

## ECONOMIC ANALYSIS

1. The economic analysis of the additional financing of the Agriculture and Rural Development Project was conducted in accordance with the Asian Development Bank (ADB) Guidelines for the Economic Analysis of Projects.<sup>1</sup> The additional financing will assist about 70 agro-enterprises and farms in investing in development of their respective value chains through the financial intermediary model. The additional financing will also finance other activities such as capacity development of agro-processing enterprises and herders, farmers, and primary processors, and brand development for export-oriented products. The analysis focused on value chain development investment (VCI) subprojects (output 1), as about 90% of the investment cost is allocated to the output.

2. The economic analysis examined representative subprojects from eight subsectors and business types to be covered by the additional financing: wool and cashmere processing, leather processing, apparel manufacturing, meat processing, dairy production, sea buckthorn plantation and processing, bee farming and product processing, and animal skin primary processing.<sup>2</sup> Particular agro-enterprises and cooperatives—project participating enterprises (PPEs)—will be selected during implementation.

### A. Macroeconomic Context

3. Gross domestic product grew by 11.7% in 2013, easing from 12.4% in 2012. Growth was boosted by highly expansionary fiscal and monetary policies to compensate for the marked slowdown in the drivers of growth in recent years, i.e., coal exports and mine development financed through foreign direct investment. Industrial production, driven by construction, increased by 20.1% in 2013, contributing 5.1 percentage points to economic growth, and mining output expanded by 20.7%. Services expanded by 10.0%, contributing 4.3 percentage points to economic growth. Favorable weather allowed agriculture to expand by 13.5%, contributing 2.0 percentage points to economic growth.<sup>3</sup>

4. Although the mining sector is expected to continuously drive Mongolia's future economic growth, it has been understood that the excessive reliance on the sector will pose two challenges for Mongolia: (i) growth with limited employment and widening inequality, and (ii) increasing vulnerability to downturns in the external economy and slumps in international mineral prices. The mining sector currently employs only 4.4% of the country's total labor force while its share of gross domestic product is 18.5% and share of total export value 81.0%.<sup>4</sup> The Government of Mongolia has been making efforts to diversify the economy while making best use of the revenue from the mining sector to fuel future development of the country.

### B. Demand Analysis<sup>5</sup>

5. As subprojects will be selected during the project implementation, it is not possible to estimate what kinds of products will be produced by the project and how much. The demand

<sup>1</sup> ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila.

<sup>2</sup> The project steering committee may propose that other subsectors are added upon concurrence of ADB during project implementation.

<sup>3</sup> ADB. 2014. *Asian Development Outlook 2014: Fiscal Policy for Inclusive Growth*. Manila.

<sup>4</sup> National University of Mongolia. 2014. Labor Force Participation and Earnings In Mongolia, Discussion paper series-3 based on data from the Labor Force Surveys (2002–2003, 2007–2008, 2010), conducted by the National Statistical Office.

<sup>5</sup> Data for the supply and demand analysis were obtained from the National Statistical Office of Mongolia (footnote 6). The analysis was based on the incremental production of 40 VCI subprojects which comprise 10 apparel production subprojects, and five each of wool and cashmere, leather and hide, meat, dairy, sea buckthorn, and bee product processing subprojects.

analysis hence assessed the incremental products produced by a typical enterprise from each business type against the size of its respective target market. Among eight subsectors and business types, only three business types (i.e., wool and cashmere processing, leather processing, and animal skin primary processing) supply products to both domestic and international markets while the others supply only or predominantly to domestic markets.

6. Based on the assessment, incremental outputs from subprojects are expected to be small in comparison with the respective target markets. The meat processing subproject is expected to generate 58 tons of incremental meat products by 2019, which is 0.3% of the domestic market. The dairy production subproject is expected to generate 514 thousand liters of incremental milk and its products, which is 0.5% of the domestic market. The animal skin primary processing subproject is expected to generate 16,400 pieces of incremental sheep and goat skin by 2019, which is equivalent to 0.2% of the domestic market implying a marginal impact on the domestic market. Given much larger size of the international market, the project will have a negligible impact on the international market even though 80% of animal skins processed in Mongolia are exported. Incremental output for apparel will be absorbed by the demand from the ongoing Government of Mongolia school uniform program, given the substantial demand still unmet. Because of the lack of reliable market data, it was not possible to draw conclusions for subprojects of other subsectors and business types (i.e., sea buckthorn plantation and processing, and bee farming and product processing). Nonetheless, as PPEs to be financed by the project are expected to be mostly small and medium sized, their incremental outputs will be comfortably absorbed by respective markets and there is no envisaged impact of the incremental outputs on market prices. Market analysis will be further conducted as part of subproject proposal preparation during the project implementation once specific enterprises or cooperatives are identified, to ensure that incremental production from the project will be absorbed by target markets.

### **C. Economic Rationale**

7. Agriculture sector is the backbone of the Mongolian economy and considered a key for diversifying the economy, which relies too heavily on the mining sector. In 2013, Mongolian agricultural primary products accounted for 20.1% and processed products for about 11.1% of Mongolia's gross domestic product. They are also the second largest export products after mineral products, accounting for 8.2% of total exports by value in 2013.<sup>6</sup> However, the agriculture sector is mostly concentrated on primary production and forgoing significant value addition in agriculture because of limited processing capacity. The bottleneck is lack of long-term financing, which has significantly hindered Mongolian agro-enterprises from making long-term investments to improve their productivity. As a result, Mongolia exports a significant portion of its agricultural products (e.g., wool, cashmere, and animal skins) after primary processing while it imports a substantial volume of processed or final products (e.g., dairy products). It is crucial for Mongolia to capitalize on the rich yet untapped resources of the agriculture sector, which employed 30% of the labor force in 2013. Development of the agro-processing industry will have a substantial impact on employment, in itself and through its backward linkages, in rural areas, where the poor comprised 33.3% of the population in 2012, and consequently contribute to sustainable and equitable development of Mongolia.

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<sup>6</sup> National Statistical Office of Mongolia. 2014. *Mongolian Statistical Yearbook 2013*. Ulaanbaatar.

## D. Cost–Benefit and Sensitivity Analysis

8. The cost–benefit analysis focused on VCI subprojects. Representative subprojects from the eight subsectors and business types were evaluated for their economic viability.<sup>7</sup> As PPEs will be selected during implementation, information needed for the analyses were collected from relevant enterprises and cooperatives.

9. The analysis was conducted based on the following assumptions: (i) the lifetime of subprojects is 20 years, which is the assumed economic life of major machinery and equipment investments; (ii) economic benefits and costs are valued in domestic price numeraire and expressed in togrog; (iii) taxes, duties, and price contingencies are excluded from the economic cost; (iv) the economic opportunity cost of capital is assumed at 12% per annum; (v) a shadow exchange rate factor of 1.07 is used to convert financial prices of traded goods to economic prices; (vi) commodity-specific conversion factors of 1.15 for primary processed skin and leather products, 1.15 for mutton, and 1.14 for beef are used; and (vii) 1.0 is used as the shadow wage rate factor for skilled labor and 0.7 is the shadow rate for unskilled labor.<sup>8</sup>

10. The projected economic benefit and cost flows of each VCI subproject were estimated for with-project and without-project situations (Table 1) and projected over a period of 20 years.<sup>9</sup> The economic cost comprises investment cost (civil works, equipment, materials, and training) and operation and maintenance cost (materials, labor, utility, and maintenance). Training cost is assumed about 5% of total investment for each subproject based on the percentage of training cost of the total project cost. The economic benefit is expected from incremental outputs of various types valued at economic prices, which were converted using the various conversion factors included in the above assumptions. The economic benefit will be generated for the increase in production and processing capacities to be supported by the project. The incremental benefit and cost flows provided the basis for calculating the economic net present value and economic internal rate of return (EIRR) of each VCI subproject.

11. All subprojects were found to be economically viable as the estimated EIRR of each ranges from 20.0% to 35.7%, which are all greater than the economic opportunity cost of capital of 12.0%. The economic net present value of each of the VCI subprojects is positive, ranging from MNT77 million to MNT1,079 million (Table 1).

**Table 1: Economic Viability of Subprojects**

<b>Subproject</b>	<b>ENPV (MNT million)</b>	<b>EIRR (%)</b>
Wool and Cashmere	1,079	30.8
Leather	528	27.0
Apparel	212	22.0
Meat	629	26.0
Dairy	391	28.6

<sup>7</sup> The project uses a sector approach and subprojects will be selected during implementation. Thus, least-cost analysis was not conducted for the analysis of the subprojects. Alternative options will be explored during the preparation of business proposals by the PPEs.

<sup>8</sup> The shadow exchange rate factor and commodity-specific conversion factors for selected outputs from the project were estimated by ADB for the project based on data provided by the Mongolian Customs Authority. The shadow wage rate factors were from ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Mongolia for Skills for Employment Project*. Manila.

<sup>9</sup> The projected benefit flow of each VCI subproject included all benefits generated by each product line produced. Investment cost requirements included capital investments such as buildings, equipment, raw materials, and training while O&M costs included materials, maintenance, labor, and utilities.

<b>Subproject</b>	<b>ENPV</b> (MNT million)	<b>EIRR</b> (%)
Sea Buckthorn	97	20.0
Bee Farming	77	21.8
Primary Skin Processing	509	35.7

EIRR = financial internal rate of return, ENPV = economic net present value.

Source: Asian Development Bank.

12. On economic viability from the perspective of financial sustainability, this project will finance working capital in the second and third years of project implementation. The portion of working capital to be financed by the project to the total working capital varies by subproject, ranging from 7% to 22% in the second year and 6% to 18% in the third year. This will help the agro-enterprises and farms overcome the financial gap during those two years after an increase in operation and maintenance (O&M) caused by the production capacity expansion and before a sufficient increase in net revenue. The cost-benefit analysis showed that every subproject will start generating net benefit either from the third year or fourth year and they are likely to be able to finance O&M cost, particularly working capital, with the net benefit flow starting in those two years. During project implementation, financial performance during and after the project period will be examined as part of due diligence for every subproject to ensure its financial sustainability.

13. Sensitivity analysis, using the switching value technique, examined the robustness of the EIRR of each subproject under four scenarios: (i) a reduction in economic benefits, (ii) occurrence of an investment cost overrun, (iii) an increase in O&M cost, and (iv) a 2-year delay in project implementation (Table 2). The sensitivity analysis confirmed the robustness of the economic viability of all the representative subprojects. The sensitivity analysis indicated that the subprojects would remain financially viable against revenue reductions of 10.1%–19.2%, investment cost increases of 43.1%–117.2%, and O&M cost increases of 12.7%–34.6%. A 2-year delay in subproject implementation will result in EIRRs ranging from 13.5% to 20.1%, implying that those subprojects will still be economically viable despite the 2-year delay.

**Table 2: Sensitivity Analysis of Subprojects (%)**

<b>Subproject</b>	<b>Base EIRR</b>	<b>Switching Values</b>			<b>Recalculated EIRR 2-year Delay in Project Implementation</b>
		<b>Benefit Reduction</b>	<b>Investment Cost Overrun</b>	<b>O&amp;M Cost Increase</b>	
Wool and Cashmere	30.8	17.4	117.0	25.7	20.1
Leather	27.0	19.2	74.6	34.6	17.0
Apparel	22.0	12.6	71.6	18.7	15.7
Meat	26.0	17.5	62.3	32.1	15.9
Dairy	28.6	10.1	92.5	12.7	18.3
Sea Buckthorn	20.0	10.7	43.1	16.7	13.5
Bee Farming	21.8	13.4	117.2	17.8	17.3
Primary Skin Processing	35.7	15.3	92.4	21.0	19.5

EIRR = economic internal rate of return, O&M = operation and maintenance.

Source: Asian Development Bank.

## E. Poverty Impact

14. The poverty impact analysis indicated that poor people will receive about 30% of the net benefits generated by each subproject. For each subproject, the poverty impact rate was estimated as a share of net benefit for poor people of the total net benefit. The project is expected to have substantial poverty impact as the major gains are by small and medium-sized enterprises (producers) and the unemployed and underemployed. The incremental production will support more demand for raw materials, which will indirectly benefit raw materials suppliers (i.e., farmers, herders, and primary processors).

**Table 3: Poverty Impact Ratio by Subproject**

<b>Wool and cashmere</b>	<b>Leather</b>	<b>Apparel</b>	<b>Meat</b>	<b>Dairy</b>	<b>Sea Buckthorn</b>	<b>Bee Farming</b>	<b>Primary Skin Processing</b>
29.4%	29.6%	31.1%	28.7%	30.2%	30.9%	30.4%	29.1%

Source: Asian Development Bank.