



**NATURAL RESOURCE ACCOUNT OF GOA
FOR THE YEAR 2020-21
MINERAL & ENERGY RESOURCES**

**An initiative of Government Accounting Standards Advisory Board
under the aegis of CAG of India**

June 2023

Table of Contents

No.	Description	Page
1	Message of the State Government	v
2	Message from the Principal Accountant General	vii
3	Executive Summary	ix
4	Creation of State NRA Cell.	xi
5	Initiatives of the State Government to assist implementation of the project.	xi
6	Unique collaboration between Accountant General's Office and the State Government departments to prepare this compilation.	xi
7	Dual stage validation/verification process.	xi
8	Major findings of the Asset Account Report	xi-xiii
9	Suggested way forward	xiii
Chapter 1 – Introductory		
1.1	Natural Resource Accounting – the concept	1-2
Chapter 2 - Implementation of NRA in India – GASAB's endeavour		
2.1.	About (GASAB) Government Accounting Standards Advisory Board	3
2.2.	Concept Paper on NRA in India – released by GASAB	3
2.3.	Goal 1 of the action plan envisaged in the Concept Paper	4
2.4.	Why - Mineral and Energy Resources	4
2.5.	Advantages of consolidating the Asset Accounts on Mineral & Energy Resources	4-6
2.6.	Evolution of the final templates	6
2.7.	Additionalities – monitoring the targets committed to COP– 26	6-7
2.8.	Consultative process	7
2.9.	Training and capacity building	7
2.10.	Onboarding and handholding the States	7
Chapter 3 - Initiatives in the State		
3.1.	Formation of State NRA Cell	9
3.2.	Follow up, trainings and capacity building	9
3.3.	Innovations and good practices	9
Chapter 4 - Mineral profile of State and shortlisting of resources		
4.1.	Mineral profile of the State of Goa	11-12
4.2.	Strategic importance of minerals for the State	12-13
4.3.	Mining process in the State	13-15
4.4.	Contribution of mineral resources in the revenues of the State	15
4.5.	Short-listing of resources for this study	15
Chapter 5 - Asset accounts of mineral and energy resources of State of Goa		
5.1.1.	Scope	17
5.1.2.	Objectives	17
5.1.3.	Methodology of data collection and compilation of physical flows	17-18
5.1.4.	Methodology of monetisation of physical flows	18-19

5.1.5.	Dual stage validation/verification of data	19
5.1.6.	Challenges and limitations	19-20
5.2	Asset Accounts on Mineral & Energy Resources	20
Chapter 5.2 Asset Accounts on Mineral & Energy Resources		
	Table 1	21-22
	Table 2	23
	Table 3	25-28
	Table 3A	29
	Table 4	31
	Table 4A	33-34
	Table 5	35-36
	Table 6	37
5.2.3.	Findings of the study	39-44
5.2.4.	Recommendations	44-45
Chapter 6 - Future Continuity Plan		
6.1.	Guidelines/SoPs issued by GASAB	47
6.2.	Need for mapping the supply and use/sale/export	47-48
6.3.	Quarterly Reporting Framework	48
6.4.	Recommendations for creation of resource-wise maps including geo-tagging of the actual mine areas with mine indicators as per their GPS co-ordinates.	48-49
Annexures		
1.	State NRA Cell - list and contact details	51

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MESSAGE

The current approach of calculating Gross Domestic Product captures only economic accounting of resources as an indicator of economic growth of the country. The depletion of natural resources and their environmental impact doesn't get factored in the GDP calculation. Therefore, effort for integration of economic and environmental accounting is expected to pave way for Green Accounting system in the country in the long run. In this direction, initiative of Government Accounting Standards Advisory Board (GASAB) under the aegis of Comptroller and Auditor General of India to support the preparation of Natural Resource Account on Mineral & Energy Resources of States is a commendable step for implementation of Natural Resource Accounting in India.

The tiny State of Goa has abundant mineral resources especially iron ore deposits. Mining activity in Goa is nearly a century old economic activity, which is deep rooted in the economic profile of the State. The large section of the population has historical inheritance of dependence on mining activity. Over the decades, the State has evolved a strong export network with different countries for exporting iron ore. Goa being a part of western ghats has rich bio-diversity, forest and tree cover with assemblage of flora and fauna. The State has long coastline and inland waterways contributing significantly to tourism, fisheries and transportation purposes. Thus, natural resources accounting would help the State in management and sustainability of resources in the long run.

It is expected that documentation of natural resource account of Goa would provide a consolidated picture of available reserves, revenues, exploitation of resources, exports and sustainability of resources. Government of Goa commends the efforts put in by the Accountant General of Goa and different departments of the State Government in bringing out this report for the year 2020-21.

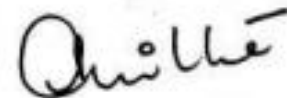
A handwritten signature in blue ink that reads "Puneet Goel".
(Dr. Puneet Kumar Goel)

MESSAGE FROM THE PRINCIPAL ACCOUNTANT GENERAL

In keeping with India's commitment to SDGs, and as per the implementation strategy suggested by the United Nations - System of Environmental Economic Accounting (SEEA) – Central Framework, the Government Accounting Standards Advisory Board (GASAB) prepared a concept paper in July 2020 envisaging a set of short, medium and long term goals starting from 2020 and converging with the target date for achievement of SDGs, i.e. 2030. The first step in this endeavour is the preparation of Asset Accounts on Mineral & Energy Resources in all the States with an aim to gradually move towards the national level. Accordingly, NRA Cells were formed in each of the States with representation from the State Governments and the Accountant General offices to take the initiative forward.

In Goa, we conducted a pilot study during 2021 to assist the State Government in preparing the Asset Accounts of Mineral and Energy Resources for the year 2019-20. Subsequently, the preparation of the NRA Report on Mineral and Energy Resources for 2020-21 was taken up. This report includes information pertaining to three major minerals and two minor minerals and renewable energy resources. We appreciate the efforts of the State Government, specifically the Directorate of Mines and Geology, in the preparation of this report.

Going forward, it is planned to expand the number of natural resources included in these Accounts. Further, the State Government envisages to capture information from the grass root level, by taking up end-to-end mapping of supply and use of resources which would streamline their control and monitoring. We hope that this endeavour of the Government will be an important step in planning for sustainable utilization of natural resources in the state of Goa.



(Anitha Balakrishna)
Principal Accountant General

EXECUTIVE SUMMARY

The GASAB Secretariat in CAG's Office prepared a Concept Paper on NRA in India (July 2020) which, inter-alia, envisaged a three-term plan for implementation of NRA in India in consonance with the strategy enshrined in the System of Economic and Environmental Accounting – Central Framework (SEEA-CF) of the UN.

The Concept Paper also suggested the templates for preparation of Asset Accounts on Mineral & Energy Resources. Simultaneously, pilot studies were initiated (August 2020) in three States, namely Goa, Meghalaya and Rajasthan and successfully completed the studies, preparing the model Asset Account on Mineral and Energy Resources in the States.

The final formats of Asset Accounts on Mineral & Energy Resources were released in October 2021 for implementation in the States. First draft Asset Accounts was targeted for the year 2020-21 to be completed by the year 2022.

Subsequently, in view of the national declaration at the Conference of the Parties (CoP) 26, efforts were made by GASAB to incorporate templates for collating information on progress in generation of renewable energy in States. These were intended to help the States and the Union to have a bird's eye view of the progress made towards meeting the targets committed by the country at the CoP 26.

The work on preparation of the Asset Accounts in the State of Goa commenced with joint efforts of the Office of the Accountant General and the State Government. This Report presents the first Asset Accounts on Mineral and Energy Resources in the State of Goa.

Effective implementation of a system of generating Asset Accounts on Mineral and Energy Resources in the States would aid in evidence-based good governance and have the following specific advantages.

- Preparation of NRA and meet the commitment made to meeting SDGs and SEEA framework.
- Resources at a glance - a one pager document on State-wise major and minor minerals.
- Compilation of physical and monetary values to enable cross verification of revenues vis-à-vis actual extractions.
- Provide pace of exploitation – to bring out sustainability of resources.
- Analysis of revenue vis-à-vis market value/export value will make it easier to assess and review the royalty rates – to protect State's revenue interest.
- Enable assessment of revenue streams for the future.
- Mine-wise data on resources – pan India.
- Enabler of identification of alternate resources (economic as well as energy).
- Close monitoring on illegal mining, and
- Progress on commitment made at COP 26

1. Creation of State NRA Cell.

NRA Cell was set up in the State (October 2021) with representative from the Accountant General's office and from seven departments of the State Government.

2. Initiatives of the State Government to assist implementation of the project.

This report includes information pertaining to three major minerals and two minor minerals related to the Directorate of Mines and Geology and information from the Electricity Department of Goa pertaining to Renewable energy resources. These departments of the State Government have co-operated with AG's Office by providing necessary information for preparation of the report.

3. Unique collaboration between Accountant General's Office and the State Government departments to prepare this compilation.

Data in respect of production figures of major and minor minerals included in the asset accounts was furnished by the Directorate of Mines and Geology, Panaji, Goa (DMG). The data in respect of royalties and other receipts was provided by DMG and Directorate of Accounts (DoA) who is in-charge of maintenance of State Government accounts. The DoA provided data in respect of receipts under the account head 0853-Mines for the financial year 2020-21. The State Electricity Department furnished information pertaining to Renewable resources.

4. Dual stage validation/verification process.

The office of the Accountant General, Goa has handheld the State Government in preparing the assets accounts. The documentary evidence available with DMG in support of the data in the tables were verified in a limited way in the process. The figures pertaining to royalty received in respect of Major and Minor minerals provided by DoA were also compared with corresponding data provided by DMG.

5. Major findings of the Asset Account Report

a. For the year 2020-21, the Natural Resource Account for the State of Goa comprises of three major minerals and two minor minerals regulated by the DMG. While the DMG office maintained various registers for monitoring purposes, timely filing of monthly and annual returns by the lessees was found to be lacking. There were delays in compilation of data and production of records (monthly or annual returns filed by the lessees) which form the basis for ascertaining the royalty or dead rent or surface rent receivable and other related receivables such as fines, fees or penalties, if any levied.

b. The DMG office provided data of challans generated at its office for making relevant payments to the State Government by lessees and details of receipts under various heads compiled from such records. However, cross verification of DMG's data with data from the DoA revealed that particulars of remittances by other departments, municipalities, panchayats, etc., were not available with DMG and thus the royalty

received data as per the DMG did not match with the total receipts data as per the DoA. Further, a comparison of the databases (provided by DMG and that of DoA) with reference to a combination of challan number and amount indicated mismatches (Para No.5.2.3.2). The DMG agreed to adopt the figures of the DoA as final.

c. Grade-wise production data was not available with the DMG. However, the DMG compiled (June 2022) grade-wise data of dispatches of major minerals from the trip sheet

d. data. Documentary evidence in support of this data was not available (Para 5.1.4 and 5.1.6.2).

e. The State Government had not notified the rate of surface rent (Para 5.2.3.4).

f. In case of leases for minor minerals, there were instances of non-payment of dead rent by 39 lessees who had not furnished returns (Para 5.2.3.6).

g. As no sand permits for riverine resources were granted by the State Government, Table 2A and 2B as prescribed by GASAB are not included in the Report.

6. Suggested way Forward

State authorities may ensure compliance of rules by lessees with respect to furnishing of monthly/annual returns. An automated system for capturing the data of supply/dispatch of resources and linking data for use of various stakeholders should be developed. All data pertaining to the process of grant of mining leases, vehicle movement, trip-sheets, etc., should be captured electronically at source. The system should provide for drawing samples from the extractions of mineral for assessing the quality and grade of minerals for ensuring correct royalty payment. Cases of illegal mining needs to be effectively followed up and also information on illegal mining and action taken thereon may also be captured and maintained electronically for future use.

CHAPTER 1

INTRODUCTORY

1.1 Natural Resource Accounting – the Concept

Economic growth over decades has largely been an outcome of continued reliance on natural resources. Growth is clearly the major engine to create livelihood options; its reliance on increased resource use has, however, led to many negative externalities. The current paradigm of resource-led economic development sees a coupling between the availability of natural resources and economic growth.

Natural resources play a crucial role for economic development of a country and are crucial for their inbuilt value of inter-generational equity and sustenance.

Over the years, there has been increasing awareness about environmental issues across the globe and growing concern about the depletion and degradation of the natural resources. This concern gave birth to the idea of sustainable development goals which aims at ending poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The sustainable development dialogue has brought to the fore the direct and indirect impact of human activity on the environment and there is now a consensus that continuing economic growth and human welfare are integrally dependent on the benefits obtained from the environment. The critical trade-offs between managing ecosystems and environmental resources for future sustainable economic and social development need to be understood for effective policy interventions.

Natural resources play a vital role in the sustainable economic development of any country. They need to be exploited in a sustainable manner so that the future generations can also avail of their advantages. The rampant over – exploitation of these resources in recent times has resulted in harmful impact on the environment and issues of climate change and global warming have become a matter of discussions and deliberations round the Globe.

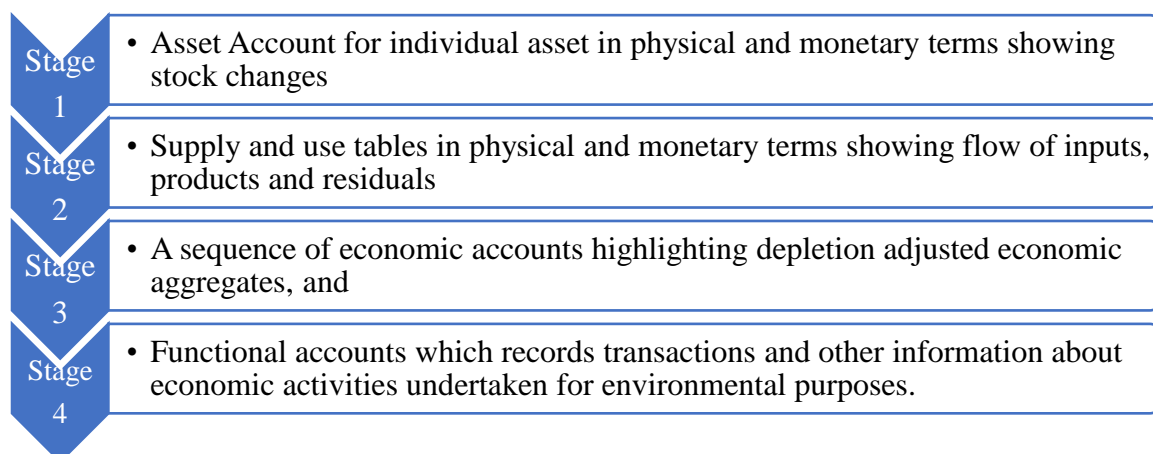
Conventional accounting captures data only of the measurable economic activity. In order to overcome this shortcoming and to capture the intimate interplay between the economic indices and the various components of the natural environment, the concept of NRA has emerged.

It is based on the concept “Measurement of a resource leads to its better Management.” The idea is to quantify the damage to the environment so that it can be reduced from GDP to arrive at Green GDP. It would assist in taking policy decisions in respect of matters affecting environment directly and indirectly and bring us in a position to use our resources on a more sustainable basis and reducing the negative impact on the environment.

In keeping with the developments, the United Nations has been working towards an universally acceptable framework on environmental resource accounting which culminated into release of the System of Economic and Environment Accounting - Central Framework (SEEA - CF) in 2012 which is the latest internationally accepted framework.



The SEEA (CF) prescribes a four-stage implementation process by compiling the following accounts as mentioned below:



However, while prescribing the aforesaid milestones for implementation of NRA across the world, the SEEA (CF) has also envisaged constraints to be faced by the countries in implementing NRA. SEEA (CF), thus, prescribed for flexibility in designing the accounts based on the specific environmental issues faced by a government. Depending upon the specific environmental issues faced, a country may choose to implement only a selection of the accounts included in the SEEA (CF). The SEEA (CF) provides that even if a country desires eventually to implement the full system, it may decide to focus its initial efforts on those accounts that are most relevant to current issues.

CHAPTER – 2

IMPLEMENTATION OF NRA IN INDIA – GASAB’S ENDEAVOUR

2.1 About (GASAB) Government Accounting Standard Advisory Board

The Government Accounting Standards Advisory Board (GASAB) was established in 2002 by the Comptroller and Auditor General of India with the assistance of Government of India to formulate Government accounting standards for improving Government accounting and financial reporting.

2.2 Concept Paper on NRA in India- released by GASAB

GASAB has taken the initiative (2019) to develop a framework for implementing NRA on priority as a nationally important project. GASAB came out with a Concept Paper on implementation of NRA in India in July 2020. The Paper, inter alia, discussed the concept and its inter-relation with the SDGs and Climate Change, international progress on environmental accounting and merger of the concept with economic environmental accounting, progress in other countries. GASAB has suggested a well laid out implementation plan divided into three term goals in consonance with the strategy envisaged by the SEEA – CF.

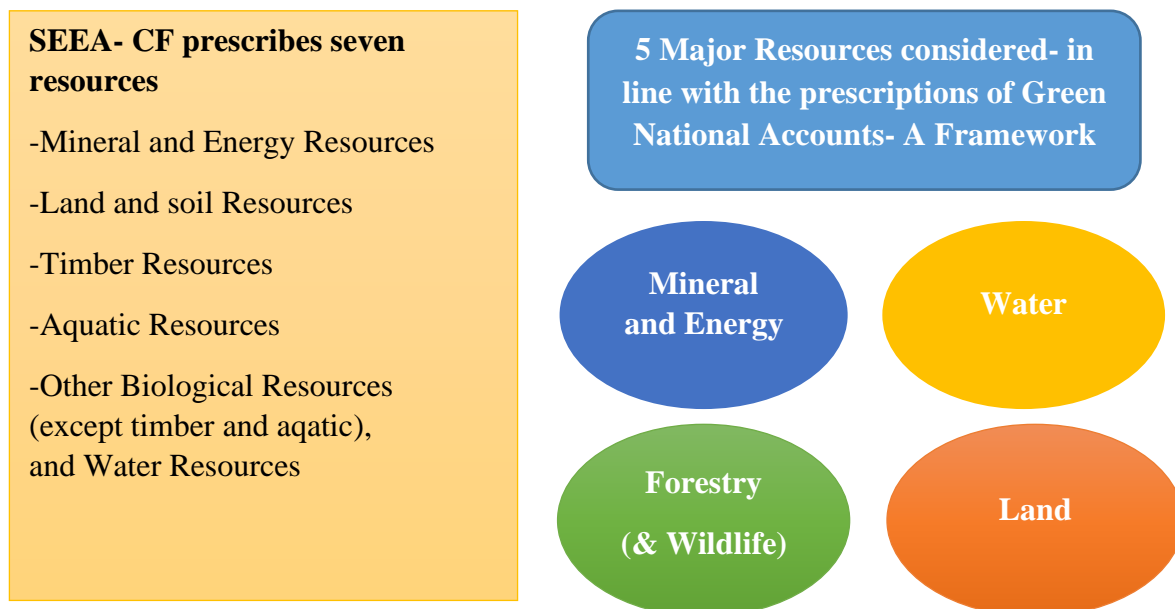
A Concept Paper on Natural Resource Accounting in India - a product of Government Accounting Standards Advisory Board (GASAB) was published in July 2020. Keeping the international as well as national developments on NRA in view and the mandate of GASAB in suggesting accounting framework for enhancing the quality of decision making and public accountability combined with suggestion of Working Group on Environmental Auditing under the INTOSAI to handhold the country in developing NRA, the Concept Paper was a result of GASAB's efforts towards helping the causes of environmental accounting in India, climate change, and sustainable development goals.

The Paper, inter-alia, envisaged short, medium and long term goals in consonance with the four stage strategy suggested by the SEEA Framework, as mentioned below:

Short term goals	Mid-term goals	Long term goals
1.Preparation of Asset Accounts on Mineral and Energy Resources in States 2.Initiation and preparation of disclosure statement on revenues and expenditure related to natural resources (2019-20 to 2021-22)	1.Preparation of National Asset Accounts on Mineral and Energy Resources 2.Preparation of Asset Accounts in respect of other four resources namely water, land and forestry & wildlife resources in the States 3.Preparation of supply and use tables in physical and monetary terms showing flow of natural resource inputs, products and residuals (2022-23 to 2024-25)	1.Preparation of the economic accounts highlighting depletion adjusted economic aggregates; and 2. Preparation of functional accounts recording transactions and other information about economic activities undertaken for environmental purposes (2025 - 26 onwards).

2.3 Goal 1 of the action plan envisaged in the Concept Paper

The initial stage of implementation strategy of NRA is preparation of the Asset Accounts on individual resources. The SEEA (CF) has listed out seven resources of which five major resources namely Mineral & Energy Resources, Water Resources, Forestry & Wildlife Resources and Land Resources have been considered for taking up initially in the Concept Paper on NRA as mentioned in the table and diagrams below:



2.4 Why - Mineral and Energy Resources

The Asset Accounts on Mineral & Energy Resources have been considered as the most important goal as it consists of non-renewable resources while other major resources fall in the other group and gets renewed naturally.

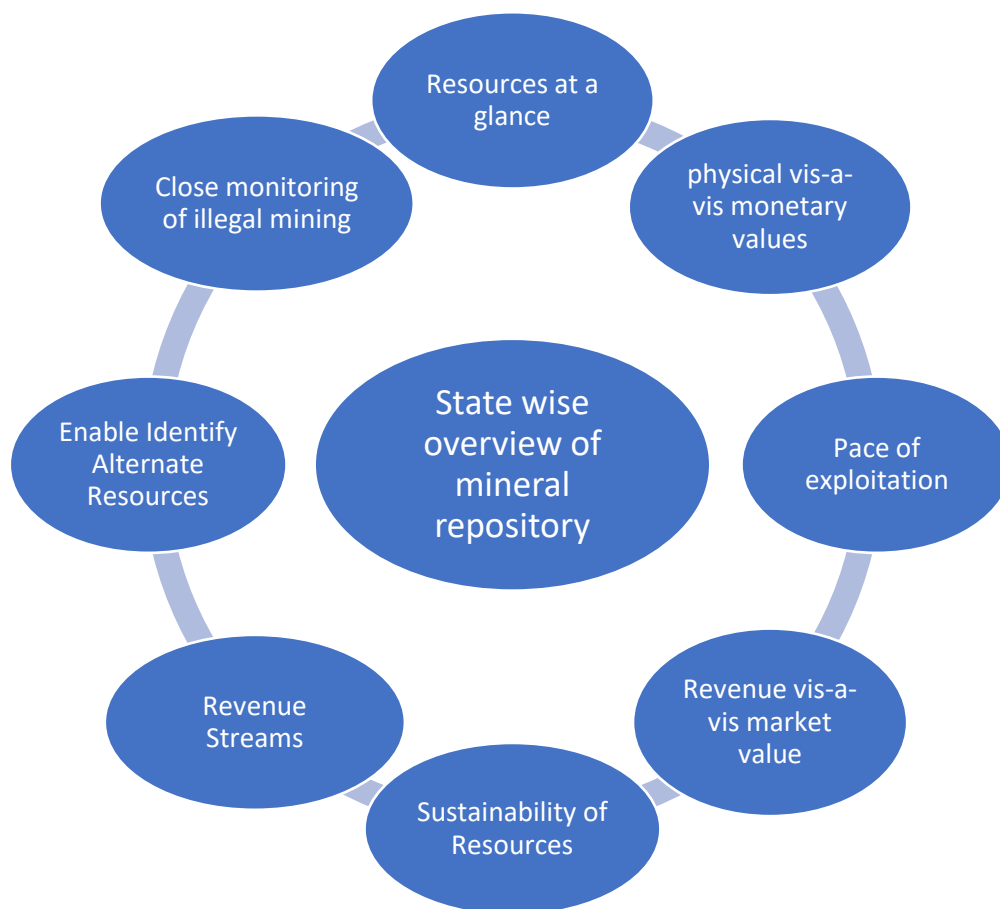
In keeping with the implementation stages as envisaged in the SEEA (CF), the flexibility embedded therein and the importance of non-renewable resources discussed above coupled with the prescription of SEEA that a country may decide to focus its initial efforts on those accounts that are most relevant to current issues, preparation of Asset Accounts on Mineral & Energy resources have been conceptualized as the need of the hour and thus planned as the short term goal No.1.

Mineral and Energy Resources, being non renewable resources have been considered as the first goal

2.5 Advantages of consolidating the Asset Accounts on Mineral & Energy Resources

A system of collation of a periodic database in the shape of an Asset Accounts on available natural resources linked with inter-related factors like revenues and costs involved in exploitation of such resources, their sustainability for the future generations would be extremely helpful in monitoring the sustainability of resources, effective decision making, adoption/adaption of SEEA besides attaining other pressing international obligations like the Sustainable Development Goals and Climate Change.

Besides the above, the Asset Accounts would aid in evidence based good governance with the following specific inputs.



Thus, the Asset Accounts, once compiled, has the potential of multi-pronged advantages for the State in particular and the country at large as summarized below:

Resources at a glance - The Asset Accounts would enable a one pager document on the resource availability of each State.

Provide invaluable information and datasets on mineral repository and potential of States - could be used to showcase for varied purposes.

Physical flows and monetary values mapped – enabler of working out the value of extracted resources and also to help in monitoring of realization of revenues vis-à-vis extraction of resources to help in identifying cases of leakage of revenue.

Pace of exploitation- Down the years, compilation of Asset Accounts would help in drawing up the pace of exploitation of resources over the years thus bringing out vital inputs like the pattern of resource usage and sustainability of resources – in years.

Revenue vis-à-vis market value- Ascribing money value with reference to the royalties/revenues combined with the market value would aid in continuous analysis of the royalty/duty/taxes to help the public exchequer.

Sustainability of minerals in years – when analysed with revenues, has the potential to point towards revenue streams for future and will also enable States to identify alternate resources – both economic and energy resources.

Close monitoring on illegal mining- The inter-operability of supply and use of resources and their incorporation in the system of preparation of Asset Accounts would enable close watch on illegal mining. This will not only help in optimizing resource base but will also help in containing unscientific mining thereby aiding in conservational efforts and restricting environmental degradation due to unscientific and unsustainable mining activities.

Thus, to sum up, Asset Accounts once compiled, would bring out State-wise mineral repository along with other inputs like actual stock of resources, usage pattern, their values- aiding in evidence- based policy framing and most importantly sustainability of resources for future generation.

2.6 Evaluation and final templates

The templates of Asset Accounts on Mineral and Energy Resources have been finalised after incorporating the comments of the Consultative Committee members and the experience gained in successful completion of pilots in three States. While the core framework as prescribed by the SEEA – CF has been retained, designs of the sub and detailed tables have been worked out by GASAB based on country specific needs and other peculiarities besides constraints/data availability etc. to capture data required for the core framework and also to serve as repository of an inclusive informative database for use by policy makers, stakeholders, academia and other interest groups. The templates, as they stood then, were released in the form of a book titled Templates of Asset Accounts on Mineral and Energy Resources in States in October 2021.

The formats were constantly updated with inputs and experiences gained through their implementation in the States from October 2021 through March 2022. The final formats included six tables for capturing the basic asset accounts (Table 1), asset accounts on physical flows along with sustainability of resources (Table 2), physical flows of riverine resources (table 2A), valuation of riverine resources (table 2B), subsidiary asset accounts linking physical flows with valuation of resources (Table 3), information on illegal mining (Table 3A), analysis of extraction, production and dispatch of resources (Table 4), collection under district mineral foundation (Table 5) and progress in generation and use of renewable energy resources (Table 6).

2.7 Additionalities- monitoring the targets committed to COP-26

At the United Nations Climate Change Conference of 2021 or the COP 26, the Government of India committed the following:

1. India will take its non-fossil energy capacity to 500 GW by 2030.
2. India will meet 50 per cent of its energy requirements from renewable energy by 2030.
3. India will reduce the total projected carbon emissions by one billion tonnes from now till 2030.

4. By 2030, India will reduce the carbon intensity of its economy by more than 45 per cent.
5. By the year 2070, India will achieve the target of Net Zero.

In order to monitor the progresses to attain the above commitments, specific input table for collecting and collating information on progress on generation of new and renewable energy have been envisaged as Table 6.

2.8 Consultative Process

To ensure wider consultation with diverse stakeholders, GASAB has constituted consultative group in GASAB headquarters consisting of ministries in Government of India, five State Governments and the Accountants General in these States, expert agencies like National Remote Sensing Center (NRSC), The Energy and Resources Institute (TERI) etc. Idea of constituting the groups was to draw technical expertise and inputs from subject experts and academia while steering the implementation process following the action plans suggested in the Concept Paper, with special emphasis on the preparation of Asset Accounts on the Mineral and Energy Resources in the States.

2.9 Training and capacity building

As the Concept Paper envisaged commencement of the project from States, it was important that proper training and capacity building was ensured for the Officers and staff members of not only the Accountants General Offices but the State Government Departments as well. Accordingly, virtual trainings/workshops were continuously held over the time of implementation of the project. Besides, State specific workshops were also held in several States like Gujarat, Jharkhand, Karnataka, Punjab etc.

2.10 Onboarding and handholding the States

In order to take the States on board as one of the most vital stakeholders in the implementation process, the highest echelons in the States were demi-officially informed (September 2021) by the Deputy CAG & Chairperson, GASAB about the endeavor of GASAB and vision of the project which was followed up with virtual presentations to the States. The views/suggestions emanated at was taken into consideration in updating/modifying the templates. After release of the templates, monthly virtual meetings were held with all the 30 States/UT in which the project was being run from October 2021 till March 2022 or such time the Asset Accounts were finalized in the States.

CHAPTER – 3**INITIATIVES IN THE STATE****3.1 Formation of State NRA Cell**

An NRA Cell was constituted (October 2021) in the State comprising representatives of the Accountant General's office and seven departments/directorates of the State Government, viz., Departments of Forest, Environment & Climate Change, Water Resources and Directorates of Accounts, Mines and Geology, Planning, Statistics & Evaluation and Settlement and Land Records. List of members of State NRA Cell is at **Annexure I**.

3.2 Follow up, training and capacity building

There has been continuous interaction between the Accountant General's office and the departments of the State Government involved in preparation of NRA. The templates/SOPs/guidelines prepared by GASAB were shared with the concerned departments. A meeting was held with the NRA Cell members (December 2021) to brief them about the concept of NRA. On an ongoing basis, discussions were held with the DMG regarding absence of necessary data, maintenance of crucial records for monitoring, etc. and requested for necessary action. Audit Office also discussed with DMG and representatives of Goa Electronics Limited, (GEL) a State PSU regarding the need for automation of various data related processes.

A meeting of the State NRA Cell was held (July 2022) to discuss the findings of NRA relating to Asset Accounts for 2020-21 as well as to guide the other departments regarding the nature of data and records required for NRA going forward. The need for automation of data capture right from the source, as well as, approvals relating to applications for lease, royalty payments, vehicle tracking, trip-sheet data, etc., involving all aspects of utilization of Natural Resources was underlined.

3.3 Innovations and good practices

The DMG has taken up (July 2021) the development of "Bhumija Ore Management System", a web-based automation solution, for automation of the processes involved in mining activity and capturing the data of related compliances by lessees, transporters, etc. through the GEL. It envisages provision of online registration of stakeholders, permits, e-wallet, Trip-sheets, Vehicle Tracking System, etc., in respect of all minerals.

Some modules of Bhumija Ore Management System, such as Online Registration of Stakeholders, Vehicle Tracking System, Royalty Payment Facility, Generation of Trip Sheets for major minerals and Call Center Support have been made operational. However, facility for filing of monthly and annual returns by lessees and maintenance of mandatory registers as per MCDR 2017 in respect of major minerals and as per Goa Minor Mineral Concession Rules, 1985 (GMMCR, 1985) in respect of minor minerals have yet to be implemented. Full implementation of the Application would facilitate the capture of data pertaining to extraction/production, dispatches of minerals from the monthly online returns filed by lessees, track and monitor the movement of trucks, legal compliances by lessees, providing updated information to all stakeholders, etc.

CHAPTER – 4

MINERAL PROFILE OF STATE AND
SHORTLISTING OF RESOURCES**4.1 Mineral profile of the State of Goa**

The State Government through DMG oversees the regulation and development of Major and Minor Minerals in Goa. Iron ore, Manganese ore and Bauxite are the three major minerals found in the State and there are 20 minor minerals viz., limestone and its varieties (lime kankar, lime shells), building stones like laterite chiras, laterite rubbles, basalt, masonry stones, metal grit, basalt blocks, boulders, shingle, gravel, kankar, ordinary sand, pebbles and modules of chalcedony, quartzite stones and flint, ordinary clay, murrum, matti and other colored matti, brick earth, ordinary earth, river sand/river pebbles, laterite, dimension stones/laterite boulders/laterite rubbles and basalt/granite rock. The aforesaid minor minerals found in the State finds its use mostly as building material.

Profile - Major Minerals

Iron: Iron ore reserves in Goa are estimated¹ to be around 1000 million tonnes. Around 80 percent of the deposits are fines and the rest are lumps. The iron ore deposits are distributed over the northern, southern and central blocks of Goa. The northern block deposits are richer both in terms of quantity and quality of the ore. All the large mines which produce over one million tonnes per annum are situated in the northern block. The Goan Iron ore industry is export oriented.

Manganese: The manganese deposits of Goa are of Lateritoid type. Geographically the manganese deposits are more concentrated in the southern part of Goa. The Goan manganese ores are generally poor in grade with manganese content varying from 30 to 45 per cent.

Bauxite: North Goa deposits include the area of Chapora river, Mopa area, Parnem area, Morgim area, Dargalim, Ibrampur, and Korgoan areas. Central Goa deposits, include Dabolim, Verna, Canua, Raia, Quessolim and Sancoale. South Goa deposits include the hilly area of southwest Quepem.

Profile - Minor Minerals

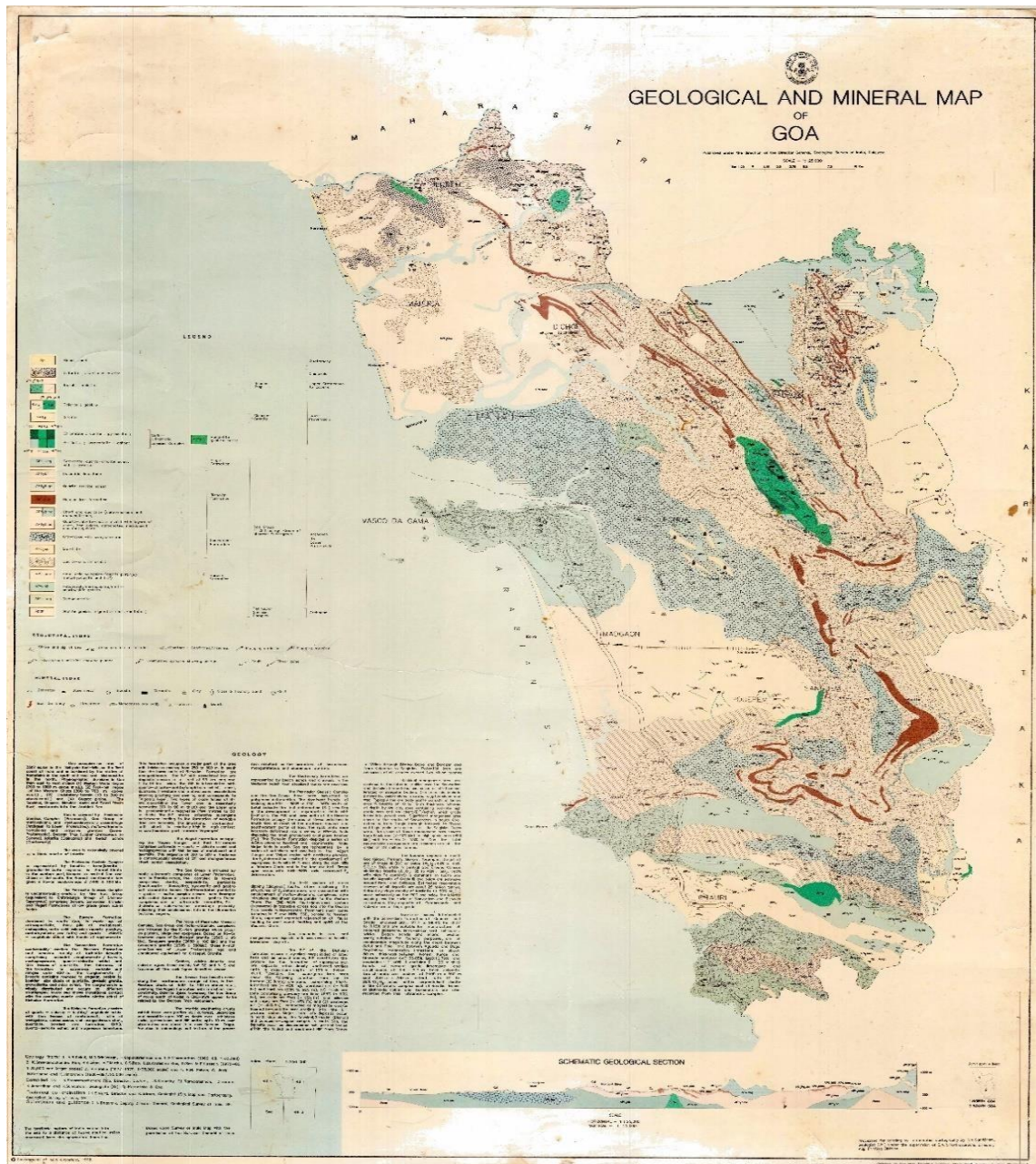
Basalt: The entire state of Goa except a narrow patch in the North Eastern corner is covered by the rocks of Dharwar Super group of Pre-Cambrian age. Wide outcrops of the rocks are in Pernem, Sattari, Salcete, Sanguem and Quepem talukas. These rocks are used in concrete works, as a road metal and Railway ballast after crushing to required size.

Laterite: Nearly two third of the area of Goa is covered by a mantle of laterite ranging in thickness from a couple of meters to over 25 mts. The laterite in Goa State is used in construction as laterite boulders and laterite stones.

Sand: Sand is available mainly in three forms in Goa. They are Ordinary sand, Sillica sand & Beach sand. Sand is collected mainly from the river Mandovi, Zuari, Terekhol, Chapora & its tributaries.

¹ Source: Website of Directorate of Mines and Geology, Goa

All minerals endowed in the State along with their geographic distribution is shown in the map annexed below:



4.2 Strategic importance of minerals for the State

Mining has been an important part of Goa’s economy, contributing to the development and industrialisation of the State, while also being a foreign exchange earner for the country. All the major minerals extracted-iron, manganese and bauxite-are of great economic importance. Besides, minor minerals extracted in the State, such as Basalt, Laterite stones and rubbles, Murrum etc., are in demand as construction material. Being a labour-intensive industry, mining has huge employment potential.

The mining belt of Goa covers an area 700 sq. km approximately and is mostly concentrated in four talukas. Infrastructure wise, Goa has a comparative advantage over other exporting regions in the country as it is endowed with a deep seaport and inland waterways that crisscross

the territory, facilitating barge transport. Total tax and non-tax receipts and mining receipts of the State for the five-year period 2016-17 to 2020-21 was as given below.

Mining receipts of the State for last five years up to 2020-21 (in ₹ crore)

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Tax and Non-tax receipts	6973	7764	7745	7437	7053
Mining receipts	348	333	34	9	168
Percentage of mining receipt to total tax and non-tax receipts	4.99	4.29	0.44	0.12	2.38

Source: State Finance Accounts

Due to the curbs (September 2012 and February 2018) imposed by the Supreme Court on mining in the State, the mining receipts to the Government had drastically fallen in the last three years.

4.3 Mining process in the State

Major Minerals:

The grant of lease for mining of major minerals is governed by Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act), Mineral Concession Rules (MCR), 1960 and Mineral Conservation and Development Rules, 1988.

The Government of India (GoI), Indian Bureau of Mines (IBM) approves the mining plan and its modifications and is responsible for ensuring that all mining operations are carried out in accordance with the mining plan. Further, Environmental Clearance (EC) is mandatory from the GoI, Ministry of Environment, Forest and Climate Change (MoEF&CC) which sets EC limits for each mining lease. Government of Goa (GoG), Directorate of Mines and Geology (DMG) is responsible for grant of reconnaissance permits, prospecting licenses or mining leases.

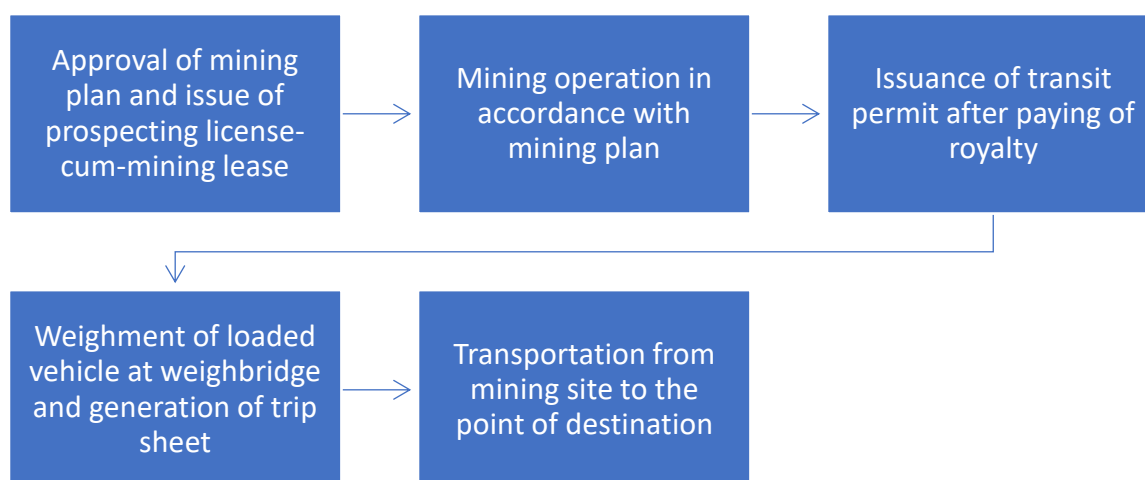
The DMG grants a prospecting licence-cum-mining lease to an applicant selected in accordance with the procedure laid down in the Act. The holder of a prospecting licence-cum-mining lease, who completes the prospecting operation and establishes the existence of mineral contents in the area is granted mining lease for such area. The mining operation is to be undertaken in accordance with the mining plan approved by the IBM and the EC issued by the MoEF&CC. The lessees are liable for payment of Royalty² on the iron ore extracted in terms of Schedule II of the MMDR Act 1957 on *ad valorem* basis. Royalty is payable on the first of every month and any delay for payment beyond a period of 60 days entails the lease holders to pay a simple interest at the rate of 24 per cent p.a.

The payment of royalty and physical transportation of ore from the mining area has been digitized thorough the DMG's Bhumija Ore Management (BOM) System. The lessee generates online challan for royalty payment which is approved by the DMG after due verification of

² Rule 45 (5) and 52 of MCDR, 1988 requires the lessee to submit the self-assessed monthly/annual returns for quantity of ore extracted.

tonnage and details with IBM. The challan amount is paid into the treasury bank and physical copies of challan submitted to DMG.

After payment of royalty, the lessee applies for Transit Permit (TP) online in BOM system and approval is granted by the DMG. The TP number is fed into the BOM system at the mining site when the loaded truck is weighed. The system generates trip sheets when each loaded truck passes through the weigh bridge. The transportation from the mining site to the point of destination (jetty) is monitored by the DMG electronically³. Once the truck reaches the jetty, the same must pass through the weigh bridge before unloading the mineral ore. The trip sheets get cancelled once the mineral ore is unloaded. The process is shown through the block diagram:



Minor Minerals:

Under the MMDR Act, 1957 the State Government is empowered to make Rules to regulate the grant of mining lease in respect of minor minerals. Accordingly, the Goa Minor Mineral Concession Rules (GMMCR), 1985 was framed.

Application for quarrying lease for minor minerals is received, processed and an order of grant is issued by the DMG after due codal verification and deposit of required amount into the Government treasury by the party.

Thereafter, a lease deed is executed by the Director with the lessee along with the certified copy of quarrying plan annexed with the deed. After execution of the lease deed, the DMG issues TP for transportation of minerals. The lessees interested in obtaining the TPs pay the royalty in advance on the minor minerals they intend to extract and an application is made to the Department. The lessee generates online challan for royalty payment and transit pass for transportation of mineral is issued by the DMG.

³ The carrier/trucks are mandatorily to be registered with the DMG and fitted with GPS device as stipulated under the Goa (prevention of Illegal Mining, Storage and Transportation of Minerals) Rules 2013.

In respect of extractions of minor minerals by the contractors of user departments like, Public Works Department, quantity of minerals extracted is measured by the user department at the construction site and royalty assessed at the notified rate and deducted from the payments to the contractors. Thereafter the user department remits the royalty collected from the contractors to the account of State Government.

4.4 Contribution of mineral resources in the revenues of the State

At its peak in 2010-11⁴ mining contributed around 18 per cent of State's Revenue. However, since the suspension of mining operations in September 2012 and the Supreme Court's quashing (February 2018) of renewal of 88 mining leases, there has been a sharp decline in the revenue from mining. The contribution of mining to the State total revenue receipts and the percentage of mining in Goa's Gross State Domestic Product (GSDP) during the three-year period prior to complete ban of mining operation by Hon'ble Supreme Court from 2015-16 to 2017-18 were as given below.

Year	2015-16	2016-17	2017-18
Contribution of mining in the state revenue	2.54%	3.64%	3.01%
Contribution of mining in Goa's Gross State Domestic Product (GSDP)	0.57%	1.96%	1.46%

Source: State Finance Accounts of Goa & Economic Survey 2012-13, 2020-21 & 2021-22 of Goa

4.5 Short-listing of resources for the study

Based on the short-listing of five minerals i.e., Iron Ore, Bauxite and Manganese (Major Minerals) and Basalt and Laterite (Minor minerals) by the DMG, they have been included in the NRA Asset Accounts for the year 2020-21. The DMG plans to include one more minor mineral viz., Dolomite in the asset accounts from the year 2021-22.

⁴ Source: State Finance Account of Goa.

CHAPTER 5

ASSET ACCOUNTS OF MINERAL AND ENERGY RESOURCES OF THE STATE OF GOA

5.1.1 Scope

This report relates to the Asset Accounts for the year 2020-21. The resources selected include three Major Minerals i.e., Iron Ore, Bauxite and Manganese and two Minor Minerals i.e., Basalt and Laterite. These are regulated by the DMG, Government of Goa. The report also includes the details of Renewable energy purchased by Electricity Department of Goa as per targets fixed by Joint Electricity Regulatory Commission (JERC).

5.1.2 Objectives

The Asset Accounts of the mineral and energy resources have been prepared with the following objectives:

- For better monitoring of resource extractions, usage, contain illegal mining and revenue optimization in the interest of the State.
- To assist the country/State in attaining the international commitment on becoming SEEA framework compliant and for effectively mapping the SDG indicators.
- To assist the policy makers with comprehensive data-sets on availability, usage and sustainability of mineral for evidence based decision making.
- To provide inputs for monitoring the progress towards national commitment made at the COP 26 on reduction in carbon emission and increase in generation and usage of renewable energy resources.

5.1.3 Methodology of data collection and compilation of physical flows

5.1.3.1 Data collection methodology

A. Data collected from Directorate of Mines and Geology

Data/information relating to mining (number of leases, monthly/annual returns from lessees, royalty received on minerals, etc.,) were collected from DMG through requisitions. Limited verification of the production figures furnished was carried out. Data/information provided by the DMG in respect of royalty received for 2020-21 on major and minor minerals was also verified in a limited way by comparing the data pertaining to a combination of challan numbers and amount with similar data provided by the DoA. As per Rule 45 of Mineral Conservation and Development Rules 2017 (MCDR 2017) in respect of lessees for major minerals and Goa Minor Minerals Concession Rules 1985 (GMMCR 1985), in respect of lessees for minor minerals, lessees were required to submit Monthly/Annual returns to DMG. Production figures furnished were verified with these returns.

As the Apex Court quashed (07/02/2018) all the 88 mining leases of major minerals that had been renewed by the State Government, operations of these mines came to a halt from 15/03/2018 and there was no extraction/production of major minerals thereafter in the State. DMG provided copies of available monthly and annual returns for three years (2015-16, 2016-17 and 2017-18) filed by 42 lessees of major minerals of Iron Ore, Bauxite and Manganese. There were no valid leases for major minerals during the period from 2018-19 to 2020-21.

Similarly, available monthly and annual returns filed by lessees of minor minerals during the period 2015-16 to 2020-21 were also scrutinized

B. Data pertaining to Royalty Received on Major and Minor Minerals

The data of royalty received on major and minor minerals and of challans generated for remittance of royalty, fees, etc., to treasury were furnished by the DMG. 100 per cent comparison of a combination of challan number and amount in the DMG's database with corresponding data of all receipts under the account Head-0853 Mining collected from Directorate of Accounts (DoA) was carried out. The DMG reconciled the differences between the above two data sources and confirmed the DoA's figures as final.

C. Opening balance of Major Minerals

As per the guidelines of GASAB, the IBM figures⁵ in respect of proved resources as on 01.04.2015 were adopted as base. In Goa, the mines were given as concessions during the Portuguese regime. Thereafter, upon implementation of Goa, Daman & Diu Mining Concessions (Abolition and Declaration as Mining Leases) Act, 1987, the existing mining concessions were converted into leases. Thus, the State Government never had the custody of mines. The State Government had never undertaken any assessment of the available ore (proved resources) and the quantity declared by the lessee as available reserve was adopted.

By adopting the opening balance as per IBM report as on 01.04.2015 and reported production figures as per available monthly returns submitted for the total 39 Iron Ore leases, 1 Bauxite and 2 Manganese for the period from 2015-16 to 2019-20, the closing balance as on 31.03.2020 or opening balance for 2020-21 was arrived at.

D. Data pertaining to Renewable Energy Resources

Table 6 of this report deals with data pertaining to renewable energy resources. The Goa Electricity Department (GED) was required to provide data pertaining to the sector wise requirement and corresponding purchases made by GED in line with targets set by the Joint Electricity Regulatory Commission. GED furnished the data on sales and projected requirements of power stating that the data was subject to finalisation of accounts. Limited verification of these data has been carried out.

5.1.4 Methodology of monetisation of physical flows

DMG did not have physical records of grade wise production or dispatch data. However, grade wise dispatch figures of major minerals (in table 3) have been compiled from trip sheet data in June 2022. DMG adopted rates of IBM in respect of major minerals and Goa Schedule of Rates in respect of minor minerals for the two-pronged valuation of physical flows, revenues and average market prices, as mentioned in the foot notes of table 3 of the Asset accounts. Analysis of royalty rates vis-à-vis the market prices to ensure there is no loss to State exchequer could not be carried out since the grade wise data of physical flow and time of removal of ore from mines was not available.

Further, due to limitations of data provided by DMG i.e., non-availability of information of advances paid, future differential payments made and actual date of movement of minerals for

⁵ As per IBM's National Mineral Inventory as on 01.04.2015

ascertaining the rate applicable as on that date, the correctness of rates and payment towards royalty or DMF could not be verified.

5.1.5 Dual stage validation/verification of data

The Asset Accounts for the year 2020-21 was forwarded (31 December 2021) to DMG for validation. After validation by the DMG, the accounts were verified with original source records i.e., monthly/annual returns, registers maintained as per MMDR 1957 and GMMCR 1985, etc. However, as DMG received some pending/missing returns subsequently, the figures in the Asset Accounts (Table 1, Table 2 and Table 3) were corrected and resubmitted (12 April 2022) and the same were verified.

5.1.6 Challenges and limitations

5.1.6.1 Due to lack of complete records, information on minor minerals regarding number of leases which were valid and functioning and the number of leases which had no production could not be ascertained.

5.1.6.2 Wherever returns were not filed by the lessees, the DMG treated such cases as leases without production.

5.1.6.3 As per clarification of DMG, the lessees were allowed to declare the percentage of lumps and fines in the ore. The DMG stated that as there was no price specified for ROM⁶ (extracted iron ore before processing), the lessees, declared the percentage of lumps and fines in ore and paid royalty based on their own assessment of quality of ore, as per norms calculated on IBM rate valid for declared category of iron ore. Challans were generated for payment accordingly at the DMG. The correctness of such declaration made by the lessees was not counterchecked by the DMG or any other certifying authority. Thus, the correctness of grade of ore declared could not be verified.

Grade wise production data has not been furnished till date (September 2022). The DMG need to put in a mechanism for drawing samples from the extractions for assessment of the quality of the ore and verify the correctness of the percentage of lumps and fines declared by the lessees in order to ensure that royalty remitted by lessees are at appropriate rate and there is no leakage of royalty revenue to the Government.

The correctness of IBM rates applied for computation of royalty and DMF paid by the lessees due to lack of data such as exact date of removal of ore, advances received in earlier years and differential payments made later could not be verified.

5.1.6.4 The office of IBM at Goa was requested to furnish copies of monthly/annual returns which were mandatorily required to be furnished by the lessees to IBM with a copy to the State Authority i.e., DMG. The IBM, however, did not respond to the request. Hence, the correctness of periodical reporting by lessees could not be counter-checked.

5.1.6.5 There was no system of maintaining authenticated registers for monitoring valid leases/lessee names for the year, lease validity period, register for receipt of counterfoil of transit passes, receipt of monthly/annual returns. Hence, AG's Office could not verify the correctness of the number of valid leases, ensure monitoring of submission of returns,

⁶ Run Of Mine

applicability of dead rent or misuse of transit passes for more than admissible quantity, etc. The DMG did not possess the stocks of both major and minor minerals.

5.2 Asset Accounts on Mineral & Energy Resources

5.2.1 Highlights

A brief description of the contents of the tabulated data as well as findings during the course of verification/ test check of data and records are given below.

5.2.2 Asset Accounts – the tables

The Asset Account comprises of six tables and contain the following data/ information.

- 1. Table 1:** This table indicates the opening stock (as on 01.04.2020), addition to stock, extraction and the closing stock (as on 31.03.2021) of environmental assets included in Asset Accounts 2020-21.
- 2. Table 2:** The table indicates physical flows and sustainability of resources for the Asset Accounts 2020-21.
- 3. Table 2A & 2B:** DMG informed that during 2020-21 no permits for extraction of sand or other riverine resources have been granted. Hence, these tables have not been included.
- 4. Table 3:** This table is to indicate the detailed grade wise production, dispatch and closing stock along with monetisation of physical flows. However, in case of Goa, grade-wise data was available only in case of dispatch (based on data as in electronic trip-sheets generated).
- 5. Table 4:** This table indicates analysis of extraction, production and dispatch of resources.
- 6. Table 5:** This table indicates the contribution to District Mineral Fund receivable and received during 2020-21.
- 7. Table 6:** This table indicates progress in generation and use of renewable energy resources.

Table 1

Basic asset accounts on Mineral & Non-Renewable Energy Resources

Particulars	Name of resources				
	Major Minerals			Minor minerals	
	Iron Ore (in MT)	Bauxite (in MT)	Manganese (in MT)	Basalt (in cu.m)	Laterite stone/ rubbles(in cu.m)
Opening stock of environmental asset (As on 01.04.2020)	26,37,89,863	117,63,497	11,90,866	41,98,717	2,24,000
Growth in stock				4,72,943	
Discoveries of new stock				Nil	
Upward reappraisals					
Reclassifications					
Total addition of stock				4,72,943	
Reduction of stock					
Extractions		Nil		2,99,013	Nil#
Normal loss of stock				Nil	
Catastrophic losses					
Downward reappraisals					
Reclassification					
Total reduction in stock				2,99,013	
Revenue receivable (₹ crore) as in Table 3	5,832.39	186.75	19.13	27.29	1.48
Valuation/Revaluation of the stock * (Actual market price) as in Table 3 (₹ in crore)	38,882.63	746.98	382.51	393.54	38.73
Closing stock of environmental assets(As on 31.03.2021)	26,37,89,863	117,63,497	11,90,866	43,72,646	2,24,000

(Source: As per the data received from Directorate of Mines and Geology)

NOTE :

- i) Other extraction (559.3 tonnes of iron ore and 18216 cum of laterite) represents illegal mining detected by the Directorate, which has not been deducted from opening stock of proved reserves for arriving at the closing stock as total reserves at the location of detection of illegal mining has not been assessed for inclusion in opening stock.
- ii) The quantity of opening stock is of 15 quarrying plans approved up to 01.04.2021. However, a total of 24 quarrying plans are approved so far as on date and the data is under compilation for asset accounts for the year 2021-2022.
- iii) As far as Sand Mining is concerned, the National Institute of Oceanography is undertaking studies through Environment Department to demarcate the sand mining zones for reserve estimation. So far, no sand permits are granted for sand extraction in the State of Goa.

* The valuation is as per average sale value published by IBM for March 2021 for major minerals and the average market price determined based on as per Goa schedule of rate-2019 for minor minerals.

Slight variation with figure at table 2 is due to conversion of metric tonnes to million tonnes (MT)

Table 2

Asset Accounts on physical flows of Mineral and Non- Renewable Energy Resources along with sustainability of resources

Classification	Grade wise sub-classification (may vary from stateto state)	Sub-Classification	Opening stock of proved reserves	Addition to stock*	Reduction in stock				Closing stock of proved reserves	Sustainability of resources in years ****
					Extracted by/for					
					Govt. Sector	Private Sector	Other Extractions ***	Total Extraction		
Major Minerals (in MT)	Data Not Provided	Iron ore	26,37,89,863	-	-	-	559.3	-	26,37,89,863	#
		Bauxite	1,17,63,497	-	-	-	-	-	1,17,63,497	#
		Manganese	11,90,866	-	-	-	-	-	11,90,866	#
Minor Minerals (in cu.m)		Basalt	41,98,717	4,72,943	2,02,820 ^{\$}		96,193 ^{\$}	2,99,013	43,72,647	14.62
		Laterite stones/Rubble	2,24,000	-	-	-	18,216	-	2,24,000	#

(Source: As per the data received from Directorate of Mines and Geology)

Notes :

- i) Opening stock of reserves has been worked out as per methodology mentioned in Chapter 6.3 of Final Templates for Asset accounts.
- ii) The break-up of total extractions based on use by government and private sector was not maintained by DMG as the entire use was by private sector and there were no Government users.
- iii) Due to mining ban by Hon'ble Supreme Court, no major minerals were extracted during 2020-21.
- iv) Other extraction (559.3 tonnes of iron ore and 18216 cum of laterite) represents illegal mining detected by the Directorate, which has not been deducted from opening stock of proved reserves for arriving at the closing stock as total reserves at the location of detection of illegal mining has not been assessed for inclusion in opening stock.
- v) Fossil fuels (Petroleum, coal, natural gas) is not available in State of Goa as per Energy Statistics 2021.
- vi) Other resources, if any, is NIL in State of Goa during 2020-21.
- # Not calculated as there was no extraction during 2020-21
- \$ Total production of basalt during 2020-21 was 299013.22 cubic meters. Of this, 202820.48 cum was from the quarry leases wherein the quarrying plans were approved. The remainder production was from those quarry leases wherein the quarry plan were not approved as on date/was not approved during 2020-21.

Table 3
Subsidiary Asset Accounts linking detailed physical flows in respect of Minerals and Non-Renewable Energy Resources with the valuation of resources

Particulars	Grade-wise sub-classification (may vary from state to state)	Name of Minerals (as per priorities of State Govt)	Physical unit (in tonnes/cum) (Major Minerals in Metric Tonnes & Minor Minerals in cubic meter)	Valuation of resources (on stock for						
				Revenue receivable (in crore) showing Govt./Private and other sector	Total revenue receivable	Average Market value (as ascertained from the IBM or state Statistical Department)				
Opening stock/availability of resources at the beginning of the year		Iron Ore	26,37,89,863 (MT)	3454.33 ^{\$1}	3,727.25	23,028.86 ^{\$5}				
		Bauxite	1,17,63,497 (MT)	199.39 ^{\$2}		797.57 ^{\$6}				
		Manganese	11,90,866 (MT)	45.85 ^{\$13}		916.97 ^{\$14}				
		Basalt	41,98,717 (cu.m)	26.20 ^{\$3}		377.88 ^{\$7}				
		Laterite	2,24,000 (cu.m)	1.48 ^{\$4}		38.7 ^{\$12}				
Addition during the year										
Growth in Stock		Iron Ore	Nil	NA						
		Bauxite								
		Manganese								
		Basalt					4,72,943 (cu.m)	-	-	-
		Laterite								
Discoveries of new Stock		Nil	NA							
Reclassification										
Total Addition:		4,72,943 (cu.m)	-	-	-					
Actual reductions during the year:										
Extraction as reported by the State Government Department of Geology & Mining, (on recovery of royalty, cess, fees, NPV etc.) #		Iron Ore	Nil	NA						
		Bauxite								
		Manganese								
		Basalt					2,99,013 (cu.m)	1.87 ^{\$3}	1.87	26.91 ^{\$7}
		Laterite					Nil	NA		
Revenue related to exploitation of resources out of total revenue included in Statement 14 of the State Finance Account (Refer Note iii)				103.90						
Normal reduction in stock:-			Nil							

Catastrophic losses including natural and manmade disasters:-						
Downward reappraisals:-						
Reclassifications:-						
Production Loss		Iron Ore	Nil			
		Manganese	Nil			
		Bauxite	Nil			
		Basalt	Nil			
		Laterite Stones/Rubbles	Nil			
Final production		Iron Ore	Nil			
		Manganese	Nil			
		Bauxite	Nil			
		Basalt	299013.22			
		Laterite Stones/Rubbles	Nil			
Exports @@		Iron Ore	5840379.70			
	Below 55%	Total Rom	1631267.07	21.36	101.81	142.41
	55% to Below 58%	Total Rom	76123.47	2.57		17.10
	Below 55%	Total Lumps	508450.90	6.66		44.39
	55% to Below 58%	Total Lumps	404009.15	13.61		90.74
	Below 55%	Total Fines	1235013.73	22.79		151.91
	55% to Below 58%	Total Fines	1128943.05	22.59		150.60
	55% to Below 58%	Total Tailings (Fines)	640835.66	11.82		78.82
	Below 55%	Concentrates	15566.94	0.41		2.76
		Bauxite Ore	Nil			
	Manganese	Nil				
Dispatches #		Iron Ore	4917975.34			
	Below 55%	Total Rom	3621832.10	47.42	74.29	316.19
	55% to Below 58%	Total Rom	227919.90	7.68		51.19
	58% to Below 60%	Total Rom	41468.12	1.57		10.49
	Below 55%	Total Lumps	420604.11	5.51		36.72
	55% to Below 58%	Total Lumps	112381.18	3.79		25.24
	58% to Below 60%	Total Lumps	1222.00	0.05		0.30
	Below 55%	Total Fines	228099.98	4.21		28.06
	55% to Below 58%	Total Fines	132372.57	2.65		17.66
	58% to Below 60%	Total Fines	105.57	0.003		0.02
60% to Below 62%	Total Fines	22377.85	0.57	3.79		

	Below 55%	Total Tailings (Fines)	93423.00	0.41		2.75
	Below 55%	Total Concentrates	16168.96	0.43		2.87
		Bauxite Ore	11986.42			
	Below 40%	Total Bauxite (Fresh)	11986.42	0.20	0.20	0.81
Reduction due to mining activities not approved by the Department \$			Nil		NA	
Total reduction:		Basalt	2,99,013.22			
Extractions						
Extractions permitted during the year		Iron Ore	No permitted quantities	0	Nil	Nil
		Bauxite		0	Nil	Nil
		Manganese		0	Nil	Nil
		Basalt	12,84,424 (cum)	8.01	8.01	115.60
		Laterite	2,880 (cum)	0.02	0.02	0.50
Closing stock		Iron Ore	26,37,89,863 (MT)	5,832.39 ^{\$8}	6,067	3,88,82.63 ^{\$10}
		Bauxite	1,17,63,497 (MT)	186.75 ^{\$9}		746.98 ^{\$11}
		Manganese	11,90,866 (MT)	19.13 ^{\$15}		382.51 ^{\$16}
		Basalt	43,72,647 (cum)	27.29 ^{\$3}		393.54 ^{\$7}
		Laterite	2,24,000 (cum)	1.48 ^{\$4}		38.73 ^{\$12}

(Source: As per the data received from Directorate of Mines and Geology)

Notes:

- i) There was no mining of iron and manganese ore in Goa for the period 2020-21 due to ban by the Hon'ble Supreme Court. Also, there was no mining of bauxite for 2020-21 as the period of mining lease producing bauxite expired. Thus, there were no permitted quantities for iron, manganese and bauxite. Average sale price of major minerals for Goa is not available (except for manganese for March 2020) and hence all India IBM rate was used for arriving at market value/revenue receivables. Average sale price of minor minerals was also not maintained by DMG and hence Goa Schedule of Rate for the minor mineral was used for arriving at market value.
 - ii) Royalty collected by DMG in respect of minor minerals extracted as per monthly returns of lessees is shown under Total Revenue implications. This figure will differ from figures as per State Finance Accounts as latter includes remittances made by Village Panchayats, PWD etc., on account of royalty on minerals used in Government construction work also.
 - iii) The tonnages (major minerals) on which the royalties are paid are not maintained by the Directorate. The Directorate is in the process to initiate a system to capture the tonnages.
 - iv) Royalty amounting to ₹ 80,500/- has been collected for transport of manganese ore and ₹ 3,47,880/- for murrum ore excluded from asset accounts as opening stock was not available for murrum.
 - v) The permitted quantity of basalt for the year 2020-21 is obtained from the production limit as specified in the Environmental Clearances. Wherever the production limit is specified in metric tonnes, the same is converted into cubic meters by considering a specific gravity of 2.8 for the rock as the Directorate (DMG) charges royalty on cubic meters as per the schedule for royalty rates for minor minerals.
 - vi) The permitted quantity of laterite chiras for the year 2020-21 is obtained from the production limit as specified in the Environmental Clearance.
 - vii) The details of production of processed ore and its type and grade for the years 2015-16 to 2020-21 are not available.
 - viii) Basalt and Laterite stones/rubbles are not exported.
 - ix) Other extraction (559.3 tonnes of iron ore and 18216 cum of laterite) represents illegal mining detected by the Directorate, which has not been deducted from opening stock of proved reserves for arriving at the closing stock as total reserves at the location of detection of illegal mining has not been assessed for inclusion in opening stock.
- * The breakup of minerals used in Government and Private works is not applicable as the entire quantity pertains to private sector.

- \$1. Royalty Calculated based on all India IBM rate for Iron ore lumps below 55% for March 2020 (263789863.39 MT x 873/MT x 15 % Royalty)
- \$2. Royalty Calculated based on all India IBM rate for Bauxite-Cement for March 2020 (11763497.00 MT x 678/MT x 25% Royalty)
- \$3. Royalty Calculated based on Royalty rate as per gazette notification no.04/59/2015/Minor/Mines/3657 dated 10.12.2015 for Basalt (₹ 62.40/cum)
- \$4. Royalty Calculated based on Royalty rate as per gazette notification no.04/59/2015/Minor/Mines/3657 dated 10.12.2015 for laterite chiras (₹66/cum)
- \$5. Average market price was determined based on as per all India IBM rate for March 2020 for Iron Ore Lumps below 55% (263789863.39 MT x ₹ 873/MT)
- \$6. Average market price was determined based on as per all India IBM rate for March 2020 for Bauxite-Cement (11763497.00 MT x ₹ 678/MT)
- \$7. Average market price was determined based on as per Goa schedule of rate-2019 for Basalt @ ₹ 900/cum
- \$8. Royalty Calculated based on all India IBM rate for Iron ore lumps below 55% for March 2021 (263789863.39 MT x ₹ 1474/MT x 15 % Royalty)
- \$9. Royalty Calculated based on all India IBM rate for Bauxite-Cement for March 2021(11763497.00(MT)x ₹ 635/MTx25%Royalty)
- \$10. Average market price was determined based on as per all India IBM rate for March 2021 for Iron Ore Lumps below 55% (263789863.39 MT x ₹ 1474/MT)
- \$11. Average market price was determined based on as per all India IBM rate for March 2021 for Bauxite-Cement (11763497.00(MT)x ₹ 635/MT)
- \$12. Average market price was determined based on as per Goa schedule of rate -2019 for Laterite chiras (block) of dimensions 30cm x 23cm x 16cm (224000 cum x ₹ 1729/cum) @ ₹ 1900/- per 100 chiras.
- \$13. Royalty Calculated based on IBM rate for Goa for Manganese ore of grade 25% to below 35% Mn for March 2020 (1190866 MT x 7700/MT x 5 % Royalty)
- \$14. Average market price was determined based on IBM rate for Goa for March 2020 for Manganese Ore of grade 25% to below 35% Mn (1190866 MT x ₹ 7700/MT)
- \$15. Royalty Calculated based on all India IBM rate for Manganese ore below 25% for March 2021 (1190866 MT x ₹ 3212/MT x 5 % Royalty)
- \$16. Average market price was determined based on as per all India IBM rate for March 2021 for Manganese Ore below 25% Mn (1190866 MT x ₹ 3212/MT)
- x) For dispatches and exports of iron ore, the revenue receivable is calculated based on all India IBM rate for Iron ore as follows:
- | | | |
|--------------------------------------|-----------|--|
| ➤ for Iron ore lumps | below 55% | for March 2020 (tonnage x ₹ 873 x 15%), |
| ➤ for Iron ore lumps Fe | 55%-58% | for March 2020 (tonnage x ₹ 2246 x 15%), |
| ➤ for Iron ore lumps Fe | 58% -60% | for March 2020 (tonnage x ₹ 2530 x 15%), |
| ➤ for Iron ore fines and tailings | below 55% | for March 2020 (tonnage x ₹ 1230 x 15%), |
| ➤ for Iron ore fines and tailings Fe | 55%-58% | for March 2020 (tonnage x ₹ 1334 x 15%), |
| ➤ for Iron ore fines Fe | 58% -60% | for March 2020 (tonnage x ₹ 1697 x 15%), |
| ➤ for Iron ore concentrates | | for March 2020 (tonnage x ₹ 1774 x 15%) |
- xi) For dispatches and exports of iron ore, the average market value is calculated based on all India IBM rate for Iron ore
- | | | |
|--------------------------------------|-----------|------------------------------------|
| ➤ lumps | below 55% | for March 2020 (tonnage x ₹ 873), |
| ➤ for Iron ore lumps Fe | 55%-58% | for March 2020 (tonnage x ₹ 2246), |
| ➤ for Iron ore lumps Fe | 58% -60% | for March 2020 (tonnage x ₹ 2530), |
| ➤ for Iron ore fines and tailings | below 55% | for March 2020 (tonnage x ₹ 1230), |
| ➤ for Iron ore fines and tailings Fe | 55%-58% | for March 2020 (tonnage x ₹ 1334), |
| ➤ for Iron ore fines Fe | 58% -60% | for March 2020 (tonnage x ₹ 1697), |
| ➤ for Iron ore concentrates | | for March 2020 (tonnage x ₹ 1774). |
- For dispatches of bauxite, the revenue receivable is calculated based on all India IBM rate for bauxite for March 2020 (tonnage x ₹ 678 x 25%)
- For dispatches of bauxite, the average market value is calculated based on all India IBM rate for bauxite for March 2020 (tonnage x ₹ 678)
- @@ DMG compiled this information from electronic trip-sheet data. Cross verification of the export data with corresponding data of Customs is pending.
- # As per the data mentioned in Table 4A.

Table 3A

Table showing information on illegal mining
(Please show case-wise details)

Sl No.	Name of the district	Authority which detected the offence (deptt/Police/Enforcement/others)	Detection of illegal mining by the department authorities on which challans issued and offence report registered				
			Name of minerals with grades (if available)	Physical quantity/ volume	Revenue involved (₹)	Amount recovered (₹)	Provisions under which compounding done/remarks
1	North Goa	Police Department	Sand	160 M3	208000/-	-	Mapusa Police has registered an offence and the case is under investigation
2		Directorate of Mines & Geology		125 M3	Under process	-	Complaint registered before Mapusa Police Station. Sand found was disposed off by putting back into the Chapora river as per the direction of Hon`ble High Court in PIL-WP-14/2018
3		Police Department	Laterite stones	1660 M3	2420838/-	-	Valpoi Police station has registered an offence and the case is under investigation.
4		Directorate of Mines & Geology/Mamlatdar of Bicholim Taluka	Sand	Approximately 1500 M3	-	-	Complaint filed before Bicholim Police Station and the investigation is under process
5		Mamlatdar of Bicholim Taluka	Laterite stones	12216 M3	Under Process	-	Mamlatdar of Bicholim filed the complaint before the Bicholim Police Station and the case is under investigation.
6		Mamlatdar/ Police Department/ Directorate of Mines & Geology		20030 M3	29208938/-	-	Complaint filed by Mamlatdar before Valpoi Police Station and the investigation is in progress
7		Police Department	Iron Ore	559.30 Tonnes	6,95,209/-	-	Police complaint registered
8	South Goa	Directorate of Mines & Geology	Laterite stones	790 numbers	Under Process	-	-
9				6,000 M3	10326082/-	-	Police complaint filed and the case is under investigation
10				-	-	-	

Table 4
Analysis of extraction, production and dispatch of resources

Name of resource(s) with detailed grades	Name of Mineral	Opening stock at the beginning of the year		Extractions during the year	Production during the year	Production loss/variatio ns between extraction and production		Dispatch during the year @@	Closing stock at the end of the year		
		Raw/ ores	Finished products			In volume	In per cent		Raw/ores	Finished products	
		(Major Minerals in Metric Tonnes & Minor Minerals in cubic meter)							(Major Minerals in Metric Tonnes & Minor Minerals in cubic meter)		
Grade-wise Sub-classification not provided	Iron Ore	26,37,89,863	Not available	Nil	NA	NA	NA	49,17,975.34	26,37,89,863	Not available	
	Manganese	11,90,866						Nil	11,90,866		
	Bauxite	117,63,497						2,99,013	11,986.42		117,63,497
	Basalt	41,98,717							Not Available		43,72,646 *
	Laterite Stones/	2,24,000						Nil	2,24,000		

(Source: As per the data received from Directorate of Mines and Geology)

Notes:

- i) The opening stock and closing stock of raw/ore has been taken from Table 1
 - ii) Dispatch during the year of Iron ore and Bauxite was from the production pertaining to previous years as there was no production during 2020-21, hence the closing stock remains same.
- @@ Dispatches from mine site during the year 2020-21 (Information compiled by DMG from trip sheet data)
- NA Not Applicable.
- * This was an addition of 4,72,943 cum.

Table 4A
Details of dispatch for the year 2020-21

Particulars	Mineral (in tonnes)	Grade-wise sub-classification	Physical unit (in tonnes/cum) showing Govt., Private and other sector*	Valuation of resources		
				Revenue receivable (in crore) showing Govt., Private and other sector	Total revenue receivable	Average Market value (as ascertained from the IBM or State Statistical Department)
				(₹ in crore)		
Dispatches of finished products	Iron ore:4917975.34	Total Rom Below 55%	3621832.10	47.42	74.29	316.19
		Total Rom 55% to Below 58%	227919.90	7.68		51.19
		Total Rom 58% to Below 60%	41468.12	1.57		10.49
		Total Lumps Below 55%	420604.11	5.51		36.72
		Total Lumps 55% to Below 58%	112381.18	3.79		25.24
		Total Lumps 58% to Below 60%	1222.00	0.05		0.30
		Total Fines Below 55%	228099.98	4.21		28.06
		Total Fines 55% to Below 58%	132372.57	2.65		17.66
		Total Fines 58% to Below 60%	105.57	0.003		0.02
		Total Fines 60% to Below 62%	22377.85	0.57		3.79
		Total Tailings (Fines)s Below 55%	93423.00	0.41		2.75
		Total Concentrates Below 55%	16168.96	0.43		2.87
	Bauxite ore: 11986.42	Total Bauxite (Fresh) Below 40%	11986.42	0.20	0.20	0.81
	Manganese ore: NIL	-	-	-	-	-
Basalt: Not Available	-	-	-	-	-	
Laterite Stones/Rubbles: Not Available	-	-	-	-	-	

1. Revenue receivable on iron ore is calculated based on all India IBM rate for Iron ore lumps below 55% for March 2020 (tonnage ₹873x15%), for Iron ore lumps Fe 55%- 58% for March 2020 (tonnagex₹2246x15%), for Iron ore lumps Fe 58%-60% for March (tonnage ₹2530 x15%), for Iron ore fines and tailings below 55% for March 2020(tonnage ₹1230 x15%), for Iron ore fines and tailings Fe 55%-58% for March 2020 (tonnage ₹1334 x15%), for Iron fines Fe 58%-60% for March 2020 (tonnage ₹1697 x15%), for Iron ore fines Fe 60%-62% for March 2020 (tonnage ₹1697 x15%) for Iron ore concentrates for March 2020 (tonnage ₹1774 x15%).

2. Average market value of iron ore is calculated based on all India IBM rate for Iron ore lumps below 55% for March 2020 (tonnage ₹873), for Iron ore lumps Fe 55%- 58% for March 2020 (tonnage ₹2246), for Iron ore lumps Fe 58%-60% for March (tonnage ₹2530), for Iron ore fines and tailings below 55% for March 2020 (tonnage ₹1230), for Iron ore fines and tailings Fe 55%-58% for March 2020 (tonnage ₹1334), for Iron fines Fe 58%-60% for March 2020 (tonnage ₹1697), for Iron ore fines Fe 60%-62% for March 2020 (tonnage ₹1697) for Iron ore concentrates for March 2020 (tonnage ₹1774).
3. Revenue receivable on bauxite is calculated based on all India IBM rate for March 2020 (tonnage ₹678x25%)
4. Average market value on bauxite is calculated based on all India IBM rate for March 2020 (tonnage ₹678)

Table 5
Tables showing analysis of District Mineral Foundation

Sl No.	Name of Minerals/District	Volume of Mineral on which DMF was realisable (Quantity in Tonnes)	Royalty Paid ₹	DMF # realisable (A) ₹	DMF realised (B) ₹	Variations, if any ₹
South Goa/Bauxite						
1	4/NSD/BAUX/68	2000	0	0	300000	300000
South Goa/ Manganese Ore						
2	17/49		80500	24150	0	-24150
North Goa/Iron Ore						
3	04/49	246018	46694128	14008238.4	14008241	2.60
4	6/55	964	122805	36841.5	36842	0.50
5	04/AMLG(ML-3)SRL/17-5/54,20/54,21/54	30500	3644400	1093320	1093320	0.00
6	06/AMLG(ML-2)CCPL/17-31/53,41/56	664228	89608894	26882668.2	26882671	2.80
7	07/AMLG(ML-2)CCPL/17-13/49, 5/49	51105	7514999	2254499.7	2254501	1.30
8	08/AMLG(ML-5)SMCL/17-11-12-13-14-15/41	572649	80516295	24154888.5	24154890	1.50
9	1/AMLG(ML-4)VMSB/17-83/52,19/58,29/54,62B/52	378204	47132006	14139601.8	14139604	2.20
10	16/55	67450	7990883	2397264.9	2397265	0.10
11	28/51	26772	3470163	1041048.9	1041050	1.10
12	45/52	62933	7776466	2332939.8	2332940	0.20
13	55/51	202927	23182606	6954781.8	7307281	352499.20
14	70/51	103866	11319529	3395858.7	3395860	1.30
South Goa/Iron Ore						
15	02/AMLG(ML-2)NSN/17-(40/51,12/52)	130024	16621957	4986587.1	4986588	0.90
16	03/AMLG(ML-3)VED/17-126/53,70/52,69/51	294486	36749091	11024727.3	11024727	-0.30
17	06/61	56168	11302518	3390755.4	3390756	0.60
18	08/41	114344	21560106	6468031.8	6468033.4	1.60
19	09/AMLG(ML-2)VVCL/17-16/51,40/50	179149	30362362	9108708.6	9108708.6	0.00
20	10/51	57638	8568062	2570418.6	2570420	1.40
21	10/AMLG(ML-3)CCPL/17-22/50,38/51,12/57	57471	8459324	2537797.2	2537800	2.80
22	11/AMLG(ML-2)SRL/17-3/51,40/54	37770	8428228	2528468.4	2528491.85	23.45
23	14/52	5673	1816778	545033.4	545033	-0.40
24	143/53	144933	21897778	6569333.4	6569335	1.60
25	34/55	121950	17844316	5353294.8	5353289	-5.80

26	50/53	79988	15777569	4733270.7	4733271	0.30
27	50/58	10000	1463714	439114.2	439115	0.80
28	59/51	140272	17731102	5319330.6	5319332	1.40
29	61/53	144337	20340143	6102042.9	6102044	1.10
30	62/51	700000	101702326	30510697.8	30530932	20234.20
31	76/52	65479	11209550	3362865	3362866	1.00
32	88/52	107283	19199041	5759712.3	5759714	1.70
33	98/52	245255	34333499	10300049.7	10300051	1.30
Grand Total		5101836	734421138	220326341.4	220974971.9	648630.45

(Source: As per the data received from Directorate of Mines and Geology)

DMF leviable @30 percent of royalty amount

Table 6
Progress in generation and use of renewable energy resources

Sector	Energy requirement by sector during the year (in MUs)	Total energy requirement in the state (in MUs)	Generation/additional generation of the energy during the year – (in MUs)					Percentage share of non-renewable and renewable energy resources vis-à-vis total requirement		Energy surplus or deficit including total MUs of deficit/surplus power	
			Non-renewable (N/R) energy/ Fossil fuel sources	Renewable energy resources				Total	N/R		Renewable energy
				Solar	Wind	Hydel	Others including Bio mass, waste to energy, Geothermal etc.				
Industries	1789067	3575.56	*4213.06	151.18	362.54	@513.72	117.82	14.36	Surplus 1151.13		
Domestic	1268960										
Agriculture	31250										
Commercial	430171										
Traction	0										
Railways	0										
Others	56202										

(Source: As per the data received from Goa Electricity Department subject to finalization of accounts)

* Includes 4063.53 MU purchased from outside State. Thus, non-renewable energy generated within States is 149.53 MU.

@ Renewable energy generated within State is calculated at 13.28 MU (513.72-(138.53 MU +369.91 MU) Purchased from outside the State. Hence, percentage generation of renewable energy within the State (13.28 MU) vis-à-vis total requirement (3575.56 MU) works out to 0.03 percentage only.

5.2.3 Findings of the study

5.2.3.1 An attempt was made to match/check the correctness of the data furnished with original records. Original records maintained at DMG such as register of issuance of transit passes, register of applications received for grant/renewal of quarrying leases and lease deeds were examined. The following was observed.

I. Opening balance of Minor Minerals

The opening balance as on 01.04.2020 of Minor Minerals was as provided by the DMG. The DMG had not carried out any assessment of the quantity of minerals available at site. It was observed that the quantity proposed by the applicant in their quarrying plan was considered as the proved resource for the current plan/area/lease validity by DMG. DMG stated that there is no statutory requirement of carrying out provisional assessment of minor mineral at site by the State Government. It was also stated that such an assessment of minor minerals entails huge expenditure in terms of exploratory studies to be carried out by the competent agency as the major part of the State is having minor mineral which is largely used as building material.

II. Non-availability of details of opening balance of minerals with DMG

DMG adopted the opening balance figures of iron ore and bauxite as per the data published in the National Mineral Inventory (NMI) by IBM. The IBM worked out the balances of minerals by reducing the subsequent extractions reported by lessees from the previous balances reported of the mineral in the NMI. The details of the mining leases from which the opening stocks of proved reserves of Iron ore and bauxite is arrived at by the IBM, is, however, not available with the DMG.

III. Register maintained for issuance of transit passes for minor minerals

a. The register was neither signed by the person maintaining it nor was it checked and authenticated by any competent higher authority. Hence, the correctness of data recorded in the register could not be verified.

b. Issue of transit passes were not acknowledged in the register by the receiver of the passes. Further, details of receipt of returnable counterfoils of used transit passes were not recorded in the register. Thus, the register did not serve its purpose of being a valid record for easy monitoring of the issue of Transit Pass Book and receipt of the corresponding counterfoils. The upkeep of the register was also not appropriate considering the importance of the record. Further, many cases of overwriting/corrections were also noticed.

DMG informed that the department is in the process of putting in place a mechanism to issue online passes so that all records are maintained.

IV. Register of applications received for grant of quarrying leases for minor minerals

a. The dates of receipt of applications were not recorded in the Register.

b. In some cases, the entries in the Register did not convey whether the application received was for new lease or renewal of existing lease.

c. According to Rule 11 of GMMCR, 1985, applications for quarrying lease were to be disposed of within 12 months. Similarly, application for renewal for quarrying lease was to be disposed of within six months. If no response was given within the prescribed time limit, the application is deemed to have been rejected. However, the register does not record the date of approval or details as to whether the lease was granted or not. Thus, information as to how many days were taken to dispose of each application was not discernible from the register.

In this regard, DMG informed that the department has decided to implement automation of the system so that shortcomings observed hereinabove are captured.

V. Register of Lease Deed for grant of quarrying lease of minor minerals

As per Rule 14 of the GMMCR 1985, register for quarrying lease should be maintained in Form "E" annexed to the Rules. However, the register was not being maintained in the prescribed format, and details like date of receipt of application, number and date of grant of lease, date of execution of mining lease, situation and boundaries of land, period of lease, period of renewal, etc. were not being recorded by the DMG.

VI. Monthly/Annual returns in respect of Major Minerals.

In the case of major minerals, DMG had provided copies of available monthly or annual returns for three years (2015-16, 2016-17 and 2017-18) in respect of total 39 lessees for Iron Ore, one for Bauxite and two for Manganese. There were no valid leases for major minerals during the period from 2018-19 to 2020-21.

The year-wise actual position of annual returns furnished were as follows.

Years		2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Iron ore- Valid leases		88	88	88	No valid leases		
Each year information to be furnished by Lessees	Made available	23	35	36			
	Not furnished	65	53	52			

In respect of major mineral Iron ore, DMG stated that only 23 leases in 2015-16, 35 in 2016-17 and 36 in 2017-18 were in operation. Thus, the balance

number of mines i.e. 65 in 2015-16, 53 in 2016-17 and 52 in 2017-18 were stated as not in operation and hence no information in respect of such lessees was furnished.

As the Apex Court had quashed (07/02/2018) the 88 leases of major minerals renewed by the State Government, operations of these mines came to a halt from 07/02/2018 and there was no extraction and production thereafter. Thus, no monthly or annual returns were produced to for the years 2018-19 to 2020-21 in respect of major minerals.

VII. Monthly/Annual returns in respect of Minor Minerals

DMG stated that there were 67 valid quarrying leases for minor minerals during the year 2020-21. However, only 28 lessees had furnished monthly/annual returns during the year 2020-21. This entails the risk that the quantity of extractions of minor mineral shown in the Tables may

not be correct. The total number of valid leases during 2015-16 to 2019-20 was not readily available with DMG. During this period returns were furnished by 37 lessees in 2015-16, 32 in 2016-17, 30 in 2017-18, 31 in 2018-19 and 22 in 2019-20. Thus, it could not be ascertained as to how many lessees failed to furnish requisite information/returns during 2015-16 to 2019-20.

Despite being vested with enforcement powers, the DMG failed to ensure timely submission of returns by the lessees of minor minerals.

5.2.3.2 Non-availability of mechanism to cross check the grades of mines declared by lessees.

The lessees, based on their own assessment of quality of ore, declared the percentage of lumps and fines in ore and paid royalty at applicable IBM rate for the declared grade of the ore. There was no system for counter checking the correctness of such declarations made by the lessees. As the onus of declaring the grade of the ore is on the lessees and they remitted royalty accordingly. Declaration of incorrect grade may impact the royalty revenue to the Government.

5.2.3.3 Mismatches between figures of Royalty received as furnished by DMG and corresponding data of DoA.

a. It was observed that the amount of royalty received during the year 2020-21 of ₹ 73,43,40,641 in respect of major minerals as furnished by DMG differed from the amount of royalty of ₹ 95,49,79,694 as reflected in their own data maintained/furnished in MS-Excel and both the figures in turn differed with the amount of royalty received of ₹ 100,51,95,558 as per the records of DoA.

b. Similarly, the figures of royalty received of ₹ 2,24,79,192 in respect of minor minerals as furnished by DMG differed from the amount of

₹ 3,40,96,487 as reflected in their own data maintained/furnished in MS-Excel and both differed with the figure of ₹ 3,37,99,546 furnished by the DoA.

DMG has, however, reconciled the differences of amount with DoA. The DMG confirmed the DoA's figures as final.

As per the reply of DMG, the difference in amount was due to transfer entries, inclusion of certain receipts 'actually realized in April' but accounted for in March as per date of cheques deposited and entries of transfer by Book Adjustment by other works department. This was due to absence of a proper

software for accounting/recording of all the receipts on cash basis as followed in Government Accounts, avoiding duplicate/incorrect entries and showing non-realized cheques in closing month as 'amounts pending realization'. This however, indicates the need for the DMG to have a system where real time/up-to-date data of the correct value of receipts as per the DoA's database are available.

5.2.3.4 Absence of proper records for ascertaining remittances received/receivable under various heads such as Royalty, Dead Rent, Surface Rent, etc., from all lessees

The register maintained for recording 'Royalty Received on Minor Minerals' did not contain complete set of entries. DMG stated that the register reflected only the details of physical

challans issued by DMG. There was no system of maintaining proper register or any other form of complete accounting records like lessee-wise ledger account for ascertaining and monitoring the remittances received or receivable under the heads Royalty, Dead Rent, Surface Rent, other fees, etc., from all lessees of minor minerals.

Therefore, whether there was timely monitoring of receivables and follow-up action thereon by DMG could not be ascertained.

5.2.3.5 No notification of rate of surface rent for quarrying leases of minor minerals.

As per Rule 4, Part V of The GMMCR 1985, the lessee shall pay to the Government for all parts of the surface area leased to him for the purpose of quarrying, surface rent at the rate prescribed by the Government. However, the Department had not notified the rate for surface rent for minor minerals till date.

5.2.3.6 Extending of powers under MCDR 2017 to State Authorities

The Mineral Conservation and Development Rules, 2017 (MCDR 2017), does not apply to minor minerals, as provided in Rule 2.

However, Rule 2 empowers the State Government to extend the application of any of the provisions of the MCDR 2017 with such modification, as may be deemed necessary and appropriate, to minor minerals, by notification.

Rule 2 also provides that the powers and responsibilities to be exercised by the Central Government or the Indian Bureau of Mines in respect of minerals other than minor minerals could be exercisable by the State Government or State Directorate of Mining and Geology or any other authority subordinate to the State Government if notified by the State Government while extending the application of these rules to minor minerals.

Thus, the State Government could have by notification extended the application of powers under MCDR 2017 in respect of minor minerals to itself/DMG immediately after the notification of MCDR 2017 (February 2017) by the Ministry of Mines and also extend the powers and responsibilities to be exercised by the Central Government or the Indian Bureau of Mines in respect of major minerals to the State Government or State Directorate of Mining and Geology or any other authority subordinate to the State Government. Ministry of Mines, (November 2021) amended the MCDR 2017 to give such powers to State Government or its designated authorities.

The effects of not extending the powers under MCDR 2017 to State Government/DMG resulted in lack of enforcement powers for ensuring timely submission of monthly and annual returns by major mineral lessees. In the case of minor minerals, the DMG was yet to receive monthly and annual returns from many lessees.

5.2.3.7 Non-payment of dead rent in respect of minor minerals leases.

Government of Goa notified (10/12/2015) the rate of dead rent for leases for Basalt mineral at ₹ 30,000⁷ per year and for the leases for Laterite at ₹10,000⁸ per year. Hence, lessees have to pay dead rent as per the fixed rate in case of non-production or would have to pay the difference

⁷ For a stipulated minimum volume of 480.76 m³ @ 62.40/m³ = 30,000

⁸ For stipulated minimum volume of 1041.67 m³ @ 9.60/m³ = 10,000

of the royalty and fixed dead rent if the production for the year was less than the stipulated volume.

Out of 88 leases for minor minerals, nine leases were not valid during 2020-21 and in 12 cases renewals were not obtained⁹ by lessees. Hence, there were only 67 valid leases of minor minerals for 2020-21. Out of these 67 cases, only 28 lessees had submitted production returns. In the remaining 39 cases it could not be confirmed whether production was zero during the year 2020-21 in the absence of returns filed by lessees.

If DMG considered that lessees who did not submit returns had no production, then the lessees should have remitted dead rent. However, only two lessees¹⁰ had paid dead rent as per data provided.

In the case of 28 lessees who had submitted returns, production in 26 cases was more than the stipulated volume while in two cases¹¹ the production was less than the stipulated volume and hence in these two cases difference of royalty and dead rent was payable. But both the lessees did not remit the differential amount.

5.2.3.8 Low ratio of generation of power from renewable energy resources

The total energy requirement of the State for the year 2020-21 was 3575.65 MU. Of this, 3412.84 MU (95 per cent) were purchased from outside and the balance energy only was generated within the State. The renewable energy generation (13.28 MU) in the State, however, was only 0.03 per cent of its total energy requirement.

5.2.3.9 Status of control and monitoring of illegal mining in the State.

Section 23C of MMDR Act, 1957 empowers the State Government to make rules for preventing illegal mining, transportation and storage of mineral s. In exercise of this power, the State Government had framed the Goa (Prevention of Illegal Mining, Storage and Transportation of Minerals) Rules, 2013 (the Rules) which was notified in October 2013. As per the said Rules, "Illegal mining" means any mining activity undertaken in violation of sub-section (1)¹² and/or (1A)¹³ of section 4 of the Act and violations of provisions contained in the Rules. The Rules, apply to all minerals other than minor minerals.

As per Rule 3 of the above rules no person shall carry on the business of buying, storing, selling, supplying, transporting, distributing or delivering for sale or processing of minerals at any place for the purpose of sale or consumption or otherwise deal with any mineral except under and in accordance with these rules and the terms and conditions of a registration granted under rule 45 of MCDR Rules, 1988.

Rule 32 provides for punishment for illegal mining with imprisonment for a term which may extend to one year, or with fine which may extend to five thousand rupees or with both and in

⁹ Either not applied or applied for surrender or amalgamated

¹⁰ Lease Nos. 16/Basalt/88 and 4/Basalt/18

¹¹ Lease Nos. 3/Basalt/93 and 3/Basalt/03

¹² No person shall undertake any reconnaissance, prospecting or mining operations in any area, except under and in accordance with the terms and conditions of a reconnaissance permit or of a prospecting licence or, as the case may be, of a mining lease, granted under this Act and the rules made thereunder

¹³ No person shall transport or store or cause to be transported or stored any mineral otherwise than in accordance with the provisions of this Act and the rules made thereunder

case of continuance of such illegal activity with an additional fine which may extend to five hundred rupees for each day during which such illegal activity continues after conviction for the first such contravention.

As per the system followed, the DMG on receipt of complaints of illegal mining, forward the same to the concerned taluka officer/in charge to initiate action under respective the rules. Actions were initiated under rule 2 (e) GMMCR 1985 in respect cases of illegal mining of minor minerals. Further, surface right holders were instructed to report cases of illegal extraction, transport, trade & storage of minor mineral noticed. The DMG has constituted flying squads from the office of Mamlatdars and coordinated efforts of all other line departments were ensured to deal with the illegal mining in the State. DMG, however, do not have enforcement power; but the same is with Police and other line Departments.

DMG has maintained a register for recording complaints received of illegal mining. Scrutiny of the register, however, revealed that information with regard to follow up action taken on, details of disposal, etc., of the complaints were not recorded in it.

Therefore, current status of the complaint could not be ascertained. In some cases, no entry was made in the column 'forwarded to' and the competent authority had not signed in the register also.

There were 10 cases (one major mineral and nine minor minerals) of illegal mining reported during the year 2020-21. All cases were pending and DMG could not recover any amount involved which indicates that the cases were not properly and timely followed up. In five out of the ten cases reported, DMG could not quantify the revenue involved and in one case it could not also quantify the quantity/volume of minerals illegally mined.

5.2.3.10 Geo-fencing was not available for any mine in the State.

5.2.4 Recommendations

The following recommendations are made.

1. The State Authority may ensure compliance by all lessees to the requirement of submission of electronic information/returns, as required under rules (viz., MCDR 2017, GMMCR 1985, etc.) or as demanded from time to time by the Authority. The State Authority should ensure laying down of a definitive workflow automation process to continuously capture and generate data from ground zero i.e., the districts, to eliminate time consumed in data collection and consolidation process in the future.
2. The State Authority should put in place an automated system for capturing the data of supply/dispatch of resources allowed by the administrating departments and use/sale of resources and linking the data for use of various agencies such as weigh-bridges, mobile checking, geo- surveillance, check-posts, exit gates, railway sidings, resellers, user agencies, industries, Directorates and District Mining Offices.

Thus, processing of all data relating to mining activities of each lessee such as mining plan clearances from concerned departments, geo-spatial data, geo-fencing of mines i.e., clear identification of mining area, assessment of quantity, detailed plans for periodic extractions and State Authority approvals/actions may be considered for automation and transparency.

3. All data pertaining to the process of grant of lease (viz., applications, approvals, permissions, etc.), vehicle movement, trip-sheets, etc., should be arranged to be captured electronically at source and linked for compliance and further use at various levels.
4. The system should provide for drawing samples from the extractions of mineral for assessment of the quality and grade of minerals and verify the correctness of the percentage of lumps and fines declared by the lessees in order to ensure that royalty remitted by lessees are at appropriate rate.
5. The automation system should take care of complete accounting of head- wise payables by the lessee in a time bound manner as required under law.
6. Information on illegal mining and action taken thereon may also be captured and maintained electronically for future use.
7. The State Authority should also design an authentication process so as to ensure the correctness and authenticity of data sets generated.
8. Geo fencing may be done for all mines in the State.

CHAPTER 6

FUTURE CONTINUITY PLAN

6.1 Guidelines / SoPs issued by GASAB

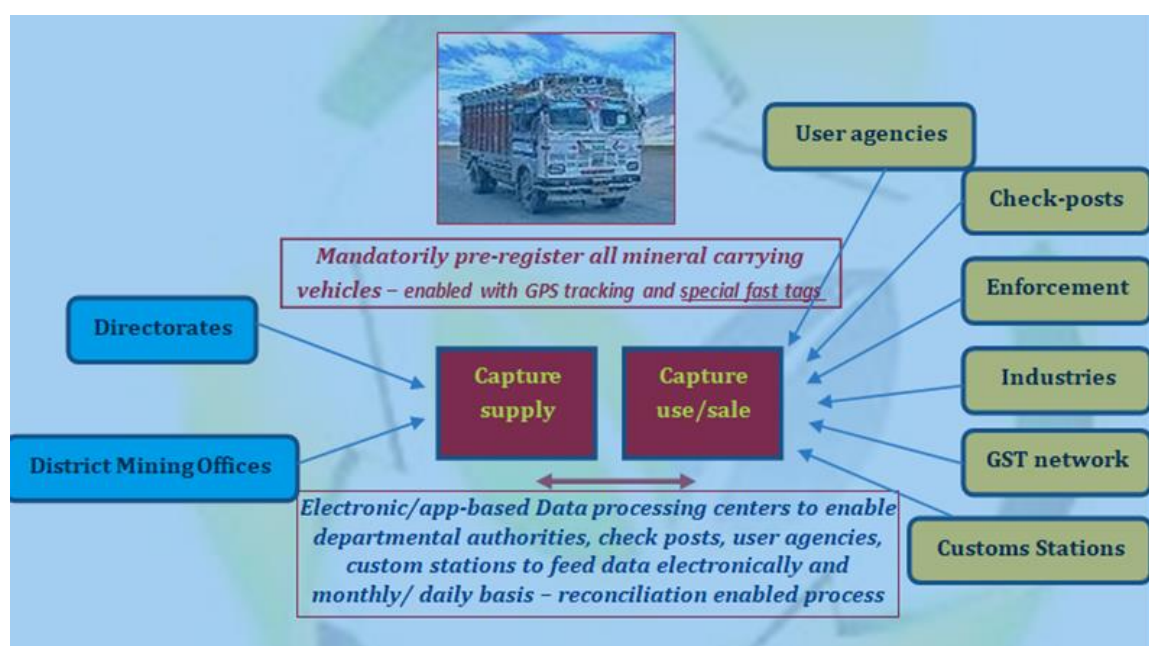
Asset Accounting process for Mineral and Energy Resources is to be a continuous process now onwards. Hence, there is a need for instituting systems and procedures for regularly capturing the data on physical flows of resources, while other inputs like addition in stock, average revenues, market prices, extractions not approved by the DMG and subsequently detected by various agencies could be collected from different sources while finalizing the Asset Accounts.

GASAB has issued Guidelines/SoPs in June 2022 suggesting methodologies for quarterly reporting framework and novel initiative of mapping the supply and use of resources. These will ensure timely collection and collation of data for the Asset Accounts. The mapping of supply and use of resources will enable 360 degrees profiling of mineral extraction and their use for effective management and optimisation of resources for the State exchequer. These are discussed in the succeeding paragraph.

6.2 Need for mapping the supply and use/sale/export.

Revenues from Minerals and Energy Resources consists of substantial part of State’s receipt and largely help the entities welfare fund and other planned activities of the State. Hence, it is imperative to implement cross-verification mechanism to prevent misuse of resources and optimize revenue yields from exploitation of minerals. A robust framework must be put in place to ensure zero tolerance on resource and revenue pilferage.

A suggested mechanism for enhancing the control measures for optimizing monitoring on resource sale/use/consumption for better resource management and revenue yields to be adopted as per the following flowchart:



Source: GASAB

The DMG agreed to furnish the data as envisaged in the guidelines circulated by GASAB and issued a memo to all ADMGs to furnish the required information and required change management in e-permit system is in process.

6.3 Quarterly Reporting Framework.

From the April 2022, the quarterly reporting framework for Asset Account on Minerals and Energy Resources has to be implemented as suggested by the GASAB. The DMG has agreed to implement the quarterly reporting framework for the Asset Account from April 2022. The department has assured their full co-operation in this regard.

6.4 Recommendations for improving management of mineral and energy resources of the State and optimization of revenue yields therefrom

The following approaches are recommended to make the system robust and inclusive in the best interest of conservation, sustainability of resources, optimisation of revenues for the State exchequer.

a) Statutory approach

- The State as part of enhanced statutory controls over mining activities, extractions/ productions/ dispatch and revenue yields should automate the e-permit system, with bar-coding of permits real time information sharing on permits issued pre-registration, GPS tagging of carriage vehicles with unladen weight and special fast tags for easy monitoring of minerals carried at the weigh bridges.
- The State may consider making it mandatory for the check posts (both intra and inter-State/customs check posts at international borders)/receiving points at industries to e-verify the permits – making them invalid for re-use. Else, movement/receipt should be allowed only upon full payment of royalty, fees, fines, etc.
- The State may consider enacting laws for making the lease holders/their personnel, departmental officials, industries/their personnel authorised to receive produces, personally liable for recovery of royalty, fees, fines, etc., in cases of movement/acceptance/consumption of minerals without valid permits/multiple use of permits. Also, enhancing the nature and quantum of penal measures to act as high deterrent on illegal mining activities.
- The State may consider introducing rewards scheme in the lines as prevalent in Central Excise and Customs Department for suitably rewarding the informers/Officers/whistle blowers leading to detection of illegal mining.

b) Other approach

The following could consist of the probable steps (in addition to those taken/being taken by the States) leading to a complete monitoring mechanism on usage/sale of mineral produces.

- Statutory interventions for ensuring strict monitoring on permitted mining activities and deterring illegal mining and their sale/use as discussed under statutory approach.
- Mapping the contact points through which minerals are passed within and outside the State/country, user agencies, consuming industries, wholesale/bulk selling points (getting them registered similar to the practice in Forest Department to register the sawing mills).

- Establishing seamless flow of information from these sources to the Directorates managing the resources on usage and sale of resources and their continuous validation vis-à-vis the e-permit system.
- Installing systems for automated verification mechanisms as above to raise red flags on unauthorised supply/consumption of minerals – issuing notice for further action.

For further detail recommendation in Chapter VII of compendium of Asset Accounts on Mineral and Energy Resources released by GASAB in October 2022 may be referred (<https://gasab.gov.in/gasab/pdf/Compendium-of-Asset-final.pdf>)

c) Need for GPS/geo-tagged district-wise mineral maps

The GPS/geo-tagged district-wise mineral map would help in consolidation at the national level for providing precise data on availability of resources across the country along with their pace of extractions, revenue generations, market values, available stock of resources. Mine and Resource wise collection of GPS co-ordinates will help in creation of resource-wise maps by each States with mine indicators as per their GPS co-ordinates.

Gradually, other data sets like that of Indian Bureau of Mines, Directorate of Hydrocarbons, etc. could be possible to be mapped into these GPS enabled mapping system for resources. Requisite mapping could be enabled navigating the readers to the latest Asset Accounts providing information on total stock of resources in the district, annual extraction, revenue realised, and other details captured through our Asset Accounting processes in the districts and compiled State-wise.

Annexure – I
(Referred to in paragraph no. 3.1)
State NRA Cell Members-List.

Sr No	Name of the Department	Name of the Officer/ Official, Designation
1	Office of the Accountant General, Goa	Ms. Anitha Balakrishna, Accountant General
2	Office of the Accountant General, Goa	Ms. Monisha T M, Deputy Accountant General
3	Office of the Accountant General, Goa	Smt Joyce Pinto Senior Audit Officer
4	Office of the Accountant General, Goa	Smt Shreelekha Menon Senior Audit Officer
5	Office of the Accountant General, Goa	Shri Kannan Jithendran Senior Audit Officer (Upto December 2021)
6	Office of the Accountant General, Goa	Santosh P Vellody Senior Audit Officer (From 17 February 2022 up to 22 July 2022)
7	Department of Environment & Climate Change	Sh. Pradip Samokadam, Member Secretary
8	Directorate of Accounts	Sh. Dilip K. Humraskar, Director
9	Directorate of Planning, Statistics & Evaluation	Ms. Asha Sambary, Deputy Director
10	Forest Department	Sh. Santosh Fadte, DCF (Planning & Statistics)
11	Water Resources Department	Sh. Shantaram B. Ghantkar, Engineering Officer
12	Directorate of settlement and Land Records	Sh. Rajesh R Pai Kuchelkar, Inspector of Survey & Land Records
13	Directorate of Mines and Geology	Sh. Suraj Kalgutkar, Technical Assistant