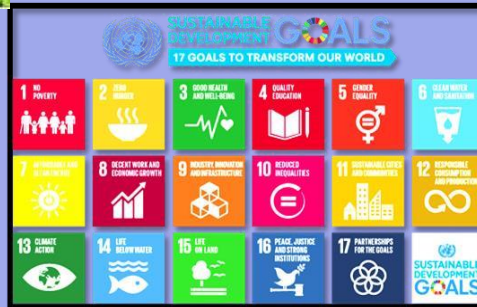




सत्यमेव जयते

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



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

2023

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Roopwnt Singh, IAS
Commissioner of Geology & Mining
Industries & Mines Department
Government of Gujarat



Message

The mining industry aside from supporting thousands of jobs provides raw materials critical to our economy. They provide the foundations for modern living, innovation and engineering achievement. However, mining activity leads to depletion of natural resources which may result in degradation of ecosystems. When ecosystem services and the benefits they provide are lost, it is difficult and often highly costly to society to offset the loss.

Gross Domestic Product (GDP), the traditional measure of economic activity remains inadequate when it comes to accounting for consumption of these resources as it does not account for the usage of natural resources and neither assigns any monetary value to their consumption rate.

Specifically, prices of environmental deprivation and natural resource exhaustion, and non-market amenity values aren't kept into account.

In this regard, there is a need to construct a full-fledged and robust environmental and natural resource accounting methodology to ensure that natural capital, resource depletion and environment effects are accounted for and stays in line with the Agenda 21 of the Rio+20 declaration to '*integrate nature into decision making*'.

This NRA is a critical step in this regard and will help the mining fraternity in assessing the impact of harnessing the natural resources with their relevance to the society and environment. Further, this would be a milestone in integrating United Nations Sustainable Development Goals into healthy and informed decision making.

I would like to recognise the efforts laid by the team from Government Accounting Standards Advisory Board and the internal working team in putting out this publication.

I sincerely hope that this publication would be helpful for all the stakeholders from the sector and will be taken forward for implementation.

(Roopwnt Singh)

MESSAGE FROM THE ACCOUNTANTS GENERAL

Natural resources play a pivotal role for economic development of a country and are crucial for their inbuilt value of inter-generational equity and sustenance. The need for Natural Resources Accounts took its first step at the United Nations (UN) conference on Human Environment in 1970 when the relationship between economic development and environmental degradation was discussed for the first time. This was followed up by the Brundtland Commission, the Earth Summits in 1992, 2002 and 2012. Simultaneously, the UN also brought out and adopted the System of Economic and Environmental Accounting – Central Framework (SEEA – CF) in August 2012. NRA has deep inter-linkage with the Sustainable Development Goals which relate to management of Natural Resources and their Accounting and monitor the Commitments of the “**Panchamrit Scheme**” given by Hon'ble Prime Minister of India.

Currently, many policymakers lack information needed to understand the potential environmental impact of their decisions, and the economic implications of changes to their environment and natural resources. Environmental accounts have the potential to provide key information that policymakers can use to understand the state of the environment, how it is changing over time, and the consequences of various policy options.

The GASAB under the aegis of the CAG spearheaded the implementation of NRA in India by proposing Concept Paper on NRA in July 2020 which would serve as the stepping stone for building up a robust framework of NRA in the country which will not only help in meeting international commitments but would also aid in evidence-based decision making by the policy makers. It will also help in monitoring resource-usage aiding sustainable developments while on the other hand keeping necessary stock of resources for our future generations

The Concept Paper envisaged short, medium and long term goals starting from 2020 with the compilation of a periodic database on five selected resources in the shape of Asset Accounts and converging with the target date of SDGs, i.e. 2030 in consonance with the four stage implementation strategy suggested by the System of Economic and Environmental Accounting – Central Framework. The first such goal is preparation of Asset Accounts on Mineral & Non-Renewable Energy Resources in all the States with the aim to gradually moving towards the national level.

The Asset Accounts, has the potential of multi-pronged advantages for the States in particular and the country at large as it would help the stakeholders to update the resources available in a state, provide invaluable information and datasets on mineral repository and potential of States, physical flows and monetary values mapped, the pace of exploitation, revenue vis-à-vis market value, sustainability of minerals in years and close monitoring on illegal mining.

NRA Cell in the State of Gujarat is formed in Office of the Principal Accountant General (A&E), Gujarat.

This NRA Report is a joint effort of the Principal Accountants General Offices and the State Government Departments. We appreciate the State Government offices for providing timely inputs and cooperation.

We sincerely hope that the first Draft of Asset Accounts on Mineral and Non-Renewable Energy Resource of Gujarat, will warrant greater engagement across various stakeholders and further strengthen co-operation not only for data sharing but greater exchange of practices that can facilitate a transition to resources efficiency in the State.



(Biren D Parmar)
Pr. Accountant General (A&E)



(H K Dharmadarshi)
Pr. Accountant General
(Audit-II)

Disclaimer Statement

Preparation of Asset Accounts is part of four-stage implementation strategy coined by the System of Economic and Environmental Accounting – Central Framework. This in turn is part of the Sustainable Development Goals to which India is a signatory. Thus, preparation of Asset Accounts on selective resources is an obligation for the country to be able to meet the international commitments.

The endeavour of Government Accounting Standards Advisory Board under the aegis of institution of Comptroller and Auditor General of India through its Accountants General Offices in States is only aimed at handholding the States in implementing Natural Resource Accounting commencing with the preparation of the first draft of Asset Accounts on Mineral and Energy Resources in a uniform and robust manner. Once the comprehensiveness and reliability of Asset Accounts prepared by the State Government stabilizes, State Government will produce this on regular basis.

The Asset Accounts have been prepared solely based on information/data provided by the concerned departments of the State Government and GASAB/CAG of India disclaims any responsibility for their correctness/inclusivity.

The limited verification by Audit Office is a test check that the data/information are supported by primary documents maintained in the offices of the concerned departments and is not an audit of stock of minerals and mining activities in the State.

Sustainability of resources is arrived by dividing the closing stocks of a particular year with annual reduction in that particular year. Hence the years shown in sustainability of resources may vary depending on the production/ reduction of the mineral of the particular year.

The reduction in stocks (reserves) covers only the value captured from the e-permit system. The corresponding mineral revenue may not tally with the actual revenue as reported in Statement 14, because the mineral revenue includes e-permit system, seigniorage fee paid through challans debited from the mineral consuming Government Department, book adjustment and others like penalty, application fee etc. However, the Mineral revenue shown in the data is corresponding to the permitted quantity issued through e-Permit System.

Executive Summary

The GASAB Secretariat in CAG's Office has come out with a Concept Paper on NRA in India in July 2020 which, *inter-alia*, envisaged a three-term plan for implementation of NRA in India in consonance with the strategy enshrined in the SEEA – CF of the UN.

Besides the plans, the Concept Paper also suggested the templates for preparation of Asset Accounts on Mineral & Energy Resources. Simultaneous to the release of the Concept Paper, pilot studies were initiated (August 2020) in three States, namely Goa, Meghalaya and Rajasthan which 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 the shape of a book 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.

The work on preparation of the Asset Accounts in the State of Gujarat commenced with joint efforts of the Accountants General Offices and the State Government. This Report presents the first draft of the Asset Accounts on Mineral and Energy Resources in the State of Gujarat for the year 2020-21.

Effective implementation of a system of generating Asset Accounts on Mineral & Energy Resources in the State 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 – arrest windfall gains and 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*
- *Progresses on commitment made at COP 26.*

Salient features of this compilation are mentioned below:

Salient features of the Project

1. Creation of State NRA Cell:

State NRA Cell was formed consisting of Officers/officials from the offices of the PAG (A&E) Rajkot and PAG (Audit-II) Ahmedabad along with representatives from State Government Departments.

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

Office of the Commissioner of Geology and Mining and Energy and Petro - chemical Department, Gujarat had coordinated with their subordinate offices for the collection of required data and forwarded the same to office of the Principal Accountants General in the prescribed format within stipulated time, based on the guidelines received from GASAB.

3. Unique collaboration between Principal Accountants General Offices and the State Government department in compiling the accounts:

Both the offices extended full co-operation to each other during the entire process of compilation in a time bound manner. Action plan was prepared, and meetings were held to discuss and clear the doubts.

4. Dual stage validation/limited verification process:

The Asset Accounts for the year 2020-21 were submitted for validation process by due date. During the process of limited verification by PAG, Audit-II office, there were observations pointed out for due reconciliation by Office of the Commissioner of Geology and Mining, Gandhinagar which were rectified during the verification process.

Major findings of the Asset Accounts Report, disclaimers/exclusions and recommendations:

A) Major Findings

- I. There was accretion in the stock of some minerals for the year 2020-21.
- II. Variation in figures provided by State Government and published by Indian Bureau of Mines (IBM).
- III. Sustainability of resources in (Table -2) indicates the number of reserve available against the minerals at the end of particular period of Accounts. This would help in drawing up the pace of exploitation resources over the years.
- IV. The stock of riverine resources could not be readily available at CGM level. However, the data is available in the mining plan which could be consolidated.
- V. The data for illegal mining was provided by CGM office after Audit observation while verifying the records and the data provided by CGM office has been included in the Table – 3A of NRA report 2020-21.
- VI. CGM maintains different grades of major and minor minerals resources which attract different rates of royalties. The classification of major minerals to be maintained in line with IBM.

B) Exclusions

- I. Production loss of mineral.
- II. Grade-wise mineral resources.
- III. Riverine resources stock

C) Recommendations:

- Steps may be taken for reconciliation of the data regarding extraction and production of minerals between IBM and CGM.
- Average Sale price / Average market price value of products available in Indian Bureau of Mines site for Major Minerals are with reference to the grade of minerals. The same may be incorporated in the subsequent asset accounts.
- Technological assistance like remote sensing and GPS tracking of mineral carrying vehicles may be used for further detection of illegal mining.
- Steps may be taken for digitisation of mining plans for better and effective control of quantity allowed vis-à-vis actual extractions.
- A system may be developed to capture the data relating to exports of minerals from the state for incorporation in Table-2 in subsequent asset accounts.
- Steps may be taken to capture all the relevant data like extraction, production, production loss, grade-wise resources and reserves of riverine resources in subsequent asset accounts from the information already being captured in ILMS.

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.

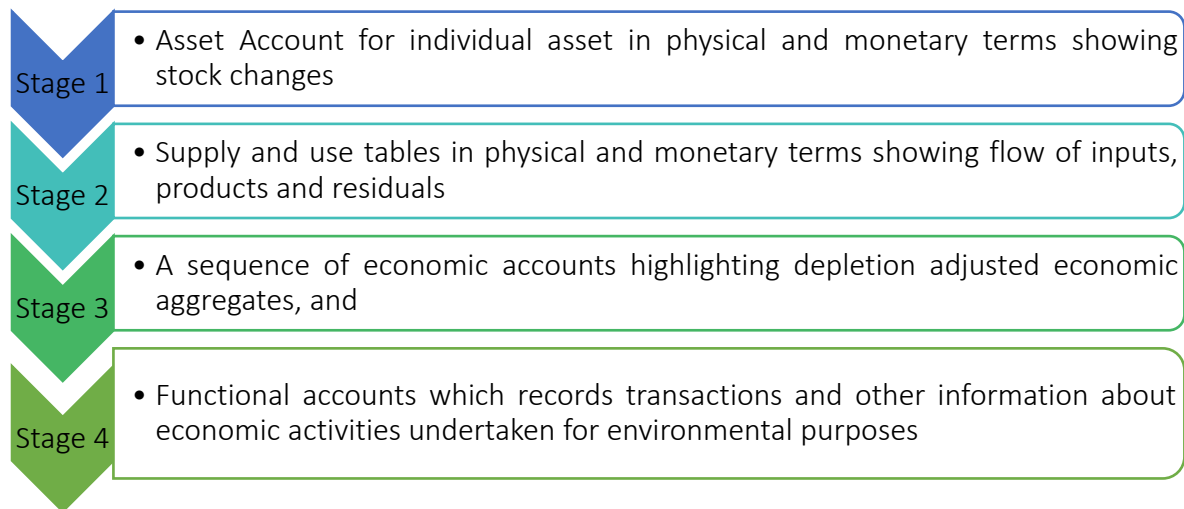


Conventional accounting captures data only of the measurable economic activity .In order to overcome this shortcoming and to capture the intimate interplay between the economic indices and the various components of the natural environment, the concept of NRA has emerged.

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 a universally acceptable framework on environmental resource accounting which culminated into release of the (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

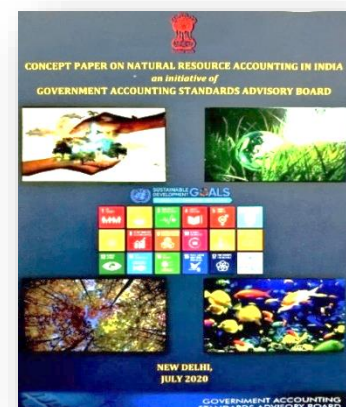
IMPLEMENTATION OF NRA IN INDIA – GASAB’S ENDEAVOUR

2.1 About (GASAB) Government Accounting Standards 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.



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 and the mandate of GASAB in suggesting accounting framework for enhancing the quality of decision making and public accountability in view combined with suggestion of Working Group on Environmental Auditing under the International Organization of Supreme Audit Institution (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.

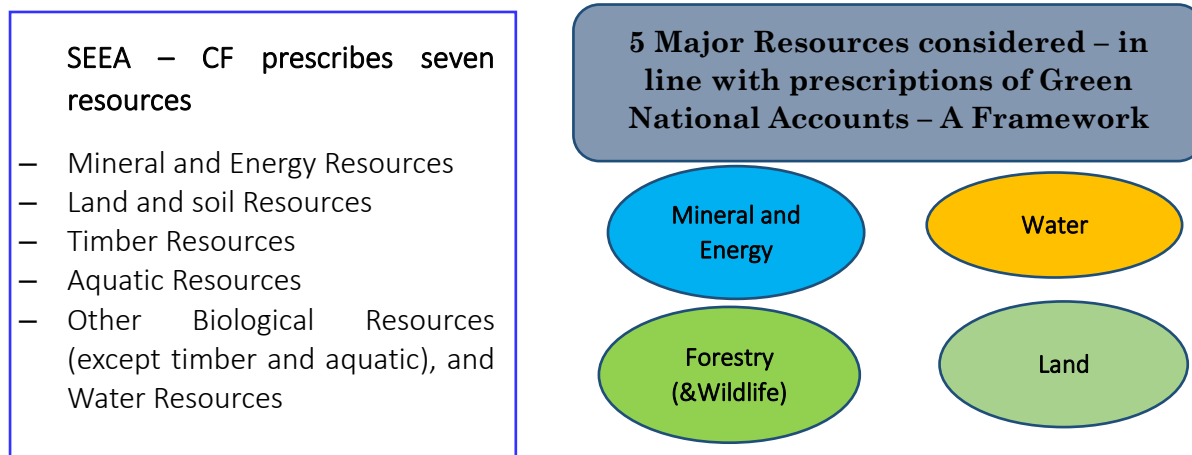
GASAB has suggested a well laid out implementation plan divided into three term goals in consonance with the strategy envisaged by the SEEA – CF.

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 <i>(2019-20 to 2021-22)</i>	1. Preparation of National Asset Accounts on Mineral and Non-Renewable 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 <i>(2022-23 to 2024-25)</i>	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. <i>(2025 - 26 onwards)</i>

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 conceptualised as the need of the hour and thus planned as the short term goal No. 1.

Mineral & 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:



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 realisation 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 State to identify alternate resources – both economic and energy resources.

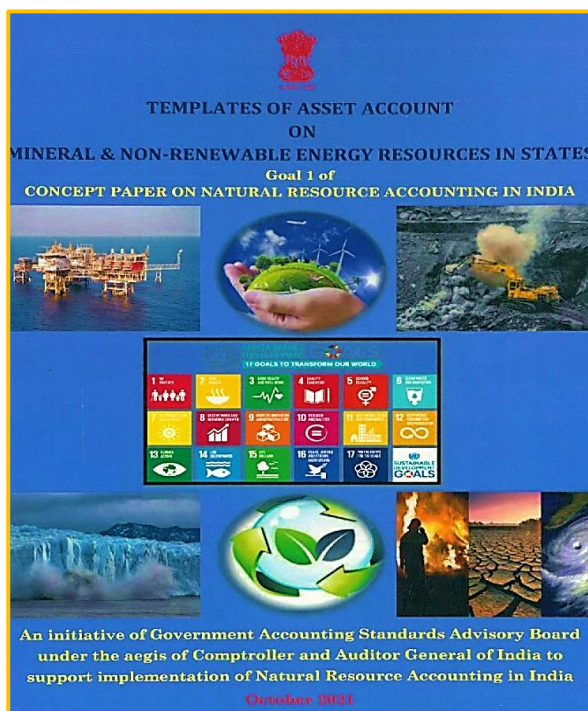
Close monitoring on illegal mining: The inter-operability of supply and use of resources and their incorporation in the system of preparation of Asset Accounts would enable close watch on illegal mining. This will not only help in optimising resource base but will also help in containing unscientific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

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 generations.

2.6 Evolution of the 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 main 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 percent 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 percent.
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 Tables 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 Centre (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 workshop was also held in the State. Details are in paragraph 3.2

2.10 Onboarding and handholding the States

In order to take the State on board as one of the most vital stakeholders in the implementation process, the highest echelons in the State were demi-officially informed (September 2021) by the Deputy CAG & Chairperson, GASAB about the endeavour of GASAB and vision of the project which was followed up with virtual presentations to the State Government Departments. The views/suggestions emanated at this meeting was taken into consideration in updating/modifying the templates.

After release of the templates, monthly virtual meeting was held by GASAB with all the 30 States/UT in which the project 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

As per GASAB Guidelines, NRA Cell in the Office of the Principal Accountant General (A&E), Gujarat, Rajkot was formed in October 2020.

Senior Deputy Accountant General/Administration from the Office of Principal Accountant General (A&E), Gujarat has been nominated as Nodal Officer of the NRA Cell in the State of Gujarat.

In order to steer the implementation strategy envisaged in the Concept Paper, an NRA Cell has been constituted at GASAB headquarters at CAG's Office with experts from diverse stakeholder ministries in the Government of India, five State Governments, the Accountants General in these five States, besides environmental specialists.

The constitution of the Cell is as under:

THE CORE CELL	CONSULTATIVE COMMITTEE
<ul style="list-style-type: none"> • Additional Deputy CAG, GASAB as Chairperson. • Sr. AO, GASAB & NRA Cell • AAO, GASAB & NRA Cell 	<ul style="list-style-type: none"> • Commercial Wing and iCED under CAG • Five State Governments – Gujarat, Jharkhand, Meghalaya, Karnataka and Uttarakhand • Accountants General of Audit and A&E Offices of these five States • Members from Ministries of Mines, Environment, Forest & Climate Change, MNRE, Jal Shakti, Land Resources, Statistics Programme Implementation • Member from specialist agencies like IBM, ICAI, ICMAI, TERI, NRSC • Shri Mukul Sanwal, IAS 1971 (retd)

Gujarat State is one of the five members of the Consultative Committee.

Pr. Accountant General (A&E), Gujarat and Pr. Accountant General (Audit –II), Gujarat are nominated as the members of the Consultative Committee.

Commissioner of Geology and Mining, Gujarat is nominated as the representative of Consultative committee for the State of Gujarat.

Nomination of representatives for NRA CELL from various State Government Departments, *i. e.* Industries and Mines Department, Finance Department, Energy and Petrochemical Department, Statistics Department, Forestry and Environment Department, Water Resources Department was completed successfully.

Formation of NRA Cell in the State is the key impetus for the functional implementation process of preparation of Asset Accounts with consultation and mutual cooperation of all the representatives.

Details of members, designation/credentials and their contact details are given at **Annexure-A**.

3.2 Follow up, trainings and capacity building

Taking a cue from GASAB’s monthly meetings, NRA Cell of O/o the Principal Accountant General (A&E) and Principal Accountant General (Audit-II) held meetings with officials of State Government offices. These meetings were held during September 2021 to June 2022 and have proved the key to extract the relevant data from State Department for the NRA report 2020-21.

Training, Workshop and Capacity Building

GASAB has initiated capacity building workshops/ Webinars for Officials of IAAD and State Government as given in below tables. These workshops were very useful for field offices and could enhance the capacity building slowly over the years. Some of the special mentions are as given below: **Training/Workshops organised by GASAB**

TRAINING/WORKSHOPS	CAPACITY BUILDING
A special workshop was organized virtually for preparation of Asset Accounts for the State of Gujarat in the month of March 2021 by GASAB.	<ul style="list-style-type: none"> • Concept on NRA. • CAG’s role for implementation of NRA in India and Constitutional provision. • Main aims of NRA for the State/India • Implementation of System of Environmental and Economic Accounting –Central Framework (SEEA-CF) • Three term plans (Short, Medium and Long) for implementation of NRA in State/India • Natural resource Accounts which include physical and monetary values. • Compilation of data relating to natural resources within an accounting framework
All India Webinar by GASAB on NRA in the month of June 2021	<ul style="list-style-type: none"> • Preparation of Asset Accounts on Mineral & Energy Resources in States (2019-20 to 2021-22) • Preparation of National Asset Accounts on Mineral & Energy Resources in States (2022-23 to 2024-25)
A workshop of NRA by International Center for Environmental Audit and Sustainable Development (ICED), Jaipur in the month of July 2021.	Sustainable Development Goals (SDGs) and international commitments to UN Climate Change Conference 2021.

Workshops with State Government Offices by the Office of the Principal Accountant General (A&E), Gujarat

As per GASAB guidelines, officials of the Office of the Pr. Accountant General (A&E), Gujarat, Rajkot visited (between September 2021 to December 2021) to impress upon the importance of Natural Resource Accounting the details of which are given below: -.

Workshop held with state government	Purpose of visits
For discussion on Collection of data	<ul style="list-style-type: none"> • IAAD officials held a meeting to discuss the way forward for preparation of Asset Accounts. • Provided information about the pilot study done in three States, results yielded positive outcome and guidance for preparation of Asset Accounts. • A team of officials from Principal Accountant General (A&E), visited Office of the Commissioner of Geology & Mining, Directorate of Petroleum and Indian Bureau of Mines office for discussion on preparation of Asset Accounts. • To identify the major & minor minerals according to their monetary importance. • A formal request for collection of data in respect of opening stock and extractions were explained and the source of said data was identified. • The data regarding extractions for 39 major & minor minerals during the period 2015-16 to 2020-21 were obtained (October-2021) from Office of the Commissioner of Geology and Mining. • Further it was explained to the State Government offices to provide the opening stock of resources since these will be more authentic as all the mining activities are entirely recorded in the State Directorates.
Workshop for preparation & methodology of Asset Accounts - held at Office of Commissioner of Geology and Mining, Gujarat, Gandhinagar.	<ul style="list-style-type: none"> • After the receipt of details of opening stock, extractions/dispatch minerals the methodology for preparation of Asset Accounts were discussed. • Discussions were held in respect of methodology for working out opening stock/balance of mineral resources as on 01-04-2020, which were arrived at by deducting the extractions from 01-04-2015 to 31-03-2020. • Methodology for working out physical flows & sustainability of resources were also discussed. • Discussed about the methods for valuation of resources

Meetings held by Office of the Principal Accountant General (A&E)

With the continuous interaction and cooperation of State Government, the required data was obtained for preparation of Asset Accounts (Table 1 to 3). The methodology as prescribed in the GASAB guidelines were adopted for preparation of Asset Accounts. Further, the matter regarding validation and automation of Asset Accounts were discussed for the preparation of draft Asset Account to be finalised by January - 2022 as per timelines provided by GASAB. (Visits in the month of November/December/January/February & May-2022). The details of meetings held for the said purpose are given below:

MEETINGS HELD WITH STATE GOVT. & AUDIT OFFICES	PURPOSE OF VISITS AND MATTERS DISCUSSED
Discussion on SOPs on control mechanism, illegal mining, validation process, automation of Asset Accounts and implementation of revised formats	<ul style="list-style-type: none"> • IA&AD officials held meetings individually and with State Government Departments. • The control mechanisms to be followed by the Directorates for mining activity <i>i.e.</i>, clearances to be obtained from concerned departments like Ministry of Environment, Forest and Climate Change, Ministry of Mines <i>etc.</i> • Checks to be imposed during mining – the concerned officer to keep close watch and monitor mining activity. • Post mining checks – Continued monitoring of processed minerals till their destination to prevent unauthorised mining/utilisation. • Capturing the physical flows with other inputs like addition in stock, average revenue generated, market prices, extractions not approved by the departments from various sources. • Dual validation process by State Government and limited verification by Audit Offices for finalising the Asset Accounts. • Annual Audits by Audit offices • Validation by State Government will involve sampling methodology. • obtaining the data in the revised formats for (Table 1 to 6). • Recommended creation of sub-heads to classify receipts like application fees, dead rent and royalties on one-to-one co-relation with Finance Accounts.

3.3 Innovations and good practices

For improved monitoring of mineral resources, the State Government Departments *viz.* Office of the Commissioner of Geology and Mining under Industries and Mines Department and Energy and Petrochemical Department have implemented innovative/good practices as discussed below:

Innovations/Good Practices Adopted by Office of the Commissioner of Geology and Mining

Office of the Commissioner of Geology and Mining, Gujarat has carried out and adopted innovative/good practices for improved monitoring of Mineral resources. Few good practices adopted in the State are discussed in the following paragraphs: -

“Drone Project (Trinetra)”

- Office of the Commissioner of Geology and Mining, introduced ‘Drone Project (Trinetra)’ which is first of its kind used for surveillance of Mining areas in India.
- The Drone can record video in Full High Definition (**Picture – 1**) and can be controlled from a distance 4–5 kilometre (at a radius of 2 to 2.5 km) and cover approximately 10 kms.

- Further, the Drone can capture the mining activities and vehicle number from height of 30 to 35 meters during daytime and can record mining activities from the height of 70 to 75 meters with night vision facility.



Picture 1– Drone Surveillance

GPS based vehicle tracking and monitoring system

The prime objective of implementing GPS based Vehicle Tracking Monitoring System (VTMS) is to curb royalty theft and illegal transportation of minerals.

Benefits of VTMS

- This system ensures monitoring and tracking the navigation route of vehicles transporting minerals using GPS technology to prevent illegal mining activities.
- Alerts of deviation in the pre-determined route of transportation is ensured and delivery of minerals at the defined location and decided time is also monitored.
- Use of modern tool/technologies to enable field officers to establish better control on mining activities and its transportation including driving pattern analysis is to ensure that there is no loss of minerals due to rash/careless driving patterns. Further, it increases transparency in mining and its logistics activities.

Geomine mobile application

- Geo Mine is a Mobile with Cloud Based Application to be used by the for the officials of the Commissioner of Geology and Mining, Gujarat.
- The main aim of the Geo Mine application is to empower the Commissioner of Geology and Mining, Gujarat to regulate and ensure compliance, inspection and enforcement of all the mining activities digitally.
- Geo Mine is introduced to bring the field staff and office administration staff closer and eliminate the gap of communication and duplication of work and transmit the data to the Central Server.
- Global Positioning System (GPS) allows to get the location of a person/official which is recorded, ensuring that the officer actually visited the site/location and the duties were performed at the site.

GEO-tagged mapping & GPS coordinates

All the mines in Gujarat State have been Geo - Tagged with the help of Bhaskaracharya National Institute for Space Applications and Geo - Informatics (BISAG). The Geo-Tagged mine data contains details such as name of Lease Holder, Mine Area, Environmental clearance Status along with Geographical Boundary of Mine etc. (**Picture -2**) below depicts the Geo – Tagged Mining area.



Unknown Area Type

```

Id = 0
Name = Gujarat Industries Power Co. Ltd
Village_Na = Differences
Area = 1.53233796005e+003
List = Running Lease ML
List_Area = 1504.75.90
Taluka = Mandvi
District = Surat
Mineral = Lignite
Map_w_Cord =
EC_Status =
EC_Grant_D =
MP_Status =
EC_Product = 0.000000000000000e+000
MP_Product = 0.000000000000000e+000
Saved_Case =
Block =
Running_Le =
QL_No_ = ML1704014524
Survey_No_ = Differences
Ownership =
1st_Grant =
1st_Agreem =
Cluster_ID = BHA SUR 1
Lease_ID = BHA SUR 1 - 3
EC_Certifi =
Display_ID =
    
```

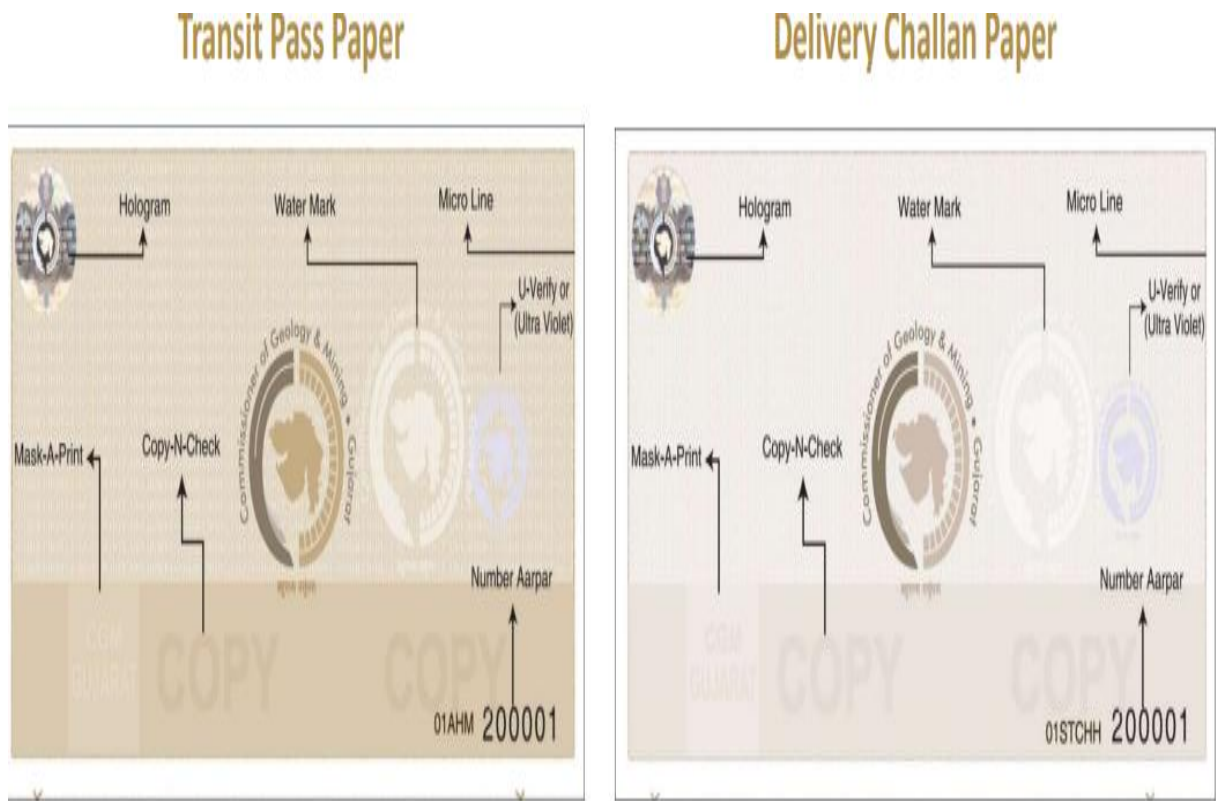
Picture 2: Geotagged Mining area
Source of data: Commissioner of Geology and Mining, Gujarat

Note: GPS Coordinates in Keyhole Mark-up Language File received from Commissioner of Geology and Mining, Gujarat

Other mechanism

- A well-established Integrated Lease Management System and Flying Squad are operational in Office of the Commissioner of Geology and Mining, Gujarat for monitoring of minerals.
- Electronic Mechanism is in place for monitoring of data and submission of Monthly Accounts/Reports.

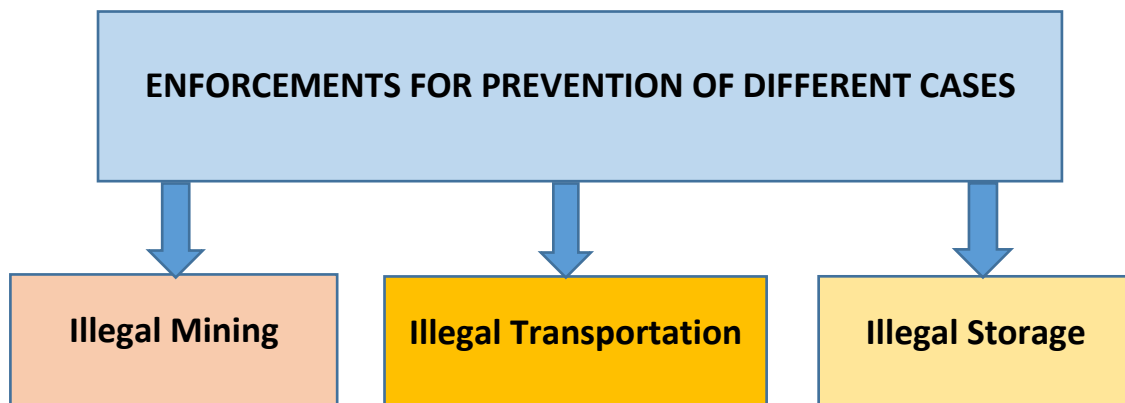
- To prevent printing of duplicate royalty pass/ delivery challan, Special Security Paper containing Hall Mark Logo of the Department, Water marks and other hidden security features re being issued as shown in **Picture -3** below: -



Picture 3: Security Paper

Chart showing enforcements for prevention of illegal mining activities

To prevent and control illegal mining in the State of Gujarat, the State Government has framed Gujarat Mineral (Prevention of Illegal Mining, Transportation and Storage) Rules 2017 under section 23 C of Mines and Minerals (Development and Regulation) Act 1957 which has been implemented from date 26th September 2017.



- Prevention of cases related to illegal mining, transportation and storage is undertaken by the Flying Squad (FS) and all District Offices.

- FSs conduct surprise checking and inspection of mineral bearing area and also performs road checking to prevent illegal mining, transportation and storage.
- Special flying squad teams comprising of 2 Official, 1 Videographer, 1 Police constable, 2 security guards and 1 Regional Transport Office (RTO) person (when required) have been formed in Ahmedabad, Chhotaudepur, Gandhinagar, Mehsana, Navsari and Sabarkantha districts.
- If required, teams are formed including the officer from different district offices/circle offices for conducting raid. Raids are conducted according to the information received regarding illegal mining activities through letters, E-mails, Geo-mine application, by control room complaints or in person.
- Detailed investigation report is submitted along with the necessary evidences to the authorized officer for further action, after the completion of the surprise spot inspection.

Good practices adopted by energy and petrochemical department

- All payments related to license and lease is being collected online through cyber treasury portal of the State Government under ease of doing business.
- Monthly returns (production details) mandated under PNG Rules is to be reported through online mode developed by this Directorate.
- All the applications related to Petroleum Exploration License and Petroleum Mining Lease and its approval process would be through online mode under Prime Minister's Gati Shakti Project - Trial Run is on.

Enforcement for prevention of cases related to illegal mining, transportation and storage

- In majority of cases, transportation of crude oil to the refinery is through pipeline embedded with Supervisory Control and Data Acquisition (SCADA) system which is monitored for leakage and pressure drop. Natural Gas is transported through pipeline to the customers.
- Major producer is Oil and Natural Gas Corporation Limited (ONGC) (Central Public Sector Undertaking) which has four Assets name in Districts Mehsana, Ahmedabad, Cambay (Khambhat) & Ankleshwar. The crude produced in around vicinity of these Assets is collected at a central tank farm of each asset and then supplied through pipeline to the Baroda Refinery.
- Other lease holders either State Public Sector Undertaking or private players are mandated by the Directorate General of Hydrocarbon to make their production custody to nearby Oil and Natural Gas Corporation Limited (ONGC) Asset. From their it is supplied along with Oil and Natural Gas Corporation Limited (ONGC) crude to the Baroda Refinery.
- Supply of Crude oil to the end point - Baroda refinery is through pipeline which has Supervisory Control and Data Acquisition (SCADA) system useful in detecting any pressure drop or leakages.
- All the above enforcements implemented by the State Government Departments are intended to help in prevention of cases related to illegal mining, transportation and storage of resources.

CHAPTER - 4

MINERAL PROFILE OF STATE AND SHORTLISTING OF RESOURCES

4.1 Mineral profile of Gujarat State

There are 39 major and minor minerals and 02 fossil minerals in the State of Gujarat as per the details provided by Commissioner of Geology and Mining and Energy and Petro Chemical Department, Gandhinagar. Out of 41 minerals 18 minerals have been included in the first Asset Account.

Gujarat is rich with Mineral resources. Natural resources are essential for the growth of the economy, employment and prosperity of the State. Total availability of mineral resources in the State have been identified for the project of Natural Resource Accounting which are as follows:

Major Minerals:

Bauxite, Lignite, Limestone, and Manganese ore.

Minor Minerals:

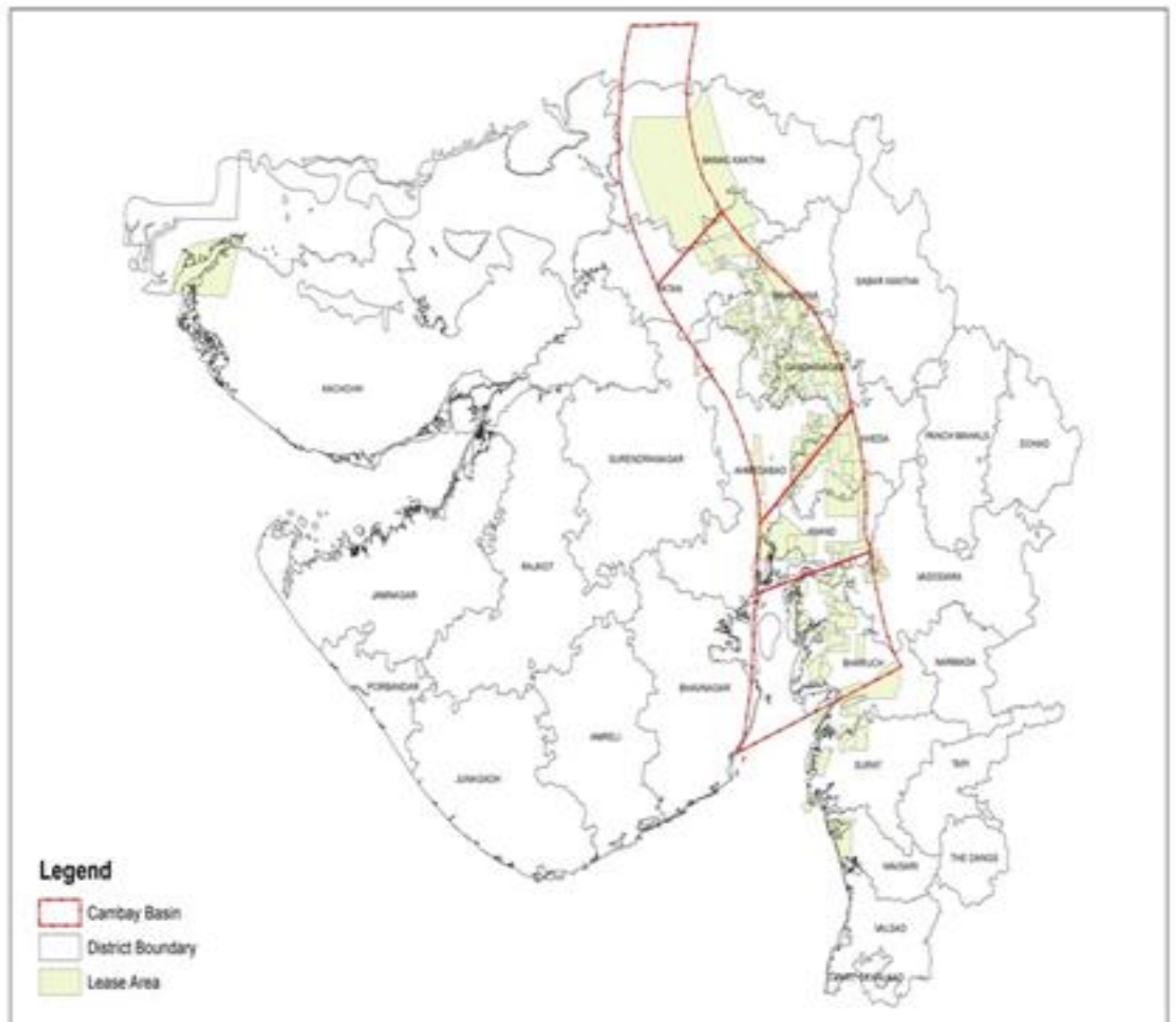
Bentonite, China clay, Calcite, Dolomite, Quartz, Sandstone, Silica Sand, Granite, Chalk, Marble, Fire clay, Gypsum.

Fossil Mineral:

Crude Oil and Natural Gas.

Minerals like Chalk and Perlite are produced only in Gujarat in the country. Production wise Gujarat ranks first in Fluorite and Silica sand, second in Bauxite, Lignite, Fire clay and Clay (others) and third in Quartz and Ball clay and fourth in Limestone and China clay.

Mineral Map of Gujarat for Major Minor and Fossil minerals



4.2 Strategic importance of minerals for the State

MAJOR AND MINERAL MINERALS

- The Commissioner of Geology and Mining working under the Industries and Mines Department Government of Gujarat, administer all Major and Minor Minerals in the State.
- Due to the increasing demand of various minerals like Lignite, Bauxite, China Clay, Bentonite and Limestone in the State to cater the requirement of the industries, exploration is being carried out.
- After introduction of MMDR (Amendment) Act 2015 and Mineral (Evidence of Mineral Content) Rules – 2015, Department has started mineral exploration as per the norms fixed for auction by Government of India (Ministry of Mines).

- The Exploration of Major & Minor Minerals is carried out by Office of the Commissioner of Geology and Mining in such a way that it increases State's Mineral Revenue & their Sustainable Development Framework.
- State Government Department also encourages value addition of minerals by promoting mineral based industries which results in increase in employment and Structural Development in the State.
- The mineral resources wherein the complete details were provided by CGM Office have been included in the Asset Accounts for 2020-21. It was suggested to CGM office to provide the remaining mineral details wherein extractions are carried out for gradual onboarding in future years.

FOSSIL MINERALS

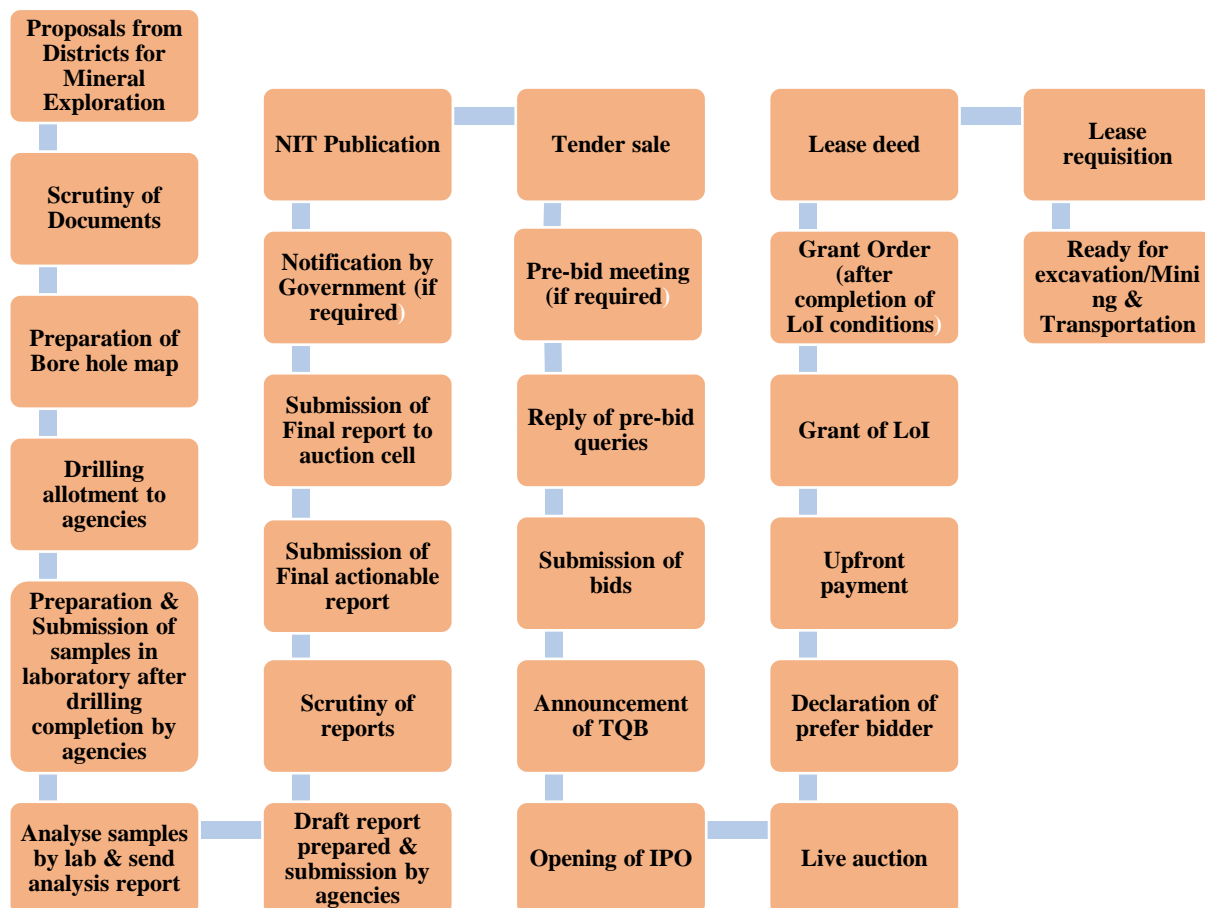
Energy & Petrochemicals Department is the governing department under the Petroleum & Natural Gas Rules (PNG). Office of Directorate of Petroleum is established under Energy & Petrochemicals Department to monitor the exploration and production operations for sustainable development of petroleum resources and to facilitate the industry in conducting their operations.

- To monitor and reconcile the statutory payments arising out of exploration and production activities.
- To prepare proposals for sharing of revenue earn from the production oil and gas from State with the Central Government.

4.3 Mining process followed in the State

Mining Process followed in the State for Major and Minor Mineral

The mining process followed for major and minor minerals is furnished by Office of Commissioner of Geology and Mining, Gujarat in the form of flow chart as shown below: -



Picture: Flow Chart of Mining Process

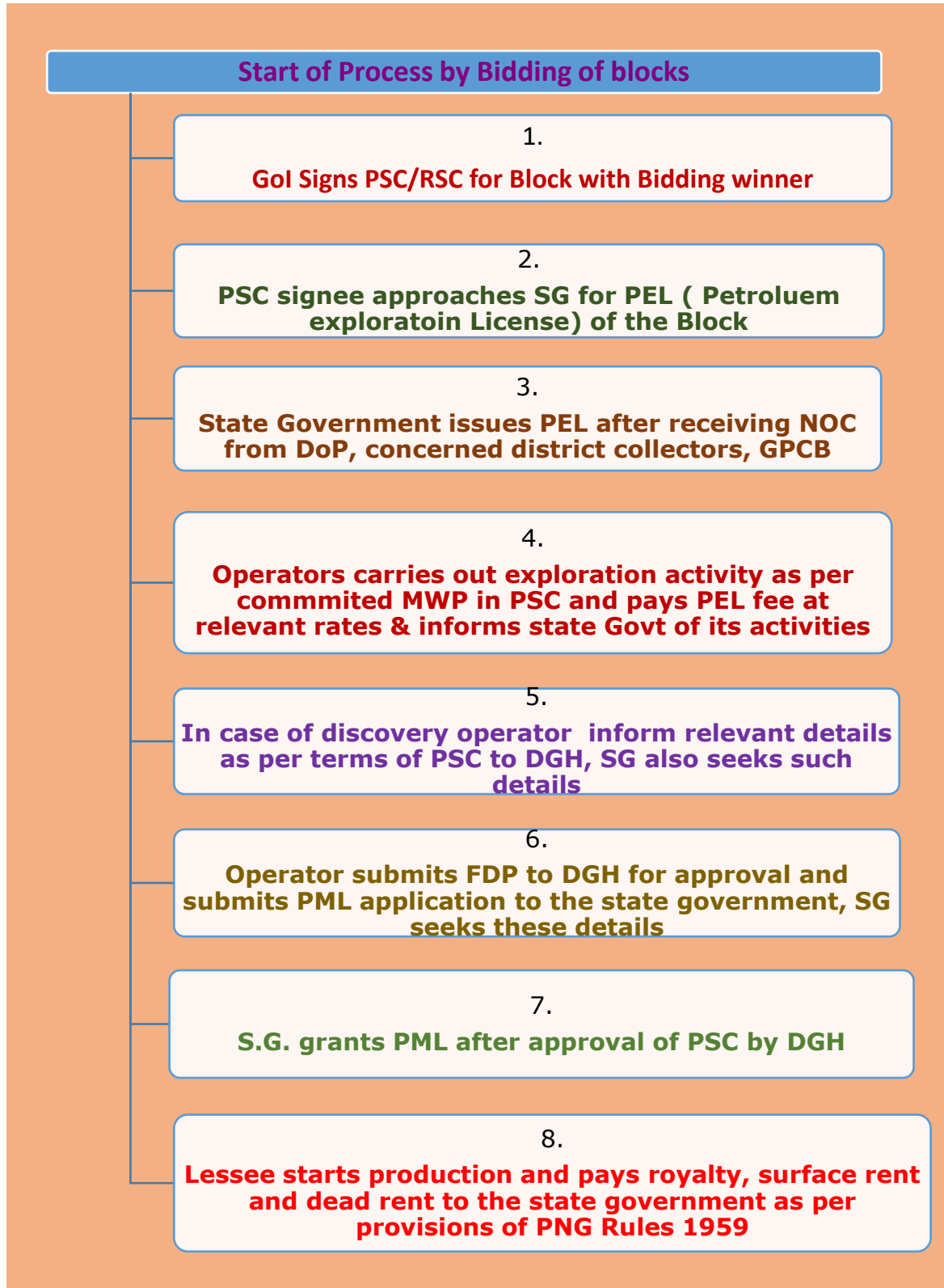
Source of data CGM office, Gandhinagar

Mining plans for fossil minerals

- Oil and Gas mining is carried out through well drilling.
- Oil and Gas is a central subject governed by Oilfield (Regulation & Development) Act 1948 and Petroleum and Natural Gas Rules 1959.
- Blocks are awarded through bidding by Ministry of Petroleum and Natural Gas. Once successful bidder executes the contract with the Ministry of Petroleum and Natural Gas, the bidder/ contractor approaches Energy & Petrochemicals Department for the grant of Petroleum Exploration License / Petroleum Mining Lease after making an application with all necessary payments.
- For the Petroleum Exploration License, a work program is approved by the office of Directorate General of Hydrocarbon under the aegis of Ministry of Petroleum and Natural Gas. Based on the work program approved, licensee carry out his exploration plan and if he makes any discovery then he would apply for the Petroleum Mining Lease. For Petroleum Mining Lease, a field development plan for the discovery made has to be approved by the Directorate General of Hydrocarbon. Based on the approved plan, production is commenced and royalty is paid to the State Government.

Mining process for fossil mineral

The Mining Process followed for Fossil Mineral is furnished by Directorate of Petroleum, Gujarat in the form of Flow Chart as shown below:

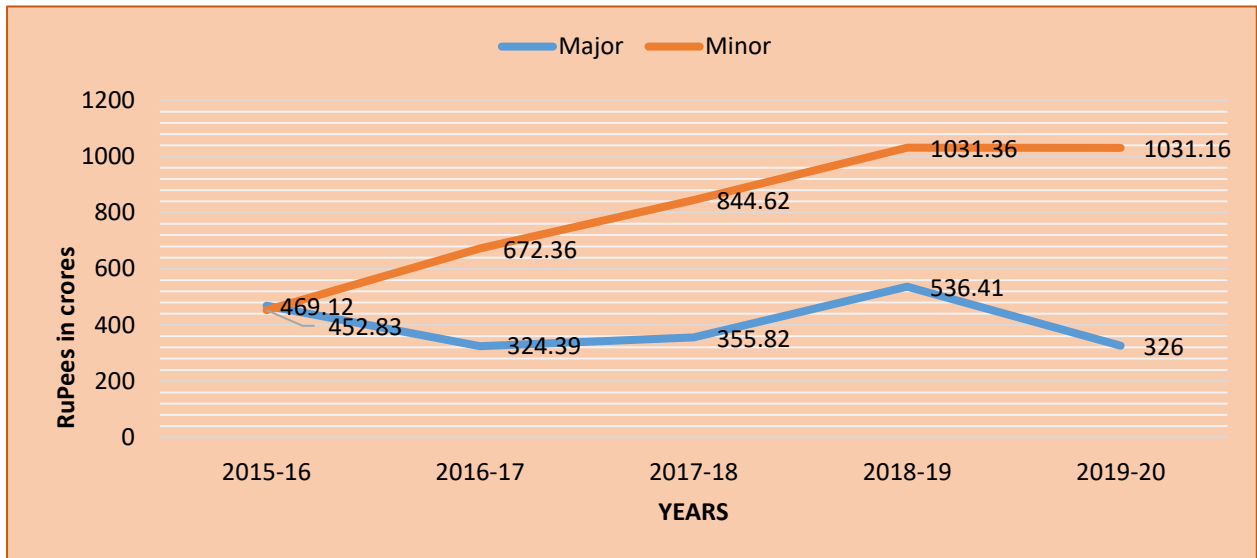


Picture: Flow chart of Mining Process
Source of data EPCD, Gujarat

4.4 Contribution of mineral resources in the revenues of the State

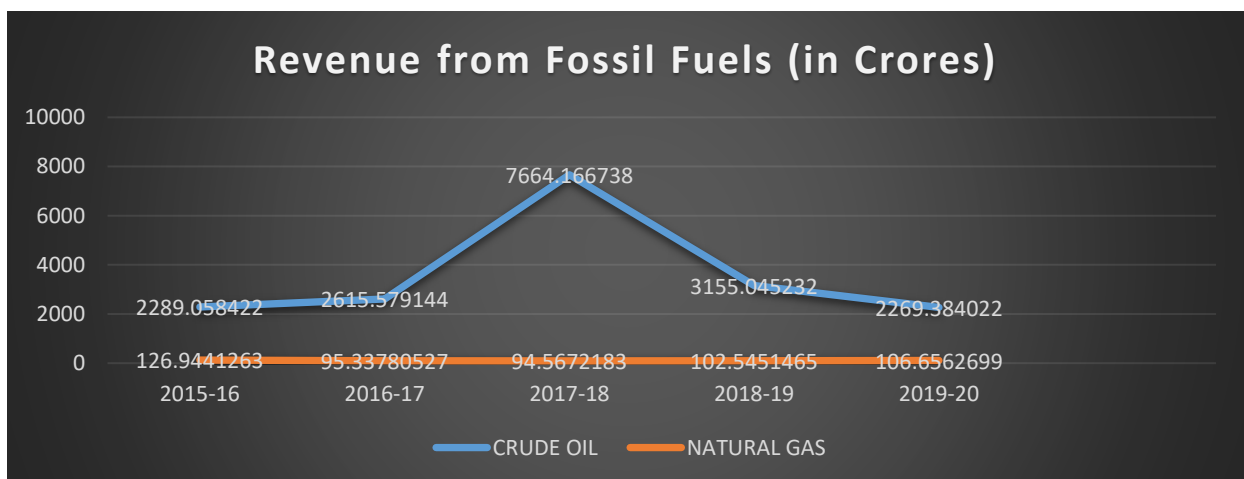
Revenues from major and minor minerals:

Gujarat is rich in Mineral & Commissioner of Geology and Mining promotes Mineral based industries in the State. The trends analysis for five-year period ended 31 March 2020 as reading available with the Department of Gujarat States Mineral Revenues are depicted in the Line graph.



Source: Website of Commissioner of Geology and Mining, Gujarat

Revenues from fossil minerals



Source: Data Provided by Directorate of Petroleum, Gujarat

Analysis of Mineral Receipt with Tax and Non-Tax Receipt of Gujarat State for 2020-21

Name of State	Tax receipts	Non-Tax Receipts	Total receipts	Mining receipts	Percentage of mining receipts to total non-tax receipts	Percentage of mining receipts to total tax and non-tax receipts of State
Gujarat	90484.71	10492.66	100977.37	1888.90	18.00	1.87

Source of Data:

1. The data for tax and non-tax revenue have been taken from Finance Account 2020-21, Statement 14.
2. The data for mining receipts has been taken from the data provided by State Government Authorities.

4.5 Short-listing of resources for this study

This being the first year, the robustness and inclusivity of the data collection mechanism and the comprehensiveness of the data-sets has been given priority.

- Office of the Commissioner of Geology and Mining, Gujarat has provided dispatch data for 39 minerals from 2015-16 to 2020-21.
- The collection and compilation of data involved obtaining details from 32 District offices, which was time consuming process. Therefore, not all the minerals were possible to be included in the Asset Accounts.
- However, the opening stock was provided for 16 minerals, since exploration is not carried out for other minerals like Marl, Brick Earth, Agate, Calcareous Shale, Dolerite, etc. so the resources against which all the data was available are considered for National Compilation of Natural Resources Accounting Report 2020-21 for the State of Gujarat.
- Energy and Petrochemical Department has provided the entire data on Crude Oil and Natural Gas (2 Fossil Minerals).
- As per Guidelines by GASAB, the inclusion of data related to remaining Resources during subsequent years is under discussion with Office of the Commissioner of Geology and Mining, Gujarat.
- List of mineral included in the Asset Account is shown below:

List of Mineral Resources included in the Asset Accounts			
Sr. No.		Name of Mineral	Geographical availability in the State
1.	Major Mineral	Bauxite	Kutch, Jamnagar, Bhavnagar, Amreli, Junagarh, Porbandar, Sabarkantha, Valsad, Kheda
2.		Lignite	Kutch, Bharuch, Surat, Bhavnagar
3.		Limestone	Kutch, Porbandar, Junagadh, Amreli, Bhavnagar, Dahod, Panchmahal, Bharuch, Narmda, Surat, Banaskantha, Sabarkantha, , Surendranagar, Kheda
4.		Manganese	Panchmahal, Vadodara
5.	Minor Mineral	Bentonite	Amreli, Patan, Bhavnagar, Bharuch, Jamnagar, Kachchha, Mehsana, Sabarkantha, Kheda, Surendranagar, Porbandar
6.		Calcite	Amreli, Bhavnagar, Rajkot, Junagadh, Banaskantha and Jamnagar district
7.		Chalk	Porbandar, Rajkot
8.		China clay	Mahesana, Patan, Sabarkantha, Surat, Panchmahal, Kutch, Amreli.
9.		Dolomite	Kutch, Navsari, Chhota Udaipur, Vadodra, Jamnagar, Kheda.
10.		Fire clay	Amreli, Kutch, Mehsana, Panchmahal, Sabarkantha, Surendranagar, Rajkot, Surat and Morbi.
11.		Granite	Panchmahal, Vadodara, Sabarkantha, Banaskantha, Mehsana and Rajkot.
12.		Gypsum	Kutch.
13.		Marble	Banaskantha, Vadodara, Kutch.
14.		Quartz	Panchmahal, Dahod, Aravalli.
15.		Sandstone	Vadodara, Surendranagar, Morbi, Kutch.
16.		Silica Sand	Kutch, Surendranagar, Bharuch,
17. & 18.	Fossil Mineral	Crude Oil and Natural Gas	Surat, Bharuch, Vadodara, Anand, Kheda, Ahmedabad, Gandhinagar, Mehsana

CHAPTER 5

ASSET ACCOUNT OF MINERAL AND ENERGY RESOURCES OF GUJARAT

5.1.1 Scope

The first Natural Resource Asset Account of the State of Gujarat for the year 2020-21 covers 18 minerals out of 41 mineral resources (04 major minerals, 12 minor minerals and 02 fossil fuel minerals). All the minerals where revenue was realised during the year 2020-21 were covered.

5.1.2 Objectives

- To prepare the Asset Account of mineral and energy resources of the State 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-set on availability, usage and sustainability of mineral for evidence-based decision making, and
- To provide inputs for monitoring the progresses towards national commitment made at the COP 26 on generation and usage of renewable energy resources.

5.1.3 Methodology of data collection and compilation of physical flows

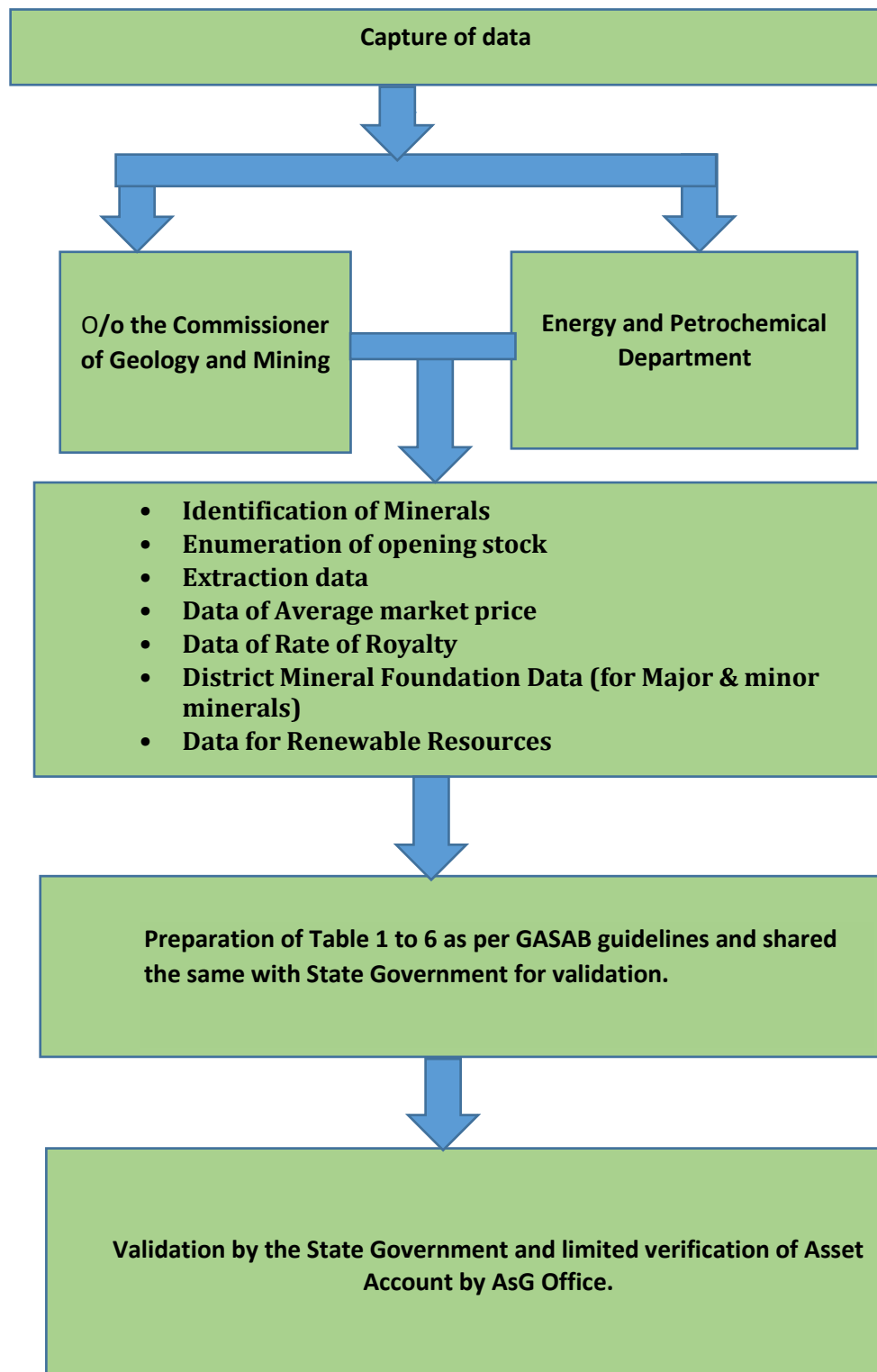
Data collection methodology

As per guidelines of GASAB, the preparation of Asset Accounts included three vital parts *viz.*

1. Identification major minerals contributing revenues to State exchequer
2. Enumeration of the opening stock and
3. Reduction in minerals due to exploitation/extractions

The opening stock of minerals and extractions during the period of Asset Accounts were provided from the Administrative Departments governing the resources *i.e.* CGM for major and minor minerals and EPCD for fossil minerals were provided.

Flow chart showing compilation of data



Methodology adopted for collection of data by Office of the Commissioner of Geology and Mining, Gujarat

- Source data is collected from Mineral Treasures of Gujarat book *i.e.* Reserves till 2002-2003 (which is derived from exploration reports of Office of the Commissioner of Geology and Mining, Gujarat).
- From 2003-2015 reserves data is considered from various departmental exploration schemes undertaken by Office of the Commissioner of Geology and Mining, Gujarat.
- Details of dispatch and royalty from 2003-04 to 2012-2013 was compiled from districts and was provided by the office of the CGM.
- Details of dispatch and royalty from 2013-14 to 2020-21 was compiled online from Integrated Lease Management System (ILMS) branch of Office of the Commissioner of Geology and Mining, Gujarat.
- Opening Balance as on 01.04.2015 was calculated for 16 minerals by compiling all the aforementioned information.

Detail of mineral-wise leases included in Asset Account 2020-21

SR NO	MINERAL	NO OF DISTRICT	NO OF LEASES
1	Bauxite	7	137
2	Limestone	11	255
3	Lignite	4	17
4	Manganese Ore	1	1
5	Sandstone	4	248
6	Granite	6	88
7	Marble	2	36
8	Bentonite	4	331
9	Silica Sand	6	71
10	Dolomite	2	71
11	China Clay	5	102
12	Fire Clay	5	61
13	Chalk	4	135
14	Gypsum	2	5
15	Calcite	3	4
16	Quartz	4	48
	Total	70	1610

Methodology adopted for collection of data by Directorate of Petroleum

- Any Lease governed by Petroleum and Natural Gas Rules (1959) and as per Rule 14 (2) lessee has to submit monthly return (Production Statement) within seven days of every month for the crude oil, natural gas produced during preceding month.
- Office of Directorate of Petroleum receives the above details every month for each mining lease granted by the Energy & Petrochemicals Department. An annual statement is prepared thereafter.
- The data of the fossil fuels were compiled from the above monthly / Annual reports.

Challenges, limitations for working out the opening stock of mineral resources

1. Opening stock of major and minor minerals were not readily available with CGM office.
2. NRA being new concept, data required for all input table were not available.
3. There were gaps in co-ordination with IBM which delayed data inputs.
4. Average sale price of fossil fuels could not be worked out.

The opening stock resources were obtained from O/o the Commissioner of Geology and Mining & Directorate of Petroleum, Gujarat to proceed with the preparation of Draft Asset Accounts.

The constraint were collection and compilation from 32 districts which was time consuming.

Due to good co-ordination with the Office of the Commissioner of Geology and Mining, Gujarat, Office of the Principal Accountant General (A&E), Gujarat could prepare the Asset Account 2020-21 by due dates.

Methodology of working out the opening stock of resources

As per GASAB guidelines, opening stock of resources was worked out as per methodology provided in Table -12 of Concept Paper issued in July 2020 as stated below.

The yearly dispatch data for 16 minerals and growth in stock for 2 minerals from 2015-16 to 2020-21, were available with Commissioner of Geology & Mining. Total extractions of resources during the aforesaid period were deducted from the Opening stock (as on 01-04-2015) and growth of resources were added to arrive at the closing stock of Mineral resources as on 31-03-2021.

5.1.4 Methodology of monetisation of physical flows

Average Sale price / Average market price value of products

Average Sale price / Average market price value of products available in Indian Bureau of Mines site for Major Minerals are with reference to the grade of minerals. Since, the Grade wise details for resources are not provided by Office of the Commissioner of Geology and Mining, Gujarat, therefore, after due consultation with State Government the average of all grade of respective mineral was taken into consideration while valuing the resources.

Since, the Average market price and Royalty rate for Lignite, was not available in Indian Bureau of Mines site, the same was obtained from Gujarat Mineral Development Corporation. However, the rates were with reference to the Grade of Lignite during the year 2020-21. Therefore, after consultation with Office of the Commissioner of Geology and Mining, Gujarat the average of highest rates was considered while valuing Lignite.

Further, State Government office has provided the rate of royalty & price per metric tonne of minor mineral which was considered.

For Fossil mineral, State Government office has provided with the total amount of royalty received. As informed by Energy and Petrochemical Department price per metric tonne cannot be prefixed. So, valuation of fossil mineral could not be worked out.

5.1.5 Dual stage validation and limited verification of data

After the preparation of Asset Accounts 2020-21, the Draft Asset Account was validated by the State Government Department and after that limited verification was again carried out by AsG office through following dual validation and verification.

First by the concerned Departments of State Government then limited verification by Office of the Principal Accountant General (Audit-II), Gujarat.

The process of dual validation by the above offices is discussed in the following paras:

Validation of data by Directorate of Petroleum (first stage)

The details available with Directorate of Petroleum, Gujarat were made available for the period 2015-16 to 2020-21 to the Audit party. Also, requisition of data as required by the audit party was made available to them for validation.

The Validation from Directorate of Petroleum has been completed and forwarded to Office of Pr. Accountant General (A&E), Gujarat.

Validation of data by office of Commissioner of Geology and Mining, Gujarat (first stage)

- **Initial validation** by Office of Commissioner of Geology and Mining, Gujarat was done timely.
- **Second validation:** Office of Principal Accountant General (Audit-II), Gujarat, Ahmedabad, raised few queries regarding Exploration data, figures of dispatch and royalty.
- Considering the same, Office of Commissioner of Geology and Mining, Gujarat revised and provided the Opening Balance for 16 minerals and duplicate entries were omitted. Also, there was some technical error issues and discrepancies in data belonging to newly formed districts.
- There was mismatch in data provided by Office of Commissioner of Geology and Mining, Gujarat and District office working under Geology and Mining department. For royalty figures, it was noticed that data of royalty provided by Office of Commissioner of Geology and Mining, Gujarat is including other heads like DMF, TCS, NMET etc. and for dispatch data there occurred some technical issues.
- Resolving all the queries, revised Opening Balance and Exploration data along with correspondence was shared to Office of Principal Accountant General (Audit-II), Gujarat.

Verification of data by Audit (second stage)

For the second stage verification of data, asset accounts of mineral and energy resources prepared by the Office of the Principal Accountant General (A&E) Gujarat, Rajkot were forwarded to the Office of the Principal Accountant General (Audit-II), Gujarat, Ahmedabad.

5.2 Asset Accounts on mineral and energy resource

The preparation of Asset Accounts 2020-21 was based on three main aspects viz. 1. ascertaining the opening stock of resources 2. information on physical flows or additions and reductions during the year 3. monetising the physical flows of resources.

Further, the four components of preparation of Asset Accounts were classified under three distinct categories *i.e.*

1. Mandatory activities during the period 2. Recommended activities and 3. Desirable Activities.

1. Physical Flows (mandatory)
2. Monetising the extractions (mandatory)
3. Finalisation of Asset Accounts and validations (mandatory)
4. Working out of Opening stock (recommended)
5. Include other information on illegal mining (desirable)

While preparing the Asset Accounts 2020-21 the mandatory categories from Serial No. 1 to 3 were invariably worked out. However, working out of opening stock was prepared from the data provided by the department administering the resources and due to paucity of time the District-wise information on illegal mining could not be compiled. The Mineral-wise data on illegal mining will be incorporated in the Asset Accounts of 2021-22.

5.2.1 Highlights

The Asset Account for the year 2020-21 including methodology of working out of opening balances of mineral resources was tabulated in the formats mentioned below: -

- **Methodology** of working out the opening balance with available information
- **Table 1:** Basic Asset Accounts on Mineral & Energy Resources.
- **Table 2:** Asset Accounts on physical flows of Mineral and Energy Resources along with sustainability of resources.
- **Table 2A:** Riverine resources - physical flows.
- **Table 2B:** Riverine resources – Valuations.
- **Table 3:** Subsidiary Asset Accounts linking detailed physical flows in respect of Mineral and Energy Resources with the valuation of resources.
- **Table 3A-** Data on illegal Mining.
- **Table 4:** Analysis of Extraction Production and Dispatch of Resources.
- **Table 5:** Collection of District Mineral Foundations (DMF).
- **Table 6:** Progress in generation and use of renewable and non-renewable energy resources.

Apart from the table formats prescribed by GASAB, the Comparative Table between the data of Indian Bureau of Mines and Commissioner of Geology and Mining, Gujarat has been prepared for the study of variation between figures.

5.2.2 Asset Account – the tables

Table for working out Opening Balance as on 01.04.2020												
Name of minerals	TYPE	UNIT	Opening stock as on 1 April 2015	Annual Dispatch (in MT) during							Closing stock as on 31 March 2020	
				2015-16	Addition of 2015-16	2016-17	2017-18	2018-19	Addition of 2018-19	2019-20		Addition of 2019-20
Major Mineral												
Bauxite		MT	43689860.61	8919641.48		3615187.589	2008174.296	2511604.849		1729460.44		24905791.96
Lignite		MT	3564505570	10105533.61		10549979.68	13780553.41	13096290.91		11176014.08		3505797198
Limestone Major		MT	58363659162	17997439.99	1083500000.00	17975961.36	18768883.16	19857658.67	169000000.00	17560149.30		59523999069.52
Manganese Ore		MT	1678987.775	46136.235		43074.23	52544.94	48713.68		68750.69		1419768
Fossil Fuel												
Natural Gas		cubic meter	No need to calculate as Opening Balance as on 01/04/2020 has been provided by Directorate of Petroleum, Gujarat.									5713000000
Crude Oil		MT										118600000
Minor Mineral												
Bentonite		MT	88844286.99	2065008.41		2440230.628	2602174.611	2893325.762		2775714.359		76067833.22
Calcite		MT	53641	21		32.5	0	0		0		53587.5
Chalk		MT	153620467.9	145614.896		167365.789	170463.579	180666.336		138891.385		152817465.9
China Clay		MT	283347304.7	4773789.08		4132111.112	3810213.513	3825340.598		4798889.539	5000000	267006960.9
Dolomite		MT	1889570186	938650.061		883506.597	998308.691	970028.879		855576.268		1884924116
Fire Clay		MT	151487122.1	629686.812		513099.924	649672.213	612479.871		617916.597		148464266.7
Granite		MT	18968983790	222343.244		315907.939	326592.946	413883.634		492829.341		18967212233
Gypsum		MT	3329774	8		56	32	14.85		34.28		3329628.87
Marble		MT	253501754.9	853313.05		983399.782	943499.587	1072975.07		897546.696		248751020.7
Quartz		MT	14874068.86	341019.831		268152.659	262293.799	280920.784		261479.099		13460202.69
Sandstone		MT	1362569749	523430.613		626611.624	562412.768	659691.975		777580.414		1359420022
Silica Sand		MT	972528340.7	1581438.6		1518404.64	1571671.863	1919343.948		1570772.289		964366709.4
Opening stock of Major & Minor Minerals as on 1 April 2015 is incorporated in the tables as per Key Documents received from CGM Office.												
Dispatch Figures are incorporated in the tables as per Key Documents received from CGM Office.												

Table 1
Basic Asset Accounts on Mineral & Non-renewable Energy Resources for the year 2020-21

Name of Resources									
Particulars	Bauxite	Lignite	Limestone Major	Manganese Ore	Natural Gas	Crude Oil	Bentonite	Calcite	Chalk
Opening Stock of Environmental Asset as on 01.04.2020	24905791.96	3505797198	59523999070	1419768	57130000000	118600000	76067833.22	53587.5	152817465.9
Growth in stock	5530000	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Discovery in New Stock	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Upward Reappraisal	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Reclassification	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Total Addition to Stock	5530000	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Reduction									
Extraction during the year 2020-21	1658341.26	21613057.15	17524964.02	57569.39	685470142.9	4467741.239	3036288.74	0.00	135634.58
Normal Loss of Stock	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Catastrophic losses	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Downward Reappraisal	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Reclassification	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Total Reduction in Stock	1658341.26	21613057.15	17524964.02	57569.39	685470142.9	4467741.239	3036288.74	0.00	135634.58
Valuation/Revaluation of the Stock									
(Revenue Receivable/Actual Market Price)	41055058840.76	5288991526296.06	25698295888705.50	13467300708.07	N.A.	N.A.	32133879569.88	32152500.00	101533417837.78
Closing Stock of Environmental Asset (as on 31.03.2021)	28777450.70	3484184141.17	59506474105.50	1362198.61	56444529857	114132258.8	73031544.48	53587.50	152681831.34

Continued...

Table 1

Basic Asset Accounts on Mineral & Non-renewable Energy Resources for the year 2020-21

Particulars	Name of Resources									
	China Clay	Dolomite	Fire Clay	Granite	Gypsum	Marble	Quartz	Sandstone	Silica Sand	
Opening Stock of Environmental Asset as on 01.04.2020	267006960.9	1884924116	148464266.7	18967212233	3329628.87	248751020.7	13460202.69	1359420022	964366709.4	
Growth in stock	3040000	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Discovery in New Stock	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Upward Reappraisal	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Reclassification	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Total Addition to Stock	3040000	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Reduction										
Extraction during the year 2020-21	4895354.08	1063401.74	615426.83	373153.57	0.00	659432.78	266886.32	1123365.03	1597307.73	
Normal Loss of Stock	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Catastrophic losses	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Downward Reappraisal	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Reclassification	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Total Reduction in Stock	4895354.08	1063401.74	615426.83	373153.57	0.00	659432.78	266886.32	1123365.03	1597307.73	
Valuation/Revaluation of the Stock (Revenue Receivable/Actual Market Price)	107386400747.12	843969599764.93	33265989966.48	23898217239945.70	898999794.90	855915978393.00	4461716200052.70	679148328286.00	216623115366.53	
Closing Stock of Environmental Asset (as on 31.03.2021)	265151606.78	1883860713.76	147848839.85	18966839079.32	3329628.87	248091587.9	13193316.37	1358296657	962769401.6	

Continued...

Note

Extraction figures are the Dispatch figures provided by CGM office.
Valuation of Fossil Minerals are in Dollars & the figures provided by Directorate of Petroleum.
Minerals units are in Metric Tonne and Natural Gas is in Cubic Meter.
Bauxite price has been taken for Refractory Grade as CGM majority works on Refractory Grade.
Average sales price has calculated as sum of amount of respective Month /No. of months where data is available.
Average Sales Price has been taken from Mineral year book of BM for the year 2020-21.
NA represents data not available in IBM site.
For average sales price of Major Mineral Limestone, calculations are based on cement grade.
For Major Mineral Manganese Ore the calculation is carried out on the basis of grade i.e. 35% to below 46%

Table-2											
Asset Accounts on physical flows of mineral and non-renewable energy resources along with sustainability of resources for the Year 2020-21											
Classification	Sub-Classification	Source of Opening Balance	unit	Opening stock of proved reserves as on 01-04.2020	Addition to stock	Reduction in stock				Closing stock of proved reserves 31.03.2021	Sustainability of resources in years.
						Extracted by/for		Other extractions	Total extraction in F.Y. 2020-21		
						Govt Sector	Private Sector				
Major Mineral	Bauxite	CGM	MT	24905791.96	5530000	388878.34	1269462.92	N.A.	1658341.26	28777450.70	17
	Lignite	CGM	MT	3505797198	N.A.	10788493.35	10824563.80	N.A.	21613057.15	3484184141.17	161
	Limestone Major	CGM	MT	59523999069.52	N.A.	7680.39	17517283.63	N.A.	17524964.02	59506474105.50	3396
	Manganese Ore	CGM	MT	1419768	N.A.	57569.39	0.00	N.A.	57569.39	1362198.61	24
Fossil fuel	Natural Gas	DoP	cubic meter	57130000000	N.A.	641093106.80	33943928.05	10433108.00	685470142.85	56444529857	82
	Crude Oil	DoP	MT	118600000	N.A.	4391723.11	57539.83	18478.31	4467741.24	114132258.8	26
Minor Mineral	Bentonite	CGM	MT	76067833.22	N.A.	44174.27	2992114.47	N.A.	3036288.74	73031544.48	24
	Calcite	CGM	MT	53587.5	0.00	0.00	0.00	0.00	0.00	53587.50	N.A.
	Chalk	CGM	MT	152817465.9	N.A.	N.A.	135634.58	N.A.	135634.58	152681831.34	1126
	China Clay	CGM	MT	267006960.9	3040000	N.A.	4895354.08	N.A.	4895354.08	265151606.78	54
	Dolomite	CGM	MT	1884924116	N.A.	N.A.	1063401.74	N.A.	1063401.74	1883860713.76	1772
	Fire Clay	CGM	MT	148464266.7	N.A.	N.A.	615426.83	N.A.	615426.83	147848839.85	240
	Granite	CGM	MT	18967212233	N.A.	N.A.	373153.57	N.A.	373153.57	18966839079.32	50829
	Gypsum	CGM	MT	3329628.87	N.A.	N.A.	N.A.	N.A.	0.00	3329628.87	N.A.
	Marble	CGM	MT	248751020.7	N.A.	N.A.	659432.78	N.A.	659432.78	248091587.9	376
	Quartz	CGM	MT	13460202.69	N.A.	N.A.	266886.32	N.A.	266886.32	13193316.37	49
	Sandstone	CGM	MT	1359420022	N.A.	N.A.	1123365.03	N.A.	1123365.03	1358296657	1209
Silica Sand	CGM	MT	964366709.4	N.A.	22319.91	1574987.82	N.A.	1597307.73	962769401.6	603	
Total extraction figures of Major & Minor Minerals during the year 2020-21 is Dispatch figures provided by CGM Office, Gandhinagar.											
Sustainability of resources has been arrived at by dividing the closing stock as on 31/03/2021 with Dispatch figures of year 2020-21.											

Calculation of Sustainability of resources worked out as per Table -2 which displays the number of reserves available at the end of the year. For case study, some minerals such as Bauxite, Manganese ore, Bentonite, China clay and Quartz which were showing the sustainability below 100 years were taken as samples for analysis.

**Table showing sustainability of selected minerals
Where sustainability below 100 years**

Years	Bauxite	Manganese Ore	Bentonite	China Clay	Quartz
2020-21	17	24	24	54	49

Table 2A									
Riverine Resources-Physical Flows for the year 2020-21									
Classification	Grade wise sub-classification (may vary from state to state)	Available reserves at the beginning of the year (as per mining plans) as on 01-04.2020	Accumulation during the year	Reduction in Stock				Remaining reserve at the end of the year as on 31.03.2021	Sustainability of resources in years (if ascertainable)
				Extracted by/ for		Other Extraction including exports	Total Extraction for the year 2020-21		
				Govt. Sector	Private Sector				
Riverine Resources		(in tonnes/cum - as the case may be)							
	Ordinary Sand	N.A.	N.A.	N.A.	56485099.21	477587.01	56962686.22	N.A.	N.A.
	Others								
Total extraction of Major & Minor Minerals during the year 2020-21 is Dispatch figures provided by CGM Office, Gujarat.									
Extraction Figures are in Metric Tonne.									
N.A. stands for Not Available with CGM Office.									
Data for illegal mining provided by CGM Office from 3 districts is added with data provided by Audit from 30 districts and incorporated in Other Extraction figures Column.									
Audit Figure	465234.48								
CGM Figure	12352.53								
Total Figure	477587.01								

Table- 2B							
Riverine resources - Valuations for the year 2020-21							
Particulars	Grade wise sub-classification (may vary from state to state)	Physical unit Extracted showing Govt, Private and other sector as in table 2A for the year 2020-21	Valuation of Resources			District Mineral Foundation	
			Revenue	Total revenue	Average Market	Amount	Amount
Ordinary Sand	N.A.	56485099.21	2259403968.40	2259403968.40	13556423810.40	225940396.8	Not provided Mineral Wise
Others							
N.A. Stands for Not Available with CGM office.							
Royalty for Ordinary Sand is Rs. 40/ MT							
DMF Receivable is taken as 10% of Royalty Receivable Column.							
Average market value is Rs. 240/- MT as per industries and mines notification.							

Table 3								
Subsidiary Asset Accounts linking detailed physical flows in respect of mineral and non- renewable energy resources with the valuation of resources.2020-21								
Particulars	Classification of minerals (as per the priorities of the State Governments)	Physical unit (in tonnes/cum) extracted showing Govt, Private and other sector	Rate of Royalty (in rupees)	Revenue receivable (in rupees) showing Govt, Private and other sector	Total revenue implications	Average Market value (as ascertained from the IBM or State Statistical Department)Rs.	Price Per metric Tonne (as per CGM/IBM)	Grade of Minerals as per CGM
Opening stock/availability of resources at the beginning of the year(as 01-apr-2020)	Major Mineral							
	Bauxite	24905791.96				36501928689.25	1465.6	
	Lignite	3505797198				5321800147046.72	1518	
	Limestone Major	59523999070				25705864169595.90	431.8571429	
	Manganese Ore	1419768				14036457276.74	9886.444318	
	Fossil Fuel							
	Natural Gas	57130000000						
Crude Oil	118600000							
Additions during the year:	Major Mineral							
	Bauxite	5530000		Nil	Nil	Nil		
	Lignite	Nil		Nil	Nil	Nil		
	Limestone Major	Nil		Nil	Nil	Nil		
	Manganese Ore	Nil		Nil	Nil	Nil		
Fossil Fuel	Nil		Nil	Nil	Nil			
Growth in Stock Discoveries of new stock	Major Mineral	Nil		Nil	Nil	Nil		
	Fossil Fuel	Nil		Nil	Nil	Nil		
Reclassifications		Nil		Nil	Nil	Nil		
Total Addition :		5530000		Nil	Nil	Nil		
Actual reductions during the year:	Major Mineral	Nil		Nil	Nil	Nil		
	Fossil Fuel	Nil		Nil	Nil	Nil		
Extractions as reported by the State Government Department of Geology & Mining (on recovery of royalty, cess, fees, NPV etc)	Major Mineral							
	Bauxite	1658341.26		385265246.3	2878803601			
	Lignite	21613057.15		513879417.4				
	Limestone Major	17524964.02		1977395023				
	Manganese Ore	57569.39		2263914.05				
	Fossil Fuel							
Natural Gas	685470142.9		584187008		56638422.813\$			
Crude Oil	4467741.239		14930638710		1265285764.32\$			
Other extractions, not taxed (if any)								
Normal reduction in stock								
Catastrophic losses including natural and manmade disasters								
Downward reappraisals								
Reclassifications								
Production loss								
Exports								
Reduction due to mining activities not approved by Deptts \$								
Total reduction:								
Closing Stock on 31/03/2021	Major Mineral							
	Bauxite	28777450.70				41055058840.76	1426.639881	
	Lignite	3484184141.17				5288991526296.06	1518	
	Limestone Major	59506474105.50				25698295888705.50	431.8571429	
	Manganese Ore	1362198.61				13467300708.07	9886.444318	
	Fossil Fuel							
	Natural Gas	56444529857						
Crude Oil	114132258.8							

Opening stock/availability of resources at the beginning of the year(as 01-apr-2020)	Minor Mineral							
	Bentonite	76067833.22	110.00	8367461653.87		33469846615.48	440.00	
	Calcite	53587.5	60.00	3215250.00		32152500.00	600.00	
	Chalk	152817465.9	95.00	14517659261.93		101623614833.48	665.00	
	China Clay	267006960.9	45.00	12015313238.70		108137819148.30	405.00	Crude
	Dolomite	1884924116	75.00	141369308662.80		844446003745.79	448.00	Lumps
	Fire Clay	148464266.7	45.00	6680892000.74		33404460003.68	225.00	
	Granite	18967212233	210.00	3983114568908.16		23898687413449.00	1260.00	Block
	Gypsum	3329628.87	45.00	149833299.15		898999794.90	270.00	
	Marble	248751020.7	230.00	57212734764.45		858191021466.75	3450.00	Block
	Quartz	13460202.69	60.00	807612161.28		4038060806.40	300.00	
	Sandstone	1359420022	50.00	67971001080.30		679710010803.00	500.00	
Silica Sand	964366709.4	45.00	43396501921.34		216982509606.68	225.00		
Additions during the year:	Minor Mineral		Nil	Nil	Nil			
	China Clay	3040000						
Growth in Stock Discoveries of new stock	Minor Mineral	Nil	Nil	Nil	Nil			
Total Addition :		3040000	Nil	Nil	Nil			
Actual reductions during the year:	Minor Mineral	Nil		Nil	Nil	Nil		
Extractions as reported by the State Government Department of Geology & Mining (on recovery of royalty, cess, fees, NPV etc)	Minor Mineral							
	Bentonite	3036288.74	110	333991761.40		1335967045.60	440	
	Calcite	0.00	60	0.00				
	Chalk	135634.58	95	12885285.10		90196995.70	665	
	China Clay	4895354.08	45	220290933.47		1982618401.19	405	Crude
	Dolomite	1063401.74	75	79755130.73		476403980.86	448	
	Fire Clay	615426.83	45	27694207.44		138471037.20	225	
	Granite	373153.57	210	78362250.54		470173503.24	1260	
	Gypsum	0.00	45	0.00				
	Marble	659432.78	230	151669538.25		2275043073.75	3450	
	Quartz	266886.32	60	16013179.14		80065895.70	300	
	Sandstone	1123365.03	50	56168251.70		561682517.00	500	
Silica Sand	1597307.73	45	71878848.03		359394240.15	225		
Other extractions, not taxed (if any)								
Normal reduction in stock								
Catastrophic losses including natural and manmade disasters								
Downward reappraisals								
Reclassifications								
Production loss								
Exports								
Reduction due to mining activities not approved by Depts \$								
Total reduction:								
Closing Stock as on 31/03/21	Minor Minerals							
	Bentonite	73031544.48	110	8033469892.47		32133879569.88	440	
	Calcite	53587.50	60	3215250.00		32152500.00	600	
	Chalk	152681831.34	95	14504773976.83		101533417837.78	665	
	China Clay	265151606.78	45	11931822305.24		107386400747.12	405	
	Dolomite	1883860713.76	75	141289553532.08		843969599764.93	448	
	Fire Clay	147848839.85	45	6653197793.30		33265988966.48	225	
	Granite	18966839079.32	210	3983036206657.62		23898217239945.70	1260	
	Gypsum	3329628.87	45	149833299.15		898999794.90	270	
	Marble	248091587.9	230	57061065226.20		855915978393.00	3450	
	Quartz	13193316.37	60	791598982.14		3957994910.70	300	
	Sandstone	1358296657	50	67914832828.60		679148328286.00	500	
Silica Sand	962769401.6	45	43324623073.31		216623115366.53	225		
Notes	Average Price for the financial year 2020-21 are - (1) Crude Oil - 44.32\$/Bbl (2) Natural Gas - 2.34\$/MMBTU. The data received from Energy and Petrochemical Department.							
	Average market value of Minor Minerals is calculated on basis of Price per Metric tonne given by O/o the CGM,							
	Average Market value of Major Mineral is calculated on the basis of Average sales price published by IBM.							
	Formula for working out Revenue Receivable= Physical quantity * Rate of Royalty given by IBM/CGM							
	Formula for working out Average Market Value= Physical quantity * Price per Metric Tonne given by CGM/IBM							
Average market value for Lignite has been taken from GMDC. The grade wise data provided by GMDC. However we have The Department could not provide grade-wise production of resources.								

Table -3 A									
Table showing information on Illegal Mining. (Please show casewise details) for the year 2020-21									
Name of State	Name of district in which detected	No of cases Minor minerals involved	No of cases Major minerals involved	Name of Mineral involved	Volume of Minor minerals involved	Volume of Major minerals involved	Royalty involved	Penalty collected Minor mineral (in crore)	Penalty collected Major mineral (in crore)
Gujarat	Ahmedabad	241	0	N. A.	59938.48	0.00	0.00	4.29	0.00
	Gandhinagar	223	0	N. A.	63934.197	0.00	0.00	2.2992	0.00
	Banaskantha	310	0	N. A.	46048	0.00	0.00	4.714	0.00
	Bhavnagar	224	0	N. A.	21282.345	0.00	0.00	2.3322	0.00
	Bharuch	149	0	N. A.	61630.645	0.00	0.00	2.6495	0.00
	Patan	248	0	N. A.	11800.622	0.00	0.00	2.4888	0.00
	Dahod	116	0	N. A.	4208.26	0.00	0.00	1.0863	0.00
	Panchmahal	238	0	N. A.	21312.61	0.00	0.00	2.65	0.00
	Jamnagar	139	1	N. A.	4836.496	32	0.00	1.41	0.0041
	Junagadh	213	8	N. A.	19225.89	627.86	0.00	2.3771	0.1648
	Valsad	129	0	N. A.	14838.325	0.00	0.00	1.3281	0.00
	Sabarkantha	355	0	N. A.	26869.67	0.00	0.00	4.3278	0.00
	Navsari	133	0	N. A.	42450.68	0.00	0.00	2.0302	0.00
	Surendranagar	400	0	N. A.	63214.807	0.00	0.00	7.3234	0.00
	Rajkot	214	10	N. A.	25149.158	435.89	0.00	3.05	0.2042
	Surat	214	0	N. A.	93572.46	0.00	0.00	4.008	0.00
	Kheda	88	6	N. A.	6695.82	0.00	0.00	1.437	0.7232
	Anand	193	4	N. A.	30378.86	64.1	0.00	2.4236	0.0721
	Narmada	109	0	N. A.	11455.48	0.00	0.00	1.462	0.00
	Vadodara	255	0	N. A.	228018.22	0.00	0.00	4.5115	0.00
	Porbandar	119	10	N. A.	8777.815	3869.41	0.00	1.10	0.0728
	Amreli	339	0	N. A.	33236.3	0.00	0.00	2.39	0.00
	Kutch East	195	1	N. A.	87732.22	1910	0.00	3.10	0.0812
	Kutch West	249	6	N. A.	78851.698	2986.6	0.00	3.43	0.2074
	Tapi	161	0	N. A.	26805.18	0.00	0.00	2.2998	0.00
	Mehsana	137	0	N. A.	63497.217	0.00	0.00	1.9742	0.00
	FS Rajkot	12	0	N. A.	433.5	0.00	0.00	0.1402	0.00
	Aravali	103	0	N. A.	3352.64	0.00	0.00	1.3895	0.00
	Morbi	226	0	N. A.	65752.614	0.00	0.00	5.06	0.00
	Mahisagar	75	0	N. A.	7821.836	0.00	0.00	0.8435	0.00
	Botad	106	0	N. A.	2761.32	0.00	0.00	0.9875	0.00
	Devbhumi dwarka	177	26	N. A.	354993.18	110261.32	0.00	1.4763	1.7218
	Gir somnath	189	15	N. A.	13416.774	324.45	0.00	1.2796	0.1099
chhotaudepur	508	0	N. A.	153294.646	0.00	0.00	9.3601	0.00	
FS Gandhinagar	226	0	N. A.	148850.42	0.00	0.00	5.4983	0.00	
FS Bhuj	49	0	N. A.	601.04	0.00	0.00	0.72	0.00	
Total		7062	87	N. A.	1907039.43	120511.63	0.00	99.24	3.36
Total								102.60	
Note:- The data provided by CGM Office has been taken as base data. The Mineral wise data is not provided by CGM office.									
The amount is in Crores.									

Table 4									
Table showing analysis of extraction, production and dispatch of Resources for the year 2020-21									
Name of Resources with Detailed Grades	Opening Stock at the beginning of the Year (as on 01.04.2020)		Extractions during the year 2020-21	Productions during the year 2020-21	Production loss/ Variations between extraction and production		Dispatch during the year 2020-21	Closing Stock at the end of the year (as on 31.03.2021)	
	Raw/Ores	Finished Products			In volume	In Percent		Raw/Ores	Finished Products
	Physical Unit						Physical Unit		
Major Mineral									
Bauxite	24905791.96	N.A.	N.A.	1945851	N.A.	N.A.	1658341.26	28777450.70	N.A.
Lignite	3505797198	N.A.	N.A.	11779041	N.A.	N.A.	21613057.15	3484184141.17	N.A.
Limestone Major	59523999070	N.A.	N.A.	35657570	N.A.	N.A.	17524964.02	59506474105.50	N.A.
Manganese Ore	1419768	N.A.	N.A.	57569	N.A.	N.A.	57569.39	1362198.61	N.A.
Fossil Fuel									
Natural Gas	57130000000	N.A.	N.A.	N.A.	N.A.	N.A.	685470142.85	56444529857	N.A.
Crude Oil	118600000	N.A.	N.A.	N.A.	N.A.	N.A.	4467741.24	114132258.8	N.A.
Minor Mineral									
Bentonite	76067833.22	N.A.	N.A.	2833690	N.A.	N.A.	3036288.74	73031544.48	N.A.
Calcite	53587.5	N.A.	N.A.	0.00	N.A.	N.A.	0.00	53587.50	N.A.
Chalk	152817465.9	N.A.	N.A.	148236	N.A.	N.A.	135634.58	152681831.34	N.A.
China Clay	267006960.9	N.A.	N.A.	4388384	N.A.	N.A.	4895354.08	265151606.78	N.A.
Dolomite	1884924116	N.A.	N.A.	1113894	N.A.	N.A.	1063401.74	1883860713.76	N.A.
Fire Clay	148464266.7	N.A.	N.A.	596755	N.A.	N.A.	615426.83	147848839.85	N.A.
Granite	18967212233	N.A.	N.A.	423745	N.A.	N.A.	373153.57	18966839079.32	N.A.
Gypsum	3329628.87	N.A.	N.A.	0.00	N.A.	N.A.	0.00	3329628.87	N.A.
Marble	248751020.7	N.A.	N.A.	634256	N.A.	N.A.	659432.78	248091587.9	N.A.
Quartz	13460203	N.A.	N.A.	265145	N.A.	N.A.	266886.32	13193316.37	N.A.
Sandstone	1359420022	N.A.	N.A.	1124565	N.A.	N.A.	1123365.03	1358296657	N.A.
Silica Sand	964366709.4	N.A.	N.A.	9099512	N.A.	N.A.	1597307.73	962769401.6	N.A.
Note: The Department could not provide bifurcation of extraction, production and dispatch.									

Table 5						
Table showing analysis of District Mineral Foundation for the year 2020-21						
Name of Mine/Mineral/District	Volume of minerals on which DMF was realisable for the year 2020-21	Rate at which DMF realisable	Total DMF realisable	Total DMF realised	Variation, if any	
					in Rs. (in Lakhs)	in Percentage
AHMEDABAD	2687820.481	30% or 10%	93.183	83.312	9.871	10.59
AMRELI	2714095.615	30% or 10%	1,435.478	1,609.140	-173.662	-12.10
ANAND	2169991.213	30% or 10%	97.772	94.945	2.826	2.89
ARAVALLI	12377403.98	30% or 10%	578.480	645.140	-66.660	-11.52
BANASKANTHA	14152692.3	30% or 10%	663.876	702.426	-38.550	-5.81
BHARUCH	15517649.31	30% or 10%	920.897	1,011.988	-91.091	-9.89
BHAVNAGAR	4877509.932	30% or 10%	422.601	425.053	-2.452	-0.58
BOTAD	1467180.374	30% or 10%	63.100	73.160	-10.060	-15.94
CHHOTAUDEPUR	16719077.99	30% or 10%	709.363	794.583	-85.220	-12.01
DAHOD	748695.872	30% or 10%	34.792	42.037	-7.246	-20.83
DEVBHUMIDWARKA	3595712.208	30% or 10%	707.933	1,028.689	-320.756	-45.31
GANDHINAGAR	5010813.741	30% or 10%	196.439	213.441	-17.002	-8.66
GIRSOMNATH	7311164.011	30% or 10%	1,793.950	1,991.928	-197.979	-11.04
JAMNAGAR	3194988.84	30% or 10%	411.286	309.514	101.771	24.74
JUNAGADH	4121414.457	30% or 10%	277.099	350.588	-73.489	-26.52
KACHCHH	31134331.72	30% or 10%	3,444.727	3,626.679	-181.952	-5.28
KHEDA	5304744.017	30% or 10%	385.051	346.640	38.411	9.98
MAHISAGAR	1480176.268	30% or 10%	215.827	242.274	-26.447	-12.25
MEHSANA	4363659.391	30% or 10%	67.212	47.016	20.196	30.05
MORBI	3608133.446	30% or 10%	162.899	137.869	25.030	15.37
NARMADA	423735.35	30% or 10%	19.345	29.721	-10.377	-53.64
NAVSARI	13138955.97	30% or 10%	532.614	533.938	-1.323	-0.25
PANCHMAHAL	7162947.605	30% or 10%	349.684	339.366	10.318	2.95
PATAN	1218657.019	30% or 10%	48.805	51.097	-2.292	-4.70
PORBANDAR	4808256.214	30% or 10%	1,203.787	1,221.985	-18.198	-1.51
RAJKOT	2585573.229	30% or 10%	128.006	168.337	-40.331	-31.51
SABARKANTHA	6248960.554	30% or 10%	408.235	441.582	-33.348	-8.17
SURAT	8131835.632	30% or 10%	672.087	835.229	-163.141	-24.27
SURENDRANAGAR	11265380.28	30% or 10%	503.958	497.975	5.984	1.19
TAPI	9373956.381	30% or 10%	363.175	434.286	-71.111	-19.58
VADODARA	18554868.45	30% or 10%	724.849	719.657	5.192	0.72
VALSAD	3221223.428	30% or 10%	134.924	150.943	-16.019	-11.87
Total	228691605.3		17,771.43	19,200.54	-1,429.11	-8.04
DMF data is provided by CGM Office. (Monetary terms shown are in Lakhs)						
DMF for Major Mineral is 30% and for Minor Mineral is 10%.						
District wise data provided by CGM so both the rates (30% and 10%) are mentioned here						
District wise dispatch figures are provided by CGM Office is taken as volume of Mineral.						

Table 6

Progress in generation and use of renewable energy resources for the year 2020-21

Sector	Sub Sector	Energy of sector during the year (in MWH)	Total Energy catered in the state (in MWH)	Generation energy during the year (in MWH)					Percentage share of non-renewable and renewable energy resources vis-à-vis total requirement		Reduction of Carbon emission as a result of increase in renewable energy usage over previous year (in volume/pc)	
				Renewable Energy				Total	Non-renewable	Renewable		
				Non-renewable energy/Fossil fuel sources (MWH)	Solar	Wind	Hydel					
Industries	Industries	41152260										
Domestic	JGY	16392055										
	URBEN	15254062										
Agriculture	Agriculture	23543337	116609907	101459252	4050960	9936750	1122149	40800	15150659	87	13	
Commercial		Nil										
Traction and Railways		Nil										
Others		20268193										

Others column include TAECO+TSECO+Aux.

Sources of data for preparation of Asset Account 2020-21:

The sources of information/data for filling the templates of Mineral and Energy Resources are as follows:

1. The Mineral year book of Indian Bureau of Mines for the year 2015-16 to 2020-21.
2. Office of the Commissioner of Geology and Mining, Gujarat.
3. Directorate of Petroleum, Gujarat.
4. Sources of data for valuation of resources were from respective departments in States and also the data on average sale/market price available on the website of Indian Bureau of Mines.
5. Average market value for Lignite has been taken from Gujarat Mineral Development Corporation.

Thus, to sum up, the Asset Accounts for year 2020-21 for the State of Gujarat was prepared by Office of the Principal Accountant General(A&E) as per target in January 2022 and shared with State Government Department and Audit office for dual validation process on 31 January 2022.

5.2.3 Findings of the study

Findings of the study are in the following points:

- The comparison between Dispatch figures provided by Office of Commissioner of Geology and Mining, Gujarat and Indian Bureau of Mines indicated variation ranged between 10% to 100% in some of the resources. Upon further analysis, it was found that the extraction data for one mineral i.e. Manganese ore was shown as NIL by IBM records but the CGM had positive figures for the same. The CGM figures were verifiable through royalty passes and other documents.
- Average Sale price / Average market price value of products available in Indian Bureau of Mines website for Major Minerals are with reference to the grade of minerals. Non-availability of Grade wise details for resources with the Commissioner of Geology and Mining, Gujarat hindered further analysis of revenues due vis-à-vis collected.
- Calculation of sustainability of resources (Table -2) indicates that some minerals such as Bauxite, Manganese ore, Bentonite, China clay and Quartz have sustainability below 100 years while sustainability of one mineral i.e. Bauxite was found to be less than 20 years.
- It is observed that after the notification of the Gujarat Mineral (Prevention of illegal Mining and Transportation and Storage) Rules 2016, there has been an upwards trend in the penalty levied on the illegal mining activities. In the year 2020-21, the total quantity of illegal mining detected by the State Government is approx. 20 MMT which is less than one *per cent* of total mineral resources extracted. ₹ 102.60 crore was collected as penalty from illegal miners.
- The state of Gujarat has come up with an Integrated Lease management system which is an award winning system for lease management as well as collection of royalty and filing returns. However, the mining plans in the State are yet to be digitised and linked with ILMS which may result in better and effective control of quantity allowed vis-à-vis actual extractions.
- The details of export of minerals is not readily available with the CGM office in absence of which the data could not be incorporated in table 2. However, limits and controls on the

same are exercised by the district geologist offices by keeping a record of no objection certificates issued for export.

- The information on extraction, production, production loss, grade-wise resources and reserves of riverine resources had not been incorporated in the Asset Accounts for 2020-21 by the CGM. However, the returns of the lessees contain the same information and the CGM has assured of incorporating the information from the Asset Account year 2021-22

5.2.4 Recommendations

The Study emanates the following recommendations:

- Steps may be taken for reconciliation of the data regarding extraction and production of minerals between IBM and CGM.
- Average Sale price / Average market price value of products available in Indian Bureau of Mines site for Major Minerals are with reference to the grade of minerals. The same may be incorporated in the subsequent asset accounts.
- Sustainability of resources needs to be considered while formulating policies related to mineral extraction especially Bauxite.
- Technological assistance like remote sensing and GPS tracking of mineral carrying vehicles may be used for further detection of illegal mining.
- Steps may be taken for digitisation of mining plans for better and effective control of quantity allowed vis-à-vis actual extractions.
- A system may be developed to capture the data relating to exports of minerals from the state for incorporation in Table-2 in subsequent asset accounts.
- Steps may be taken to capture all the relevant data like extraction, production, production loss, grade-wise resources and reserves of riverine resources in subsequent asset accounts from the information already being captured in ILMS.

CHAPTER 6

FUTURE CONTINUITY PLAN

6.1 Guidelines / SoPs issued by GASAB

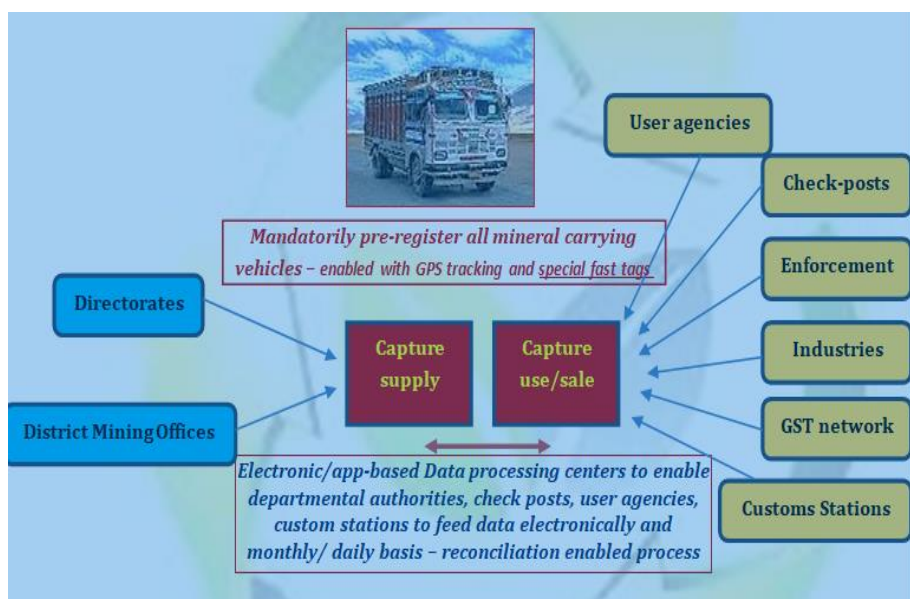
Asset Accounting process for Mineral and Energy Resources is to be a continuous process now onwards. Hence, there is a need for instituting systems and procedures for regularly capturing the data on physical flows of resources, while other inputs like addition in stock, average revenues, market prices, extractions not approved by the CGM 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 office of the CGM agreed to furnish the data as envisaged in the guidelines circulated by GASAB and issued a memo to all District Geologist Offices 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 CGM has agreed to implement the quarterly reporting framework for the Asset Account from April 2022. Prescribed formats have been circulated to District Geologist Offices to submit their information on asset account on quarterly basis to CGM.

At present, the CGM will collect the information from all District Geologist Offices and submit the quarterly report to AG office manually. A meeting was held with officials of the CGM and all the points were discussed in detail for the preparation of Asset Account for the year 2021-22 and report for quarter ending June 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.

Annexures**A. State NRA Cell - list and contact details**

<u>Sl. No.</u>	<u>Name of the Office</u>	<u>Name of the Officer/Official</u>	<u>Designation</u>	<u>E-mail id</u>
<u>1</u>	<u>O/o the Pr. A.G. (A&E), Gujarat, Rajkot.</u>	<u>Shri Saji Thomas</u>	<u>Sr. Dy.A.G.</u>	thomass@cag.gov.in
<u>2</u>	<u>O/o the Pr. A.G. (A&E), Gujarat, Rajkot.</u>	<u>Smt. Annie Jeejo</u>	<u>Sr.A.O.</u>	jeejoa.guj.ae@cag.gov.in
<u>3</u>	<u>O/o the Pr.A.G. (Audit-I), Gujarat, Rajkot.</u>	<u>Shri Siva Subramanian,</u>	<u>Dy.A.G.</u>	sivas@cag.gov.in
<u>4</u>	<u>O/o the Pr.A.G. (Audit-II), Gujarat, Ahmedabad.</u>	<u>Shri Aaditya Pant</u>	<u>Dy.A.G.</u>	panta@cag.gov.in
<u>5</u>	<u>O/o the Pr.A.G. (Audit-II), Gujarat, Ahmedabad</u>	<u>Shri P.B. Chougule</u>	<u>Sr.A.O.</u>	chougulepb.guj.sca@cag.gov.in
<u>1</u>	<u>O/o the Commissioner, Geology & Mining</u>	<u>Shri Roopwant Singh, IAS</u>	<u>Commissioner, Geology & Mining</u>	commissioner-cgm@gujarat.gov.in
<u>2</u>	<u>Narmada, Water Resources, Water Supply and Kalpasar Department</u>	<u>Shri A.D. Kanani</u>	<u>Chief Engineer (Central Gujarat) & Additional Secretary</u>	ce-cg-nwrws@gujarat.gov.in , kananiad@gmail.com , pa2ce-cg-nwrws@gujarat.gov.in
<u>3</u>	<u>Energy and Petrochemical Department</u>	<u>Shri Manoj Patel</u>	<u>Deputy Secretary</u>	ds-petro-re-epd@gujarat.gov.in
<u>4</u>	<u>Directorate of Economics and Statistics</u>	<u>Shri A. V. Champaneri</u>	<u>Joint Director (NSS)</u>	jdnssdes@gujarat.gov.in , nssdes@gujarat.gov.in
<u>5</u>	<u>Forest and Environment Department</u>	<u>Shri N. Srivastva</u>	<u>Additional Pr. Chief Conservator of Forest</u>	apccf.fst.fm@gmail.com
<u>6</u>	<u>Revenue Department</u>	<u>Shri D.R. Bhammar</u>	<u>Deputy Secretary (Land).</u>	js-land-rev@gujarat.gov.in

7	<u>O/o the Director of Accounts & Treasuries, Gandhinagar.</u>	<u>Ms. Falguni Shukul,</u>	<u>Joint Director</u>	dydir1-dat@gujarat.gov.in
8	<u>Industries and Mines Department, O/o the CGM</u>	<u>Shri M.R. Wala,</u>	<u>Sr. Geologist (Exploration),</u>	dydir-fs-inm@gujarat.gov.in

B. Meetings of State NRA Cell.

B.1 Meeting held on 12-10-2021 in the Office of the Commissioner of Geology and Mining, Gandhinagar

B.2 Meeting held on 12-11-2021 in the Office of the Pr. Accountant General (Audit - II), Ahmedabad

B.3 Meeting held on 15-11-2021 in office of the Commissioner of Geology and Mining, Gandhinagar

B.4 Meeting held on 15-11-2021 in the Office of Energy and Petrochemical Department, Gandhinagar.

B.5 Meeting held on 18-05-2022 in the office of the Commissioner of Geology and Mining, Gandhinagar.

B.6 Meeting held on 24-06-2022 in Office of the Principal Accountant General(A&E), Rajkot.