A Note on
the Estimated Value of Government-Owned Natural Resources in India

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I. Introduction

The Government is the custodian of the country's natural resources such as land, forests and bio-reserves, mines, minerals and hydro-carbon etc. It also has the authority to allocate spectrum to various telecommunication service providers in the country. In this note, we refer to the country's natural resources as Government 'owned' natural resources, but the underlying perspective is that the people of the country are the sovereign owners of these resources - the government holds these in trust for all of us.

Estimating the value of all natural resources 'owned' by Government is an extremely challenging task as their prices are not properly defined. *The per-capita value of Government owned natural resources has been estimated in this exercise at (approximately) Rs. 40 lakh with a total estimated value of Government owned natural resources in the country at (approximately) Rs. 5000 lakh crore. However, this is an incomplete estimate.*

The main limitation of the present exercise is that it does not capture the value of land owned by the Central Government, State Governments and Local Governments in the country. It does not capture the value of spectrum. In this exercise, we have been able to capture the estimated value of hydro-carbon reserves and other mineral resources available in the country. However, the value of all kinds of mineral resources in the country could not be taken into account in the total estimate because of lack of data. This exercise is based entirely on the information already available in public domain.

The purpose of quantifying the value of natural resources owned by the Government is not to suggest even remotely that these should be sold. The purpose is to substantiate that: the people are the sovereign owners of these resources - the government merely holds these in trust for each of us; these are considerable by any standards - on a per capita basis amounting to millions of rupees - so every scam by which these resources are privately cornered is a loss in wealth for each and every citizen of this country and we should be concerned about this; and given that these are considerable and they are presently used in economic activity under the supervision of the Government, the poverty of the citizens is a paradox worth dwelling on and is at least in part due to the fact that these resources are not being treated as the property of the citizens of this country.

II. Coverage

An effort has been made to cover the following natural resources in this estimation:

a. Stocks of hydrocarbon in the country such as, Coal, Lignite, Crude Oil, Natural gas etc. and
b. Major mines and mineral resources stock in the country.

III. Methodology and Data

The estimated value of a particular resource is the product of price and quantity of its availability.

$$V_i = P_i * Q_i$$

Where, V_i is the value of i'th resource, P_i is the price of i'th resource, Q_i quantity of availability of i'th resource.

IIIa. Quantity- In case of the hydrocarbon resources as well as other minerals that have been covered, the Quantity is taken as the resource stock in the country at present, as per United Nations Framework Classification (UNFC) of energy and mineral resources. The source of information for these resource stocks is Indian Minerals Year Book 2011, published by Indian Bureau of Mines, Government of India.

IIIb. Price- The methodology for determination of prices for various resource stocks is the crux of this exercise. The price for various hydrocarbon stocks in the country is determined through export parity, import parity or average cost pricing methodology. The export parity pricing is used when a particular resource is export dominant. The import parity pricing methodology is used for a product when the country relies mostly on imports of the same. Average cost pricing is used when the country's demand for the product is mostly met through domestic resource availability. For example in case of coal and lignite, the export parity pricing is used, for crude oil import parity pricing methodology is used, and, in case of natural gas, the average cost pricing methodology is used. It should be noted that the use of these methodologies for pricing of resources is not completely objective in some cases, which is mainly due to lack of required data. Similarly, these three methodologies have also been used for pricing the other minerals.

The details of the methodologies have been discussed in the following:

Export parity pricing is the ratio of export value of a resource in a particular year and the quantity of its exports in that year.

$$Epi_t = \frac{(Evit)}{Eqit}$$

Where, *Epi* is the export parity price of i'th resource stock in the year 't', $Evit$ is the export value of i'th resource in the year 't', $Eqit$ is the export quantity of i'th resource in the year 't'.

Import parity pricing methodology is the following:

$$Ipi_t = \frac{(Ivit)}{Iqit}$$

Where, *Ipi* is the import parity price of i'th resource stock in the year 't', $Ivit$ is the import value of i'th resource in the year 't', $Iqit$ is the import quantity of i'th resource in the year 't'.

In case of average cost pricing, the average cost of production of a particular product is taken as the price of that resource stock. Average Cost pricing methodology is given in the following:

$$Ci_t = \frac{(Pit)}{Qit}$$

Where, *Cit* is the average of cost of production of i'th product in the year 't', Pit is the production value of i'th product in the year 't', Qit is the quantity of i'th product produced in the year 't'.

IV. Key Findings

In this exercise, we find that the estimated value of hydro-carbon and other mineral resources available in the country is at least Rs. 5011.6 lakh crore. With a population of 1.2 billion as of 2011, the estimated per-capita value of Government owned resources would be approximately Rs. 41.76 lakh.

Table I. Estimated Value of Government-Owned Natural Resources in India

Resources	Estimated Value
Hydro Carbon (in Rs. Lakh Crore)	1512.2
Mines and Minerals (in Rs. Lakh Crore)	3390.4
Value of Radioactive substances (in Rs. Lakh Crore)	109
Value of the above Government-Owned Natural Resources in India	Rs. 5011.6 Lakh Crore
Total population in the country according to Census 2011	120 Crore
Resources per capita (Rs.)	41.76 lakh

Source: Estimated by the author from the information made available in public domain by various Government and Non-Government Agencies

V. Estimating the Value of Government-Owned Natural Resources

This section provides somewhat detailed information for the different resource stocks covered in the estimation presented above.

V1. Value of Hydro-Carbon Reserves in the Country

The Government takes the decisions pertaining to the hydro-carbon reserves in the country with an aim to optimize the use of those. Coal, lignite, crude oil and natural gas are primarily known as hydro-carbon. Total amount of coal resource in the country is 293.5 billion tonnes and lignite is 41.96 billion tonnes as of April 2010. Total amount of crude oil resource is 760 million tonnes and natural gas resource is 946 million tonnes. The value of these resources as of 2011 is estimated at Rs. 1512.2 lakh crore. The methods of export parity pricing, import parity pricing and average cost pricing have been used to determine the value of hydrocarbon resource stock in the country. The estimated value for each group is presented in the following:

Table II. Estimated Value of Hydrocarbon Reserves in India as of 2011

Sl. No.	Hydrocarbon	Total Amount of Resources as of 2011	Value of Resources (in Rs. Lakh Crore)
1	Coal	293.5 billion tonnes	850
2	Lignite	41.96 billion tonnes	612
3	Crude Oil	760 million tonnes	30.4
4	Natural Gas	946 million tonnes	19.8
Estimated Value of Total Hydro Carbon Resources			1512.2

Note: Estimated by the author with the help of information given in Indian Minerals Yearbook 2011

The details of methods of pricing and valuation of these resources are discussed in the following.

<u>1a.Valuation of Coal and Lignite Resources</u>

(i) Coal Resources in India at present: 293.5 billion tonnes
(Source: India Minerals Year book 2011, Indian Bueau of Mines)

Price of 1 tonne of coal in 2010-11 = Rs. 2898 (As per the export pricing methodology)

293.5 billion tonne = Rs. 85073011 Crore (or Rs. 850 lakh crore)

(ii) Lignite resources in the country at present: 41.96 billion tonnes.
(Source: India Minerals Year book 2011, Indian Bureau of Mines)

Price of 1 tonne lignite is estimated at Rs. 14,583

Value of total lignite resources would be Rs. 61190268 crore (or Rs. 612 lakh crore)

1b.Valuation of Crude Oil Reserves

Crude Oil Reserves in India at present = 760 million metric tonnes
(Source: India Minerals Year book 2011, Indian Bureau of Mines)

Price of 1 metric tonne crude oil = Rs. 40000 (Import Price)

Price of 760 million metric tonnes crude oil = Rs. 30400 billion (Rs. 30.4 lakh crore)

1c.Valuation of Gas Reserves

Total Gas Reserves in India = 1330 billion cubic meter = 946 million tonnes
(Source: India Minerals Year book 2011, Indian Bureau of Mines)

Price of 1 tonne gas = Rs. 20997 (production value)

Price of 946 million tonne gas = Rs. 19863 billion (Rs. 19.8 lakh crore)

V2. Mines and Minerals



The country is endowed with vast reserves of many metallic and non-metallic minerals. Mining sector is an important segment of the Indian economy. Since Independence, there has been a rapid growth in mineral production both in terms of quantity and value. India produces as many as 87 minerals, which include 4 fuels, 10 metallic, 47 non-metallic, 3 atomic and 23 minor minerals. The mines and minerals reserves in the country are under the ownership of the

Government and the Government takes the decision to develop these resources by leasing out the same to public and private enterprises. The detailed information about the quantity of some of the mineral reserves and their valuation are given in the following table.

Table III. Important Mineral Reserves and their Estimated Value as of 2011-12

Sl. No.	Mineral	Total Reserves (in Tonne)	Price (Rs. in thousand / tonne)	Value (in Rs. Crore)	Method of Pricing
1	Antimony	1 lakh	490	518	Export Parity
2	Asbestos	22.2 million	350	62875	Import Parity
3	Barytes	73 million	5.2	38066	Export Parity
4	Betonite	568 million	26.6	1510969	Export Parity
5	Borax	74.2 thousand	20.2	150	Import Parity
6	Calcite	20.94 million	4.7	9782	Import Parity
7	Chromite	203 million	16.5	335934	Export Parity
8	Copper	1.56 billion	45.3	7069237	Export Parity
9	Diamond	31.92 million	0.207/carat	661	Export Parity
10	Diaspore	5.98 million	1	598	Export Parity
11	Diatomite	2.9 million	8.9	2554	Export Parity
12	Dolomite	7.7 billion	2.3	1755856	Import parity
13	Felspar	132 million	3.4	44595	Export Parity
14	Fireclay	713.5 million	2.5	180923	Export Parity
15	Fluorite	18.2 million	9.8	17878	Export Parity
16	Fuller Earth	256.7 million	3.4	87786	Average Cost
17	Garnet	56.96 million	7.5	42762	Export Parity
18	Granite	116 billion	12.3	142939709	Export Parity
19	Gold	493.69 million	1920/kg	94859391	Average Cost
20	Graphite	174.85 million	32	560591	Import Parity
21	Gypsum	1.2 billion	1.3	171950	Export Parity
22	Titanium	394 million	5.1	201376	Export Parity
23	Iron Ore (Hematite)	17.9 billion	4.6	8176992	Export Parity
24	Iron (Magnetite)	10.6 billion	4.6	4842241	Export Parity
25	Kyanite	103.24 million	13.6	140480	Export Parity
26	Sillimanite	66.98 million	11.4	76201	Export Parity
27	Andalusite	18.5 million	2.4	4440	Export Parity
28	Lead & Zinc	685.6 million	22.6	1550625	Export Parity
29	Limestone	184.9 bilion	0.136	2508236	Average Cost
30	Magnesite	335 million	8.7	292824	Export Parity
31	Manganese	288 million	0.709	20431	Export Parity
32	marble	1.93 billion	1.2	225475	Average Cost
33	Mica	5.3 lakh	17.7	942.6	Export Parity
34	Molybdenum	19.3 million	11.7	22627.2	Export Parity
35	Nickel	189 million	1000	18841797	Export Parity
36	Ochre	144.26 million	12	174869	Export Parity

37	Platinum	15.7	70 /kg	109	Export Parity
38	Potash	21.8 billion	20	43408755	Export Parity
39	Quartz and Silica	3.5 billion	5.6	1972584	Export Parity
40	Quartizite	1.25 billion	30	3735119	Import Parity
41	Silver	467 million	37/kg	1712471	Average Cost
42	Talc/Steatite/Soapstone	270 million	6	161744	Export Parity
43	Tin	83.73 million	0.152/kg	1272696	Average Cost
	Total Value (in Rs. Crore)			339035819.8	

Source: The values are estimated with the help of information obtained from India Minerals Year Book 2011-12, Indian Bureau of Mines

The total estimated value of the mines and minerals are estimated at Rs. 3390 lakh crore. The values of minerals are the product of amount of resources and the current market prices associated with them. For some of the minerals, the current market price refers to their import price and for the others it refers to their export price. The import price is taken for those minerals, which are least produced in the country and not exported much, while the export price is used for the minerals which are largely exported. For some of the minerals, the average cost of their production in the recent years is taken as their price.

V3. Value of Some of the Radio Active Substances

Thorium deposits in India are estimated to be 3.6 lakh tonnes. Uranium reserves are estimated to be 1.86 lakh tonnes at present. At current international prices, the value of both these reserves is found to be Rs. 109 lakh crore. The methods of estimation and data sources are indicated in the following,

Table IV. Estimated Value of Thorium and Uranium Reserves in India

Thorium Deposits in India	360000 tonnes	
1 kg	$5,000	Rs. 300,000
1 tonne		Rs. 30 crore
360000		Rs. 108 lakh crore

Source: http://www.thorium.tv/en/thorium_costs/thorium_costs.php

Uranium Reserves	186650 tonnes	
1 pound	40 $	Rs. 2400
1 kg	2.2 pound	
Price of 1 kg Uranium	Rs. 5280	
Value of 186650 tonne	Rs. 98551.2 Crore	Rs. 1 lakh Crore (approx..)

Source: http://www.uraniumminer.net/market_price.htm

VI. Concluding Remarks

The per-capita Government owned natural resources has been estimated at Rs. 41.76 lakh with a total estimated value of Government owned natural resources in the country at Rs. 5011.6 lakh crore. However, this is an incomplete estimate. It does not capture the value of land owned by the Central Government, State Governments and Local Governments in the country. It does not capture the value of spectrum. It captures the estimated value of only the hydro-carbon reserves and other mineral resources available in the country. Also, the value of all kinds of mineral resources in the country could not be taken into account in the total estimate because of lack of data.

In order to generate a proper estimate of Government owned resources in India, there is a need to prepare a comprehensive list of all the resources owned by Central, State and Local Governments. If a comprehensive list of resources owned by the Central, State and Local Governments is prepared, the per-capita value might be well above the estimated figure of Rs. 41.76 lakh.

As stated at the outset, the purpose of quantifying the value of natural resources owned by the Government in India is not to suggest even remotely that these should be sold. Given that every scam by which these resources are privately cornered is a loss in wealth for each and every citizen of this country, we should be concerned about how these resources are being used in economic activity under the supervision of the Government.

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