



TECHNICAL NOTES
Mineral Accounts of the Philippines:
Asset Accounts

I. Conceptual Framework

The Mineral Accounts of the Philippines is a publication that presents the physical and monetary asset accounts of the country's metallic mineral resources, namely: nickel, gold, copper, and chromite. The accounts are updated on an annual basis.

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 focus of this compilation.

The mineral asset 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

Value 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

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II. 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">● Gross Value Added in Mining and Quarrying● Input-Output Table● Total revenue, book value of fixed assets, and interest expense of establishments engaged in Mining and Quarrying	Philippine Statistics Authority
<ul style="list-style-type: none">● Treasury bill rates	Bangko Sentral ng Pilipinas
<ul style="list-style-type: none">● Social discount rate	National Economic Development Authority

III. Estimation Methodology

A. Physical Asset Accounts

1. Encode the mineral inventory data and annual production data by mining contractor.
2. Determine 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. Estimate the opening stocks, closing stocks, and reappraisals (balancing item using residual method) based on the available data.
4. Determine the appropriate class using the criteria discussed in the next section and identify timepoints when reclassifications occurred.
5. Consolidate the results by class.

B. Monetary Asset Accounts

1. Calculate the ratios of compensation of employees, consumption of fixed capital, and taxes less subsidies to gross output by sub-industry using the Input-Output Table.
2. Estimate the annual compensation of employees, consumption of fixed capital, and taxes less subsidies using the results from Step 1.
3. Compute the Gross and Net Operating Surplus.
4. Collect data on the book value of fixed assets, total revenue, and interest expense from the ASPBI. Calculate ratio of book value of fixed assets to total revenue (i.e., $Ratio_{BVFA}$) and interest expense to total revenue (i.e., $Ratio_{IE}$).
5. Compute the Return to Produced Assets.

$$Return\ to\ Produced\ Assets = Ratio_{BVFA} \times Gross\ Output \times Treasury\ Bill\ Rate$$

6. Compute the resource rent.

$$Resource\ Rent = NOS - Return\ to\ Produced\ Assets - (Ratio_{IE} \times Gross\ Output)$$

7. Derive the asset life for each resource.

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

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

$$Resource\ value = \sum_{i=1}^t \frac{RR_i}{(1+r)^i} \quad \begin{array}{l} \text{where } RR \text{ is the resource rent} \\ r \text{ is the discount rate} \\ t \text{ is the asset life} \end{array}$$

$$Unit\ Resource\ Value = \frac{Resource\ Value}{Closing\ Stocks\ of\ Class\ A}$$

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

C. Operationalized Classification Criteria

The Mines and Geosciences Bureau organizes the mineral resource/reserve inventory (MRI) following the classifications defined in the DENR Administrative Order 2010-09 “Providing for the Classification and Reporting Standards of Exploration Results, Mineral Resources and Ore Reserves”.

Mineral Resource is a concentration or occurrence of material of intrinsic economic interest in or on the Earth’s crust in such form, quality, and quantity that there are reasonable prospects for eventual economic extraction. It is subdivided, in order of increasing geological confidence, into Inferred, Indicated, and Measured categories.

Ore Reserves is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined. It is subdivided, in order of increasing confidence, into Probable and Proved ore reserves.

In addition, *Other known deposits* are those quantities reported in the earlier versions of the MRI (i.e. Pre-2014) which did not have any updates in its subsequent versions. It is assumed that these known deposits or prospects are not considered as economically viable in the foreseeable future and thus, no development project is pursued.

Table 3. Operationalized Classification Criteria

MRI Category	Status of Mining Operation	SEEA Class
Reserves	Producing / Commercial operation	A
	Not yet producing but Declaration of Mining Project Feasibility (DMPF) is approved	
	Temporarily suspended	B
	Decommissioned / Closed	C
	Inactive	
Measured or Indicated Resources*	Commercial operation	B
	Development Stage	

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MRI Category	Status of Mining Operation	SEEA Class
*Net of reserves	Under Exploration	C
	Decommissioned / Closed	
	Inactive	
Inferred Resource	<i>Regardless of status</i>	C
Other Known Deposits	Inactive	C
	Additional quantities in place	C

IV. Definition of Terms

- a. Asset is 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.
- b. 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.
- c. 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.
- d. Catastrophic losses rarely occur with mineral resources. Catastrophes such as collapsing of mines may occur, but this does not reduce the stocks of the resources.
- e. 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.
- f. Discoveries are additions representing the arrival of new resources to a stock and commonly arise through exploration and evaluation.
- g. Extractions are reductions in stock due to physical removal or harvest of an environmental asset through a process of production.
- h. Mineral resources comprise known deposits of non-metallic minerals and metallic minerals.

- i. 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.
- j. 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.
- k. Revaluations relate to changes in the value of assets due to price changes.

Source: *System of Environmental-Economic Accounting 2012 Central Framework*

V. Dissemination of Results and Revision

The Mineral Accounts of the Philippines is updated annually in the PSA website. The web release materials include press release, statistical tables, and infographics.

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Table 5.1 Mineral Resource Rents

Table 5.2 Mineral Resource Rents as % of GDP

VI. Citation

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