Quality of Supervision

80. The World Bank supervision missions have been fielded regularly with a relatively stable team. The supervision teams were quick to find and were upfront with the key implementation issues such as delays and problematic procurement procedures. Notwithstanding the delays in decision making at the Government level (see section on factors within government control), in the early stages of project implementation, the task team could have been more proactive in coming up with alternative solutions to make up for the lost time, for example, aligning the PIM with the legal agreement and commencing the first household survey to reflect the changed composition of *Soums*. On the positive side, the team adhered to the original project objectives and designed project interventions without yielding to undue pressure from the Government.

81. The World Bank missions have accorded due attention to project sustainability, particularly for enterprises and cooperatives financed through the matching grant scheme. Market development was always emphasized by the supervision missions to ensure the financial sustainability. The supervision missions were candid and fair with the ratings of the project implementation status. Moderately Unsatisfactory ratings had been recorded in the early stage implementation to reflect the project delay and issues to be addressed. In general, the World Bank task team maintained a good working relationship with the counterparts throughout the project implementation.

Justification of Overall Rating of Bank Performance

Rating: Satisfactory

82. Overall, the World Bank performance is rated Satisfactory based on (a) satisfactory quality at entry for the innovative project design and appropriate implementation arrangements; (b) overall good quality supervision to address implementation and sustainability issues; and (c) candid and fair ratings of implementation status.

D. RISK TO DEVELOPMENT OUTCOME

83. The risk to development outcome is rated Moderate. For the public goods, supported under the project and which require continued budget allocations beyond the lifetime of the project, there is a risk that public budget will not be available after project completion. Currently, this risk can be addressed through the Government's planned follow-up operation on key livestock and agriculture programs. This will, however, depend on the Government's appetite in institutionalizing the project innovations and interventions in its regular programs and allocating enough budgetary resources to be able to do this beyond the project's geographical scope and to further deepen these in the project areas.

84. At the enterprise/local levels, many of the investments under the project (value chains, vegetable production, and so on) do not depend on the Government's continued support beyond the project's lifetime. The project was designed in such a way that each proposal financed through the matching grant scheme meets financial and technical sustainability requirements. However, for these enterprises to grow links would be required with the formal financial sector.

85. A couple of technical aspects including climate risks, such as water availability for horticulture crops and hay farming enterprises/cooperatives and quarantine restrictions imposed for preventing



outbreaks of animal diseases, can potentially disrupt the businesses and the links, thus affecting growth opportunities.

V. LESSONS AND RECOMMENDATIONS

86. Based on the review of project documentation, MIS, qualitative and quantitative studies, and stakeholder interactions the mission has listed the following lessons from LAMP implementation:

- (a) **Innovative project design using a value chain approach for the livestock sector development has contributed to the national policy formulation and emerging legal framework.** By connecting the dots between animal breeding, animal health, and animal nutrition activities within the same *Soums*, LAMP not only demonstrated efficacy of its coordinated interventions, but also informed the national policy and recently enacted Animal Health Law and Animal Breeding Law.
- (b) **Public services (such as animal health and breeding) delivered effectively and efficiently using private sector solutions through unique fee-for-service models.** The project strengthened the public-private partnership by making targeted cold chain interventions for ensuring timely supply of quality vaccines. Likewise, it developed business models for animal nutrition and animal breeding services (nucleus flocks) for overall improvement in productivity and quality of livestock. Partnership between the Government and the private sector can be done through performance-based contracts or output-based contracts to ensure greater efficiency and wider reach among herders.
- (c) **Matching grants served as effective risk capital instruments for meeting the twin policy objectives of building a productive assets base and completing markets in the last mile.** Microgrants helped vulnerable households invest in productive assets, thus kick-starting their livelihoods for increasing and diversifying consumption. Cooperatives and private sector enterprises used matching grants to leverage private capital/bank loans to deepen their service offerings and enter into productive partnerships (formal contracts) with herder households. Matching grants could be institutionalized under the Government's own program for incentivizing local governments and private sector for achieving higher productivity and unit value realization in the livestock sector development by shifting a portion of subsidies that are currently incentivizing production incentives to more sustainable basis of productivity and quality outcomes.
- (d) **Collaborative research initiatives brought refreshing insights through research, innovation, and knowledge transfer in no small measure.** The Public extension system has nearly collapsed in the country. The Government needs to expand and strengthen the local extension service delivery system for systematic research dissemination and adoption, particularly, in areas relating to climate-smart farming, production/processing, and affordable water technologies to enhance market competitiveness and improve access to markets.
- (e) **Risk reduction initiatives undertaken by LAMP have shown good results but require ecosystem services to thrive.** Fodder production has been demonstrated in enhancing



livestock productivity and mitigating risks related to extreme weather. After achieving a triple increase in production of hay and fodder production the year before, the overall production fell, by one-third, due to intense drought conditions.

- (f) **Frequent outbreak of transboundary animal diseases (TAD) such as FMD and PPR across the international border adversely affect industry's growth and competitiveness.** The free movement of animals/animal products are severely impaired during any FMD scare alert from a far-off *Aimag*. The FMD free-zones in the past could not be secured by localized measures in isolation. Animal health requires coordinated control activities by various government authorities for systematic vaccine procurement, vaccination campaigns, disease surveillance, and the evaluation of the effectiveness of outbreak control measures.

- (g) **A PIU integrated with implementation structures of national programs for livestock and animal health created opportunities for sustaining and mainstreaming LAMP achievements.** The strategic leadership of the project embedded in the MoFALI structure with the PIU providing technical backstopping for certain critical functions and enhancing capabilities for innovative delivery systems ensured stability in the operating environment of the project.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: The Project Development Objective (PDO) is to improve rural livelihoods and food security in selected Aimags and Soums through investments in enhanced productivity, market access and diversification i

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
(GAFSP) Number of intended and actual direct beneficiaries, gender disaggregated	Number	0.00 30-Aug-2013	8110.00 31-Jan-2017	12000.00 31-Dec-2017	13684.00 31-Dec-2017

Comments (achievements against targets): Internal MIS showed participation of 6,083 female beneficiaries (44 percent) and 7,601 male beneficiaries (56 percent)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
(GAFSP) Increase in household income from livestock and in selected cases horticultural products.	Percentage	0.00 30-Aug-2013	20.00 31-Jan-2017	20.00 31-Dec-2017	73.90 31-Dec-2017
From Livestock	Amount(USD)	1572.90	1887.50	1887.50	2736.20



		30-Aug-2013		31-Dec-2017	31-Dec-2017
From horticulture products	Amount(USD)	6.80	8.20	8.20	61.80
		30-Aug-2013		31-Dec-2017	31-Dec-2017

Comments (achievements against targets): Independent external evaluation showed 73.9 percent increase in income from livestock and nearly 9 times increase from select horticulture activities. This increase was 27 percent higher than the income increase from livestock for control households.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Share of marketed products going through contracts and established companies.	Percentage	0.00	100.00	30.00	45.00
		01-Jan-2013	31-Jan-2017	31-Dec-2017	31-Dec-2017

Comments (achievements against targets): Independent external evaluation showed that 45.0 percent of meat, 37.0 percent of milk, 42.0 percent of wool, 52 percent of green fodder, 31 percent of hay and 50 percent of potatoes produced were marketed through both, informal and written contracts.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percentage of increase in output of livestock products (meat, milk, wool, cashmere)	Percentage	0.00	20.00	20.00	51.80
		30-Aug-2013	31-Jan-2017	31-Dec-2017	31-Dec-2017
Increase in meat output	Metric tons/year	0.50	0.60	0.60	0.76
		30-Aug-2013		31-Dec-2017	31-Dec-2017



Increase in milk output	Liter	1996.00 30-Aug-2013	2395.00	2395.00 31-Dec-2017	2657.60 31-Dec-2017
Increase in wool output	Metric tons/year	0.14 30-Aug-2013	0.17	0.17 31-Dec-2017	0.17 31-Dec-2017
Increase in cashmere output	Metric tons/year	0.03 30-Aug-2013	0.04	0.04 31-Dec-2017	0.05 31-Dec-2017
Comments (achievements against targets): Independent external evaluation showed increase in milk production by 33.1 percent, wool by 21.6 percent and cashmere by 47.8 percent.					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
(GAFSP) Change in per capita consumption of various food ingredients, disaggregated by gender and vulnerable groups.	Percentage	0.00 30-Aug-2013	5.00 31-Jan-2017	5.00 31-Dec-2017	47.60 31-Dec-2017
Per capita consumption of horse meat	Metric tons/year	2.10 30-Aug-2013	2.20	2.20 31-Dec-2017	3.10 31-Dec-2017



Per capita consumption of milk	Liter	27.10 30-Aug-2013	32.50	32.50 31-Dec-2017	31.80 31-Dec-2017
Per capita consumption of carrots	Metric tons/year	1.20 30-Aug-2013	1.30	1.30 31-Dec-2017	1.50 31-Dec-2017
Per capita consumption of sea-buckthorn	Metric tons/year	0.20 30-Aug-2013	0.21	0.21 31-Dec-2017	0.50 31-Dec-2017

Comments (achievements against targets): Independent external evaluation showed increases in treatment households’ per capita consumption of horse meat (47.6%), milk (36.6%), carrot (20.8%) and sea buckthorn (2.3 times) indicating improved nutrition and diet diversification. Using the Household Diet Diversity Score (HDDS) measure, most households were in the high diversity group (treatment 67.3%, control 58.9%).

A.2 Intermediate Results Indicators

Component: Linking Herders with Markets

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of functioning productive partnerships	Number	0.00 30-Aug-2013	15.00 31-Jan-2017	60.00 31-Dec-2017	64.00 31-Dec-2017

Comments (achievements against targets): Internal MIS



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase of farm production under improved post-harvest management (i.e. value chains) (GAFSP)	Percentage	0.00 30-Aug-2013	20.00 31-Jan-2017	20.00 31-Dec-2017	47.00 31-Dec-2017
Comments (achievements against targets): Green fodder and hay: 47 percent and Potatoes and other vegetables: 50 percent					
Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of herder cooperatives linked to markets	Number	0.00 30-Aug-2013	15.00 31-Jan-2017	40.00 31-Dec-2017	86.00 31-Dec-2017
Comments (achievements against targets): Internal MIS					
Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
No. of women trained and engaged in horticulture production	Number	0.00 30-Aug-2013	50.00 31-Jan-2017	700.00 31-Dec-2017	1270.00 31-Dec-2017
Comments (achievements against targets): Internal MIS					



Component: Raising Livestock Productivity and Quality

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of herders who have adopted improved animal husbandry technologies (GAFSP indicator) disaggregated by gender	Number	0.00	8000.00	5000.00	6125.00
		30-Aug-2013	31-Jan-2017	31-Dec-2017	31-Dec-2017

Comments (achievements against targets): Internal MIS showed gender disaggregation for this indicator: female participation of 3,105 (51 percent) and male participation of 3,020 (49 percent)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of collaborative research	Number	0.00	5.00	5.00	5.00
		30-Aug-2013	31-Jan-2017	31-Dec-2017	31-Dec-2017

Comments (achievements against targets): Internal MIS showed collaborative researches completed: 2 in animal health, 2 in animal breeding, 1 in animal nutrition.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased sheep reproductive rate	Percentage	0.00	5.00	5.00	12.00
		01-Jan-2015	31-Jan-2017	31-Dec-2017	31-Dec-2017



Comments (achievements against targets): Internal MIS showed number of offspring produced by the breeding animals supplied by the Project and declared by the benefitting nucleus and male flock handlers (in total 1,780 young animals including 1085 lambs, 659 goat kids, 36 calves were received from 2,379 invested breeding animals)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased sheep carcass weight	Percentage	0.00	5.00	5.00	5.00
		01-Jan-2015	31-Jan-2017	31-Dec-2017	31-Dec-2017

Comments (achievements against targets): 2,379 animals were measured in May 2017: spring live weight (sheep) 46.9 kg (relative carcass weight increase 5.9 percent), spring live weight (goats) 33.7 kg (relative carcass weight increase 6.3 percent) and spring live weight (cattle) 329 kg (relative carcass weight increase 1.7 percent)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of target groups with use or ownership of land under forage production	Number	0.00	60.00	30.00	40.00
		01-Jan-2015	31-Jan-2017	31-Dec-2017	31-Dec-2017

Comments (achievements against targets): Internal MIS showed 4 were female headed households

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of herders participating in training and awareness events	Number	0.00	8000.00	8000.00	8000.00
		01-Jan-2015	31-Jan-2017	31-Dec-2017	31-Dec-2017



Comments (achievements against targets): Internal MIS (Training and events participants: 7,450 i.e. Male: 4,552 and Female: 2,898). In addition number of herders who were reached with awareness events that include media campaigns through TV and radio broadcasts, as well as hand-outs and materials distributed (19 types of extension materials including 3 types of hand-outs in 8,000 copies each, 10 types of video lessons, 140 minutes of TV nation-wide broadcast, 114 minutes of nation-wide radio broadcast, etc.)

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Existence and use of cold chain and SOPs for vaccines and sample transportation	Number	0.00 01-Jan-2015	5.00 31-Jan-2017	5.00 31-Dec-2017	5.00 31-Dec-2017

Comments (achievements against targets): Internal MIS showed vaccine cold chains exist and operate in 5 Aimags. Project supplied refrigerated vehicles to 5 Aimags and vaccine refrigerators to 15 Soums veterinary and breeding units (VABUs), successfully establishing and strengthening Aimag cold chains.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Genetics and breeding - no. of nucleus flocks established	Number	0.00 30-Aug-2013	5.00 31-Jan-2017	11.00 31-Dec-2017	19.00 31-Dec-2017

Comments (achievements against targets): Internal MIS

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Genetics and breeding - no.	Number	0.00	1500.00	1500.00	2904.00



of improved males distributed from nucleus flock		30-Aug-2013	31-Jan-2017	31-Dec-2017	31-Dec-2017
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Comments (achievements against targets): Internal MIS: Number of improved sires distributed from male flocks established by the Project for animal breeding beneficiaries.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Genetics and breeding - number of AI operators trained	Number	0.00 30-Aug-2013	90.00 31-Jan-2017	90.00 31-Dec-2017	90.00 31-Dec-2017

Comments (achievements against targets): Internal MIS

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Feeds and feeding - ha of land allocated to forages at the soum	Number	0.00 30-Aug-2013	3000.00 31-Jan-2017	2000.00 31-Dec-2017	2288.00 31-Dec-2017

Comments (achievements against targets): Internal MIS

Component: Project Management

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
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Efficient and effective project management	Text	0.0 30-Aug-2013	Project management rated Satisfactory 31-Jan-2017	Project management rated Satisfactory 31-Dec-2017	Project management rated Satisfactory 31-Aug-2017
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Comments (achievements against targets): World Bank supervision ratings, etc.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Quality of the financial reports and audits	Text	n/a 30-Aug-2013	Financial reports and audits rated Satisfactory 31-Jan-2017	Financial reports and audits rated Satisfactory 31-Dec-2017	Financial reports and audits rated Satisfactory 31-Dec-2017

Comments (achievements against targets): World Bank supervision ratings, etc.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Quality of project progress reports	Text	n/a 30-Aug-2013	Project reports rated Satisfactory 31-Jan-2017	Project reports rated Satisfactory 31-Dec-2017	Project reports rated Satisfactory 31-Dec-2017

Comments (achievements against targets): World Bank supervision ratings, etc.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
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Quality of the M&E reports	Text	0.0	M&E reports rated Satisfactory	M&E reports rated Satisfactory	M&E reports rated Satisfactory
		30-Aug-2013	31-Jan-2017	31-Dec-2017	31-Dec-2017

Comments (achievements against targets): World Bank supervision ratings, etc.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of participants in M&E workshops, training events, seminars, conferences etc (disaggregated by gender and affiliation)	Number	0.00	600.00	600.00	685.00
		30-Aug-2013	31-Jan-2017	31-Dec-2017	31-Dec-2017

Comments (achievements against targets): Internal MIS showed participation of females: 376 (55 percent) and participation of males: 308 (45 percent). This included civil servants: 378 and private sector: 307

A. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Targeted coverage	
Outcome Indicators	Number of intended and actual direct beneficiaries, gender disaggregated



Objective/Outcome 2: Improved livelihoods and diversification of livestock production system	
Outcome Indicators	Increase in household income from livestock and in selected cases horticulture products
Intermediate Results Indicators	<ol style="list-style-type: none"> 1. Number of women trained and engaged in horticulture production 2. Number of herders participating in training and awareness events
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	<ul style="list-style-type: none"> • 68 subprojects for fruits and vegetables production • 88 trainings sessions were organized covering 8000 trainees
Objective/Outcome 3: Enhanced market access	
Outcome Indicators	Share of marketed products going through contracts and established companies
Intermediate Results Indicators	<ol style="list-style-type: none"> 1. Number of functioning productive partnerships 2. Number of herder cooperatives linked to markets
Key Outputs by Component (linked to the achievement of the Objective/Outcome 3)	<ul style="list-style-type: none"> • 37 subprojects for value chain development
Objective/Outcome 4: Enhanced productivity	
Outcome Indicators	Percentage of increase in output of livestock products (meat, wool and cashmere)
Intermediate Results Indicators	<ol style="list-style-type: none"> 1. Increase of farm production under improved post-harvest management (i.e. value chains) (GAFSP) 2. Number of herders who have adopted improved animal husbandry technologies (GAFSP) 3. Increased sheep reproductive rate 4. Increase sheep carcass weight 5. Genetics and breeding – Number of nucleus flocks established



	<p>6. Genetics and breeding - Number of improved males distributed from nucleus flock</p> <p>7. Genetics and breeding – Number of AI operators trained</p> <p>8. Number of target groups with use or ownership of land under forage production</p> <p>9. Feeds and feeding - ha of land allocated to forages at the <i>Soum</i></p> <p>10. Number of collaborative research</p>
<p>Key Outputs by Component (linked to the achievement of the Objective/Outcome 4)</p>	<ul style="list-style-type: none"> • Cold chain for animal vaccines established in 15 <i>Soums</i> • 40 PVUs supported • 15 <i>Soum</i>-level VABUs upgraded • 5 <i>Aimag</i> veterinary divisions and laboratories upgraded • 6 buffer zones check points established • 19 nucleus flocks for Montbeliarde cattle and Alpine dairy goats supported • 24 cooperatives and entities supported in animal nutrition
<p>Objective/Outcome 5: Improved food security</p>	
<p>Outcome Indicators</p>	<p>Change in per capita consumption of various food ingredients, disaggregated by gender and vulnerable groups</p>



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

B. TASK TEAM MEMBERS	
Name	Role
Preparation/Supervision	
Charles Annor-Frempong	Senior RD Specialist Task Team Leader (Preparation)
Stephane Forman	Sr Agriculture Specialist - Task Team Leader (SPN)
Andrew D. Goodland	Program Leader – Task Team Leader (Inception)
Gerelgua Tserendagva	Procurement Specialist
Badamchimeg Dondog	Public Sector Specialist
Dulguun Byambatsooi	Financial Management Specialist
Giovanni Bo	Counsel
Carolina V. Figueroa-Geron	Lead Rural Development Economist
Erdene Ochir Badarch	Social Safeguards Specialist
Feng Ji	Senior Environmental Specialist
Iftikhar Mostafa	Senior Agriculture Economist
Jonathan Miles McKenna	Analyst
Ning Yang	Environmental Safeguards Specialist
Ria Nuri Dharmawan	Counsel
Sylvester Kofi Awanyo	Practice Manager
Yiren Feng	Senior Environmental Specialist
Arailym Murat	Program Assistant
Gantuya Paniga	Senior Program Assistant
ICR	
Sitaramachandra Machiraju	Senior Agribusiness Specialist - Task Team Leader (ICR)
Gerelgua Tserendagva	Procurement Specialist
Erdene Ayush	Financial Management Specialist
Carolina V. Figueroa-Geron	Lead Rural Development Economist
Erdene Ochir Badarch	Social Safeguards Specialist
Ning Yang	Environmental Safeguards Specialist
Arailym Murat	Program Assistant
Extended Team – Food and Agriculture Organization of United Nations	
Bolor Battengel	Monitoring and Evaluation Consultant
Ganzorig Gonchigsumlaa	Economic and Financial Analysis Consultant
Paul Boettcher	Animal Breeding and Genetics Specialist
Xueming Liu	Senior Project Economist



C. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY11	4.400	28,244.83
FY12	13.388	260,957.46
FY13	16.050	151,704.97
FY14	2.800	23,602.70
FY15	.625	857.13
FY16	4.500	4,847.04
FY17	1.250	50,040.51
FY18	0	0.00
Total	43.01	520,254.64
Supervision/ICR		
FY14	6.200	31,223.04
FY15	11.689	121,846.21
FY16	14.709	135,677.97
FY17	43.608	321,406.47
FY18	19.035	264,723.35
FY19	0	65,000.00
Total	95.24	939,877.04



ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US\$, million)	Actual at Project Closing (US\$, million)	Percentage of Approval
Component 1: Linking Herders with Markets	6.26	4.23	68
Component 2: Raising Livestock Productivity and Quality	4.23	4.98	118
Component 3: Project Management	1.00	1.74	174
Total	11.49	10.95	95



ANNEX 4. EFFICIENCY ANALYSIS

Introduction

1. LAMP benefitted 13,684 people not only in the target 15 *Soums*, but also in neighboring *Soums* and *Aimags*. The significant benefits were anticipated for strengthening cooperatives and increasing their incomes through investments for income-generating activities, including meat, fiber, dairy, horticulture, and fodder production. Other critical benefits of LAMP were strengthening animal health and breeding capacities both at the *Soum* and *Aimag* level through investing in laboratory equipment, vehicles, high-value nucleus flocks for small ruminants, capacity building, and so on.
2. The efficiency analysis was built on a cost-benefit analysis to assess how LAMP benefits to the society are more than its costs, using enterprise data of the 46 beneficiary subprojects and the National Statistical Office (NSO) and ELS data.
3. All income-generating activities were financially viable as the financial internal rates of return (FIRRs) were higher than the opportunity cost of the capital (12 percent social discount rate). Overall, the project EIRR was calculated at 35 percent, which is a robust result against the scenario of reduction of net benefits and occurrence of harsh *dzud*. In the PAD, the EIRR was estimated at 42 percent (table 4.1).

Table 4.1. Summary of EIRR of LAMP

Component	Models	EIRR (percent)	
		At Appraisal (PAD)	At Completion (ICR)
1. Linking Herders to Markets	1. Meat production: slaughterhouse	56.0	57.9
	2. Meat storage	—	25.3
	3. Wool cleaning and processing	77.0	33.1
	4. Milk processing units: dairy	74.0	13.2
	5. Potato farming	—	23.9
	6. Greenhouse (cucumber and tomato)	—	13.9
	7. Sea buckthorn	—	24.2
	8. Mixed vegetable	100.5	49.1
2. Raising Livestock Productivity and Quality	9. Reducing livestock loss due to diseases	—	94.5
	10. Increased productivity of sheep and goat meat	—	
	11. Increased productivity of wool and cashmere	—	
	12. Oat	—	22.3
	13. Oat and hay	—	61.7
	14. Mixed fodder	14.0	19.9
	15. Mineral bricks	—	31.6
Overall		42.0	35.0

4. The PDOs were achieved and costs were highly disbursed for targeted activities. Based on results of an efficiency analysis, the rating of the efficiency of the project is Substantial.



Project Benefits and Beneficiaries

5. LAMP has shown significant benefits to the local communities through building capacities of cooperatives, private companies, and local government organizations. Basically, the benefits could be divided into two broad categories: (a) income-generating activities and (b) non-income-generating activities, although both supplement each.

6. The benefits of the income-generating activities include economic profits earned from production of meat, fiber (wool), dairy, horticulture, and fodder totaling 121 subprojects (cooperatives/companies) under Components 1 and 2 of LAMP (excluding animal health and breeding). The benefits of those economic activities were mostly for herders who are the members of cooperatives in the 15 target *Soums* of 5 *Aimags*² (hereafter, target *Soums*).

7. The benefits of the non-income-generating activities were actually generated from 110 subprojects of two subcomponents of Component 2 of LAMP: (a) Promoting Animal Health and (b) Animal Breeding and Genetic Improvement. A total of 40 PVUs, 15 *Soum* VABUs, 8 *Aimags* veterinary divisions and laboratories, and 6 buffer zone check points were invested in by LAMP for promoting animal health in the region. For animal breeding, LAMP invested to establish and strengthen 20 small ruminant (sheep and goat) male flocks, 19 nucleus flocks, 1 Montbeliarde cattle, and 1 Alpine dairy goat. The benefits of the non-income-generating activities include benefits of saving livestock from loss due to animal diseases and the incremental gain of having more meat and hair output (wool/cashmere) per head of sheep and goat, which were measured in monetary terms for economic analysis.

Methodology

8. A conventional cost-benefit analysis was used for the efficiency analysis first for the financial models of the income-generating subprojects, which was then converted to the economic analysis.

9. Financial analysis was built on enterprise data and from the data key financial parameters (investment cost, total income, and total operational and general costs) were converted to economic parameters for economic analysis using the standard conversion factor (SCF) of Mongolia. In the conversion process, the taxes (including value added tax, income tax, social insurances) were removed from the analysis to eliminate the policy failure in prices for economic analysis. Furthermore, another assumption used for converting the financial model to the economic model, the salary of family labor was valued at 50 percent (assumed) of the hired labor salary and accounted in the cost, which happened to horticulture farming activities, oat farming, and oat and hay farming activities.

10. For non-income-generating activities, two types of benefits were valued in monetary terms for calculating the economic benefits of supporting animal health and breeding activities by LAMP. First, livestock loss due to diseases is reduced, which is based on comparison of loss data between treatment

² Chuluut, Tsahir, and Tsetserleg *Soums* of Arkhangai *Aimags*; Bayantsagaan, Galuut, and Jargalant *Soums* of Bayankhongor *Aimags*; Bugat, Tsogt, and Tsel *Soums* of Gobi-Altai *Aimags*; Otgon, Tsetsen-Uul, and Yaruu *Soums* of Zavkhan *Aimags*; Burentogtokh, Tosontsengel, and Tunel *Soums* of Khuvsgul *Aimags*.



(or target) *Soums* of LAMP and control (or non-target) *Soums*.³ Second, LAMP treatment households had higher rate of meat and hair output per small ruminant (sheep and goat) compared to control households, which is evidenced by the ELS data of SICA (research institute hired by the World Bank to conduct the ELS for the LAMP ICR).

11. There was significant difference identified for comparing the economic benefits of the PAD and actual implementation for livestock breeding services. In the PAD, one of the projected activities to be held under animal breeding was AI for cattle, although during project implementation several tries failed and, hence this activity had to be stopped because (a) there was no demand for having AI for cattle from local herders who were not intensive livestock farmers; and (b) the cost of liquid nitrogen used for AI for cattle was too high to transport from the Veterinary and Animal Breeding Agency at Ulaanbaatar to the target *Soums*. Instead, LAMP did AI for small ruminants (sheep and goats). The process of AI for small ruminants were simple to apply as there was no need to have the liquid nitrogen, but fresh semen was taken from healthy sires and was directly used to artificially inseminate the small female ruminants. This approach was highly demanded by the local herders.

Data Collection

12. For financial analysis, the enterprise data template was distributed to all 121 income-generating subprojects (excluding animal health and breeding, and marketing projects); 67 templates were filled although 46 were qualified for analysis. Twelve types of enterprise models were developed by the collected data as described in table 4.2.

Table 4.2. Subprojects and Sample Size of Enterprise Models

Component	Subcomponent	Models	Number of Subprojects	Sample Size for Modelling
1. Linking Herders to Markets	1a: Meat and Fiber Market Development	1. Meat production: slaughterhouse	10	5
		2. Meat storage	5	3
		3. Wool cleaning and processing	4	2
	1b: Dairy Market Development	4. Milk processing units: dairy	10	4
	1c: Pilot Horticulture Production	5. Potato farming	7	7
		6. Greenhouse (cucumber and tomato)	9	4
		7. Sea buckthorn	6	1
		8. Mixed vegetable	46	6
2. Raising Livestock Productivity and Quality	2c: Animal Nutrition (Fodder Production)	9. Oat	7	7
		10. Oat and hay	4	4
		11. Mixed fodder	10	1
		12. Mineral bricks	3	2
Total			121	46

Source: LAMP PIU.

³ Control *Soums* include Tariat, Undur-Ulaan, and Erdenemandal *Soums* of Arkhangai *Aimag*; Bogd, Jinst, and Ulziit *Soums* of Bayankhongor *Aimag*; Biger, Jargalan, and Tugrug *Soums* of Gobi-Altai *Aimag*; Aldarkhaan, Durvuljin, and Tsagaankhairkhan *Soums* of Zavkhan *Aimag*; and Tumurbulag, Jargalant, and Ikh-Uul *Soums* of Khuvsgul *Aimag*. The ELS was done for 900 control households in these *Soums* by SICA, a research organization in Mongolia. LAMP and the World Bank ICR team agreed with these control *Soums*.



13. The data of livestock loss due to diseases at the *Soum* level and livestock price data per head at the *Aimags* level was obtained from the NSO's online database, www.1212.mn. The mortality rate per *Soum* was compared between treatment and control *Soums*. The difference was treated as the benefit of LAMP, that is, treatment *Soums* had lower mortality rates than the control *Soums* (except for three *Soums* of Khuvsgul Aimag). The number of livestock that could be saved from death due to diseases was calculated as the number of livestock multiplied by the reduced mortality rate (difference of mortality rate between target and control *Soums*).

14. Furthermore, ELS data was used to calculate the potential increase of meat and hair output of sheep and goats compared to treatment and control *Soums*. According to ELS data, it was calculated that meat output per sheep (goat) for treatment household is 1.06 kg (0.73 kg) higher than the control household. Therefore, wool (cashmere) output per sheep (goat) for a treatment household is 55 grams (11 grams) higher than a control household. The incremental gain of meat output per head was multiplied by the number of slaughtered sheep and goat (summation of number of livestock slaughtered for sale and home consumption) using the NSO data at each target *Soum*. The incremental gain of wool/cashmere output per sheep/goat was multiplied by the number of sheep and goat for wool/cashmere production (number of sheep/goat at the beginning of 2017 minus livestock loss assuming that the loss happened before hair production) using the NSO data at each target *Soum*.

15. The investment cost data for each income-generating subproject and total project cost data was provided by the LAMP PIU.

Assumptions for Financial Analysis

- One enterprise model was developed based on the average of selected sample templates filled by subprojects (table 4.2).
- Taxes included social insurance (10 percent of hired labor cost) and enterprise net income tax (10 percent of net income). Agricultural activities were exempted from value added tax by law in Mongolia.
- Useful lives of investment items is 20 years and salvage value is 5 percent of the investment cost.
- All subprojects start 100 percent operation from fourth year, except the meat slaughterhouse.
- Subprojects represent cooperatives and most of them are newly established for LAMP, hence it was assumed that the 'without project' scenario is set to zero, or no former activities for cooperatives.

Assumptions for Economic Analysis

General Assumptions

- For calculation of EIRR, a 20-year time line was used.



- For NPV calculation, a 12 percent social discount rate was used.
- U.S. dollar exchange rate: US\$1 = MNT 2,440; which was the average of monthly rates in 2017.
- Prices of output and input were set for 2017, which holds for calculation of future values.

Income-generating Activities

- The SCF of Mongolia, in 2017, was calculated to be 0.937 meaning that the opportunity cost of outputs and inputs of production could be equal to 93.7 percent of their domestic prices. The total financial incomes and costs were converted by the SCF.
- The salary of family labor was valued at 50 percent of the hired labor salary and treated in the cost of the production.
- All taxes were removed from the financial models for economic analysis to assess the viability of the project without government policy distortions.
- To extrapolate the one enterprise model results to all subprojects, net income per turgrik of investment (return on investment) was multiplied by the total investment of each subproject.

Non-income-generating Activities

- The benefit of animal health and breeding and fodder production and livestock loss due to diseases was reduced in treatment *Soums* compared to control *Soums*.
- The average price of livestock was calculated as the average of male and female livestock, obtained from the NSO.
- The average incremental gain of meat and hair output per sheep and goat in *Soums*, calculated based on ELS data, represents the benefit of the animal health, breeding, and nutrition interventions of LAMP in treatment *Soums*.
- The number of slaughtered sheep and goat for meat production equals the sum of slaughtered livestock for sale and home consumption in target *Soums*.
- The number of sheep and goat for wool/cashmere production equals the total number of livestock in the beginning of 2017 minus livestock loss (assuming the loss occurred before wool/cashmere preparation).

Financial and Economic Analysis for Income-Generation Activities

16. Table 4.3 shows the financial viability and FIRRs and EIRRs and for the 12 income-generating enterprise models, for a year of 100 percent operation.



Table 4.3. Financial Indicators of the Economic Activities of LAMP

Models	Main Outputs		Total Revenue (MNT, millions)	Total Production Cost (MNT, millions)	Taxes (MNT, millions)	Net Profit (MNT, millions)	Hired Labor (Person days)	Family Labor (Person days)	Return to Labor ^a (MNT per person day)	Investment (MNT, millions)	FIRR (percent)	EIRR (percent)
	Quantity	Units (Type of product)										
1. Meat production: slaughterhouse	449,867	Kg (Meat of goat, sheep, cattle, and horse)	2,109.7	1,906.1	27.6	176.0	978	0	179,944	287.4	47.7	57.9
2. Meat storage	77,533	Kg (Meat of goat, sheep, cattle, and horse)	382.3	293.2	5.9	83.3	260	0	320,392	292.1	23.7	25.3
3. Wool processing	157,500	Units (Woollen felt)	797.3	681.6	8.1	107.6	3,195	0	33,673	188.8	30.9	33.1
4. Milk processing units: dairy	3,893	Kg (Curd)	55.4	18.3	3.5	33.6	435	128	59,748	213.4	12.1	13.2
5. Potato farming	10,614	Kg (Potato)	5.1	2.4	0.2	2.5	8	29	67,426	9.8	24.5	23.9
6. Green house	1,319	Kg (cucumber and tomato)	4.3	1.7	0.2	2.4	1	19	119,540	16.2	13.7	13.9
7. Sea buckthorn	500	Kg (Sea buckthorn berry)	4.3	1.0	0.3	3.0	20	34	56,046	9.1	23.8	24.2
8. Mixed vegetable	9,777	Kg (Potato, cucumber, turnip/need, cabbage, carrot)	8.8	2.9	0.5	5.4	14	74	61,457	10.3	51.1	49.1
9. Oat	109,286	Kg (Oat)	38.4	18.2	2.0	18.2	215	58	66,756	84.3	20.6	22.3
10. Oat and hay	338,875	Kg (Oat and hay)	86.6	41.9	3.9	40.8	225	52	147,449	67.8	56.9	61.7
11. Mixed fodder	250,000	Kg (Oats, rye, and barley)	60.0	25.1	3.5	31.5	354	0	88,814	139.7	17.9	19.9
12. Mineral bricks	69,500	Kg (Mineral bricks)	200.4	89.9	11.2	99.3	1,440	0	68,987	271.8	28.7	31.6

Source: Calculations done based on filled templates by enterprises (beneficiary subprojects)

Note: ^a The net profit was divided by total (hired and family) labor.



17. The highest financial and economic returns was identified for 'oat and hay' farming. Oats were identified as being very resistant to drought, especially in 2017; apart from that, the fodder producers used their tractors for natural hay harvest and sold it in the market.

18. The dairy and milk processing unit has the lowest financial and economic performance with regard to FIRR and EIRR, although, both are above the benchmark of 12 percent of economic cost of capital. This is because of the high costs incurred in collecting raw milk, poor road conditions, and distance from herders. In the PAD, the milk processing unit was assumed to have much more higher capacity of milk processing plants, although at implementation stage that was not the case.

19. For horticulture cooperatives, growing mixed vegetables gives the highest return (FIRR 51 percent and EIRR 49 percent), but greenhouse (cucumber and tomato) farming was at survival level of feasibility.

Economic Analysis for the Whole Project

20. The livestock loss because of diseases might be reduced because LAMP invested in strengthening the VABUs and PVUs at the *Soum* level, *Aimag* veterinary divisions and laboratories, and buffer zone check points. LAMP also invested in breeding services to strengthen the livestock resistance to harsh climatic conditions, and fodder production. The *Soum*-level statistics reveal that the mortality rate in the treatment *Soums* decreased over the last four years, while target *Soums* experience higher mortality rates compared to control *Soums* especially in Khuvsgul *Aimag* (table 4.4).

21. Table 4.4 shows the number of livestock that could be saved from livestock loss because of diseases, which reached 4,660 heads of livestock equating MNT 411.1 million (US\$0.17 million) in 2017.



Table 4.4. Benefit of Reducing Livestock Loss due to Diseases

Aimag ^a	Livestock Type	Number of Livestock that could be Saved from Loss due to Diseases ^b	Livestock Price in 2017 (MNT per head)	Total Benefit of Reducing Livestock loss due to Diseases (MNT)
Arkhangai	Camel	0.0	705,167	0
	Horse	8.9	453,542	4,022,011
	Cattle	180.5	513,740	92,707,024
	Sheep	4,416.1	72,827	321,614,764
	Goat	661.0	51,923	34,321,699
Bayankhongor	Camel	0.0	537,919	0
	Horse	-4.0	413,860	-1,655,440
	Cattle	7.0	499,119	3,511,766
	Sheep	-3.0	69,619	-208,857
	Goat	-6.0	49,031	-294,186
Gobi-Altai	Camel	1.4	736,113	1,026,817
	Horse	9.2	583,185	5,382,353
	Cattle	2.3	658,465	1,530,533
	Sheep	53.8	80,773	4,346,702
	Goat	367.6	50,717	18,644,069
Zavkhan	Camel	0.0	497,292	0
	Horse	2.1	433,719	898,271
	Cattle	10.7	609,240	6,500,073
	Sheep	-1.0	72,165	-72,165
	Goat	0.6	43,004	25,214
Khuvsgul	Camel	0.0	597,067	0
	Horse	-8.5	460,654	-3,915,499
	Cattle	-46.0	477,104	-21,924,651
	Sheep	-404.5	67,583	-27,340,648
	Goat	-588.3	47,140	-27,734,329
Total		4,660	—	411,385,521

Source: Calculated using NSO data in 2017.

Note: ^a There are three treatment *Soums* in each *Aimag*, other *Soums* were not considered in the calculation.

^b The mortality rate difference between control and treatment *Soums* within the *Aimag* was multiplied by the total number of livestock in treatment *Soums*. Here, negative values represent that in this *Aimag*, the mortality rate was higher in treatment *Soums* than the control *Soums*, but is 4,660 livestock overall, assuming that it is due to LAMP animal health, breeding, and nutrition activities.

22. ELS data show that slaughtered sheep (goat) weighted 1.06 kg (0.73 kg) more for treatment households compared to control households. This produces a benefit of MNT 2,954 million (US\$1.21 million) for the treatment *Soums* in 2017.



Table 4.5. Benefit of Increasing Meat and Hair Output of Sheep and Goat

Aimags	Total Incremental Benefit of Increasing Meat Production (MNT) ^a			Total Incremental Benefit of Increasing Hair Production (MNT) ^b			Total
	Mutton	Goat Meat	Total	Sheep Wool	Goat Cashmere	Total	
Arkhangai	493.9	140.7	634.5	24.1	93.0	117.1	751.6
Bayankhongor	256.3	197.9	454.3	32.1	249.1	281.1	735.4
Gobi-Altai	191.8	239.8	431.6	22.7	325.9	348.7	780.3
Zavkhan	383.9	151.4	535.3	21.5	125.6	147.1	682.5
Khuvsgul	652.6	246.1	898.7	48.6	252.6	301.3	1,200.0
TOTAL	1,978.5	975.9	2,954.4	149.0	1,046.2	1,195.3	4,149.7

Source: Calculated using NSO and ELS data.

Note: ^a Number of slaughtered sheep and goat was multiplied by incremental meat output per head (ELS data)

^b Number of sheep and goat used for hair production was multiplied by incremental hair output per head (ELS data).

23. Similarly, based on ELS data, sheep wool (goat cashmere) weighed 55 grams (11 grams) more for treatment households than the control households. In total, MNT 1,195 million (US\$0.49 million) of benefits were accrued from increasing wool/cashmere productivity for the treatment *Soums* in 2017.

24. The annual total benefit of reducing livestock loss and improving livestock productivity of meat and hair was calculated at MNT 4,561.1 million (US\$1.87 million) with an EIRR of 94.5 percent and NPV of MNT 26,110 million (US\$10.7 million).

25. Table 4.6 shows the calculations of the total economic benefit of LAMP.

26. The total NPV of the net benefit of LAMP in 20 years (2017–2020) was calculated at MNT 32,842.4 million (US\$13.5 million), with an EIRR of 35 percent. The result shows that the project was highly economically efficient as the EIRR was much higher than the 12 percent social discount rate. The result is lower than the EIRR (42 percent) in the PAD.

27. The result is robust against two scenarios. The first scenario is that the *dzud* reduces net benefits of meat production and storage, wool processing, dairy, reducing livestock loss, and increasing sheep and goat meat and hair by 60 percent and 70 percent (switching value 71.2 percent). The second scenario is that the net benefit of all activities is reduced by 50 percent and 60 percent (switching value 61.7 percent).

Implementation Efficiency

28. The project implementation was slower in the initial period because of procedural challenges in hiring TSPs and, consequently, delaying the preparation of business plans, approval, and implementing of subprojects. Frequent turnover and transitions in project leadership also contributed, in part, to inefficiencies. However, it should be noted that the project efficiency noticeably improved, particularly during the late stage of implementation, resulting in the achievement of the PDOs and virtually full disbursement of loan proceeds within the revised closing date.

Ratings

29. Based on results of the efficiency analysis and the project administrative efficiency, the rating on project efficiency is Substantial.



Table 4.6. Net Benefit of LAMP and Project EIRR

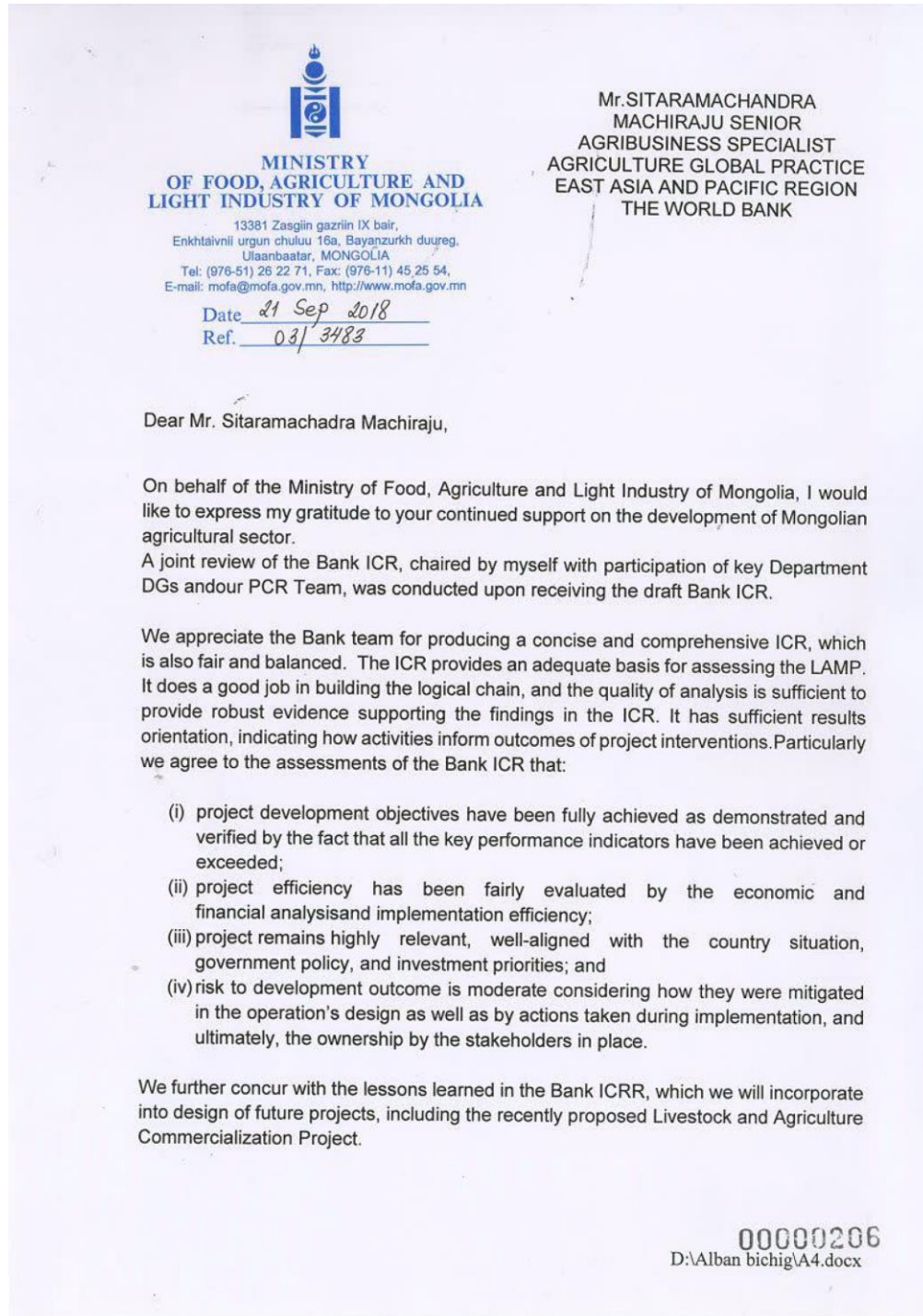
Indicator	Component	Models	Year0	Year1	Year2	Year3	Year4	Year5–19 ^a	Year20 ^b
			2014–2016	2017	2018	2019	2020	2021–2035	2036
Benefit (MNT, millions)	1. Linking Herders to Markets	1. Meat production: slaughterhouse		1,242.5	1,247.7	1,443.8	1,443.8	1,664.5	1,782.0
		2. Meat storage		149.0	280.1	371.8	371.8	371.8	432.7
		3. Wool cleaning and processing		-2.0	79.0	240.3	401.7	401.7	434.4
		4. Milk processing units: dairy		87.8	113.4	164.4	215.5	215.5	279.2
		5. Potato farming		14.8	17.1	17.1	17.1	17.1	20.5
		6. Greenhouse (cucumber and tomato)		19.5	21.5	21.5	21.5	21.5	28.6
		7. Sea buckthorn		1.3	8.4	12.4	16.4	16.4	18.7
		8. Mixed vegetable		217.9	236.4	236.4	236.4	236.4	259.8
	2. Raising Livestock Productivity and Quality	9. Reducing livestock loss due to diseases		411.4	411.4	411.4	411.4	411.4	411.4
		10. Increased productivity of sheep and goat meat		2,954.4	2,954.4	2,954.4	2,954.4	2,954.4	2,954.4
		11. Increased productivity of wool and cashmere		1,195.3	1,195.3	1,195.3	1,195.3	1,195.3	1,195.3
		12. Oat		119.8	138.0	138.0	138.0	138.0	167.7
		13. Oat and hay		152.2	176.0	176.0	176.0	176.0	189.5
		14. Mixed fodder		-22.6	265.7	265.7	265.7	265.7	318.8
		15. Mineral bricks		23.6	269.2	269.2	269.2	269.2	302.3
	Total Benefit		6,564.9	7,413.5	7,917.6	8,134.0	8,354.6	8,795.2	
	Total Cost (MNT, millions)	16,449.8	6,692.8	553.9	0.0	0.0	0.0	0.0	
	Net benefit (MNT, millions)	-16,449.8	-127.9	6,859.6	7,917.6	8,134.0	8,354.6	8,795.2	
	EIRR		35.0 percent						
	NPV (MNT, millions)		32,842.4						

Note: ^a Values are the same for 2021–2035.

^b Salvage value of investment items in the 20th year increases the income-generating activities (5 percent of investment cost for income-generating activities is assumed).



ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS





We would like to put on record our acknowledgement of the excellent performance of World Bank team in the project design and implementation supervision, and the close and productive cooperation with us and the project stakeholders.

We would also like to extend our deepest appreciation to the Bank ICR team for its efficient interactions and close collaboration with the government PCR team and the LAMP PIU in particular.

We look forward to our continued collaboration.

T. JAMBALTSEREN

A handwritten signature in black ink, appearing to read 'Jambaltseren T.' with a stylized flourish at the end.

DIRECTOR GENERAL
STATE ADMINISTRATION
AND MANAGEMENT DEPARTMENT

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ANNEX 6. SUPPORTING DOCUMENTS (IF ANY)

1. SICA ELS Report
2. Government Project Completion Report
3. List of the subprojects financed by the project