NATIONAL
STATISTICS OFFICE
OF MONGOLIA

ENVIRONMENTAL – ECONOMIC ACCOUNTS

A SUMMARY REPORT

Ulaanbaatar
2025

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Abbreviation

SNA	System of National Accounts
NEEP	National expenditure on environment protection
EEA	Environmental-Economic Accounts
SEEA CF	System of Environmental-Economic Accounting Central Framework
GJ	Gigajoule
GDP	Gross domestic product
PSUT	Physical supply and use tables
SUT	Supply and Use Tables
UN	United Nations
TJ	Terajoule
NSO	National statistics office
PHA	Physical flow accounting
PEFA	Physical energy flow account
AEA	Air emissions account
MFA	Material flow accounts
SDG	Sustainable Development Goals
EPEA	Environmental protection expenditure accounts
EGSS	Environmental goods and services sector account
CEPA	Classification of Environmental Protection Activities
ROW	Rest of World
MNT	togrog (national currency)

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1. INTRODUCTION

In the System of National Accounts, economic activities—including production and consumption—rely not only on labour and produced assets, but also on non-produced natural assets, such as raw materials (e.g., ores, minerals, and water), land (for production, consumption, and leisure) and ecosystems (for absorption and degradation of residuals and pollutants, waste, and wastewater).

Economic activity—through the use and exploitation of resources—leads to changes in the state of the environment or natural assets. To mitigate these negative effects, targeted environmental protection measures are implemented.

To gain a comprehensive understanding of the interactions between an environment and society, it is necessary to collect information about the state of the environment, as well as key trends, drivers and the underlying causes of environmental change.

The System of Environmental-Economic Accounting (SEEA), developed by the United Nations Statistics Division, provides the internationally agreed framework for environmental accounting, integrating environmental and economic data.

Environmental accounts systematically describe the interactions between the economy, households and the environment, by aligning physical environmental data—such material and energy flows, water and land use, waste and wastewater disposal and air emissions—with economic data such as gross domestic product (GDP) and gross value added (GVA).

The general framework of the SEEA comprises three main components:

1. Physical flow accounts – which track the flows of materials and energy (in physical units) within the economy and between the economy and the environment;
2. Environmental asset accounts – which record the stocks and changes in stocks of natural resources and other environmental assets;
3. Environmental activity accounts – which capture economic activities and transactions related to the environment and resource management.

The National Statistics Office (NSO) is gradually developing methodologies for compiling relevant accounts under the SEEA Central Framework (SEEA CF) and is producing relevant environmental-economic accounts.

This report provides a detailed summary of the annual thematic reports compiled under the SEEA CF. It covers the following accounts:

Physical Flow Accounts:

1. Material Flow Account
2. Energy Physical Flow Account
3. Solid Waste Account
4. Water Physical Flow Account
5. Air Emissions Account

Asset Accounts:

6. Land Use Account
7. Forest Resource Account

Environmental Activity Accounts:

8. Environmental Taxes, Subsidies and Transfers Account
9. Environmental Protection Expenditure Account

The detailed reports, indicator dynamics, methodologies, statistical glossary and other related information can be downloaded from the Mongolian Statistical Information Service www.1212.mn .

2. PHYSICAL FLOW ACCOUNTING

Physical flows refer to the movement of materials and energy that flow into, within, and out of the economy. These flows are recorded in Physical Supply and Use Tables (PSUTs).

PSUTs are an extension of the Supply and Use Tables (SUTs) of the System of National Accounts (SNA), expanded to include environmental indicators. Extra rows are added for the flows between the environment and the economy such as natural inputs (e.g., raw materials, water, energy) and residuals (e.g., waste, emissions, and wastewater). An additional column represents the environment reflecting its dual role as a supplier of natural inputs and a recipient of residuals.

FIGURE 1. GENERAL PHYSICAL SUPPLY AND USE TABLES (PSUT)

	By industries	Households	Accumulation	Rest of the world	Environment	Total
PHYSICAL SUPPLY TABLE						
Natural inputs					A. Flows from the environment[1]	Total Supply of Natural Inputs
Products	C. Output[2]			D. Imports of products		Total Supply of Products
Residuals	I. Residuals generated by industry[3]	J. Residuals generated by HH final consumption	K.Residuals from produced assets[4]	L. Residuals received from rest of the world	M. Residuals recovered from the environment	Total Supply of residuals
PHYSICAL USE TABLE						
Natural inputs	B. Extraction of natural inputs[5]					Total Use of Natural Inputs
Products	E. Intermediate consumption[6]	F. Household final consumption[7]	G. Gross Capital Formation[8]	H. Exports of products		Total Use of Products
Residuals	N.Collection and treatment of residuals[9]		O. Accumula-tion of waste in controlled landfill sited	P. Residuals sent to the rest of the world	Q. Residual flows to the environment[10]	Total Use of residuals

SEEA 2012 CF (UN)

The National Statistics Office of Mongolia, based on SEEA CF international statistical standard, developed and adopted the following methodologies:

1. Methodology for Compiling the Material Flow Account in 2018;
2. Methodology for Compiling the Physical Flow Accounts for Energy in 2018;
3. Methodology for Compiling the Air Emissions Account in 2020;
4. Methodology for Compiling the Solid Waste Physical Flow Account in 2021.
5. Methodology for Compiling the Physical Flow Account for Water in 2021.

[1] Including natural resource residuals
[2] Including sale of recycled and reused products
[3] Including natural resource residuals and residuals generated after treatment
[4] From scrapping and demolition of produced assets, and emissions from controlled landfill sites
[5] Divided into two components: B1-Extraction used in production and B2-Natural resource residuals
[6] Including purchase of recycled and reused products
[7] Including purchase of recycled and reused products
[8] Including fixed assets and inventories
[9] Excluding accumulation in controlled landfill sites
[10] Divided into two components: Direct from industry and households (including natural resource residuals and landfill emissions) and residual flows following treatment

Material flow accounts (MFA) provide an aggregate overview—in tonnes per year—of the material flows into and out of an economy. It includes the volume of material inputs extracted from nature, material outputs returned to the environment, and imports and exports in physical terms.

Physical flow accounts for energy record the flows of energy—measured in terajoules—from the environment to the economy (natural inputs), within the economy (energy products), and back to the environment (residuals). These accounts show the supply and use by type of energy product and provide indicators of energy use and efficiency across economic industries.

Solid waste accounts present organized information on the generation and management of solid waste, including flows of solid waste to recycling facilities, controlled landfills, or direct discharge to the environment.

Physical flow accounts for water describe the abstraction of water resources (as natural inputs) from the environment, the flow of water within the economy (supply and use by industries and households), and the return flows of water to the environment (as residuals).

Air emissions account (AEA) provides information on emissions released to the atmosphere by industries and households as a result of production, consumption and accumulation processes. This account is compiled using data based on the Production, Export, Fuel use Approach (PEFA).

3. ASSET ACCOUNTS

Environmental assets refer to the components of the environment that provide resources that can be used for economic purposes. When these assets provide economic benefits, they are also considered as economic assets, which may be either produced or non-produced.

- Produced assets include cultivated biological resources which are recorded as fixed assets or inventories in economic accounts.
- Non-produced assets include natural resources and land. Natural resources are defined in the SEEA as environmental assets excluding land and cultivated biological resources.

Not all environmental assets are utilized or reflected in the economic accounts. For instance, unused land or unexploited known mineral deposits may not have a counterpart in these accounts.

Asset accounts record the opening and the closing stock of assets and track changes in assets over the accounting period. These accounts are compiled by type of natural asset and can be presented in both physical and monetary terms. The general structure for compiling accounts in physical and monetary terms is similar, but the monetary asset accounts include an additional entry to capture the changes in asset value as a consequence of price changes or revaluation.

Changes in the stock of natural assets are linked to the natural inputs used by the economy. Although these assets originate from the natural environment, most of them undergo changes as a result of economic activity.

FIGURE 2. GENERAL STRUCTURE OF THE PHYSICAL ASSET ACCOUNT FOR ENVIRONMENTAL ASSETS

	Environmental assets, by resource type				
	Land (use, cover)	Water	Timber	Soil	Mineral and energy
Opening stock of resources	✓	✓	✓	✓	✓
Additions to stock of resources					
Growth in stock	✓	Precipitation Return flows	Growth	Soil formation Soil deposition	-
Discoveries of new stock	-	✓	-	-	✓
Upward reappraisals*	✓	✓	✓	✓	✓
Reclassifications	✓	-	✓	✓	✓
Total additions to stock					
Reduction in stock of resources					
Extractions	-	Abstraction	Removals	Soil extraction	Extraction
Normal reductions in stock	-	Evaporation Evapotranspiration	Natural losses	Erosion	-
Catastrophic losses	✓	✓	✓	✓	✓
Downward reappraisals*	✓	✓	✓	✓	✓
Reclassifications	✓	-	✓	✓	✓
Total reductions in stock					
Closing stock of resources	✓	✓	✓	✓	✓

** related to monetary accounts*

The NSO developed and adopted the following methodologies on asset accounts:

1. Methodology for Compiling the Physical Land Use Asset Account in 2021;
2. Methodology for Compiling the Physical Water Resource Asset Account in 2021;
3. Methodology for Compiling the Forest Resource Account in 2023.

Physical asset accounts for land use present information on the use of land and changes in land use over time. Under the SEEA framework, land accounts consist of two types: one to record land use and another for land cover, both of which are linked to the economy.

Physical asset accounts for water resources provide information on the opening and closing stocks of water within a defined accounting period. These stocks may be held in artificial reservoirs, surface water bodies such as lakes and rivers, or as groundwater and soil moisture. The accounts also capture flows of water, including abstraction for economic or environmental use, consumption, and additions from natural processes such as precipitation and recharge, as well as returns to the environment.

Physical asset accounts for forests include two sub-accounts:

- Physical asset account for forest and other wooded land, measured in hectares;
- Physical asset account for timber resources, measured in cubic meters.

Environmental (natural) assets are generally stable over short periods, with significant changes occurring mainly due to natural phenomena or unexpected disasters. The main sources for compiling environmental asset accounts are the ministries and agencies responsible for environmental affairs.

Other asset accounts are still under review for phased development. Due to challenges related to data sources and valuation of natural assets, compilation of these accounts remains a technical and resource-intensive task.

4. ENVIRONMENTAL ACTIVITY ACCOUNTS (FUNCTIONAL ACCOUNTS)

One way to analyze the economic impact of environmental policies is through the analysis of monetary flows of related to environmental activities, as outlined in the SEEA CF. In line with SEEA CF, environmental activity accounts record monetary flows such as environmental taxes, subsidies, transfers, and environmental protection, providing a basis for evaluating the role of the environment in the economy and the effects of environmental policy measures.

To operationalize this framework, the NSO developed and adopted the following methodologies:

1. Methodology for Compiling the Environmental tax account in 2018.
2. Methodology for Compiling the Environmental protection expenditure account in 2018.
3. Guidelines for Compiling the Environmental subsidies and transfers account in 2023
4. Guidelines for Compiling the Environmental goods and services sector account in 2023.

Environmental tax account captures the role of government taxation in incentivizing environmental protection and internalizing environmental costs. It supports the calculation of green development indicators related to environmental taxes, assessment of policy implementation, and generation of data for environmental and economic analysis such as environmental tax-to-GDP ratio. An environmental tax is defined as a tax whose tax base is a physical unit (or proxy) of something that has a proven, specific negative impact on the environment—such as pollution, threats to natural resources, or the use of non-renewable resources. These taxes grouped into four broad categories: energy, transport, resource, and pollution taxes.

Environmental subsidies and transfers account shows the role of the government and other actors in environmental outcomes and how much of the cost is allocated to achieving environmental benefits. Environmental subsidies are financial support provided to enterprises to help them change practices and comply with environmental standards. Environmental transfers refer to financial assistance that support environmental protection efforts and reduction of resource use and extraction.

Environmental protection expenditure account (EPEA) measures the total expenditure on environmental protection activities by all institutional sectors and represents the total use of the country's economic resources for environmental protection activities. EPEA distinguishes between specific environmental protection activities (e.g., pollution control, biodiversity conservation) or non-specific environmental protection activities which do not directly involve environmental protection but produce specific products for environmental. These non-specific activities are typically recorded in the environmental goods and services sector account.

Environmental goods and services sector account (EGSS) measures the economic contribution of producers involved in environmental goods and services. Economic activities are distinguished as either environmental or non-environmental and includes information on the production of environmental goods and services, including environmental protection and resource management-specific services, dedicated environmental products, and environmentally adapted goods.

Collectively, these accounts help calculate key indicators, such as the ratios of environmental taxes, subsidies, transfers, and protection expenditures to GDP.

5. MAIN RESULTS OF THE ENVIRONMENTAL-ECONOMIC ACCOUNTS

Building on the various environmental-economic accounts outlined above—compiled in accordance with the SEEA Central Framework—this section presents the main results derived from their implementation. It summarizes the key tables and highlights main findings across the core accounts.

5.1 MATERIAL FLOW ACCOUNTS

In 2023, Mongolia extracted a total of 330.7 million tonnes of material from natural environment, of which 257.7 million tonnes were used domestically in economic activities. This represents an increase of 61.8 million tonnes (23.0%) in materials extraction compared to the previous year.

TABLE 1. AGGREGATES OF MATERIAL FLOW ACCOUNTS

Indicators	2018	2019	2020	2021	2022	2023
	million tonne					
SUPPLY						
Domestic extraction	277.4	283.0	273.6	266.1	268.9	330.7
Biomass	73.8	79.2	76.4	78.9	84.4	79.8
Metal ores	146.9	142.3	146.8	151.4	138.8	154.3
Non-metallic minerals	5.6	9.9	5.9	4.9	7.9	10.5
Fossil fuels	51.1	51.6	44.5	30.9	37.7	86.1
Import	4.5	4.8	5.1	5.0	4.9	6.1
Direct material input	**281.9**	**287.8**	**278.7**	**271.2**	**273.8**	**336.8**
USE						
Export	**46.9**	**48.6**	**40.0**	**26.2**	**39.2**	**79.1**
Domestic material consumption	**234.9**	**239.2**	**238.7**	**245.0**	**234.6**	**257.7**
Biomass	74.6	79.7	77.1	79.9	85.2	80.5
Metal ores	138.8	133.3	137.8	143.8	133.6	148.3
Non-metallic minerals	5.6	9.9	6.2	4.9	8.3	10.4
Fossil fuels	15.7	16.1	17.3	16.1	7.6	18.2
Other products	0.2	0.3	0.3	0.3	0.3	0.2

In 2023, domestic material consumption by material type was composed of the following material types:

- 46.7% metal ores
- 26.0% fossil fuels and energy materials
- 24.1% biomass
- 3.2% non-metallic minerals.

Additionally, Mongolia imported 6.1 million tonnes of materials and exported 79.1 million tonnes during the same year.

TABLE 2. KEY INDICATORS DERIVED FROM MATERIAL FLOW ACCOUNTS

Indicators	2018	2019	2020	2021	2022	2023
Indicators per capita						
Direct material input per capita, t	89.2	90.2	86.4	82.6	82.0	99.6
Material intencity indicators						
Direct material input per unit of GDP, kg/thous.tog.	10.7	10.3	10.5	10.0	9.6	11.0
Domestic material consumption per unit of GDP(USD), kg/USD	17.8	16.8	17.9	16.0	13.7	12.7
Resource productivity indicators						
GDP per unit of Domestic material consumption, tog/kg	113	117	112	111	121	119
GDP per unit of Direct material input, tog/kg	94	97	96	100	104	91
Domestic resource dependency (ratio DE/DMC)	1.18	1.18	1.15	1.09	1.15	1.28
Import dependency, percent	1.6	1.7	1.8	1.9	1.8	1.8
Export dependency, percent	16.7	16.9	14.4	9.6	14.3	23.5

5.2 PHYSICAL FLOW ACCOUNTS FOR ENERGY

In 2023, Mongolia's total energy supply reached 2,422.0 thousand terajoules (TJ), with 95.3% originating from domestic extraction and the remaining 4.7% from imports. Out of the total energy supply, 17.0% was used for industrial activities, 5.6% for household consumption, and 74.5% was supplied to the rest of world (exported).

TABLE 3. PHYSICAL SUPPLY AND USE TABLES FOR ENERGY

Indicators	2018	2019	2020	2021	2022	2023
	thous.TJ					
SUPPLY						
Supply of primary energy	1 376.5	1 509.9	1 070.5	952.1	1 002.4	2 196.6
Supply of secondary energy	73.0	83.1	152.1	93.4	107.8	111.0
Import	78.9	91.3	93.1	85.1	90.2	114.4
Total supply of energy	**1 528.4**	**1 684.3**	**1 315.7**	**1 130.7**	**1 200.4**	**2 422.0**
USE						
Energy use /net/	1 522.7	1 678.2	1 309.5	1 124.1	1 193.9	2 414.8
Energy use for intermediate consumption	294.0	307.1	290.2	308.2	310.4	412.8
Energy use for final consumption	1 228.8	1 371.1	1 019.3	815.9	883.4	2 002.0
Households	98.7	107.3	90.9	115.0	129.1	135.0
Changes in inventories and produced assets	26.1	108.4	23.6	123.7	- 105.9	63.6
Export	1 104.1	1 155.4	904.7	577.2	860.2	1 803.4
Energy losses	5.6	6.1	6.1	6.6	6.5	7.2
Total use of energy	**1 528.4**	**1 684.3**	**1 315.7**	**1 130.7**	**1 200.4**	**2 422.0**

In 2023, Mongolia's energy domestic consumption per capita was 161.9 gigajoules (GJ), which is an increase of 30.4 GJ (23.1%) compared to the previous year.

Meanwhile, the energy supply per capita in 2023 reached 682.2 GJ, which is 2.1 times higher than in 2022. This growth was primarily driven by an increase in coal production.

TABLE 4. MAIN INDICATORS DERIVED FROM PSUT FOR ENERGY

Indicators	2018	2019	2020	2021	2022	2023
Energy domestic consumption per capita, GJ	124.3	129.8	118.2	128.9	131.6	161.9
Energy supply per capita, GJ	458.8	499.1	379.1	318.5	332.4	682.2
Energy intensity, GJ/million tonnes	11.1	11.0	10.9	11.4	10.9	13.5
Energy productivity, million tonnes/TJ	90.0	90.9	91.9	87.9	91.7	74.0

Energy intensity measures how much energy is used to produce 1 million MNT of GDP, while energy productivity measures energy efficiency and reflects the amount of GDP produced per terajoule (TJ) of energy consumed. These are key indicators of how effectively a country or industry is using energy to produce goods and services.

In 2023, Mongolia experienced an increase in energy intensity and a decline in energy productivity. Specifically, the energy required to produce 1 million MNT of GDP rose from 10.9 GJ in 2022 to 13.5 GJ in 2023. Conversely, the GDP output generated per unit of energy fell, with 1 TJ of energy to produce MNT 91.7 million GDP in 2022 to MNT 74.0 million in 2023.

The increase in energy intensity and decrease in productivity indicate that energy efficiency in the economy has declined, highlighting the need for more effective use of resources to support economic growth.

5.3 SOLID WASTE ACCOUNTS

The total stock of solid waste in Mongolia amounted to 3,042.9 thousand tonnes in 2023, representing a decrease of 25.0 thousand tonnes or 0.8% compared to 2022. This decline was mainly due to the reduction in hazardous waste generated by enterprises. Of the total waste: 39.5% came from enterprises, 60.4% from households, and 0.1% was imported.

In 2023, waste generated by enterprises amounted to 1,201.9 thousand tonnes, marking a decrease of 109.0 thousand tonnes (8.3%) from the previous year. This was largely driven by a reduction of 133.5 thousand tonnes (23.6%) in hazardous waste. In contrast, household waste increased to 1,839.0 thousand tonnes in 2023, an increase of 85.0 thousand tonnes (4.8%) compared to 2022.

TABLE 5. SUPPLY AND USE OF SOLID WASTE

Indicators	2018	2019	2020	2021	2022	2023
	thous.tonne					
SUPPLY						
Generation by enterprises	1 216.9	1 317.0	1 062.3	949.0	1 311.0	1 201.9
Generation by households	1 502.9	1 612.0	1 648.8	1 675.8	1 754.0	1 839.0
Import waste material	1.4	1.9	1.6	1.9	2.9	1.9
Total supply of solid waste	**2 721.2**	**2 930.9**	**2 712.7**	**2 626.7**	**3 067.9**	**3 042.9**
USE						
Disposal of Solid waste	2 378.1	2 584.7	2 406.2	2 357.6	2 772.0	2 665.9
Landfills	2 126.3	2328	1 984.2	1 910.7	2 238.1	2 243.7
Шатаах Incineration	251.6	256.5	46.9	236.5	263.3	151.1
Other	0.2	0.2	375.0	210.4	270.6	271.1
Waste in the environment	107.1	93.1	20.8	74.8	58.0	178.0
For intermediate use in other industries	235.3	250.6	285.2	193.6	235.2	196.3
Export waste material	0.7	2.5	0.5	0.6	2.7	2.7
Total use of solid waste	**2 721.2**	**2 930.9**	**2 712.7**	**2 626.7**	**3 067.9**	**3 042.9**

The use table shows the collection and disposal of solid waste through various activities within the waste collection, treatment and disposal industry, as well as related activities in other industries. It also captures the flow of solid waste exported to the rest of the world and direct discharges to the environment.

As of 2023, the use of solid waste in Mongolia was distributed as follows: 2,243.7 thousand tonnes (73.7%) were landfilled, 151.1 thousand tonnes (5.0%) were incinerated, 271.1 thousand tonnes (8.9%) were treated by other methods (e.g., biological treatment, chemical and physical processing, disinfection, neutralization and storage, etc.), 196.3 thousand tonnes (6.5%) were recycled, 178.0 thousand tonnes (5.8%) were directly dumped into the environment, and 2.7 thousand tonnes (0.1%) were exported.

TABLE 6. SDG INDICATORS DERIVED FROM SOLID WASTE ACCOUNT

Indicators		2018	2019	2020	2021	2022	2023
		Percent					
11.6.1	Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal solid waste generated by cities	80.4	81.2	88.7	89.8	90.4	87.6
12.4.2	Proportion of hazardous waste treated	95.8	95.8	97.4	96.9	98.3	98.3
12.5.1	National recycling rate	8.0	7.9	10.5	7.4	7.7	6.5

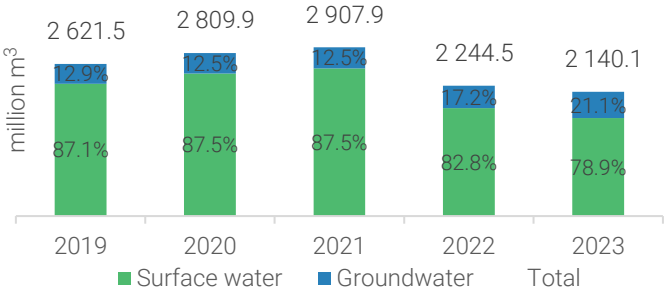
5.4 PHYSICAL WATER FLOW ACCOUNTS

The physical water flow or physical supply and use tables for 2019-2023 show that an average of 2.5 billion cubic meters of water were extracted from the environment annually, while an average of 2.1 billion cubic meters of water were returned to the environment.

TABLE 7. PHYSICAL SUPPLY AND USE TABLES FOR WATER

Water flow	Indicators	2019	2020	2021	2022	2023
		million m^3				
	USE					
From the environment to the economy						
	Total abstracted water	2 621.5	2 809.9	2 907.9	2 244.5	2 140.1
Within the economy						
	Wastewater received from other units	128.8	129.3	133.2	155.6	148.9
Total use		**2 750.3**	**2 939.2**	**3 041.1**	**2 400.1**	**2 288.9**
	SUPPLY					
Within the economy						
	Supply of water to other economic units	128.8	129.3	133.2	155.6	148.9
From the economy to the environment						
	Return flows of water	2 170.2	2 362.8	2 453.5	1 802.4	1 699.2
Total supply		**2 299.0**	**2 492.1**	**2 586.7**	**1 958.0**	**1 848.1**
Consumption of water		**451.3**	**447.1**	**454.4**	**442.1**	**440.8**

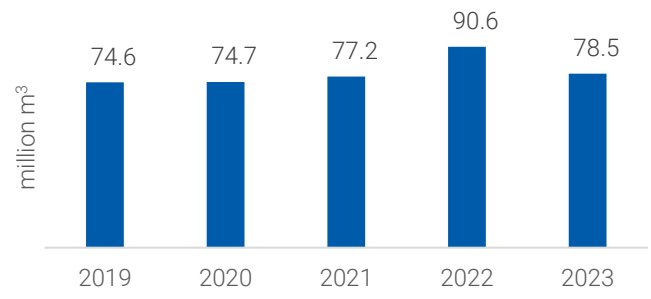
FIGURE 3. TOTAL ABSTRACTED WATER, by sources



In 2023, a total of 2140.1 million cubic meters (m^3) of water was abstracted from the environment, of which 1689.1 million m^3 (78.9%) was drawn from surface water and 450.9 million m^3 (21.1%) from groundwater resources. Total water extracted decreased by 104.5 (4.7%) million m^3 compared to 2022 due to reduced water use in hydroelectric power generation.

It is important to note that the total water abstraction in the physical use table for water differs from the total presented in the Water Agency's annual report on water use. This discrepancy arises because the water agency report does not consider water used in hydroelectric power plant pipelines and water drained from mines as abstraction, whereas the SEEA-based physical water accounts do.

FIGURE 4. VOLUME OF DISTRIBUTED WATER



In 2023, the volume of distributed water totaled 78.5 million m^3, reflecting a 13.4 percent decrease compared to the previous year. Of the total distributed water, households used 53.1 percent of distributed water, the service sector accounted for 15.0 percent, while the mining, extraction and manufacturing sectors accounted for 31.9 percent.

Water use efficiency, or the value added per unit of water used, decreased by 0.5 percent from MNT 34.8 thousand per m3 of water used in 2022 to MNT 34.6 thousand in 2023.

5.5 AIR EMISSION ACCOUNTS

The supply table of the air emissions account shows the generation of emissions by enterprises and households, by type of substance, while the use table covers the release of these emissions to the atmosphere.

In 2023, emissions from energy consumption included:

- Carbon dioxide (CO_2): 37.0 million tonnes (+17.6% from 2022)
  Nitrous oxide (N_2O): 0.6 thousand tonnes (+16.3%)
  Methane (CH_4): 22.3 thousand tonnes (−0.4%)

TABLE 8. SUPPLY AND USE OF AIR EMISSIONS

Indicators	2018	2019	2020	2021	2022	2023
	tonne					
SUPPLY / USE						
Carbon dioxide (CO_2), thous.t	**24 223.5**	**25 290.5**	**27 544.9**	**30 365.8**	**31 490.8**	**37 029.8**
Industries	21 027.7	21 691.0	21 898.2	22 627.3	22 660.0	27 920.7
Households	3 195.8	3 599.5	5 646.7	7 738.5	8 830.9	9 109.0
Total use of emissions	24 223.5	25 290.5	27 544.9	30 365.8	31 490.8	37 029.8
Nitrous oxides (N_2O)	**383.2**	**404.8**	**385.0**	**519.9**	**520.4**	**605.2**
Industries	322.7	334.2	293.6	322.9	309.2	395.5
Households	60.4	70.7	91.4	197.0	211.2	209.7
Total use of emissions	383.2	404.8	385.0	519.9	520.4	605.2
Methane (CH_4)	**14 165.2**	**16 296.2**	**12 323.5**	**19 508.5**	**22 359.6**	**22 277.0**
Industries	2 116.6	2 188.5	1 847.7	2 170.2	2 178.2	2 677.8
Households	12 048.6	14 107.7	10 475.8	17 338.2	20 181.4	19 599.2
Total use of emissions	14 165.2	16 296.2	12 323.5	19 508.5	22 359.6	22 277.0

Considering air emissions by economic sector in 2023, 75.4 percent of carbon dioxide emissions originated from economic industries, 24.6 percent from households. Meanwhile, 65.4 percent of nitrous oxide emissions were generated by economic industries and 34.6 percent by households. Lastly 12.0 percent of methane emissions are attributed to economic industries and 88.0 percent to households.

The electricity, gas, steam, and air conditioning supply industry accounted for most of the year-on-year increase in emissions from economic industries. For instance, carbon dioxide emissions from the electricity, gas, steam, and air conditioning increased by 23.2 percent in 2023 and nitrous oxide and methane emissions increased by 24.4 percent compared to the previous year

Mongolia's carbon intensity—measured as emissions per 1,000 US dollars of GDP production—stood at 1.37 tonnes in 2023. This is 4.9 times higher than the global average of 0.28 tonnes.

The decline in global average carbon emissions reflects the impact of policies aimed at increasing energy efficiency, and use of clean technologies and energy sources.

TABLE 9. CARBON DIOXIDE EMISSIONS TO PRODUCE GDP

Indicator	2020	2021	2022	2023
	tonne/thous.USD			
The amount of carbon dioxide emitted in producing GDP	1.65	1.48	1.32	1.37

5.6 PHYSICAL ASSET ACCOUNT FOR LAND USE

Land is a unique natural asset that provides the physical space for both natural and economic assets and serves as the area where environmental and economic activities take place.

The physical asset account for land use shows the opening and closing stocks of land by land use types, along with the additions and reductions within each land use category over the accounting period. The standard unit of measurement for the physical asset account for land is hectares or square meters (m^2).

TABLE 10. PHYSICAL ASSET ACCOUNT FOR LAND USE

Type of land use	2021	changes		2022	changes		2023
		addi-tions	reduc-tions		addi-tions	reduc-tions	
	thous.ha						
Total area	**156 411.6**	**437.1**	**- 437.1**	**156 411.6**	**335.9**	**- 335.9**	**156 411.6**
Agricultural land	133 440.2	20.4	-433.3	133 027.3	33.7	- 248.2	132 812.8
Land with forest resources	18 207.5	3.6	0	18 211.1	79.9	- 79.8	18 211.1
Land used for buildings, for construction purposes	1 478.6	413.1	-3.8	1 887.9	222.3	- 7.8	2 102.4
Other land	3 285.3			3 285.3			3 285.3

The changes in physical assets of land use are mainly due to the shift between land use types. For example, in 2023, agricultural land decreased by 214.5 thousand hectares, while land used for buildings and construction purposes increased by the same amount.

Considering the change in agricultural land by land type in 2023, cropland increased by 28.9 (2.5%) thousand hectares, while grassland decreased by 248.2 (0.2%) thousand hectares compared to the previous year.

Land used for buildings and construction purposes reached 2102.4 thousand hectares at the end of 2023, an increase of 214.5 thousand hectares from the previous year. This change is due to the transfer of 165.5 thousand hectares from grassland to construction land, 34.2 thousand hectares to mining land, 8.5 thousand hectares to road land, and 2.2 thousand hectares to utility land, as well as the transfer of 3.4 thousand hectares from public land to construction land and 5.3 thousand hectares to residential land.

TABLE 11. MAIN INDICATORS DERIVED FROM PHYSICAL ASSET ACCOUNT FOR LAND USE

Indicators	2020	2021	2022	2023
	percent			
Proportion of protected areas in total area	14.0	14.0	14.0	14.0
Forest area as a proportion of total land area	7.7	7.7	9.9	10.0
Proportion of land that is degraded over total land area	3.6	4.0	3.1	5.3

5.7 FOREST ACCOUNTS

Mongolia conducted a national forest inventory in 2014-2016 with the results subsequently published. Forest organization work is carried out annually covering the planned aimags and soums. In 2020, this work was conducted in the forest fund of Uvs, Uvurkhangai, and Khovd aimags which covers forested areas, non-forested patches within forest zones, and other areas needed for forest growth and regeneration. This led to the update of the national forest fund data.

As part of the forest asset accounting framework, the following accounts was compiled for the first time for 2020-2023:

1. the physical asset account of forest land
2. the physical asset account of timber.

By the end of 2023, the area of forest land and other wooded land in Mongolia was 12,621.4 thousand hectares. During the reporting year, land cover changes included 3.4 thousand hectares afforested, 16.6 thousand hectares deforested, and 1,155.4 thousand hectares affected due to natural regression and other changes.

TABLE 12. PHYSICAL ASSET ACCOUNT FOR FOREST AND OTHER WOODED LAND

indicators	2020	2021	2022	2023
	thous.ha			
Opening stock of forest and other wooded land	12 398.4	12 619.4	12 409.2	12 621.3
Additions to stock	987.5	929.2	1 510.3	1 172.0
Afforestation	2.9	2.3	2.0	3.4
Natural expansion, reclassification	984.6	926.8	1 508.3	1 168.7
Reductions in stock	766.5	1 139.4	1 298.3	1 171.9
Deforestation	19.2	42.6	18.9	16.6
Natural regression, other	747.3	1 096.8	1 279.3	1 155.4
Closing stock of forest and other wooded land	12 619.4	12 409.2	12 621.3	12 621.4

Mongolia's forest resources were estimated at 1243.2 million m^3 in 2023, reflecting an increase of 40.8 (3.4%) million m^3 since the beginning of 2020. In the same year, 696.4 thousand m^3 of wood was removed from forests, representing 0.06 percent of the year's opening stock.

TABLE 13. PHYSICAL ASSET ACCOUNT FOR TIMBER RESOURCES

indicators	2020	2021	2022	2023
	thous.cubic meters			
Opening stock of timber resource	1 202 316.4	1 245 374.5	1 228 988.4	1 243 145.6
Total changes in stock	43 058.1	- 16 386.1	14 157.1	97.1
Removals	955.0	824.8	690.6	696.4
Other changes	44 013.1	- 15 561.3	14 847.8	793.5
Closing stock of timber resource	1 245 374.5	1 228 988.4	1 243 145.6	1 243 242.7

Other changes in forest resources include factors such as natural growth and decline of trees, afforestation, and other changes. The detailed data on changes in stock are available through the country's "forest inventory and forest organization" work.

5.8 ENVIRONMENTAL TAXES AND ENVIRONMENTAL SUBSIDIES ACCOUNTS

Environmental taxes in Mongolia include energy taxes, transport taxes, environmental pollution taxes, and natural resource taxes. In 2023, Mongolia's environmental tax revenue reached MNT 1,279.3 billion, an increase of MNT 243.9 billion or 23.6% compared to the previous year. In the reporting year, environmental tax revenue accounted for 1.8% of GDP and 6.0% of total tax revenue.

TABLE 14. ENVIRONMENTAL TAXES, by type of tax income

Tax categories	2018	2019	2020	2021	2022	2023
	billion togrogs					
Environmental taxes	**857.3**	**1 009.9**	**938.6**	**1 119.9**	**1 035.3**	**1 279.3**
Energy taxes	356.2	409.5	381.6	414.0	282.9	267.3
Tax on transportation	333.7	380.2	318.7	409.4	412.4	613.2
Tax on pollution	40.1	47.3	50.4	69.4	52.6	88.0
Tax on natural resources	127.3	172.8	187.9	227.1	287.5	310.8

Environmental subsidies and similar transfers include transfers aimed at supporting activities that protect the environment and reduce the use and extraction of natural resources. In 2023, the Mongolian government's expenditure on environmental subsidies and similar transfers reached MNT 68.8 billion, an increase of MNT 5.3 billion (8.3%) compared to the previous year.

TABLE 15. ENVIRONMENTAL SUBSIDIES AND TRANSFERS

Indicators	2020	2021	2022	2023
	billion togrogs			
Environmental subsidies, transfers	**76.0**	**73.0**	**63.6**	**68.8**
By type of expenditure				
Subsidies	15.9	0.1	0.5	0.7
Current transfer	47.9	55.4	42.3	34.4
Capital transfer	12.2	17.6	20.7	33.8
By environmental protection activities				
Protection of ambient air and climate (CEPA1)	35.8	45.1	25.7	26.0
Wastewater management (CEPA2)	0.2	0.1	0.0	5.6
Waste management (CEPA3)	3.7	4.1	12.3	16.3
Protection of biodiversity and landscapes (CEPA6)	34.3	22.2	24.8	18.0
Other	2.1	1.5	0.7	2.9

Considering the environmental subsidies and transfers by environmental protection activity, 37.7 percent of total subsidies and transfers were spent on air pollution reduction, 31.9 percent on wastewater and waste management, and 30.4 percent on other activities in 2023.

TABLE 16. ENVIRONMENTAL TAX, SUBSIDY AND TRANSFER SHARES

Indicators	2018	2019	2020	2021	2022	2023
	percent					
Share of environmental taxes in total tax revenue	10.4	10.4	11.0	9.9	6.7	6.0
Share of environmental tax revenue in GDP	2.6	2.7	2.5	2.6	1.9	1.8
Share of environmental subsidies and transfers in GDP	...	...	0.20	0.17	0.12	0.10

5.9 ENVIRONMENTAL PROTECTION EXPENDITURE ACCOUNTS

Environmental protection expenditure account (EPEA) is a statistical framework that tracks the amount spent by resident economic units on environmental protection. Structured similarly to the national accounts, the EPEA consists of a set of accounts. One of its key outputs is the Total National Expenditure on Environmental Protection (NEEP), which is typically expressed as a percentage of GDP.

In 2023, Mongolia's total national expenditure on environmental protection reached MNT 617.6 billion, showing a decrease of MNT 171.2 billion (21.7%) from 2022. Disaggregating the total NEEP by type of expenditure, intermediate consumption related to environmental protection of enterprises decreased by 35.5 percent and capital formation by 45.2 percent, respectively, while final consumption expenditure spent on environmental protection by state institutions increased by 5.0 percent, and the use of external assistance transfers related to environmental protection received from foreign economies or other countries increased by 65.2 percent.

TABLE 17. TOTAL NATIONAL EXPENDITURE ON ENVIRONMENTAL PROTECTION, by expenditure type

Indicators	2018	2019	2020	2021	2022	2023
	billion togrogs					
Total national expenditure on environmental protection	**560.0**	**704.5**	**725.8**	**676.1**	**788.9**	**617.6**
Final consumption expenditure	278.8	337.4	250.1	290.0	267.2	280.7
Intermediate consumption	239.8	311.3	230.7	268.6	295.0	190.3
Gross fixed capital formation	32.2	45.6	233.1	100.1	206.2	113.0
Transfers from ROW, net	9.2	10.2	12.0	17.4	20.4	33.7

In 2023, total NEEP by environmental protection activity (EPA) showed mixed trends. Expenditure on wastewater management covering activities related to the disinfection and wastewater disposal, increased by 10.5 percent from the previous year. Conversely, expenditure on waste management including activities related to the collection, transportation, recycling, and disposal of waste decreased by 37.9 percent. Lastly, expenditure on activities related to the protection of biodiversity and landscapes decreased by 16.7 percent.

TABLE 18. TOTAL NATIONAL EXPENDITURE ON ENVIRONMENTAL PROTECTION, by environmental protection purposes

Indicators	2018	2019	2020	2021	2022	2023
	billion togrogs					
Total national expenditure on environmental protection	**560.0**	**704.5**	**725.8**	**676.1**	**788.9**	**617.6**
Waste water management	45.6	66.3	52.1	48.0	63.0	69.6
Waste management	351.6	427.1	238.2	274.8	311.3	193.3
Protection of biodiversity and landscapes	15.8	24.4	355.0	242.9	309.6	258.0
Other	146.9	186.7	80.5	110.4	105.0	96.7

In 2023, the total NEEP was primarily driven by the general government which accounted for 60.5 percent of the total. The financial and non-financial sectors contributed 33.4 percent, while households accounted for the remaining 6.1 percent.

As a share of GDP, the total NEEP was 0.9 percent, representing a decrease of 0.6 percentage points from the previous year.

CONCLUSION

The System of Environmental-Economic Accounting (SEEA) is an internationally recognized integrated statistical framework that measures the relationship between the environment and the economy. It comprises two core standards: the SEEA Central Framework and the SEEA Ecosystem Accounting.

The SEEA Central Framework employs a resource-based methodology to measure the supply, use, and availability of environmental assets. In contrast, the SEEA Ecosystem Accounting applies a spatially explicit and comprehensive approach to compile ecosystem accounts. Countries can implement the SEEA flexibly, prioritizing based on data availability and national policy needs.

SEEA accounts serve multiple policy information needs, including monitoring progress toward the Sustainable Development Goals (SDGs), climate change mitigation and adaptation, disaster-related statistics, and assessing environmental well-being. Furthermore, these accounts are expected to be a vital input for estimating core indicators such as Gross Domestic Product (GDP) under the newly adopted System of National Accounts 2025 (SNA 2025).

Environmental statistics are the primary data source for SEEA accounts, and the quality and accessibility of these data determine the feasibility and quality of account compilation. In Mongolia, compilation of accounts under the SEEA Central Framework is being carried out in phases. Challenges related to data quality and timeliness still remain, requiring further improvement.

Given that changes in environmental assets often occur gradually and that relevant environmental and economic surveys are conducted periodically over several years, some accounts may be compiled at intervals of 2–3 years.

The National Statistics Office of Mongolia (NSOM) is compiling and disseminating SEEA accounts to meet users' demand for integrated information on the environmental contribution to the economy and the economic impact on the environment. This summary presents the following SEEA Central Framework accounts: material flow account, energy physical flow account, solid waste account, water physical flow account, air emission account, land use asset account, forest resource account, environmental tax account, environmental subsidy and transfer account, and environmental protection expenditure account.

Detailed descriptions of these accounts are available on the Mongolian Statistical Information Service - NSOM's official website (www.nso.mn). In addition, the environmental goods and services account and the agriculture account have also available in the official website.

In the next phases of the implementation, the focus will be on updating and improving data sources for SEEA Central Framework accounts, compiling asset accounts in monetary terms, and integrating them with national accounts by producing data on natural resource assets. Furthermore, the NSOM will explore and implement ecosystem accounting in line with the SEEA Ecosystem Accounting methodology.

ANNEX SDG INDICATORS

	indicators	Measure unit	SDG	2018	2019	2020	2021	2022	2023
I . Material flow account									
1	Domestic material consumption	mln.t	8.4.2 / 12.2.2	234.9	239.2	238.7	245.0	234.6	257.7
2	Domestic material consumption per capita	t		74.4	74.9	74.0	74.6	70.2	76.2
3	Domestic material consumption per GDP	kg/ thous.tog		8.9	8.6	9.0	9.0	8.2	8.4
II. Energy account									
1	Renewable energy share in the total final energy consumption	percent	7.2.1	0.08	0.08	0.18	0.18	0.18	0.1
2	Energy intensity measured in terms of primary energy and GDP (GDP at 2015 constant prices)	GJ/ mln.tog	7.3.1	55.0	57.3	43.7	38.3	38.4	75.6
III. Solid waste account									
1	Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal solid waste generated	percent	11.6.1	80.4	81.2	88.7	89.8	90.4	87.6
2	Proportion of hazardous waste treated.	percent	12.4.2	95.8	95.8	97.4	96.9	98.3	98.3
3	National recycling rate	percent	12.5.1	8.0	7.9	10.5	7.4	7.7	6.5
IV. Water account									
1	Proportion of wastewater treated	percent	6.3.1	...	90.3	90.2	90.1	90.2	96.3
2	Water efficiency	thous.tog/ m^3	6.3.1	...	37.0	34.6	34.6	34.8	34.6
V. Asses account for land use									
1	Forest area as a proportion of total land area	percent	15.1.1	7.8	7.8	7.7	7.7	9.9	10.0
2	Proportion of land that is degraded over total land area	percent	15.3.1	4.7	5.0	3.6	4.0	3.1	5.3
3	Proportion of protected areas in total area	percent	15.4.1	13.5	13.5	14.0	14.0	14.0	14.0