PILOT FINDINGS FROM THE POLICY COSTING METHODOLOGICAL GUIDE

Evaluation of the Program for Supporting Food and Agriculture Production

ULAANBAATAR
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THE EUROPEAN UNION FUNDED "SDG ALIGNED BUDGETING TO TRANSFORM EMPLOYMENT IN MONGOLIA" PROJECT

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Evaluation of the Program for Supporting Food and Agriculture Production

Developed by:
Economic Research Institute Consultancy Team

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INTRODUCTION

This report was prepared as a part of the study titled "Pilot Findings From The Policy Costing Methodological Guide," commissioned by the Secretariat of the Parliament, the Ministry of Economic and Development, and the United Nations Development Programme. While in the main report of the study, a methodological guide based on international experience for policy costing was developed and presented, this report presents a case of estimating the cost of a selected policy using the above methodology.

This research evaluated the policy cost of the 2022 Parliament Resolution on food security. We focused on the subsidized loan program implemented by the Ministry of Food, Agriculture, and Light Industry (MOFALI). Information on loans granted in 2023 was obtained from MOFALI. We also conducted a sample survey of participating enterprises to gather details about their business activities and loan spending. Data from both sources was used to calculate key parameters for the policy costing model..

This report is structured as follows. Chapter 1 will present about this subsidized loan program, and Chapter 2 will present the results of a sample survey of enterprises participating in this loan program. Chapter 3 describes the method of calculating the total economic effect of the subsidized loan program or policy costing. Chapter 4 presents the evaluation results of this program. Finally, the evaluation of this program is concluded.

1 OVERVIEW OF THE "PROGRAM FOR SUPPORTING FOOD AND AGRICULTURE PRODUCTION"

In June 2022, the Mongolian Parliament passed Resolution No. 36, "Some Measures to Ensure Food Supply and Security." To support this initiative, the Parliament's Temporary Committee issued Resolution No. 02 in 2023. Additionally, the Mongolian government enacted Resolution No. 63 in 2023, titled "Some Measures Regarding Technological Work in the Food Supply and Agricultural Sector." All three resolutions aimed to bolster domestic food and agricultural production by offering subsidized loans through commercial banks.

These loans come with concessionary interest rates:

- Current asset loans: 18% annual interest (5% paid by borrower, 13% government subsidy) with a maximum 36-month term.
- Non-current asset loans: 19% annual interest (6% paid by borrower, 13% government subsidy) with a maximum 60-month term.

Parliament's Resolution No. 36 (2022) directed the government to take specific actions in five key areas to promote the national "Food Supply and Security" movement:

- Improve the legal framework for the food, agriculture, and light industry sectors.
- Enhance management and organization within the sector.
- Promote livestock production.
- Support crop production.
- Develop the food processing industry.

The last three of the five areas of the program that we assessed are generally related to, and more specifically, Sections 3.1.3, 3.2.3, 3.4.1, 3.5.2, 3.8.1, 4.1.1.2, 4.3.2, 4.3.2.1, 4.3.3, 4.4.1.1, 4.5.2, 5.2, 5.4.2, 5.5.3, 5.6.3, 5.6.4, and 5.7.3 are directly linked. Loans under the program have been provided from April 2023 through nine commercial banks. Table 1 shows the amount of loans and the number of borrowers in three main sectors: food, crop and livestock.

From April 2023 to December 2023, MNT 832.7 billion of the total approved loans (MNT 982 billion) were granted to 1,956 borrowers (1,067 enterprises and 889 individuals). The allocation of the loans across different sectors was as follows:

- Food industry: MNT 592.1 billion (71.1 percent) were allocated to 499 borrowers.
- Crop: MNT 186.5 billion (22.4 percent) were disbursed to 1,317 borrowers.
- Livestock: MNT 54.2 billion (6.5 percent) were granted to 140 borrowers.

Table 1 Loans and Borrowers in Food, Crop, and Livestock Sectors

Year/ month	Food processing		Crop		Livestock		Total amount of loan	Number of borrowers	Average amount of loan*
	Amount of loan*	Number of borrowers	Amount of loan*	Number of borrowers	Amount of loan*	Number of borrowers			
2023/04	4,475.4	20	14,963.3	208	70.0	1	19,509	229	85
2023/05	64,060.4	126	69,007.1	698	4,082.0	25	137,150	849	162
2023/06	122,759.6	127	36,665.2	260	22,112.0	48	181,537	435	417
2023/07	96,087.7	59	14,684.5	49	13,265.0	22	124,037	130	954
2023/08	19,714.6	35	5,559.3	33	5,395.0	19	30,669	87	353
2023/09	44,718.5	36	3,490.9	23	663.5	8	48,873	67	729
2023/10	35,537.0	22	2,043.1	12	2,031.4	5	39,611	39	1,016
2023/11	73,011.0	23	13,476.4	12	727.0	3	87,214	38	2,295
2023/12	131,691.9	51	26,592.9	22	5,850.0	9	164,135	82	2,002
Total	**592,056**	**499**	**186,483**	**1,317**	**54,196**	**140**	**832,735**	**1,956**	**426**

Source: Ministry of Food, Agriculture and Light Industry (MOFALI)

*Note: * -MNT million*

For the "Food and agricultural production support loan program", a total of MNT 832.7 billion was issued in loans. Of this amount, MNT 421.7 billion were granted as non-current asset loans to 366 borrowers, while MNT 411 billion were provided as current asset loans to 1,590 borrowers. The highest loan amount awarded to a single borrower was MNT 20 billion, while the smallest was MNT 1.2 million. It's worth noting that program loans were most active in May (MNT 137.2 billion), June (MNT 181.5 billion), July (MNT 124 billion), and December (MNT 164.1 billion). In total, program loans accounted for 72.9% of all loans issued.

2 PROGRAM PARTICIPANT SURVEY RESULTS

In accordance with Mongolia's Parliament Resolution No. 36 of June 2022, "Some Measures to Ensure Food Supply and Security," a sample survey was conducted among enterprises that participated in the concessional loan program for food, crop, and livestock production in 2023. This survey aims to collect additional data required to refine the policy costing of the program using our research team's macro-fiscal model.

This survey provided valuable insights into the direct impact of subsidized loan support on participating enterprises and other economic sectors. It shed light on the differential effects between loan types (current vs. non-current assets) and how the support program influenced food, crop, and livestock production.

2.1. Methodology of sampling

The survey data was collected using the following method, which includes:

- This survey employed a purposive sampling method. Since loan amounts varied depending on enterprise activities, enterprises receiving the highest loans were selected to assess their impact on the state budget and broader economy.

- A sample size of 110 enterprises was targeted, representing 50% of the 220 enterprises that signed monitoring agreements with the Ministry of Food, Agriculture and Light Industry (MOFALI). These enterprises received the highest loan amounts and were obligated to provide information for program monitoring and evaluation.

- Subsector representation was considered during sample selection. From the enterprises with monitoring agreements, 80 were selected from the food industry, 15 from crop, 10 from packaging, and 5 from livestock.

- A combination of telephone and face-to-face interviews was used. The research team obtained contact information for participating enterprises from MOFALI and contacted them by phone to obtain consent. Data collection was then conducted through phone interviews or in-person visits as needed. MOFALI program specialists assisted in contacting enterprises and gathering information.

- To expedite data collection, MOFALI specialists shared information from the records of enterprises included in the monitoring contracts. This data encompassed details such as enterprise type, loan amount, location, primary activities, production output, workforce size, and sales figures.

- A pre-designed, structured questionnaire was developed for data collection. The questionnaire consisted of three sections: basic enterprise information, details on business activities, and loan information. The research team collaborated with MOFALI specialists to develop the questionnaire.

2.2. Survey results

Amount of loan

A total of 584.2 billion MNT in subsidized loans were distributed to 153 enterprises surveyed for the study titled "Evaluation of the economic impact of loans to support food and agricultural production." The food processing industry received the largest share of the loans (MNT 487.5 billion, representing 83.4% of the total). Loans allocated to the crop and livestock sectors were MNT 51.6 billion (8.9%) and MNT 45.1 billion (7.7%), respectively.

Out of the 146 enterprises for which loan type information was available, 4 reported receiving three types of loans, while 29 received two types. In duplicated count, 151 enterprises provided in the food processing sector, while the numbers for crop and livestock were 20 and 11 enterprises, respectively. The average loan amount per enterprise was MNT 3.8 billion.

Table 2. Types of loans and number of enterprises (n=146)

№	Types of loans, according to the categories specified in Resolution 36	Number of enterprises
1	5.7.3 Current asset support for operational stability in the food processing sector	72
2	5.5.3 Increasing the capacity of food and crop machinery, and special vehicles	44
3	5.2.3 Establishing an import substitution facility for processed child food	15
4	5.7.4 Current asset support for crop farming operations	10
5	5.2.4 Establishing a local food processing facility for schools and kindergardens	8
6	5.2.1 Establishing a vegetable and fruit mash processing facility for child nutrition	6
7	5.2.2 Subsidized loan for establishing a pediatric formula production plant	5
8	3.8.1 Loans facilitate construction of storage facilities for vegetables, rice, and sugar	5
9	4.3.2 Current assets loans for meat producers	4
10	4.3.3 Investment loan for meat producers	2
11	3.5.2 Loan for establishment of greenhouses	2

12	3.4.1 Working capital loans for domestic feedstock procurement	2
13	2.1.2.3 Current assets and investment loans for poultry farmers	2
14	Establishment of primary seed breeding center and threshing floor	2
15	5.6.3 Establishing a plastic crate manufacturing plant for vegetable storage and transportation	1
16	4.3.2 Current assets loans for dairy farmers	1
17	5.6.4 Establishing a multipurpose facility for vegetable storage, transportation crates, and tree seedling storage	1

Source: Survey of loans to support food and agricultural production

Meat and meat products, along with flour and baked goods, are the dominant product categories among loan recipients. Loans allocated to these sectors represent a significant portion of the total disbursed amount. For example, Table 3 shows that 24.6% of loans went to meat and meat product producers, while flour and bakery product manufacturers received 19.2%.

Table 3. Number of lenders and loan share, by type of product

Product	Number	Loan share, %
Meat and meat product	39	24.6
Crop	22	7.3
Flour and baked product	16	19.2
Milk and diary product	12	12.8
Packaging product	11	4.5
Food	11	10.9
Beverages	6	2.2
Fruits and berries	5	7.6
Other	31	10.9
Total	153	100.0

Source: Survey of loans to support food and agricultural production

According to the loan amounts, there are 12 enterprises that received loans of at least MNT 10 billion (Table 4). The enterprise with the highest loan amount received MNT 30 billion. The most common loan bracket is MNT 1-2 billion, with 48 enterprises having loans in this range. There are also 47 businesses with loans between MNT 2-4 billion. Conversely, the fewest enterprises, only 9, have loans of MNT 6.0 billion or less.

Table 4. Loan amount and number of borrowers (n=152)

Loan amount, MNT billion	Number of enterprises
Up to 1	25
1-2	48
2-4	47
4-6	11
6-10	9
More than 10	12
Total	**152**

Source: Survey of loans to support food and agricultural production

Loan spending

Among the 153 enterprises surveyed, 86 received non-current asset loans (investment loans) to be used for the purchase of technical equipment (55 enterprises), special vehicles (9 enterprises), or construction/expansion of factories (38 enterprises). Of those who received investment loans, 489 pieces of machinery and equipment were purchased for a total of MNT 185.7 billion. Additionally, 53 special vehicles were acquired for MNT 2.9 billion.

The survey further revealed that a portion of the investment loans were spent on direct imports. Out of 39 enterprises who received investment loans, 25 imported their machinery, equipment, and special vehicles (Table 5). These imports amounted to MNT 94.4 billion, or 42.9% of their investment loans.

Furthermore, 18 out of the 52 enterprises participating in the current asset loan program spent MNT 46.4 billion of their loan financing to purchase imported goods and products, amounting to 18% of their total loan amount.

Table 5. Loan spending and import

Loan spending	Responded Enterprises	Number of enterprises that imported	Amount of imports, billion MNT	Spent on imports from loan %
Investment loan	39	25	94.4	42.9%
Current asset loan	52	18	46.4	18.0%

Source: Survey of loans to support food and agricultural production

Sixteen enterprises that purchased equipment received a customs tax credit, totaling MNT 1.3 billion (Table 6).

Table 6. Investment laon import and customs tax credit

Purpose	Number	Import, MNT billion	Enterprises received customs tax credit	Costums tax credit (MNT billion)	Imported enterprises
Equipment	560	187.1	16	1.3	21
Special vehicles	53	2.9	-	-	2
Total	613	190.0	-	-	21

Source: Survey of loans to support food and agricultural production

Change in operation

The production volume of the surveyed enterprises whose products can be measured by weight decreased from 15.4 million tons in 2022 to 12.7 million tons in 2023, representing a decline of 17.5% (Table 7). Additionally, the production of products measured in flakes decreased by 0.9%. Conversely, the production of liquid food increased from 4516.4 million liters in 2022 to 5007.8 million liters in 2023, marking an increase of 10.9%.

Table 7. Production of surveyed enterprises (n=119)

Unit	2022	2023
Million tons	15.4	12.7
Million pieces	46.7	46.3
Million liters	4516.4	5007.8

Source: Survey of loans to support food and agricultural production

The number of employees at enterprises and the number of newly created jobs increased in 2023 compared to the previous year. For example, the number of employees at 58 companies that received only current asset loans rose from 3,020 in 2022 to 3,379 in 2023 (Table 8). Likewise, 43 enterprises that received only non-current asset loans created 190 new jobs in 2022 and 442 new jobs in 2023. Notably, the 32 enterprises that received both current and non-current asset loans contributed 42.6% to the total number of jobs in 2023 (or alternatively: represented 42.6% of the total jobs in 2023). Overall, the total number of employees and the number of newly created jobs are on the rise.

Table 8. By number of workforce and newly added jobs , type of loan

Loan	Number of enterprises	Workers in 2022	Workers in 2023	Newly added jobs in 2022	Newly added jobs in 2023
Current asset	58	3020	3379	469	904
Non-current asset	43	2842	3211	190	442
Current + non-current asset	32	4427	4897	369	606

Source: Survey of loans to support food and agricultural production

As shown in Table 9, out of a total workforce of 10,284 across 131 surveyed enterprises in 2022, 4,041 workers (39.3%) were employed by 12 enterprises that received loans exceeding MNT 10 billion. These same 12 enterprises accounted for 37.8% of the total workforce in 2023, reflecting a slight decrease. They also contributed 19.7% of the newly created jobs in 2023.

Table 9. Number of labor force and newly added jobs and amount of loans (n=131)

| Amount of loan, MNT billion	Number of enterprises	Workers in 2022	Workers in 2023	Newly added jobs in 2022	Newly added jobs in 2023
Up to 1	13	312	388	61	76
1 − 2	44	1527	1587	261	435
2 − 4	47	3039	3600	334	832
4 − 6	8	631	720	73	103
6 − 10	7	733	851	82	125
10 +	12	4041	4334	317	379
Total	**131**	**10284**	**11480**	**1128**	**1950**

Source: Survey of loans to support food and agricultural production

In 2022, 47 enterprises receiving loans between MNT 2-4 billion employed 3,039 workers (29.6% of the total workforce). While this group had nearly 4 times more companies than those receiving the highest loans (12 enterprises), they employed 10,012 fewer people overall. However, these mid-range loan recipients were significant job creators in 2023, contributing 42.7% (832 positions) of the new jobs. This highlights their role in expanding employment despite smaller individual workforce sizes. Conversely, the 13 enterprises with loans up to MNT 1 billion had a relatively lower number of employees and new job additions compared to the other groups.

Sales revenue across the surveyed enterprises increased significantly in 2023 due to expanded operations. For instance, the food industry's total sales revenue jumped from MNT 1,665.2 billion in 2022 to MNT 1,906.9 billion in 2023, reflecting a 14.5% increase (Figure 1).

Crop farming income also rose, increasing from MNT 110.8 billion in 2022 to MNT 124.5 billion in 2023 (a 12.4% increase). Livestock enterprises saw the most significant income growth, with sales revenue surging 113.8% from MNT 12.3 billion in 2022 to MNT 26.3 billion in 2023.

Figure 1. Sales revenue, MNT billion (n=126)
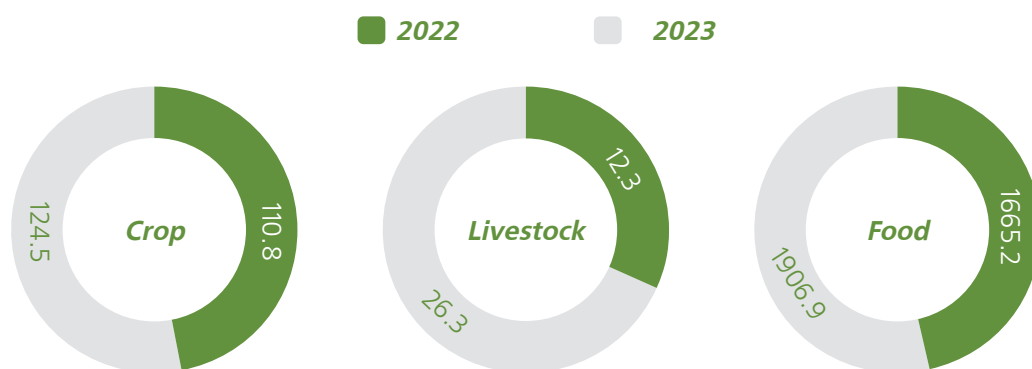
Source: Survey of loans to support food and agricultural production

Looking at sales revenue by loan type, the 32 enterprises that received both current and non-current asset loans together have the highest sales revenue, accounting for 45.8% of total sales revenue in 2023. The revenue generated by 53 enterprises that received current asset loans rose from MNT 669.1 billion in 2022 to MNT 748.6 billion in 2023. Similarly, the sales revenue of 41 companies that received non-current asset loans increased from MNT 335.3 billion to MNT 360.5 billion.

The sales revenue of enterprises that received both current and non-current asset loans increased by 20.5% in 2023 compared to the previous year. However, organizations that received only current asset loans experienced an 11.9% increase in sales revenue, whereas those that received non-current asset loans saw a 7.5% increase.

Figure 2. Sales revenue, by type of loan, MNT billion (n=126)
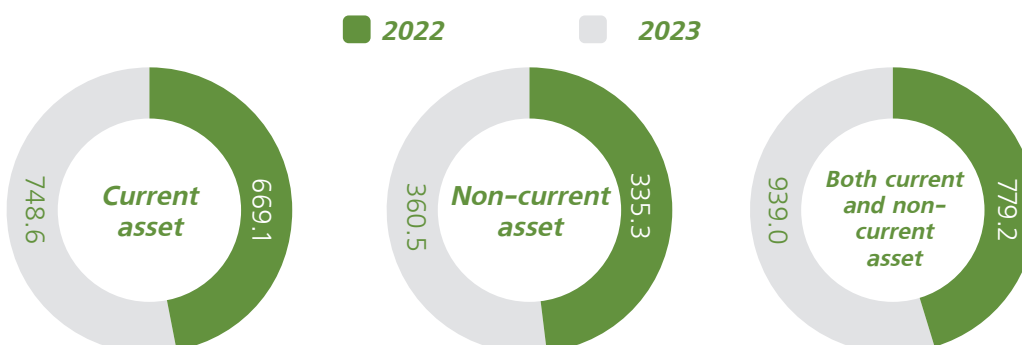
Source: Survey of loans to support food and agricultural production

The increase in sales revenue mentioned earlier can be attributed to both increased production and price hikes. For example, out of the 153 surveyed entities, 105 provided data on sales prices (Table 10). This data reveals that the average sales price in 2023 increased by 12.5% compared to the previous year. Analyzing the average price change by product type, we see that crop products experienced the highest increase, with prices rising by 34.8%. However, it's important to note the sample size difference. The average price increased by 18.8% for 35 enterprises in the meat industry, while it rose by 14.8% for only 13 enterprises in the crop industry. The dairy sector experienced the lowest price growth, with an increase of only 3.3% based on data from 12 businesses.

Table 10. Average change in product price for 2022–2023 (n=105)

Sector	Type	Average increase in price %
Meat and meat product	35	18.8
Crop	13	34.8
Flour and baked product	13	14.8
Milk and diary product	12	3.3
Packaging product	11	4.4
Food	11	5.2
Beverages	5	7.3
Fruits and berries	5	11.2
Total	**105**	**12.5**

Source: Survey of loans to support food and agricultural production

Business expansion has led to a rise in tax revenue collected from the state budget. As shown in Table 11, tax contributions from 16 crop companies increased from MNT 8.6 billion in 2022 to MNT 11.1 billion in 2023. This breakdown includes corporate income tax (CIT) rising from MNT 634.3 million to MNT 636.6 million and personal income tax (PIT) increasing from MNT 340.1 million to MNT 406.6 million.

Table 11. The amount of taxes collected in the State Budget, MNT million (n=131)

Sector	Total taxes		CIT		PIT	
	2022	2023	2022	2023	2022	2023
Livestock	1819.7	2024.1	88.2	102.7	393.5	1000.4
Crop	8619.5	11140.6	634.3	636.6	340.1	406.6
Food	95003.3	139010.4	24176.0	32314.3	15384.5	16084.8

Source: Survey of loans to support food and agricultural production

In 2022, the total tax collected from 8 companies in the livestock industry was MNT 1.8 billion, with MNT 88.2 million collected through CIT and MNT 393.5 million through another tax type (PIC). There seems to be an inconsistency in the 2023 data, as the amount collected through PIC remains the same at MNT 393.5 million. Perhaps you can check the source for clarification on this number.

In 2022, 131 companies in the food industry contributed a total of 95.0 billion MNT in tax revenue, with 24.2 billion MNT attributed to CIT and 15.4 billion MNT to PIT. By 2023, the total tax collection rose to 139.0 billion MNT, with 32.3 billion MNT allocated to CIT and 16.1 billion MNT to PIC.

Other

Among the surveyed entities, 34 reported loans separate from those obtained through this program, totaling MNT 203.3 billion, with an average loan amounting to MNT 5.6 billion (Table 12). Current asset loans account for the largest share of this amount (64.8%). Notably, five of these 34 entities also received other subsidized loans from the government, with one company receiving an MNT 8 billion loan with a government subsidy for food reserve preparation and storage.

Table 12. Number and amount of other loan institutions (n=74)

Purpose of loan	Number	Amount (MNT billion)	With goverment subsidy
Current asset	25	131.8	3
Investment	8	63.5	1
Prepare reserve	1	8	1
Total	34	203.3	5

Source: Survey of loans to support food and agricultural production

Figure 3. Current and non-current assets, in billions of MNT (n=128)

■ *Current assets*   □ *Non-current assets*
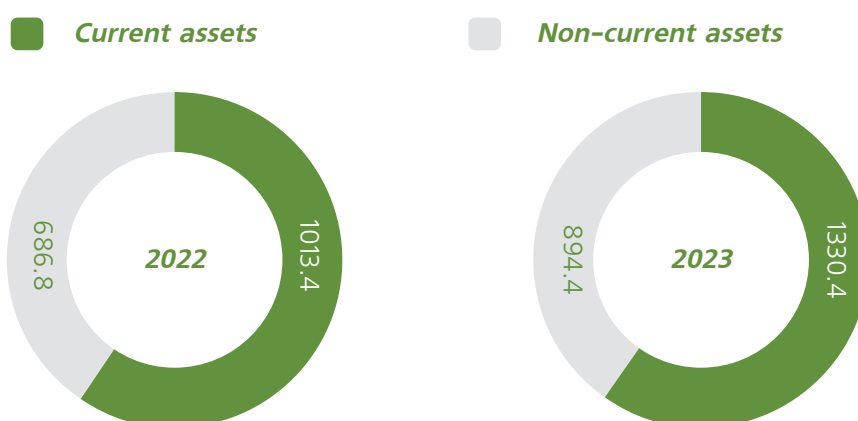
Source: Survey of loans to support food and agricultural production

As illustrated in Figure 3, both current and non-current assets have increased as a result of the expansion of activities among the surveyed enterprises. For instance, current asset rose from MNT 1,013.4 billion in 2022 to MNT 1,330.4 billion in 2023, representing a 31.3% increase. Similarly, non-current assets grew by 30.2%, from MNT 686.8 billion in 2022 to MNT 894.4 billion in 2023.

3 METHODOLOGY FOR COSTING LOAN PROGRAMS

3.1. Economic impact channels of the program

One of the key features of the program for supporting food and agriculture production is that commercial banks independently assess and make loan decisions without relying on any government organization. They issue loans using their own resources, with the government subsidizing only the interest rate differential. Figure 4 illustrates the potential impact of the subsidized loan program.

Figure 4. Potential impact of program loans
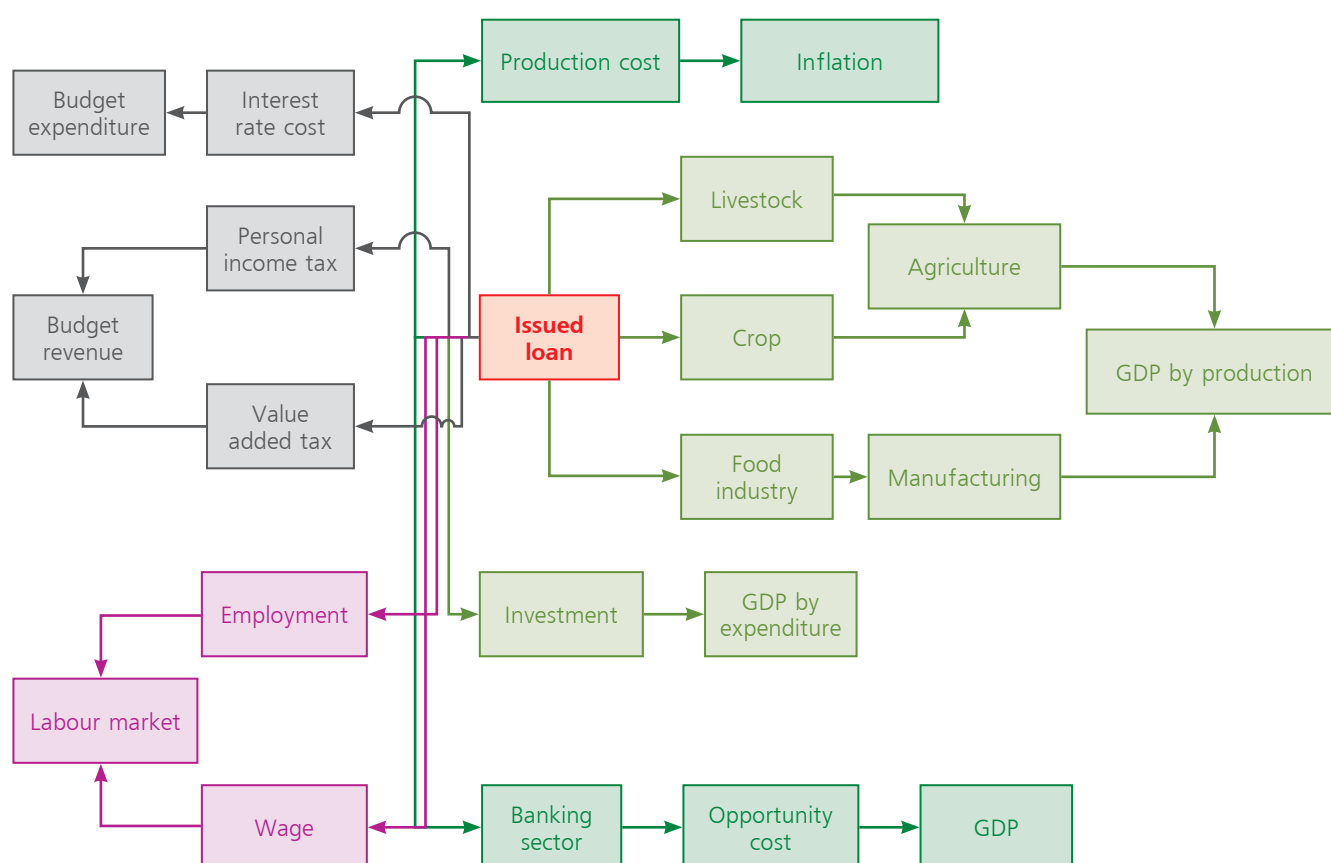
Source: Researchers' assumption

Since commercial banks' lending decisions are for profit, it is clear that the opportunity cost related to loans given to three sectors: food production, crop, and livestock were taken into account if they were given to other sectors of the economy. (Figure 4, part highlighted in green in the lower right part) Also, the subsidized interest rates will reduce their credit risk to a certain extent. Since the program loans are spent as investments in the three sectors, it will impact the expenditure side of GDP. In addition, the GDP calculated by the production side will be directly impacted by the food, agriculture and livestock sectors. (Figure 4, blue section on the right) The investment in each sector is expected to create new jobs, thereby affecting the labor market, including employment levels and wages in these sectors. (Figure 4, part highlighted in pink in the lower left) As investment grows, the impact on tax revenues is expected to increase, as producers in the food, agriculture, and livestock sectors invest in new equipment, construct buildings, and expand production. As new jobs are created in these sectors due to investment growth, Personal Income Tax (PIT) is expected to increase. It should be noted here that other types of tax revenues related to the activities of these sectors may also experience an increase. In the context of supporting food and agricultural production with working capital from commercial banks, an annual interest rate of 18 percent applies (5 percent borne by the borrower, 13 percent subsidized by the government) with a term of up to 24 months. Similarly, for investment purposes, a total interest rate of 19 percent per year is applicable (6 percent borne by the borrower, 13 percent subsidized by the government) with a term of up to 60 months. These interest subsidies will impact the budget. (Figure 4, the part shown in black in the upper left part) The government's payment of the 13 percent interest on working capital and investment loans not only alleviates interest rate burdens for producers in these sectors but also aims to establish the favorable conditions for reducing production costs in the medium and long term. Therefore, the program's loans will to some extent impact supply-side inflation through increased production in these sectors. (Figure 4, upper right part highlighted in green)

3.2. On the model for estimating the total economic impact of the program

The "GAP" semi-structured model that was first developed by the "OG Research" company based in Prague, Czechia (with a branch in Budapest, Hungary) and currently used to provide consulting services to the central banks and government research institutions of developing and newly industrialised countries. Based on this model, we evaluate the effects of the loan program at the macro level, and the some behavioral effects. In this study, the version of the model modified by Natural Resource Governance Institute (NRGI) in 2017 for Mongolian economy is used. However, researchers of ERI also extended and updated the model for the program evaluation. For example, coal, Mongolia's main export commodity, is separated from the mining product. In addition, some observational variables necessary for medium-term projections are included. The updated model has 261 equations and 261 variables, and most

of the structural equations are written based on the "gap" or difference of the endogenous variables and the trend or long-term tendency. Regarding model parameters, 277 parameters were calibrated, and 23 parameters were evaluated. These 300 parameters are used directly without any modification.

In general, it is used to evaluate policy costs based on the short, medium, and long-term projection models (either pure data-based vector autoregressive models, or semi-structural models ("GAP" model, CGEM or computational general equilibrium model), or structural theoretical models (dynamic stochastic general equilibrium model). Therefore, the database of the NRGI model (from the first quarter of 2005 to the third quarter of 2016) is updated until the end of the second quarter of 2023. The baseline forecast covers 2023-2028 (this model will be called the baseline projection model!). To assess the potential impact of loan programs on the economy, we employ a shock analysis on a baseline projection model. This involves introducing specific changes («shocks») to the model and observing how these changes affect key economic and financial variables. We consider various sectors, including the labor market, using program loan data and other relevant information. Following these simulations, we compare the results with the baseline model to identify the program›s potential effects.

Figure 4 plays a crucial role in guiding the selection and placement of these «shocks» within the model. By visually depicting the potential program impacts, we can target specific areas of the baseline model for analysis..

The results of the baseline projection model are compared with the Bank of Mongolia (Inflation Report, Q1—Q4 2023), World Bank (Global Economic Prospects, June 2023, January 2024), International Monetary Fund (World Economic Outlook, July 2023, October 2023, January 2024) and based on specific assumptions.

4 EFFECT OF SUBSIDIZED LOAN PROGRAM

4.1. Direct effects on the budget

Subsidized loans to support agriculture and food production issued in 2023 have slightly different terms depending on the type. The investment loan (non-current asset loan) has an interest rate of 6% per annum, a term of 5 years, and the borrower will be exempted from the principal payment for the first 12 months. The working capital loan has a 5% annual interest rate and a 3-year term, and the borrower will be exempted from the principal payment for the first 6 months. The borrower will pay the loan interest every month according to the schedule, while the government will transfer the 13% interest subsidy to the commercial banks every month.

According to the Ministry of Food, Agriculture and Light Industry (MOFALI), in this program, MNT 338.2 billion loans were granted in the second quarter of 2023, MNT 203.6 billion in the third quarter, and MNT 291.0 billion in the fourth quarter. Therefore, in this estimation, we assumed that the MOFALI started paying the interest subsidy from the 2023 Q3. As a result, it was considered that the interest subsidy for current asset loans will continue until the end of the 2026 Q4, and the interest subsidy for investment loans will last until the end of the 2028 Q4.

Taking into account the above terms, Table 13 shows the cost of interest support from the state budget in the coming years for the MNT 832.7 billion program loan granted in 2023. The nominal amount of total expenses for that program is MNT 271.6 billion.

Table 13. The direct burden of the program on the state budget

	2023	2024	2025	2026	2027	2028
Interest subsidy, MNT billion	28.6	102.8	74.9	40.5	19.1	5.7

The additional workload for government institutions involved in implementing the loan program was incorporated into the job descriptions of responsible officials and reflected in their organizations' budgets. However, these additional costs were considered negligible compared to the overall program subsidy. Consequently, the program's direct budgetary impact is best assessed by referring to the figures presented in Table 13.

4.2. Direct (static) effects on the economy

As illustrated in Figure 4, the direct macroeconomic impact of the program's loans, specifically the most considerable and primary impact in terms of size, will first change GDP, explicitly affecting the GDP of food production, crop, and livestock sectors. However, the loan provided to these sectors does not become direct GDP as a particular part is used for intermediate consumption and imports. We calculate this by using the data of the Input-Output table to compute the total production or consumption percentage of these three sectors, which is the average final product or GDP. This result is indicated in Table 14. Here, we employ the Input-Output tables of 55x55 in 2012, 32x32 in 2015, and 32x32 in 2019 to compare final consumption to total consumption and calculate the program's loan-to-GDP conversion factor. It was used to calculate the conversion rate of loans issued by each sector to GDP.

Table 14. Conversion factor of program loans to GDP

	Sector	2012	2015	2019	Average	Loan amount*	Amount to convert to GDP*
1	Crop	0.346	0.360	0.354	0.353	186,483	65,899
2	Livestock	0.576	0.632	0.498	0.568	54,196	30,802
3	Food production	0.877	0.860	0.884	0.874	592,056	517,390

Note: * - MNT million

Source: Researchers' own calculation

According to Table 14, from MNT 592.1 billion loaned to the food production sector, MNT 517.4 billion contributes to GDP. This translates to a contribution rate of around 87.4%. In contrast, loans to the crop and livestock sectors have a lower contribution to GDP. Only MNT 65.9 billion out of the MNT 186.5 billion loaned to the crop sector contributes to GDP (roughly 35.3%). Similarly, only MNT 30.8 billion of the MNT 54.2 billion loaned to the livestock sector contributes to GDP (approximately 56.9%). It means that nominal GDP will increase by MNT 614.1 billion in 2023.

By converting the nominal GDP of each sector to real GDP using a seasonal GDP deflator, the combined results show that the program would generate an additional 1.14% of economic growth in 2023 compared to 2022 with the loan implementation. This can be considered the program's direct impact on the macroeconomy. Table 15 demonstrates the results of real GDP estimates for each sector by quarter, disaggregated by investment and current asset loans.

Due to the baseline model's medium-term projections starting in the third quarter of 2023,

the model combines loans from the second quarter of 2023 into the third quarter to reflect the program loan shocks. Total subsidized loans will increase nominal GDP by MNT 614.1 billion in 2023, while real GDP calculated at 2010 prices will increase by MNT 219.3 billion (a 1.14% increase).

While many constraints may reduce the program loan's impact on GDP, a lack of data hinders our ability to calculate and include the detailed impact of each constraining factor. However, some limitations will be considered and factored into estimating the program loan's indirect behavioral impact.

Table 15. A detailed calculation of the ral GDP conversion rate of program loan

Consersion amount to nominal GDP				
	Loan to the food industry		Loan to agriculture	
	Investment	Current asset	Investment	Current asset
2023-Q3	179,133.8	128,313.8	22,822.4	54,103.7
2023-Q4	111,028.1	98,914.4	13,031.3	6,742.7
Conversion amount to nominal GDP				
	Loan to the food industry		Loan to agriculture	
	Investment	Current asset	Investment	Current asset
2023-Q3	58,930.5	42,212.0	10,699.5	25,364.7
2023-Q4	40,221.4	35,833.0	3,968.9	2,053.6

Note: *-MNT million

Source: Researchers' own calculation

4.3. Indirect and behavioural effects

Investment loans (50.6% of total loans) impact the trend or long-term trend of the sector, while current asset loans (49.4% of total loans) affect the GDP gap or short-term changes. Using the results of converting the nominal GDP of each of these sectors into real GDP using the seasonal GDP deflator (Table 15), the differences in the GDP of the sectors of the baseline projection model, as well as by changing the trend, were given shocks, and the following assumptions are set for calculating the effect of program loans.

✓ Since investment loans are used to buy equipment and build factories and facilities, it takes some time to start having a real effect on production. Therefore, 50% of the outcome of the investment loan was transferred to 2024. This assumption is based on the theoretical research of investment, the results of the meeting with the representatives of the enterprises held at the MOFALI, and the survey results of about 150 enterprises interviewed by ERI researchers.

✓ A 25% of the result of the current asset loans are transferred to 2024. Loans taken at the end of 2023 are unlikely to have an immediate effect in 2023.

Using the above two assumptions, the effect of previous program loans on GDP in 2023 would change. According to previous calculations (Table 15), the impact of food sector investment loans on real GDP in 2023 was MNT 99,151.8 million. Similarly, the impact of investment loans in the agricultural sector on the real GDP in 2023 will be MNT 7,334.2 million from MNT 14,668.4 million. Also, if the effect of current asset loans in the food sector on real GDP in 2023 was MNT 78,045.0 million if 25% of it is postponed and the effect is shown in 2024, it will be MNT 58,533.7 million, while the effect of current asset loans in the agricultural sector on real GDP in 2023 is MNT 27,418.3 million, it would be MNT 20,563.7 million. Finally, considering the above two assumptions, the total impact of program loans on real GDP in 2023 is MNT 136,007.5 million, which means that it will add 0.7 per cent growth compared to 2022. Differences between the model with the program loans effect and the baseline model based on this estimate are exhibited in Table 16 by key variables. See the attached Excel file named "model_result_prgrm_s3" for detailed results.

Table 16. Indirect and behavioural effects of the program loans

	Macroeconomic variables					
#	Variable (2010 constant price, MNT million)	2023	2024	2025	2026	2027
1	GDP	135,510.5	321,511.1	375,482.0	403,975.3	426,585.8
2	Private consumption	52,127.2	156,933.4	196,143.9	218,524.5	234,800.4
3	Government consumption	17,806.8	51,454.8	64,435.0	73,548.6	80,327.1
4	Gross capital formation	34,654.6	99,271.1	130,118.7	144,318.5	153,788.7
5	Export	81,379.3	223,921.7	286,613.2	314,926.6	330,080.0
6	Import	- 26,282.3	104,568.7	220,264.8	280,820.8	311,498.3
7	GDP: Agriculture	38,780.0	120,200.3	142,078.0	151,872.0	156,857.6
8	GDP: Mining	129.2	82.0	4,811.2	7,328.5	8,602.2
9	GDP: Other	97,919.1	211,465.7	237,624.3	251,785.0	265,225.8

GDP deflators					
#	Deflator	2023	2024	2025	2026	2027
1	GDP	- 0.001	- 0.005	- 0.006	- 0.010	- 0.013
2	Private consumption	- 0.001	- 0.006	- 0.010	- 0.013	- 0.015
3	Government consumption	- 0.001	- 0.005	- 0.009	- 0.012	- 0.014
4	Gross capital formation	- 0.001	- 0.005	- 0.008	- 0.011	- 0.013
5	Export	0.000	0.002	0.004	0.003	0.002
6	Import	0.000	0.000	- 0.001	- 0.002	- 0.003
7	GDP: Agriculture	- 0.002	- 0.007	- 0.010	- 0.012	- 0.015
8	GDP: Mining	0.000	0.009	0.015	0.013	0.011
9	GDP: Other	-0.001	-0.005	-0.008	-0.011	-0.015
Macroeconomic variables						
#	Variable (curent price, MNT million)	2023	2024	2025	2026	2027
1	GDP	416,821.3	1,010,571.5	1,305,391.9	1,453,162.2	1,577,388.2
2	Private consumption	112,396.9	341,593.0	428,639.1	486,115.7	533,319.3
3	Government consumption	35,646.3	102,850.9	130,032.3	152,576.7	171,615.8
4	Gross capital formation	66,076.8	189,523.0	250,961.8	282,826.6	306,545.5
5	Export	145,984.0	472,886.0	733,414.7	818,667.0	863,288.0
6	Import	- 38,426.6	127,505.5	267,905.4	331,919.6	357,262.8
7	GDP: Agriculture	93,668.4	304,766.8	385,755.5	434,049.2	469,839.8
8	GDP: Mining	634.2	44,897.8	119,546.0	134,121.6	134,175.3
9	GDP: Other	279,726.3	587,981.7	713,773.8	779,503.1	839,853.8
Financial market variables						
#	Variable	2023	2024	2025	2026	2027
1	Policy rate, %	0.001	- 0.030	-0.076	- 0.077	- 0.066
2	CPI, %	- 0.062	- 0.179	- 0.120	- 0.083	- 0.063
3	Risk premium, %	0.064	0.060	0.002	- 0.006	- 0.005
Lobour market variables						
#	Variable	2023	2024	2025	2026	2027
1	Private sector employment	718.0	5,442.3	7,469.4	8,749.4	9,657.4
2	Employment: Agriculture	- 1,588.3	384.5	684.9	705.6	707.1
3	Employment: Mining	21.5	16.0	23.1	26.0	26.6
4	Nominal wage growth, %	0.1	0.2	0.0	0.0	0.0
5	Nominal wage growth: Agriculture, %	0.2	0.4	- 0.1	- 0.1	- 0.1

Source: Researchers' own calculation

Based on the effect of program loans, the actual GDP calculated at 2010 prices in 2023, 2024, 2025, 2026, and 2027 will be MNT 135.5 billion, MNT 321.5 billion, MNT 375.5 billion, MNT 404 billion, and MNT 426.6 billion will increase, respectively. At the same time, Table 16 displays how the program affects the projections for 2023-2027 of the expenditure component of real GDP compared to 2010 prices. Overall, the program appears to have an increasing effect on each component of GDP in the medium term. In addition, due to the program's influence, the annual CPI growth or inflation rate will decrease by 0.1% in 2023, 0.2% in 2024, and 0.1% in 2025, 2026, and 2027, respectively. Employment in the agricultural sector is expected to continue to grow due to the program in the medium term, except for 2023, while it also positively affects nominal wage growth. The food industry's impact on employment and nominal wage growth cannot be directly calculated. The reason for this is that the GDP is divided into three parts: agriculture, mining, and others, according to the model we are using.

Table 17 calculates the differences in real GDP growth, its sectoral decomposition and the growth of each expenditure component of real GDP between the baseline model and the model with the program loans shock. From this, it can be concluded that the effect of program credit on real GDP, real GDP of agriculture, real GDP of other sectors, and the expenditure component of real GDP will have a more substantial impact in 2023 and 2024, respectively, and the impact will moderate in the future. For example, the difference in real GDP growth between the baseline model and the model with program shocks will be 0.7% in 2023 and 0.9% in 2024, and this difference will continue to decrease until it becomes zero in 2027 and 2028.

Table 17. Indirect and behavioural effects of program loans: Differences in growth of real GDP, its sectors and expenditure components

#	Variable (2010 constant price)	2023	2024	2025	2026	2027
1	GDP	0.7	0.9	0.2	0.1	0.0
2	Private consumption	0.4	0.8	0.2	0.1	0.0
3	Government consumption	0.5	0.8	0.2	0.1	0.1
4	Gross capital formation	0.4	0.8	0.3	0.1	0.0
5	Export	0.4	0.4	0.1	0.0	0.0
6	Import	- 0.1	0.4	0.3	0.1	0.0
7	GDP: Agriculture	1.4	3.0	0.7	0.3	0.1
8	GDP: Mining	0.0	0.0	0.1	0.0	0.0
9	GDP: Other	0.7	0.8	0.1	0.0	0.0

Source: Researchers' own calculation

5 CONCLUSION

Mongolia's Parliament passed Resolution No. 36 in 2022 ("Some Measures to Ensure Food Supply and Security"). This resolution was subsequently supported by Resolution No. 02 of the Temporary Committee of Parliament in 2023. Additionally, Government Resolution No. 63 of 2023 ("Some measures regarding the technological work of the food supply and agricultural sector") allocated a total of MNT 832.7 billion between Q2 and Q4 of 2023 to support food and agricultural production through subsidized investment and current asset loans channeled through commercial banks. The impact of this subsidized loan program is estimated using the semi-structural "GAP" model. First, a medium-term projection between 2023 and 2027 is generated using the baseline version of the GAP model. This projection incorporates data on various macroeconomic and financial market variables obtained from the Bank of Mongolia (Inflation Reports, Quarters I-IV, 2023), the World Bank (Global Economic Prospects, June 2023, January 2024), and the International Monetary Fund (World Economic Outlook, July 2023, October 2023, January 2024). The results are also compared to the projections from these institutions and adjusted based on specific assumptions.

To assess the program loan's impact on the baseline projection, we first estimate the average added value or GDP contribution of loans granted to the three sectors (food, crop, and livestock) based on Input-Output tables from 2012, 2015, and 2019 (Table 3). Recognizing that investments made through program loans take time to affect the economy (e.g., equipment purchase, installation, construction), we assume that 50% of investment loans and 25% of current asset loans will impact GDP in 2024, with the remaining impact realized in subsequent years. Using this approach, the estimated effect of program loans on increasing real GDP in 2023 is MNT 136 billion.

The overall impact of the program loans is calculated by introducing a "shock" to the gap or long-term trends of the food and agriculture sectors within the baseline projection model.

In summary, the MNT 832.7 billion in program loans granted in 2023 are estimated to generate additional economic growth of 0.7% in 2023 and 0.9% in 2024, with the impact gradually diminishing thereafter. The program also positively affects the medium-term growth of real GDP expenditure components such as private consumption, government spending, gross capital formation, exports, and imports. However, this effect is expected to wane and disappear by 2027 and 2028.

In the medium term, the program loans are expected to reduce annual consumer price index (CPI) growth, or inflation, by 0.1-0.2%. Additionally, the program is anticipated to have a positive impact on employment and nominal wages in the agricultural sector, particularly in 2023 and 2024.

It is important to note that the estimated program loan effects are contingent on several factors. These include the specific model used to calculate direct, indirect, and behavioral impacts, the assumptions made during medium-term projections with the GAP model, and the preconditions considered when incorporating program loan shocks into the model.

NOTE