

Labour Market of Khovd in Mongolia

Battsengel Gantogoo¹, Natsag Burmaa¹, Budjav Uuganbayar², Uuganabayr Bayasgalan³

¹School of Political Science, International Relations and Public Administration, National University of Mongolia, Ulaanbaatar, Mongolia

²Department of Mathematics, School of Applied Sciences, Mongolian University of Science and Technology, Ulaanbaatar, Mongolia

³School of Mines, China University of Mining and Technology, Xuzhou, China

Email: pre.gantogoo@gmail.com, burmaan@num.edu.mn, buuganaa@must.edu.mn, uuganbayrbayasgalan@gmail.com

How to cite this paper: Gantogoo, B., Burmaa, N., Uuganbayar, B., & Bayasgalan, U. (2025). Labour Market of Khovd in Mongolia. *Journal of Human Resource and Sustainability Studies*, 13, 113-130.
<https://doi.org/10.4236/jhrss.2025.131007>

Received: January 29, 2025

Accepted: March 11, 2025

Published: March 14, 2025

Copyright © 2025 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

System dynamics is a methodology that examines the dynamics of internal structures and variable processes, providing critical support for long-term policy development. This study analyzed the dynamic interrelationship between the labor market and the economic development of Khovd aimag using system dynamics modeling. Indicators such as employment, population, migration, economic diversification, and infrastructure were assessed, and strategies including economic diversification, small and medium-sized business development, tourism, and human resource capacity enhancement were proposed. Implementing large-scale projects and attracting investment can positively impact the economy of Khovd aimag while significantly contributing to GDP, employment, and infrastructure development. The study's results indicate that supporting economic diversification, increasing infrastructure investment, and activating the labor market can promote employment growth and ensure the sustainable development of the local economy.

Keywords

Labor Market, System Dynamics Modeling, Employment Trends, Sustainable Economic Growth, Policy Simulation

1. Introduction

System dynamics is a widely utilized methodology in contemporary science and policy-making that enables us to examine the internal structure of complex systems and the dynamics of changing processes. This methodology was developed based on the theory proposed by Jay Forrester in the 1950s and is now applied across various fields, including economics, ecology, and the social sciences (Bardach, 2003; Meadows et al., 1972).

The system dynamics methodology concentrates on examining the interactions among elements in a complex system and the changes that transpire over time. It illustrates the system through the interconnections of variables, feedback structures, and dynamic flow models (Sterman, 2002).

System dynamics involves interrelated elements working together. For example, the labor market in Khovd aimag (Province) includes various factors, such as economic growth, diversification, population size, employment, wage levels, and unemployment rates.

In system dynamics modeling, the relationships between variables are interdependent. These interdependencies are divided into two types: positive feedback and negative feedback. Positive feedback indicates a direct relationship between variables, where an increase in one variable leads to an increase in related variables and a decrease results in a corresponding decrease. Negative feedback, however, creates a stabilizing or limiting effect within the system (Badarch, 2003).

In **Figure 1**, the feedback information about the real world not only alters decisions but also modifies the mental model. By changing the mental model, we can adjust the system's structure, strategies, and decision-making rules, ultimately altering the system's structure and its state.

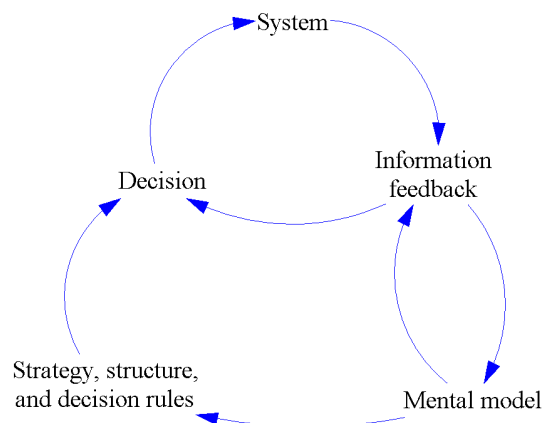


Figure 1. Double-loop diagram.

System dynamics is effectively used in various fields, for example:

- **Economics:** To evaluate labor market equilibrium and study wage dynamics.
- **Ecology:** To model the sustainable use of natural resources.
- **Social Policy:** To conduct studies on urbanization, education, and population migration.

1.1. System Dynamics and the Labor Market

Studying the labor market using system dynamics modeling allows for the identification of interactions between factors such as investment, job availability, labor productivity, wage levels, unemployment, and migration. This approach provides a foundation for forecasting long-term employment trends and understanding their

social and economic impacts.

The study titled “Influence of Labour Migration on Latvia’s Labour Market” by Valerijs Skribans (Skribans, 2009) presents the results of applying system dynamics methodology to forecast long-term trends and analyze policies for Latvia’s labor market. The model aims to identify the interactions between population dynamics, employment, labor demand, and supply. The study includes a comparison of international practices, system dynamics approaches, and labor market analysis models.

Since Latvia joined the European Union, the study analyzed how the outflow of the labor force has impacted the labor market. Using the system dynamics approach, the most critical parameters of the labor market were forecasted. The model also incorporated the effects of international migration and education policies.

The study by Adiba Muminova, “Modeling Workforce Demand in North Dakota: A System Dynamics Approach” (Muminova, 2015), analyzed the interrelationship between labor market demand and supply using a system dynamics model. It focused on understanding, modeling, and forecasting how factors such as North Dakota’s economic development, demographic changes, education levels, and workforce migration influence labor demand.

Figure 2 illustrates the correlation among the population, employment, economic development, and social indicators of Khovd province, according to our proposed hypothesis. Population growth has a positive effect due to births, while mortality has a negative impact, reducing the population. Migration affects employment levels, and limited economic growth and diversification in the region lead to low job availability, which in turn increases migration.

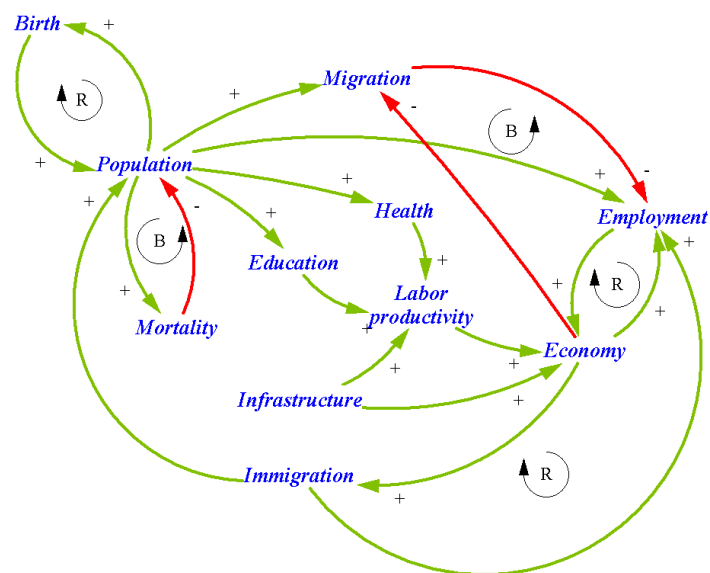


Figure 2. Feedback loop diagram of employment in Khovd aimag (Province)

Employment and the economy have a positive, mutually reinforcing relationship. The economy is closely linked to health, education, infrastructure, labor productivity, and employment (Department, 2016; Ministry of Labor and Social Protection et

al., 2024).

The social and economic data of Khovd province were primarily sourced from reference (National Statistical Committee, 2025), with historical records from 2000 to 2023 based on actual statistics. This data was processed using the system dynamics modeling methodology to generate forecasts for the years 2024-2040. In instances where specific data or research related to Khovd province was unavailable, national-level data for Mongolia served as substitutes. For instance, the labor force participation rate parameter was derived from actual data for Khovd province, while the impact of infrastructure on employment was estimated using regression analysis based on national data from Mongolia.

Various projects and measures were introduced as external shocks into the developed model to evaluate their outcomes.

1.2. Population Estimation

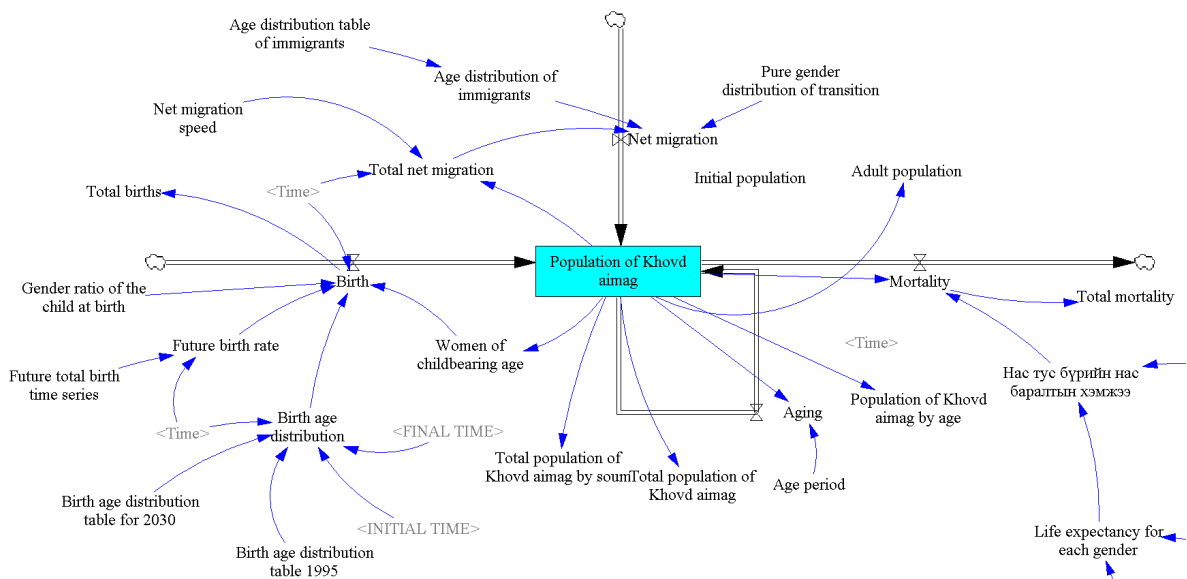
Picture 1 illustrates the principles used to estimate the population of Khovd aimag (Province).

The exponential law $P(t) = P_0 e^{kt}$ with the equation $dP/dt = kP$ is used to calculate population growth:

$$\frac{d(\text{Population})}{dt} = ((\text{Birth}\%) - (\text{Mortality}\%) + (\text{Pure transition}\%)) \times \text{Population}$$

In the context of migration, when determining the macro-level model of work, it was intended to define the relationship of GDP per capita with migration, which has a major impact on migration, using a correlation matrix.

When determining the correlation matrix, the correlation coefficient was calculated for each of the strong reliance on GDP per capita for each migration and migration (Content and Impact Assessment of the Employment Support Program, 2023).



Picture 1. Population sector.

Figure 3 shows the population of Khovd aimag; it appears that the population of Khovd aimag has been decreasing until 2010. Since 2010, the population has been steadily increasing (National Statistical Committee, 2017).

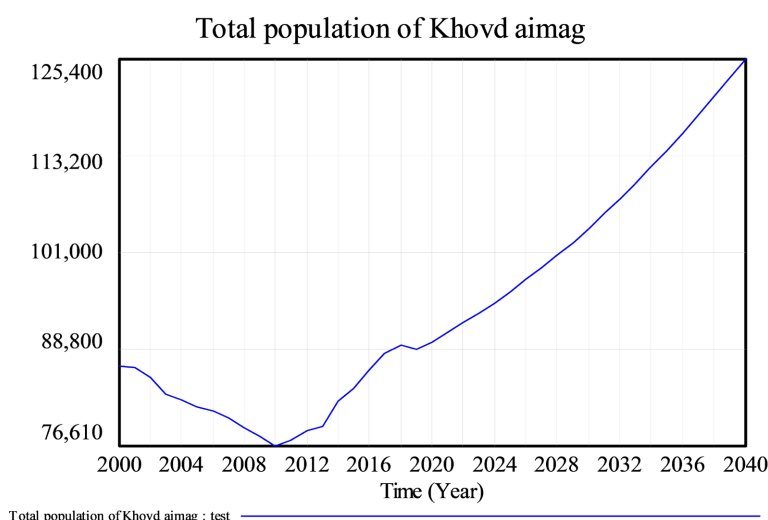


Figure 3. Population of Khovd aimag (province).

1.3. Economic Calculations

The Cobb-Douglas production function was used to model the sectors of the economy. The industry production variable represents the annual value added to the service sector (Cottrell, 2019). To calculate this, the Cobb-Douglas production function was taken to correspond to $Y = A * K^{(e-1)} * L^{(e)}$:

$$\begin{aligned} \text{Productivity} = & \text{Initial production} \times \text{Relative asset}^{(CS)} \\ & \times \text{Relative employment}^{(1-CS)} \times \text{Productivity impact} \end{aligned}$$

Here: CS—capital sentiment.

The variables considered for the impact of productivity on production are education, infrastructure, health, technology, and natural disasters. These are controlled by the parameters of relative life expectancy, natural disasters or dzud, relative index of secondary education, and relative density of infrastructure.

According to the Cobb-Douglas production function, employment is:

$$\begin{aligned} \text{Employment} = & \text{Initial employment} \times \text{Relative wealth} \times \text{Labor force participation rate} \\ & \times \text{Impact of infrastructure on employment} \end{aligned}$$

Picture 2 shows an agricultural production sector. The total production of Khovd aimag is calculated using the following sectors: Here:

- Service sector;
- Agriculture sector;
- Manufacturing sector;
- Mining sector;
- Construction sector;
- Electricity, heat, gas, and water supply sectors are included.

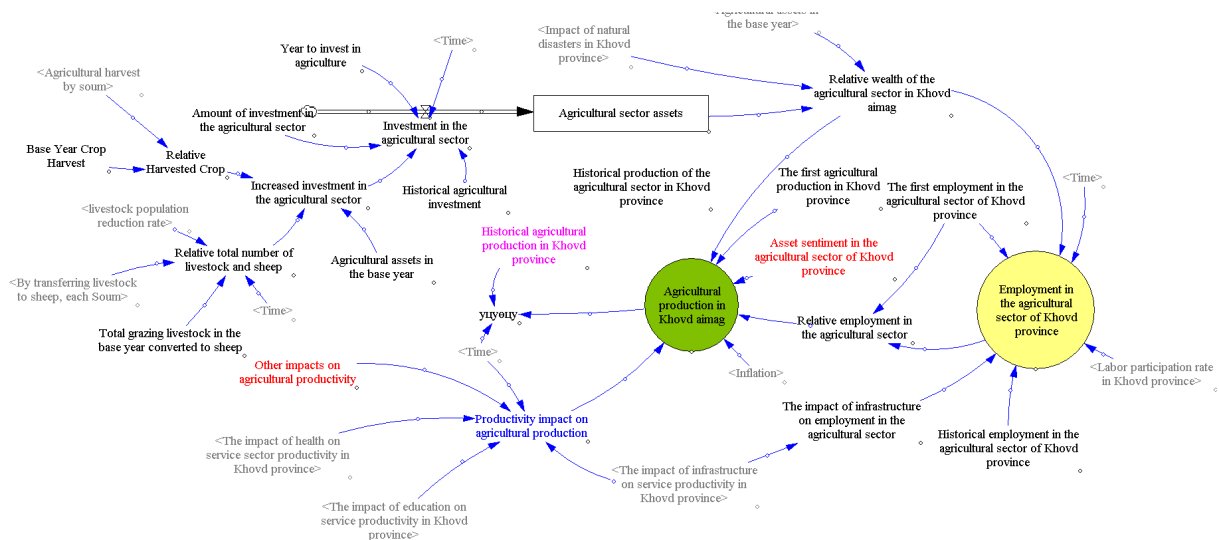
The Gross Domestic Product of Khovd aimag was taken as the sum of all economic sectors. Employment was calculated as the sum of employment in all economic sectors.

$$\text{Employment} = \text{Relative wealth} * \text{initial employment} * \text{Infrastructure impact on employment} * \text{Labor participation rate}$$

Employment in Khovd aimag was calculated by sector according to the above formula. Here, employment depends on the sector’s relative capital, infrastructure, and labor participation level.

Figure 4 shows that employment and GDP in Khovd aimag are trending toward steady growth.

Table 1 shows a Khovd aimag employment be Soum. Increasing employment plays an important role in supporting local economic development, reducing income inequality, and ensuring social stability. In Khovd aimag, the following strategies can be implemented, taking into account its natural resources, demographic characteristics, and geographical location.



Picture 2. Agricultural production sector.

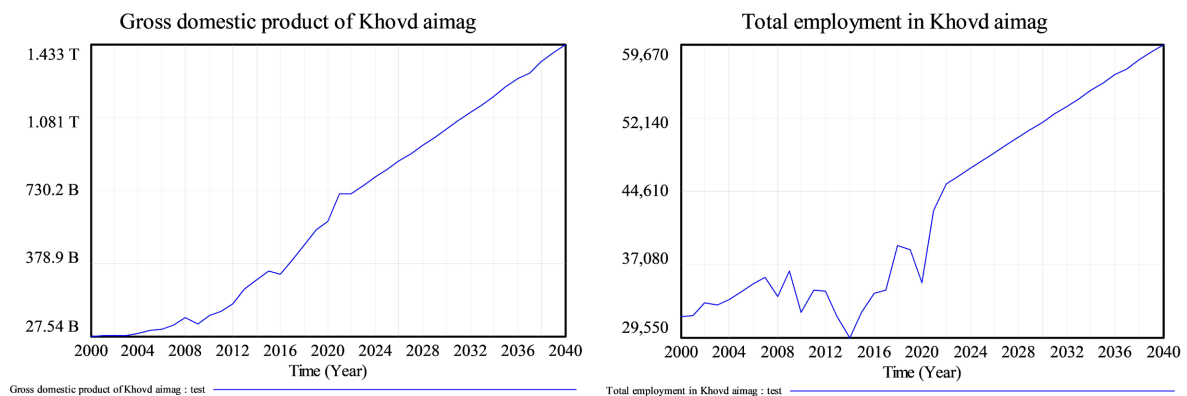


Figure 4. GDP and employment of Khovd aimag.

Table 1. Khovd aimag employment by Soum.

Total employment in Khovd aimag by soum	2000	2010	2020	2030	2040
Altai	942	882	1333	1940	2208
Bulgan	2814	2823	3135	4669	5346
Buyant	2903	3224	2885	4183	4733
Darwi	1351	1063	1044	1743	1980
Durgun	814	885	1056	1497	1509
Duut	570	530	599	796	864
Jargalant	9024	9480	12,190	19,838	24,794
Zereg	1079	1131	1086	1626	1771
Manhkan	1559	1571	1557	1957	1981
Munkhkhairkhan	707	699	603	887	1041
Must	1094	1142	964	1406	1499
Myangad	1009	1101	1236	1861	2069
Uyench	1280	1142	1537	1991	2232
Khovd	3127	3187	2701	3510	3763
Tsetseg	872	929	1028	1400	1496
Chandmani	1419	1354	1191	1747	1866
Erdeneburen	1080	976	1012	1221	1242

1) Promoting economic diversification

Limited job opportunities are one of the main employment challenges in Khovd aimag. This can be addressed through economic diversification.

- **Production:**

- Agricultural raw material processing plants (meat, milk, leather, wool).
- Small and medium-sized enterprises based on natural resources (building materials, natural resources).
- Souvenir production/travel and tourism related.

- **Technological innovation:**

- Introducing advanced technologies into agriculture.
- Implement renewable energy projects.

2) Developing small and medium businesses

Small and medium-sized enterprises (SMEs) can be a key driver of local employment growth.

- **Support policy:**

- Provide preferential financial loans and investment support to SMEs.
- Provide business training and consulting services.

- **Market opportunity:**

- Promote local products in domestic and foreign markets.

- Increase cross-border trade.

3) Expand tourism

Khovd aimag (province) is rich in natural and cultural heritage, which provides ample opportunities for tourism development.

- **Ecological tourism:**

- Use of natural beauty spots such as Altai Tavan Bogd, Khar-Us Lake, and Must Mountain.
- Promote nomadic culture and traditions.

- **Infrastructure development:**

- Improve road, hotel, and communication infrastructure.
- Develop special travel routes for tourists.

4) Human resource development

Improving the quality of local human resources is a key factor in employment growth.

- **Professional training:**

- Establish vocational training and education centers in the community.
- Organize training to acquire the necessary skills in the industrial sector.

- **Promoting youth participation:**

- Encourage and support local youth to start businesses and improve their skills.
- Increase youth participation in technology and innovation.

5) Increase infrastructure investment

- **Road and transportation infrastructure:**

- Develop road and transportation infrastructure to increase job availability.
- Connect with nearby regional markets.

- **Information technology:**

- Expand internet access to enable remote working.
- Develop an electronic trading platform for agricultural products.

6) Activate the labor market

- **Support job seekers:**

- Implement skills development programs for job seekers.
- Develop an electronic platform to connect employers and job seekers.

- **Foreign migration regulations:**

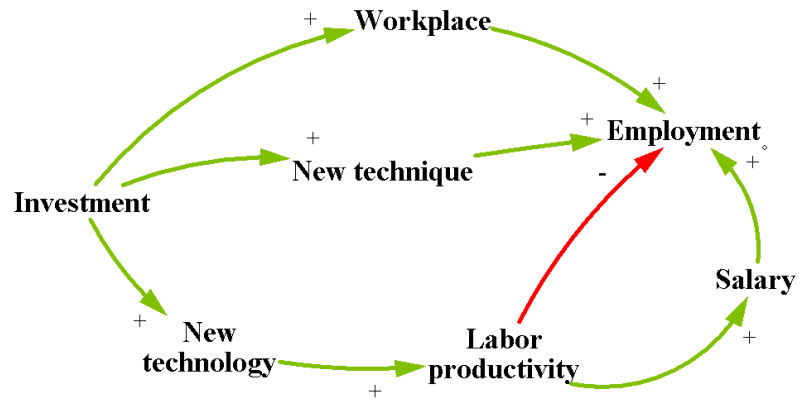
- Increase the opportunities for people working abroad and in Ulaanbaatar to return to their home country (Vision-2050, 2020).

Picture 3 shows how a new major project or investment affects employment.

Investment creates three things:

- Jobs;
- New equipment;
- New technology.

Jobs and new technology directly increase employment. New technology, on the other hand, improves labor productivity. However, higher labor productivity reduces employment. However, since higher labor productivity leads to higher wages, this in turn will increase employment.



Picture 3. Investment loop diagram.

The following scenarios have been considered in advance, considering that the way to increase the most jobs in Khovd aimag is to implement large-scale projects and attract investment. It is believed that the products produced will not only fully satisfy the western region, but also have the potential to be exported to China.

1) Processing of agricultural raw materials/Khovd Agro Park/

Here's a look at the unemployment rate in Khovd aimag (province):

The unemployment rate in Khovd aimag is higher than the Mongolian average, and the population and employment of Khovd aimag are on a steady growth trend. However, as shown in **Figure 5** and **Table 2**, the unemployment rate in Khovd aimag is not decreasing and is likely to remain stable in the future (**National Statistical Committee, 2019; Mongolia Competitiveness Survey, 2020**). Although this may appear as an increase in employment, it indicates that job growth is not keeping up with the population growth rate.

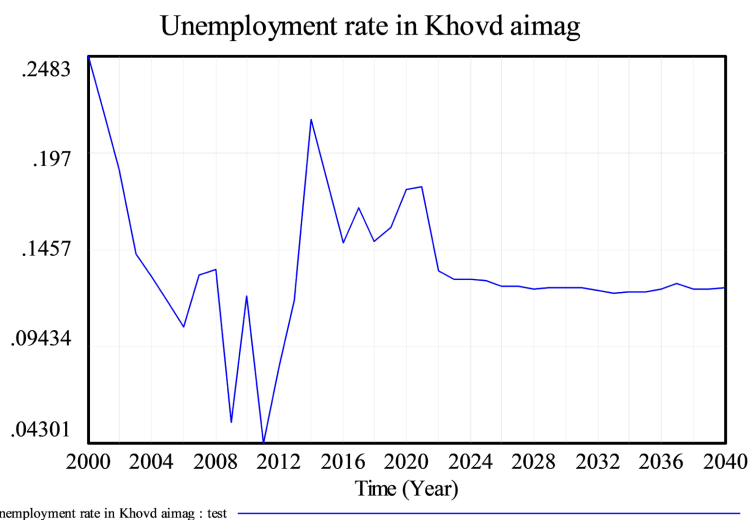


Figure 5. Unemployment rate in Khovd aimag.

In order to increase employment, it is considered necessary to develop the pro-

cessing industry of agricultural raw materials in Khovd aimag, which includes:

- Meat processing plant;
- Dairy products plant;
- Leather processing plant;
- Dairy plant;
- Dry milk processing plant;
- Wool and cashmere processing plant;
- Yarlag processing plant;
- Airag factories.

Table 2. Mongolia’s unemployment rate (National Statistical Committee, 2025).

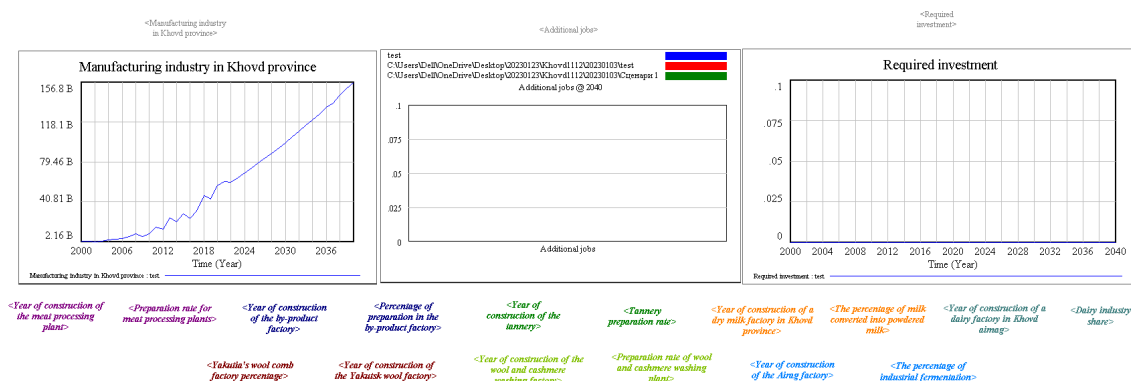
Category	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	9.9	7.7	8.2	7.9	7.9	7.5	10	8.8	7.8	9.9	6.7	8.3	6.4	5.3
Western region	10.1	10.8	9.8	11.9	13.3	9.2	12.1	10.7	8.9	11.1	8.3	9.1	9.2	5.7
Khangai region	11.9	8.3	8.3	9.8	6.8	4.9	10.6	9.8	7.1	8.1	6.2	7.9	6.5	5.7
Central region	9.3	6.8	7.7	7.7	9.2	8.9	9.2	8.3	7.6	7.3	6.8	10.3	6.3	6.2
Eastern region	10.5	11.1	10.8	11.2	13.1	10.7	11.4	10.4	8.7	11.1	7.8	4.9	4.6	3.8
Ulaanbaatar	8.7	5.6	7.1	4.6	5.1	6.9	9.1	7.5	7.6	11.2	6.3	8.1	5.8	5

More than 40 percent of Khovd aimag’s economic structure is occupied by pastoralism, with a total of about 3.5 million livestock. 44 percent of livestock raw materials are semi-processed, and the rest is wasted (*Agricultural Support and Incentive Research Report, 2023*).

Picture 4 shows how to work in our simulation sector. In conducting the above simulation, it is important to determine what percentage of Khovd province’s livestock raw materials can be processed industrially.

The following simulations were made:

- 20% of the meat and by-product processing industry in 2025;
- 30% of the leather, wool, cashmere and yak fur industry in 2026;
- 30% of the dairy and dry milk industry in 2026;
- 30% of the fermented milk industry in 2025 were simulated.



Picture 4. Simulation sector.

In Mongolia, pastoralism is predominant and the population is spread over a vast area, so it is difficult to process all of the animal-derived raw materials industrially. So let's see what results we can get by processing 20% - 30% industrially first.

Figure 6 shows by processing raw materials from livestock farming in Khovd aimag into final products, the gross domestic product of Khovd aimag has increased by an average of 21.4%. In addition, it is possible to increase GDP per capita by 21%.

Figure 7 shows the construction of agricultural raw material processing plants in Khovd aimag, which is expected to increase employment by 8,080 or 14.6%.

2) Erdeneburen 90 MW hydroelectric power plant

Since one of the factors hindering the development of large-scale production in Khovd aimag is energy supply, let's see what results will be achieved if the Erdeneburen hydroelectric power plant, which is included in the Mongolian government's roadmap, is put into operation in 2030.

The Erdeneburen Hydropower Plant has an installed capacity of 90 MW and is planned to produce an average of 366 million kWh of electricity per year.

Figure 8 shows the Erdeneburen hydroelectric power plant's annual revenue is expected to average 71.3 billion tugrugs.

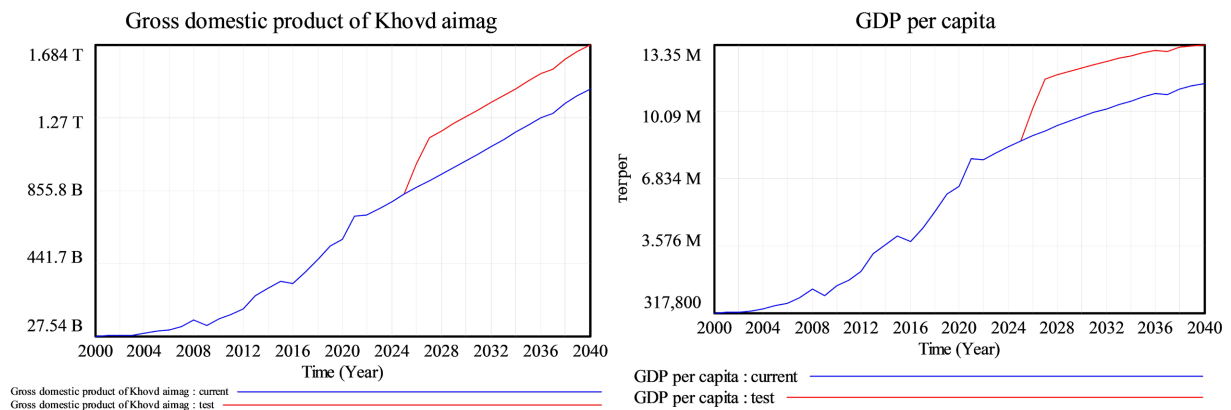


Figure 6. Khovd aimag's GDP and GDP per capita.

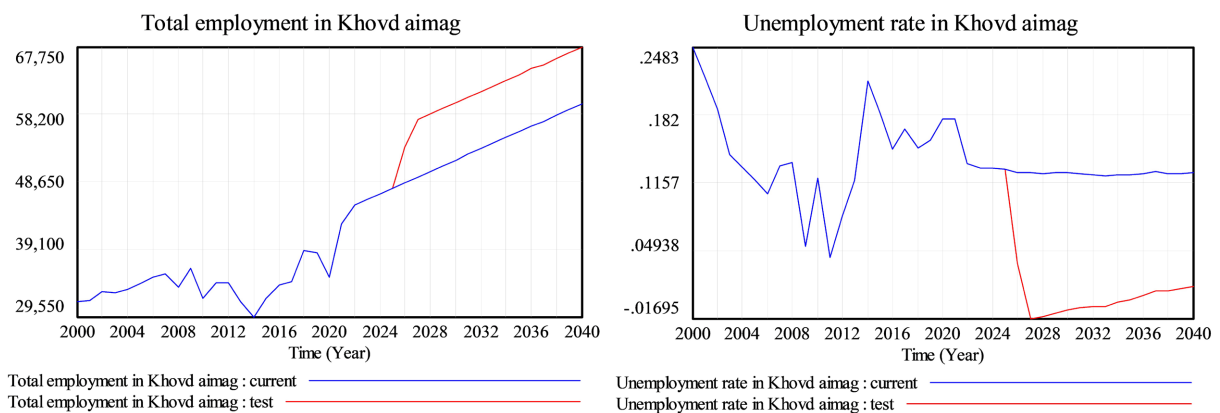


Figure 7. Employment and unemployment rates in Khovd aimag.

Figure 9 shows with the commissioning of the Erdeneburen hydroelectric power plant, production in the electricity and heat sectors of Khovd aimag is expected to increase by an average of 5.8 times, and employment in the electricity and heat sector is expected to increase by 11.08%.

Figure 10 shows the construction sector in Khovd aimag is expected to earn an average of 21.8 billion tugrugs per year until the construction of the hydroelectric

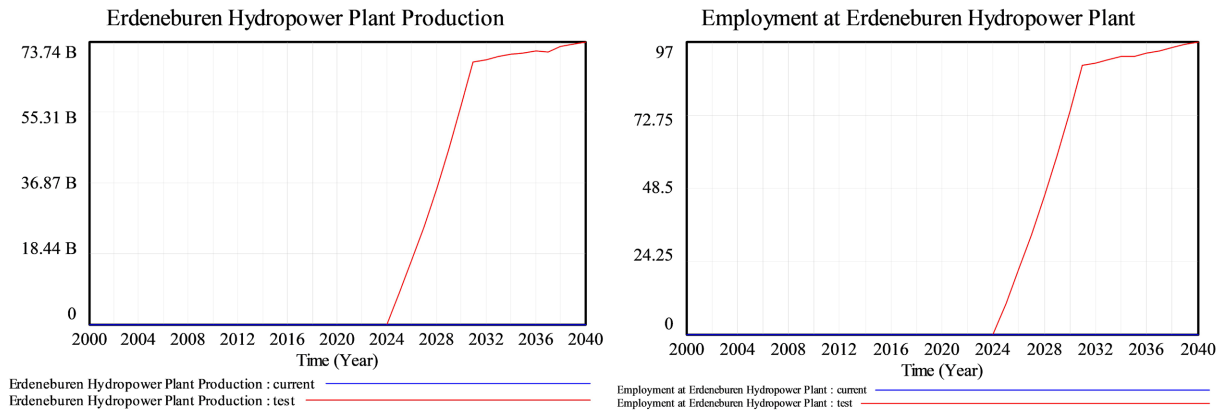


Figure 8. Erdeneburen hydropower plant revenue and employment.

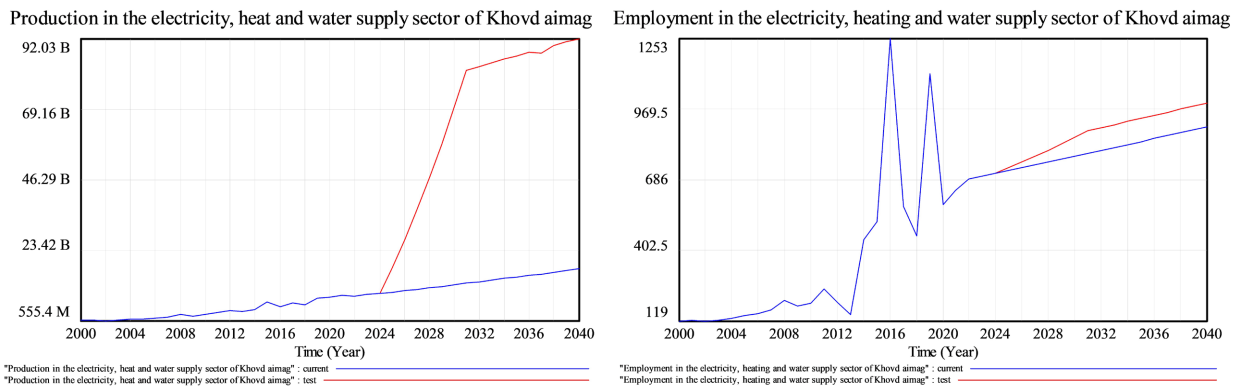


Figure 9. Production and employment in the electricity, heat, gas, and water supply sectors of Khovd aimag.

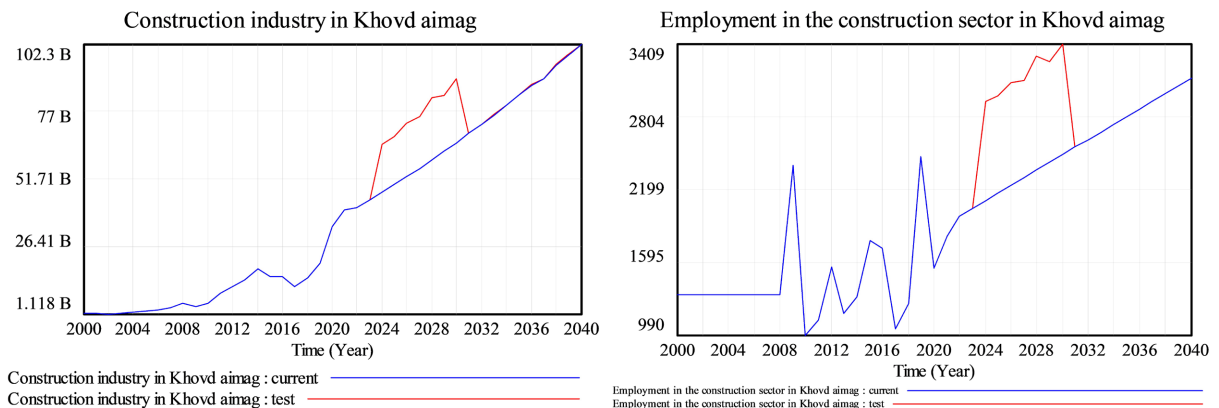


Figure 10. Production and employment in the construction sector of Khovd aimag.

power plant, i.e., from 2024 to 2030. During the construction of the hydroelectric power plant, the construction sector in Khovd aimag is expected to increase employment by an average of 903, or 34.5%.

Figure 11 shows the construction of the Erdeneburen hydroelectric power station is expected to increase Khovd aimag’s GDP by 6.1%. Total employment in Khovd aimag is expected to increase by 1.9% from 2024 to 2030, and by 0.16% after 2031.

The unemployment rate in Khovd aimag is expected to decrease by 1.6 percent from 2024 to 2030, and by 0.046 percent from 2031 onwards. (**Figure 12**)

3) Khovd Eco Cement Factory

The Khovd aimag eco-cement plant will be operational in 2025 and will have the following results:

Figure 13 shows the Eco Cement Plant is expected to generate an average annual revenue of 103 billion tugruqs once it is operational. It is also expected to create 328 direct and indirect jobs.

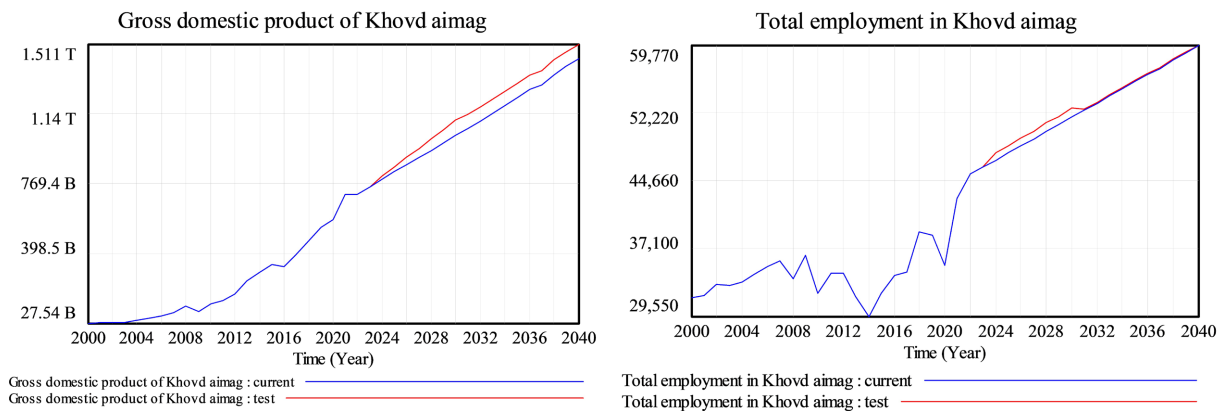


Figure 11. GDP and employment of Khovd aimag.

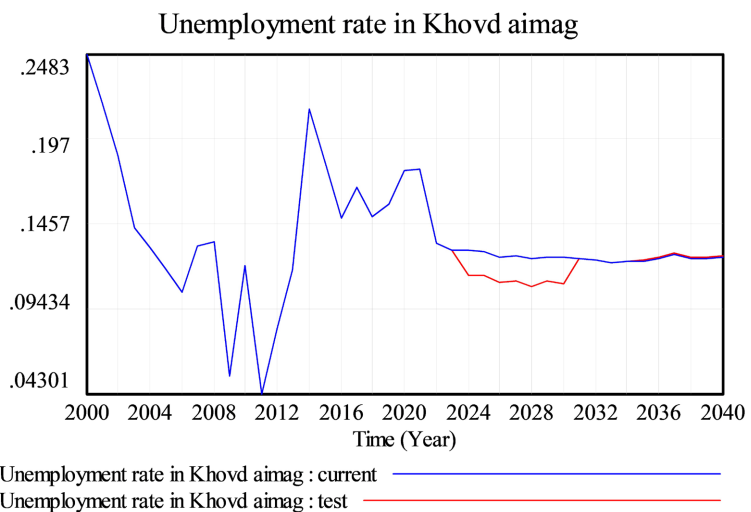


Figure 12. Unemployment rate in Khovd province.

Figure 14 shows with the commissioning of the Eco Cement Plant, production in the processing sector in Khovd province is expected to double, and the sector’s workforce is expected to increase by 13.4%.

Figure 15 shows when the Eco Cement Plant is built, Khovd aimag’s construction industry output is expected to increase by 46.4 billion, or 2.05%.

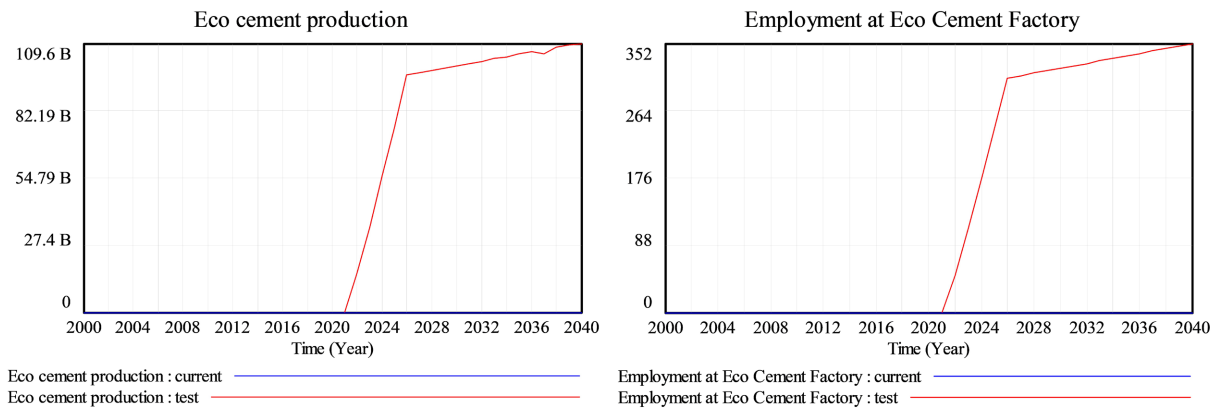


Figure 13. Eco cement factory revenue and employment.

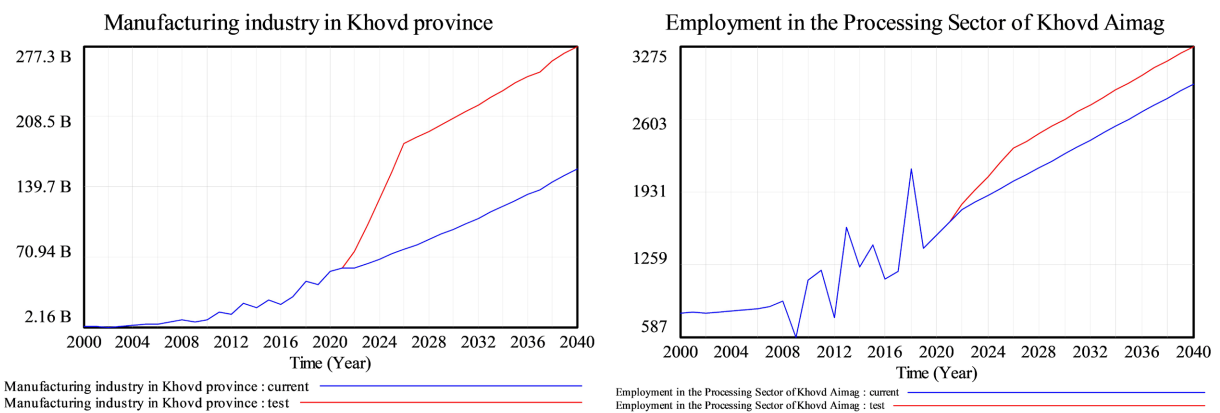


Figure 14. Manufacturing sector production and employment.

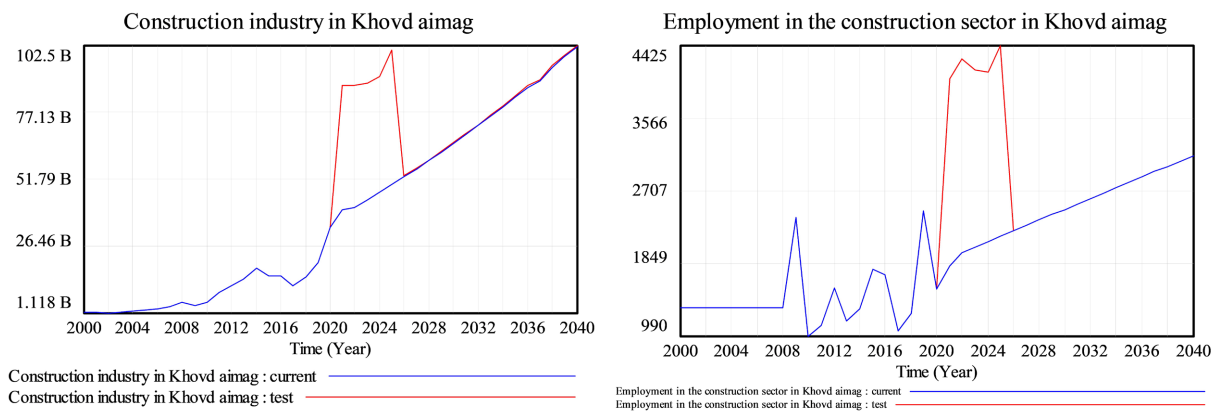


Figure 15. Construction industry production and employment.

Figure 16 shows the eco-cement plant is expected to increase the GDP of Khovd aimag by an average of 10.6%. Employment is expected to increase by 5% during the construction of the eco-cement plant and by 0.6% after the eco-cement plant is put into operation. The unemployment rate of Khovd aimag is expected to decrease by 4.2 points during the construction of the eco-cement plant and by 0.22 points after the eco-cement plant is put into operation.

Integrated simulation

If the agriculture, Erdeneburen hydroelectric power plant, and Eco Cement plant projects were all implemented simultaneously.

Figure 17 shows, looking at the results of all the above simulations, Khovd aimag’s GDP is expected to increase by 37.7% and employment by 16%. However, during the construction of the above projects, employment is expected to fall below 0. Therefore, during the implementation of the projects, there is a shortage of skilled labor and the need to recruit other labor from other aimags.

The system dynamics modeling methodology we use is based on ordinary differential equations and their systems. Therefore, the analysis of the model’s parameters relies on the stability theory of differential equations. Additionally, the Vensim software we utilize is built with a high level of intelligence, automatically selecting confidence intervals for parameters. As a result, it seldom drives the system into an unstable or chaotic state.

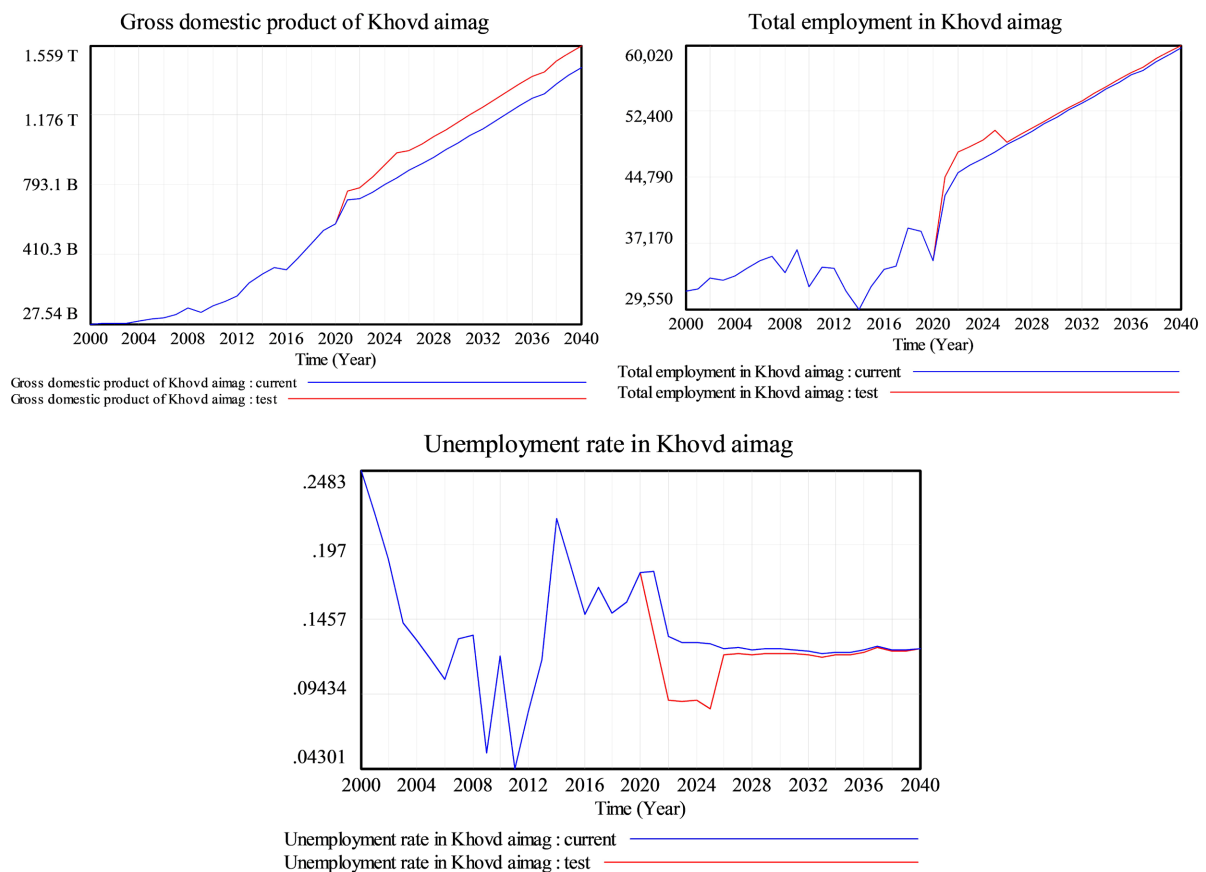


Figure 16. GDP, employment and unemployment rates of Khovd aimag.

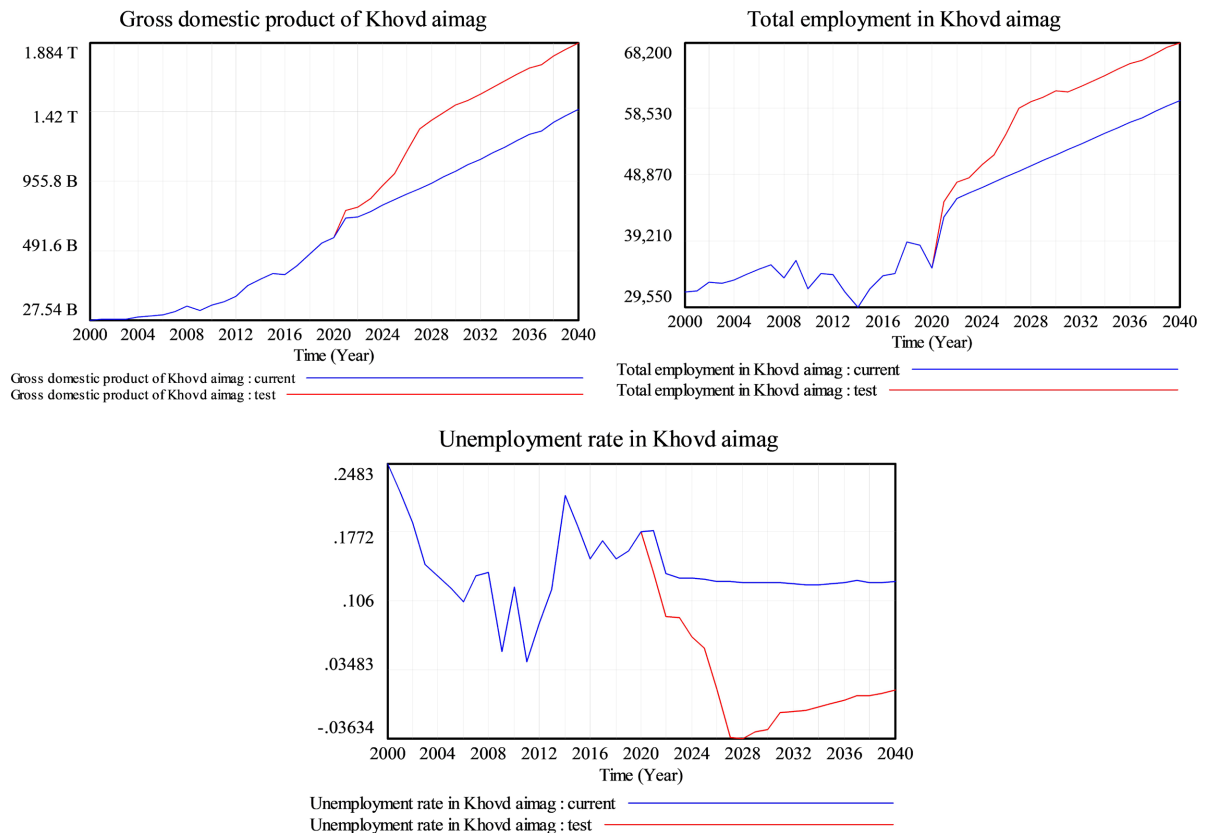


Figure 17. GDP, employment and unemployment rates of Khovd aimag.

The system dynamics modeling methodology we use is based on ordinary differential equations and their systems. Therefore, the analysis of the model's parameters relies on the stability theory of differential equations. Additionally, the Vensim software we utilize is built with a high level of intelligence, automatically selecting confidence intervals for parameters. As a result, it seldom drives the system into an unstable or chaotic state.

2. Conclusion

Of the above projects, the project for the complete processing of agricultural raw materials is expected to concentrate the most jobs. Next is the Khovd aimag cement factory, which is about to come into operation. Also, the agricultural sector project consists of several factories, so it is increasing GDP and employment the most.

1) Processing of agricultural raw materials/Khovd Agro Park/

- By **developing** agricultural processing plants, Khovd aimag's GDP could grow by an average of 21.4% and employment could increase by 14.6%.
- According to industry simulations, job availability will **improve** in 2025-2026, and there may be a need to attract labor from other provinces.
- The **construction** sector will see a 2.05-fold increase, with employment increasing by 2171.2 or 2.08 times.

2) Erdeneburen Hydropower Plant:

- Once the station is operational, it will generate 71.3 billion tugrugs in annual revenue and create an average of 94 new jobs.
- Khovd aimag's electricity and heating sector production could grow by 5.8 times and employment by 11.08%.

3) Eco Cement Factory:

- It is expected to generate 103 billion tugrugs in annual revenue and create 328 jobs.
- The construction sector will see a 2.05-fold increase, with employment increasing by 2171.2 or 2.08 times.

Integrated simulation:

- It is estimated that the integrated implementation of projects such as the agricultural sector, Erdeneburen hydroelectric power plant, and eco-cement factory will increase Khovd aimag's GDP by 37.7% and employment by 16%.

These employment support measures are expected to significantly reduce local unemployment rates and ensure sustainable economic growth. They will also significantly reduce migration to Ulaanbaatar and increase migration from other aimag cities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- Agricultural Support and Incentive Research Report* (2023).
https://www.undp.org/sites/g/files/zskgke326/files/2023-06/khodol-mor_erkhleltiyg_demzhikh_khotolboriyn_aguulga_ur_dungiyn_unelgee_2023.pdf
- Badarch, B. O. (2003). *Fundamentals of System Dynamics Modeling*. Mongolian University of Science and Technology.
- Content and Impact Assessment of the Employment Support Program* (2023).
<https://tuv.nso.mn/uploads/users/74/files/Ховд%20аймгийн%20ажил%20эрхлэлтийн%20ганилцуулга%202015.pdf>
- Cottrell, A. (2019). *The Cobb-Douglas Production Function*.
<https://users.wfu.edu/cottrell/ecn207/cobb-douglas.pdf>
- Department, K. A. S. (2016). *Employment Overview of Khovd Aimag*.
<https://tuv.nso.mn/uploads/users/74/files/%D0%A5%D0%BE%D0%B2%D0%B4%20%D0%B0%D0%B9%D0%BC%D0%B3%D0%B8%D0%B9%D0%BD%20%D0%B0%D0%B6%D0%B8%D0%BB%20%D1%8D%D1%80%D1%85%D0%BB%D1%8D%D0%BB%D1%82%D0%B8%D0%B9%D0%BD%20%D1%82%D0%B0%D0%BD%D0%B8%D0%BB%D1%86%D1%83%D1%83%D0%BB%D0%B3%D0%B0%202015.pdf>
- Meadows, D. H., Meadows, D. L., Randers, J., & Ill, W. W. B. (1972). *The Limits to Growth*. Chelsea Green Publishing.
- Ministry of Labor and Social Protection, Institute for Labor and Social Protection Training, Evaluation, and Research, MMCG Consulting LLC (2024). *Medium-Term Demand and Supply Forecast of Mongolia's Labor Market: Research Report*.

- Mongolia Competitiveness Survey (2020). *KHOVD Province Statistical Table*.
<https://aimagindex.mn/province-status?slug=ХовдVision-2050>
- Muminova, A. (2015). *Modeling Workforce Demand in North Dakota: A System Dynamics Approach*. The University of Bergen.
- National Statistical Committee (2017). *Revised Population Projections for 2015-2045*.
- National Statistical Committee (2019). *Statistical Bulletin of Mongolia 2010-2019*.
- National Statistical Committee (2025). <https://www.1212.mn>
- Skribans, V. (2009). *Preconditions of Latvian Labour Market Forecasting and Policy Analysis System Dynamics Model Development*.
<https://proceedings.systemdynamics.org/2009/proceed/papers/P1057.pdf>
- Sterman, J. D. (2002). *Business Dynamics, Systems Thinking and Modeling for a Complex World*. Massachusetts Institute of Technology Sloan School of Management.