

Minutes of the meeting held by the Office of the Principal Accountant General (Audit) I on Natural Resource Accounting on 19 April 2021 at C-Block, Audit Bhavan, Bengaluru.

A first meeting cum workshop on Natural Resource Accounting was held at C-Block, Audit Bhavan, Bengaluru on 19 April 2021.

The following officers were present in the meeting:

Name (S/Sri/Smt)	Designation
<i>GASAB wing of CAG's office</i>	
Sudipta N Biswas	Sr. Audit Officer
<i>Office of the Pr.AG(Audit)I, Karnataka</i>	
Monali Phadtare	Dy. Accountant General (AMG-III)
Kavitha B	Sr. Audit Officer, Reports 1
Vyjayanthi M D	Asst. Audit Officer, Reports 1
Kavyashree	Asst. Audit Officer, Reports 1
<i>Office of the Pr. AG(A&E), Karnataka</i>	
Naresh R	Pr. Accountant General
Yashoda M	Dy. Accountant General (Accounts & VLC)
Girija	Sr. Audit Officer
Veena L	Asst. Audit Officer
Chandan Kumar Chaudhary	Asst. Audit Officer
Raveendra M Kulkarni	Asst. Audit Officer
<i>Representatives of State Government Offices</i>	
Dr. Raman C V	Joint Director, Department of Mines and Geology
Venugopal C	Technical Director, Department of Energy
Guruprasad B	Joint Director, Department of Minor Irrigation
Naveen Kumar H P	Statistical Inspector, Department of Minor Irrigation
Kiran Masuti	Deputy Secretary, Department of Water Resources
Mahesh T	Director Technical, Environment Management and Policy Research Institute

The Dy. Accountant General (AMG-III) welcomed all the participants and started the meeting by informing about the importance of Natural Resource Accounting. Thereafter, the meeting was handed over to Sri. Sudipta N Biswas, Sr. Audit Officer, GASAB wing for informing the participants about the Concepts of Natural Resource Accounting and its implementation in India.

Shri. Sudipta N Biswas, Sr. Audit Officer of GASAB and NRA wing made a presentation which highlighted the following:

- Introduction about the Concept Paper on Natural Resource Accounting.

Important developments in SDGs, International Accords, Natural Resource Accounting in other countries, involvement of CAG etc., were discussed.

- Reason for requirement of Natural Resource Accounting.

The presentation highlighted the reason for requirement of Natural Resource Accounting viz., increased awareness regarding the impact of the exploitation of natural resources as well as their sustainability, international commitments like SEEA – CF and SDGs, water resource are being contaminated – parts of the country going water stressed, over exploitation of renewable resources in excess of assimilative capacity etc.

- Benefits of Natural Resource Accounting.

The Sr. AO in this presentation stated that Natural Resource Accounting would help in highlighting the interrelation between economy and environment and also would aid in policy framing. managing SDGs, combating climate change, aiding resource management and in identifying environmental problems.

- Stages of implementation of Natural Resource Accounting.

Implementation of Natural Resource Accounting in four stages were highlighted.

- Preparing Asset Accounts.

Starting point for Asset Accounts on Mineral and Energy Resources, Water Resources, Forestry and Wildlife Resources and Land Resources were discussed. Formats of Assets in physical and monetary terms were also suggested.

- Valuation Methodologies

The three methodologies for valuation of assets which is based on royalty, market price or on Government ownership on resources was discussed.

- Challenges

Some of the challenges such as continued reporting, mapping the periodicity, how to involve the multiple agencies in data collection, non-availability of data/information required for preparing the Asset Accounts, illegal mining, unregulated extraction of underground water etc., were discussed.

- Disclosure of Natural Resources

It is envisaged to frame a disclosure to depict the receipts as well as expenses from exploitation of natural resources through the Finance Accounts. Currently, the GA Wing in CAG has initiated notes to accounts covering the major head 3435 – ecology & environment – SFA.

After the presentation by the GASAB Wing, the meeting continued with the Audit and Accounts Office requesting the State Government representatives to provide all the necessary information (**Annexures**) at the earliest in order to achieve the Short-term and Mid-term goals.

Annexure 1

Information required and methodology in respect of Mines and Geology and Energy Department

Preparation of Asset Accounts - Mineral and energy resources

Table showing Basic form of an asset table as prescribed by SEEA

Opening stock of environmental asset
Growth in stock
Discoveries of new stock
Upward reappraisals
Reclassifications
Total addition of stock
Reduction of stock
Extractions
Normal loss of stock
Catastrophic losses
Downward reappraisals
Reclassification
Total reduction in stock
Revaluation of the stock*
Closing stock of environmental assets

* Only applicable for asset accounts in monetary terms.

Table - 9 Showing Asset Accounts on physical flows of mineral and energy resources

Classification	Sub-classification (may vary from State to State and Union)	Opening stock of proved reserves	Addition to stock*	Reduction in stock			Closing stock of proved reserves	
				Extracted by/for		Other extractions**		Total extraction
				Govt Sector	Private Sector			
(in tonnes/cum - as the case may be)								
Major Minerals	Iron Ore							
	Manganese							
	Limestone							
	Barites							
Fossil fuel	Coal							
	Petroleum							
	Natural Gas							
Minor minerals	Sand							
	Stone, boulders, aggregate							
	Shingle							
Other resources, if any								

* - to include - Growth in Stock, discoveries of new stock, reclassifications etc

** - to include - extractions other than those for **Government** and **Private** Sector such as untaxed extractions (if any), normal reduction in stock, catastrophic losses, downward reappraisals, cases of illegal mining, reclassifications etc

Table Showing Subsidiary Asset Accounts linking detailed physical flows in respect of mineral and energy resources with the valuation of resources

Particulars	Classification of minerals (illustrative only and may vary)	Physical unit (in tonnes/cum) extracted showing Govt, Private and other sector	Valuation of resources		
			Revenue involved (in crore) showing Govt, Private and other sector	Total revenue implications	Average Market value (as ascertained from the IBM or State Statistical Department) %
Opening stock /availability of resources at the beginning of the year	Coal			(a)	(b)
	Petroleum				
	Natural Gas				
	Iron Ore				
	Sand				
	Stone				
Additions during the year: Growth in Stock Discoveries of new stock Reclassifications Total Addition :	Coal				
	Petroleum				
	Natural Gas				
	Iron Ore				
	Sand				
	Stone				
Reductions during the year: Extractions (on recovery of royalty, cess, fees, NPV etc) #	Coal			(c)	(d)
	Petroleum				
	Natural Gas				
	Iron Ore				
	Sand				
	Stone				
Revenue related to exploitation of resources out of total revenue included in Statement 14 of State Finance Accounts/Statement 8 of Union Finance Accounts pertaining to four major heads ¹			(e)		

¹ Petroleum, non-ferrous mining and metallurgical industries, coal and lignite

Other extractions, not taxed (if any)					
Normal reduction in stock					
Catastrophic losses including natural and manmade disasters					
Downward reappraisals					
Reclassifications					
Reduction due to illegal mining activities \$					
Total reduction :				(f)	(g)
Closing stock	Coal			(h)	(i)
	Petroleum				
	Natural Gas				
	Iron Ore				
	Sand				
	Stone				

Notes :

(a) Rate of royalty in respect of each of the resources multiplied by opening balance of physical units to appear here. Sub-tables may be prepared as required to work out the figures in respect of each of the resources.

(b) Average market price as available in the website of IBM in respect of each of the resources multiplied by the opening balance of physical units to appear here. Sub-tables may be prepared as required to work out the figures in respect of each of the resources.

(c) Total of column 4 in respect of extraction of resources to appear here.

(d) Average market price as available in the website of IBM in respect of each of the resources multiplied by the resources extracted during the year to appear here.

(e) - Revenues earned by the entities and as reported through the Finance Accounts may be incorporated here. This will be same as (c) as it depicts the total revenues realised by the entity on exploitation of resources.

(f) and (g) - may be same as (c) and (d).

(h) Rate of royalty in respect of each of the resources multiplied by closing balance of physical units to appear here. Sub-tables may be prepared as required to work out the figures in respect of each of the resources.

(i) Average market price as available in the website of IBM/ available with the States/Union in respect of each of the resources multiplied by the closing balance of physical units to appear here. Sub-tables may be prepared as required to work out the figures in respect of each of the resources.

*# - please refer to preceding table - extraction of resources may be shown separately for **Government**, **Private** Sector and **Others**.*

% - The IBM compiles and releases average market value of minerals on monthly basis. Besides, the Statistical Departments in the States maintain the market prices of minor minerals (sand, stone, boulders etc). The average of these prices could be used to fill up these columns. Sub-tables may be prepared as required to work out the figures in respect of each of the resources.

\$ - Information may be gathered from all possible sources including those detected by the administrative Departments like Mining, Environment & Forests and also from other sources like NHAI, PWD, Inspection Reports of Accountant General (Audit) etc

- *Physical unit may be reckoned as per the usual practice, like standard cubic meter for natural gas, tonnes for metallic and non-metallic minerals, cubic feet for timber, cubic meter for minor minerals and so on.*

- **Opening Stock of resources :** *The SEEA (CF) envisages that, ideally, estimates of the opening and closing stocks of an asset should be compiled with information pertaining to the reference dates of the accounting period. However, if information in respect of those dates is not directly available, relevant information may need to be time-adjusted. From time to time, new information will emerge that leads to a change in the assumptions underlying a set of estimates. When additional information is being incorporated, it is important that the estimates continue to reflect the quantities and values that could reasonably be expected at the reference dates.*

- **Additions :** *Additions in stock includes mainly discoveries in new stock, reclassifications, opening up of new blocks to add to proved reserves, reappraisals etc. Of these, opening up of new blocks may occur in some years; otherwise, additions will more or less remain 'nil'.*

- **Reductions :** *The SEEA (CF) prescribes reduction in stock to be enumerated under five distinct categories, i.e. extractions, normal reductions in stock, catastrophic losses, downward reappraisals, and reclassifications. Of these, reduction on account of extraction of resources would be regular phenomenon while other causes of reduction may occur once in a while.*

- **Closing stock :** *The resultant value of opening stock, plus the additions, reduced by the reductions would lead to closing stock of resources. However, non-ascertainability of opening stock would result in non-determination of the closing stock. Similar to opening stock, appropriate explanation would have to be inserted against reasons hindering calculation of closing stock.*

Methodology for preparation of Asset Accounts

Methodology for preparation of the Asset Accounts in respect of mineral and energy resources would consist of three vital parts - ***identification of major minerals contributing revenues to the State exchequers, enumeration of the opening stock and third is the reduction due to exploitation of resources.*** Other elements like additions would not occur very often and rather take place once in a while after discovery of new stock or reclassification of resources or addition to the proved reserves which are very rare phenomenon. The closing stock would normally be the difference of opening stock and the reduction there from.

Methodology 1

The first approach could be the conventional system of gathering information regarding the opening stock of minerals and extractions during the period of the Asset Accounts from the administrative Departments governing the resources. While the Departments administering the resources could provide the information on physical accounts, the Finance Department can have the information on revenues while the Statistical Department/information available in the website of IBM can help with the data on market value. Upon receipt/consolidation of the information, the Asset Accounts can be prepared.

The second approach could be rather proactive. As the IBM and the EnviStats 2018 has provided the stock of minerals (metallic, non-metallic and fuel minerals) as of 1 April 2015, this could be held as the base. The data on monthly production of

Methodology 2

minerals also available in the website of the IBM could be used to reducing the volume of minerals that have been excavated during the intervening period to arrive at the opening stock of the desired periodicity of the Asset Accounts. For example, if the desired periodicity of the Asset Account is for 2018-19, the opening stock of minerals as of 1 April 2015 could be deducted by the corresponding monthly production figures for the years 2015-16, 2016-17 and 2017-18 to roughly arrive at the opening stock of minerals as of 1 April 2018.

Ascertaining the opening stock

Table 12 showing methodology of working out the opening balance with available information

Name of minerals	Opening stock as on 1 April 2015	Annual production (considering the monthly production of minerals as available in website of IBM) during			Closing stock as on 31 March 2018 or opening stock of 1 April 2018
		2015-16	2016-17	2017-18	
Minerals economically important for each States may be included in the Asset Accounts	Stock of minerals as of 1 April 2015 available in the website of IBM and also replicated in EnviStats 2018 by MoSPI may be used	Monthly production of minerals is available online at the website of IBM (www.ibm.gov.in - divisions - mining and mineral statistics - monthly statistics of mineral production)	- do -	- do -	Resultant balance of deduction of annual productions of three years from the opening balance

However, there could be some issues like stock of excavated minerals as of 1 April 2015 which will have to be gathered, discussed and clarified from the concerned Department of Geology and Mines in the States and accordingly adjusted in the Accounts.

11.3.7.3 Minor Minerals : As regards the minor minerals, the information are available with the Departments of Geology and Mining in the States which would have to be collected, consolidated and adopted in the same manner alike major minerals for incorporation in the Asset Accounts. The format for mining plan to be submitted before taking up any mining activity as available in the website of IBM requires information on geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations giving split up of various categories like proved, probable and possible reserves in the entire leasehold. As envisaged by SEEA (CF), proved reserves may be considered as the stock on the date of application while the subsequently monthly production may be deducted in similar manner as worked out for major minerals under methodology 2 above to ascertain the opening stock of minor minerals at any given date.

An example of preparation of Asset Accounts so far as the reduction due to extraction of resources, which is the most vital element of the Asset Accounts, is attempted below. Resources physically removed is mapped with the revenues deposited with the State Government. For the sample table, data collected by the Office the Accountant General (Audit), Andhra Pradesh from the Department of Mines and Geology, Andhra Pradesh for one of the Performance Audit on Department of Mines

and Geology has been used. Also, the revenues generated through exploitation of these resources as depicted in the Finance Accounts of Andhra Pradesh for the corresponding years have been taken into consideration. These revenue figures tally with the resource wise revenues collection as gathered by the Audit Office from the Department of Mines and Geology, Andhra Pradesh. The sample table below covers a period of two years 2010-11 and 2011-12:

Table 13 Showing example of mapping revenue and physical flow of resources

Name of mineral	Unit	2010-11		2011-12	
		Qty exploited	Revenue involved (in crore)	Physical Qty exploited	Revenue involved (in crore)
Coal		51.33	682	51.03	788
Barites	In mn tonnes	1.3	19	1.43	12
Iron Ore		1.31	11	1.48	7
Limestone		52.5	330	65.04	411
Limestone slabs	In mn sq meter	12.5	7	15.02	8
Granite	In mn cum	0.93	169	1.25	250
Gravel		45.09	117	72	158
Road metal		91.65	303	114.58	379
Sand	In lakh cum	334.31	158	NA	127
Crude oil	In lakh tonnes	3.6	155	3.04	130
Natural Gas	In mn cum	1384	NA	1353	NA
Other minerals	--		114		67
Total revenue			2,065		2,337

Physical qty may be appropriately inserted at # at table 10 above

As depicted in relevant head of Finance Accounts and inserted at

Note : mn - million, cum - cubic meter

Source : Revenue involved - Finance Accounts of Andhra Pradesh for relevant years and quantity exploited - information collected from the Department of Mines and Geology, Andhra Pradesh as provided in the Performance Audit on Department of Mines and Geology, Government of Andhra Pradesh (Report No. 2 of 2014).

Annexure 2

Information required and methodology in r/o Forestry and Wildlife Resources

Asset Account for Forest Resources

	Dense Forest	Moderately dense forest	Open Forests	Mangroves	Scrub	Non-forest areas
Opening Stock (in sq km)						
Additions during the report period						
Reductions						
Closing stock						

The second table of the Asset Account to show state of forests in physical and monetary terms showing opening, additions, reduction and closing stock.

Subsidiary Asset Account linking the physical flows of Forest Resources with the valuation of resources

	Dense Forest	Moderately dense forest	Open Forests	Mangroves	Scrub	Non-forest areas
Opening Stock (in sq km) (Stock enumerated by ISFR 2019 may be reckoned as opening stock)						
Additions during the report period						
Planned additions in sq km/ha (plantation)						
Expenditure incurred (₹ in crore)						
Natural growth						
Reductions						
Scientific felling						
Revenue realised (₹ in crore)						
Deforestation for developmental activities						
Net present value realised (₹ in crore)						
Natural causes/man made disasters						
Value of forest property lost (₹ in crore)						
Reported illegal felling						
Value of forest property illegally felled (₹ in crore)						
Closing stock						

Tentative Value of closing stock (₹ in crore)						
Stock as per ISFR						
Variations						

Asset Accounts of major Wildlife Resources

	National Parks	Wildlife Sanctuaries	Conservation reserves	Community reserves	Bio-sphere reserves
Opening Stock of wildlife areas (in sq km)					
Percentage of wildlife area in total forest area					
Opening stock of total count of major animals (separate species wise statement may be prepared)					
Area under human encroachment/industrial activities					
Additions, if any during the report period (in sq km)					
Planned additions in sq km					
Increase in number of animals (if census carried out during the year)					
Reductions (in sq km)					
Increased encroachment					
Industrial activities					
Reported poaching cases during the period					
Closing stock of wildlife area (in sq km)					
Closing stock of animals (separate species wise statement may be prepared)					

Annexure 3

Information required and methodology in r/o Water Resources

Tentative Asset Account for Water Resources (State-wise) for the period _____

(water flows in billion cum and revenues ` in crore)

	Surface water (unclassified data)			Ground water	Total
	Dams/ Reservoirs	Lakes	Rivers, canals and streams		
Annual requirement of water by the following categories of users					
Irrigation					
Industries					
Domestic use					
Annual availability of water resources					
Additions to stock					
Precipitation					
Returns					
Inflows from other territories					
New discoveries					
Reduction from available resources					
Natural discharge					
Natural/man made disasters					
Supplies for the following users					
Irrigation					
Industries					
- Government					
- Private					
Domestic					
Outflows (to other territories, sea, inland water resources)					
Supplies on which water rates are levied					
Irrigation					
Industrial (Govt/Private)					
Domestic					
Others					
Free supplies					
Irrigation					
Industrial (Govt/Private)					
Domestic					
Others					
Revenues generated through usage of water *					
Irrigation supplies					
Industrial supplies					

Domestic supplies					
Others taxed supplies if any					
Variation between available resources and resources used during the year for different users					
Irrigation users					
Industrial users					
Domestic users					

* - These figures would relate these tables with the revenues noted in the Finance Accounts under major, medium and minor irrigation schemes heads of accounts

Data in respect of groundwater and those in reservoirs are collected by the State Groundwater Boards on daily basis while the water data of streams, rivers etc are collected by the CWC