

TECHNICAL NOTES

A. Conceptual Framework of the Mineral Accounts

The Mineral Accounts of the Philippines is a publication that presents the physical and monetary asset accounts of the country's nickel, gold, copper, and chromite resources. This is an update of the previous compilation focusing only on the physical accounts and covering the period 2013 to 2020.

The System of Environmental-Economic Accounting 2012 Central Framework (SEEA-CF), a multi-purpose framework for measuring the environment and its interaction with the economy, serves as the framework for this compilation. It is also a statistical framework that consists of a comprehensive set of tables and accounts which guides the compilation of consistent and comparable statistics and indicators for policy making, analysis, and research.

The SEEA-CF covers measurement in three main areas: (1) the flows of resources within the economy and between the economy and the environment; (2) the economic activity and transactions related to the environment; and (3) the stocks and the changes in stocks of environmental assets, such as mineral resources, which is the main focus of this study.

The accounts provide information on the available stocks of the four metallic minerals at the start and end of each year, as well as the changes that occurred during the period. These mineral resources were also classified following the United Nations Framework Classification for Fossil Energy and Mineral Resources (UNFC-2009) as follows: Class A, commercially recoverable resources; Class B, potentially commercially recoverable resources; and Class C, non-commercial and other known deposits.

A basic physical asset account for mineral resources is compiled by type of resources, each with the same unit of measurement, and by class of resources.

Table 1. Structure of physical asset account for mineral resources

Volume of mineral resource (by mineral resource, by class)
Opening stock
Additions to stock
Discoveries
Upward reappraisals
Reclassifications
<i>Total additions to stock</i>
Reductions in stock
Extractions
Catastrophic losses
Downward reappraisals
Reclassifications
<i>Total reductions in stock</i>
Closing stock

The structure of the monetary asset account is similar to that of the physical asset account but with an additional entry: revaluations. It is recommended to value only Class A deposits in monetary terms.

Table 2. Structure of monetary asset account for mineral resources

Value of mineral resource (by mineral resource, Class A)
Opening stock
Additions to stock
Discoveries
Upward reappraisals
Reclassifications
<i>Total additions to stock</i>
Reductions in stock
Extractions
Catastrophic losses
Downward reappraisals
Reclassifications
<i>Total reductions in stock</i>
<i>Revaluations</i>
Closing stock

B. Definition of Terms

Terms	Definition
Asset	A store of value representing a benefit or series of benefits accruing to an economic owner by holding or using the entity over a period of time. It is a means of carrying forward value from one accounting period to another.
Environmental assets	Environmental assets are the naturally occurring living and non-living components of the Earth, together constituting the biophysical environment, which may provide benefits to humanity.
Individual environmental asset	Individual environmental assets are those assets that may provide resources for use in economic activity. They comprise mineral and energy resources, land, soil resources, timber resources, aquatic resources, other biological resources, and water resources.
Catastrophic losses	These rarely occur with mineral resources. Catastrophes such as collapsing of mines may occur but this does not reduce the stocks of the resources.
Depletion, <i>in physical terms</i>	Depletion, in physical terms, is the decrease in the quantity of the stock of a natural resource over an accounting period that is due to the extraction of the natural resource by economic units occurring at a level greater than that of regeneration.

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Terms	Definition
Discoveries	Discoveries are additions representing the arrival of new resources to a stock and commonly arise through exploration and evaluation.
Extraction	Extractions are reductions in stock due to physical removal or harvest of an environmental asset through a process of production.
Mineral resources	Mineral resources comprise known deposits of non-metallic minerals and metallic minerals.
Reappraisals	Reappraisals reflect changes in the measured stock of assets due to the use of updated information that permits a reassessment of the size of the stock.
Reclassifications	Reclassifications are changes in assets that result from situations in which an asset is used for a different purpose. A reclassification of an asset in one category should be offset by an equivalent reclassification in another category.
Revaluations	Revaluations relate to changes in the value of assets due to price changes.

Source: System of Environmental-Economic Accounting 2012 Central Framework

C. Data Sources

The data for estimating the physical and monetary asset accounts were gathered from the following:

Data	Data Sources
<ul style="list-style-type: none"> • Metallic Resource/Reserve Inventory of the Philippines (MRI) • Philippine Mineral Production • List of Mineral Production Sharing Agreements (MPSA) by contractor 	Mines and Geosciences Bureau, Department of Environment and Natural Resources
<ul style="list-style-type: none"> • Metallic Mineral Production Data used in the National Accounts of the Philippines • Gross Value Added in Mining and Quarrying (2013-2020) • 2020 Supply and Use Table • Total revenue, book value of fixed assets, and interest expense of establishments engaged in Mining and Quarrying 	Philippine Statistics Authority

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Data	Data Sources
<ul style="list-style-type: none"> Treasury bill rates (2013-2020) 	Bangko Sentral ng Pilipinas
<ul style="list-style-type: none"> Social discount rate 	National Economic Development Authority

D. Estimation Methodology

Physical Asset Accounts

1. Encoded the available inventory/stock data and annual production data by mining contractor.
2. Determined the year of discovery based on the list of Mineral Production Sharing Agreement, the first record in the MRI or one year before the first production, whichever is applicable.
3. Estimated the opening stocks, closing stocks, and reappraisals (balancing item using residual method) based on the available data, and determined the appropriate class using the criteria discussed in the next section.
4. Determined the timepoints when reclassifications occurred, and the corresponding stocks for each contractor.
5. Consolidated the results by class.

Monetary Asset Accounts

1. Using the 2020 Use Table, the ratios of compensation of employees, consumption of fixed capital, and taxes less subsidies to gross output by sub-industry were calculated.
2. Multiplied the ratio to the Gross Output series to estimate the respective values from 2013 to 2020.
3. Computed the Gross and Net Operating Surplus.
4. Collected data on the book value of fixed assets, total revenue, and interest expense from CPBI and ASPBI. Calculate ratio of book value to total revenue.
5. Computed Return to Produced Assets.

$$\text{Return to Produced Assets} = \text{Ratio} \times \text{Gross Output} \times \text{Treasury Bill rate}$$

6. Computed the resource rent.

$$\text{Resource Rent} = \text{NOS} - \text{Return to Produced Assets} - \text{Interest Expense}$$

7. Derived the asset life for each resource.

$$\text{Asset Life} = \frac{\text{Closing Stocks of Class A}}{\text{Extractions}}$$

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8. Computed the resource value using the Net Present Value (NPV) method, and unit resource value.

$$\text{Resource value} = \sum_{t=1}^t \frac{RR_t}{(1+r)^t} \quad \text{Unit Resource Value} = \frac{\text{Resource Value}}{\text{Closing Stocks of Class A}}$$

where RR is the resource rent
r is the discount rate
t is the asset life

9. Multiplied the unit resource value to the entries in the Class A physical asset account to come up with the monetary asset accounts.

E. Operationalized Classification Criteria

Class	Criteria
A	Producing during the reference year
	Has approved Declaration of Mining Project Feasibility (DMPF)
B	Not yet producing during the reference year but has production in succeeding years
	Has a DMPF awaiting approval
	Suspended operation for one year
C	Not producing during the reference year and no production in succeeding years
	Stopped operation for 2 or more years
	Did not apply for DMPF; or expired contract and not applying for renewal

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Nickel

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 Table 1.3 Physical Asset Account: Class B Nickel Resources, 2013 to 2020
 Table 1.4 Physical Asset Account: Class C Nickel Resources, 2013 to 2020
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Gold

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- Table 4.2 Physical Asset Account: Class A Chromite Resources, 2013 to 2020
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- Table 4.5 Amount of Chromite Resources by Class, 2013 to 2020
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