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# Implementing Intergenerational Equity in Goa

by Rahul Basu<sup>1</sup>

## Abstract

Hartwick's rule says that as mineral resources are extracted from the ground, investments in productive assets need to be made to leave future generations with as much assets as the present generation. This article examines whether mining in Goa meets Hartwick's rule, and finds that the state government captures only a small fraction of the value of the iron ore extracted from mines it has leased out. It also finds that most of the value of the iron ore is cornered by mining leaseholders, resulting in a significant redistribution of wealth from the poor to the rich. It points to national and sub-national entities that follow Hartwick's rule, and says there are many best practices that can be easily adopted by India.

## Summary

The Supreme Court has long ruled that Intergenerational Equity (IE) is part of our fundamental rights. IE can be simply stated as the principle that future generations need to have equal access to resources as the present generation. "Hartwick's rule" is that as mineral resources are depleted (i.e. extracted from the ground), investments in productive assets need to be made to at least the same extent in order to leave future generations with as much assets as the present. Under the Constitution, sub-soil minerals are the property of the States (not the Centre). Therefore, responsibility for meeting Hartwick's rule devolves on the state.

We examine whether mining in Goa meets Hartwick's rule. We find that the State Government manages to capture only a very small fraction of the value of the iron ore extracted. It is clearly unable to meet Hartwick's rule. Further, it is clear that most of the value of the iron ore extracted is captured by the mining leaseholders, resulting in a very significant redistribution of wealth from the poor to the rich.

Many countries around the world are dealing with similar issues, and have often failed to find a way out. Norway and Botswana are considered examples of countries dealing with these issues well. A few broad principles can be enunciated. First, the State should maximize its capture of the value of the natural resources extracted -- as the mineral resources are owned by the people of the state -- with a minimum target of 90%. Second, this amount should not exceed around 15% of the state budget. This is necessary in order to ensure that the state is still responsive to its citizens. Third, an amount equaling the value of

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the natural resources extracted should be invested by the State into productive assets. Lastly, performance on these aspects should be measured and reported periodically.

## **IE & Sustainability**

Sustainable development and IE are part of our fundamental rights under the Indian Constitution. It is also reflected in the customary concept of *uttaradhikari* (heir), and the cautionary mythology of Bhoodevi. A key element of this idea is that all people alive right now are equal. IE extends the idea that all people from the future are equal to people of today. A minimum threshold for IE is that future generations of people should have as much access to resources as the current generation -- we should not leave our children and grandchildren worse off.

### **Sustainability**

The imperative towards sustainability flows directly from the IE principle. After all, why value sustainability unless you value future generations? Many of the concerns related to resource depletion and environmental degradation are reflected in the concept of sustainable development. The Brundtland Commission states -

*Humanity has the ability to make development sustainable ... to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. (Brundtland, Gro Harlem, et al 1987 : 8)*

Fundamentally, there are two main concepts of sustainability – *strong* and *weak* sustainability. *Strong sustainability* considers as critical those types of capital that cannot be substituted for by other forms of capital. Critical capital is usually identified as natural capital such as biodiversity (species). Strong sustainability requires that the stock of critical capital does not decrease. Strong sustainability motivates the Precautionary Principle – don't cause a catastrophe – that environmentalists apply to climate change, nuclear power, etc. Sacred mountains would also fall in this category. In the context of Goa, the western ghats are both a biodiversity hotspot as well as the water tower for peninsular India.

*Weak sustainability* assumes that different types of capital (natural, produced, cultural, etc.) can be substituted for each other, and therefore, requires that the total stock of capital does not decline. Weak sustainability has been examined in some detail in economics in the context of non-renewable natural resources. Extracting minerals reduces or depletes the available quantity of mineral resources for use by future generations. Specifically

*"the Hartwick rule holds that consumption can be maintained — the definition of sustainable development — if the rents from non-renewable resources are continuously invested rather than used for consumption." (WB 2011 : 9)*

Hartwick's rule is quite intuitive – in order to keep our total capital constant, if we extract a mineral (a non-renewable resource) thereby reducing our mineral wealth, we need to create/invest in another asset at least to the value of the mineral that has been extracted. In the case of mineral resources, “rent” or “economic rent” or “mineral depletion” is the expected value of the mineral resources before they are extracted. Technically, rent is the difference between the price paid in the market for something versus the total cost of producing it (including a proper return on capital).

Hartwick's rule requires that the rent from extracted mineral resources be continuously invested. Therefore, there are at least two key steps in achieving weak sustainability of mineral resources – one, realizing the value of the natural resources, and two, investing those amounts earned into productive assets so that the overall wealth does not decline. This is obviously a massive over-simplification. There are many things that Governments need to do well to achieve either step.

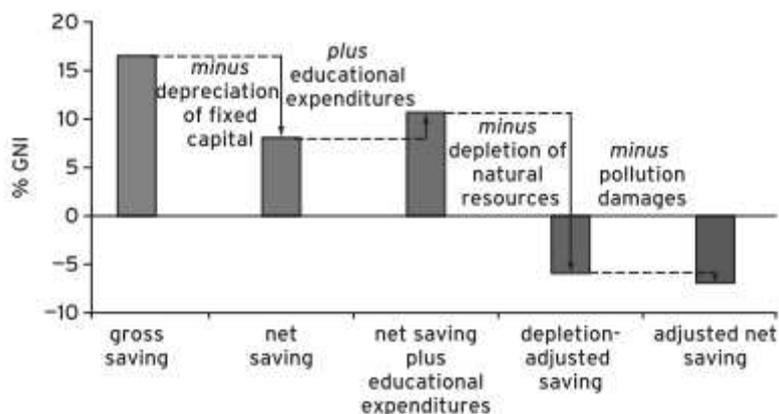
### **The Adjusted Net Savings approach**

*The Changing Wealth of Nations* study (World Bank, 2011) examines a slightly different but related measure, increasing standards of living. The World Bank says that the key to *“increasing standards of living lies in building national wealth, which requires investment and national savings to finance this investment.”* (WB 2011 : 37) A method of measuring economic progress is the level of national savings, which reflects an increase in national wealth. By definition,  $(\text{Income} - \text{Consumption Expenditure}) = \text{Savings} = \text{Increase in Wealth}$ . Increases in national wealth usually enable higher levels of income and hence is a rough indicator of positive development. Increasing wealth is a stronger requirement than Hartwick's rule, which simply requires the maintenance of wealth.

The World Bank has developed a modified measure of savings, which it terms as Adjusted Net Savings (ANS) or “genuine savings.” ANS is defined as

*“gross national savings adjusted for the annual changes in volumes of all forms of capital. ANS is measured as net national savings minus the value of environmental degradation, depletion of subsoil assets, and deforestation, and credited for education expenditures.”* (WB 2011 : 37)

This is graphically shown below:



(WB 2011 : 38)

*“Since wealth changes through saving and investment, ANS measures the change in a country’s national wealth. The rule for interpreting ANS is as follows: if ANS is negative, then the country or state is running down its capital stocks and reducing future well-being, social welfare and future capacity to maintain extant standards of living; if ANS is positive, then the nation/state is adding to wealth and future well-being.”* (WB 2011 : 37)

According to the World Bank report, ANS can be a useful indicator for resource-rich countries as transforming non-renewable natural capital into other forms of wealth is a major developmental challenge and imperative.

The World Bank has calculated ANS at the country level.<sup>2</sup> The adjustments calculated to Net Savings are for expenditure on education (positive savings), as well as depletion in various minerals, forests and pollution impacts (negative savings). These calculations are done for each mineral separately; for each year for the period 1970-2008; and for many countries individually taking into account their cost of extraction and processing each mineral.

In general, the study found that countries that are more dependent on mineral rents have underinvested – their ANS tends to be lower. All countries where mineral rents account for 15% or more of their GDP have underinvested – their ANS is negative (WB 2010 : 11). In other words, these countries are simply using up their natural resources to finance consumption rather than investing in productive assets, thereby making themselves poorer in aggregate. Had the Hartwick’s rule been followed, Nigeria would be five times as wealthy as it is. Gabon, Trinidad & Tobago, and Venezuela would each have per capita assets equivalent to South Korea.

## Has mining in Goa been sustainable?

<sup>2</sup> See World Bank : <http://bit.ly/1sWtije> , see “The Changing Wealth of Nations”, <http://data.worldbank.org/data-catalog/wealth-of-nations>

Under the Indian Constitution (read along with the Portuguese Mining Code 1906), sub-soil minerals in Goa are the property of the state, not that of the central government, the owner of the surface rights or the mining lessee. Therefore, we ask whether mining is sustainable for Goa, i.e., is the wealth of Goa being maintained? Since the State of Goa is a public trustee for all Goan residents, the State Government should implement Hartwick's rule by capturing the rent arising from iron ore depletion, and investing the same in a productive manner.

As it relates to iron ore mining in Goa, there are three assets that are being utilized and depleted:

- (a) the iron ore mineral resource,
- (b) water filtration and storage functions of the iron ore and overburden, and
- (c) the overall environment, which is being damaged at various levels.

All three are part of the inheritance from nature, and the value of their depletion should be subtracted when looking at the income of Goa (GSDP) or at the overall increase in wealth of Goa. In this paper, we are concentrating on the depletion of mineral resources. The results that follow do not consider the depletion in water filtration and storage or the damage to the environment

### Mineral depletion ...

We use the inputs from the World Bank study<sup>3</sup> to value the loss of wealth on account of depletion of iron ore by mining in Goa. Due to non-availability of iron ore rent data, we have restricted our analysis to the five year period 2004-05 to 2008-09. Unfortunately, this misses the three years with the maximum exports, 2009-10 to 2011-12. Since the World Bank data considers calendar years, we have used the calendar year data against the Indian financial year that has the most months of that calendar year. For example, we have used 2008 World Bank data for FY 2008-09 data from India.

Data on iron ore exports from Goa are taken from the data published by the Goa Mineral Ore Exporters Association (GMOEA). The World Bank study provides the iron ore rent in US\$/Metric Ton for each year from 1970 till 2008 separately for India's cost structure. We have used the annual exchange rate that the World Bank publishes.

Value of the ore extracted	Units	2004-05	2005-06	2006-07	2007-08	2008-09	Total	Source
Goan iron ore exports	Mn Tons	23.31	25.54	30.89	33.43	38.08	151.25	GMOEA
Iron Ore Rent	\$/MT	25	52	64	71	127		<a href="#">World Bank</a>
Exchange rate INR/\$	Rs/\$	45.32	44.10	45.31	41.35	43.51		<a href="#">World Bank</a>
Value of Mineral Depleted	Rs. Cr	2,630	5,857	8,950	9,785	20,977	48,199	Multiply above
Goa GSDP at Current Prices	Rs. Cr	12,713	14,327	16,523	19,565	25,414	88,542	Goa Eco Survey
Mineral Depletion / GSDP	%	21%	41%	54%	50%	83%	54%	Calculated

<sup>3</sup> See the "Iron ore" section in "Metals and Minerals Rents", [http://siteresources.worldbank.org/EXT/EEI/Resources/Metals\\_and\\_Minerals\\_Rents.xls](http://siteresources.worldbank.org/EXT/EEI/Resources/Metals_and_Minerals_Rents.xls)

Even with extremely conservative assumptions, the mineral depletion in Goa is very significant, adding up to around Rs. 48,000 crores in only 5 years. As the China boom impacts the iron ore prices in later years and consequently the volume of iron ore exports from Goa, we find the mineral depletion rising significantly, both in absolute terms as well as a % of GSDP. Those of us inured to large scams should remember that Goa has a tiny population – 14,57,723 as per the 2011 census. Rs. 48,000 crores works out to Rs. 3.3 lakhs per capita!

### ... Compared with State Finances

It is instructive to compare the amount of mineral depletion with certain critical statistics of the Goa Government. It must be noted that this analysis does not include the collection of income taxes by the Center, as this would also form part of the capture of mineral depletion. However, use of Export-Oriented Units and contracting with overseas trading parties leads to much lower effective capture of mineral depletion through income taxes.

Goa State Finances & Mining	Units	2004-05	2005-06	2006-07	2007-08	2008-09	Total	Source
Mineral Depletion	Rs. Cr	2,630	5,857	8,950	9,785	20,977	<b>48,199</b>	From above
Mines Dept. Revenue Receipts	Rs. Cr	26	27	34	36	36	<b>161</b>	PAC Report
% mineral depletion captured	%	1.0%	0.5%	0.4%	0.4%	0.2%	<b>0.3%</b>	Division above
Govt. Total expenditure	Rs. Cr	2,182	2,486	2,709	3,175	3,880	<b>14,431</b>	Goa Eco Survey
Fiscal Deficit	Rs. Cr	550	581	529	541	916	<b>3,116</b>	Goa Eco Survey
Govt Outstanding Debt	Rs. Cr		3,714	4,690	5,127	5,623	<b>NA</b>	Goa Eco Survey

As can be seen, the revenues of the Mines Department of the Goa Government, principally royalty, captured a pathetic 0.3% of the mineral depletion – Rs. 161 crores out of Rs. 48,199 crores. The 0.3% should be contrasted with what many countries achieve –60% (Barma et al 2011 : 161). In oil & gas extraction, a more capital intensive business, capture rates in excess of 90% are achieved (Barma et al : 162).

### Losers and Winners

This also raises the questions around the increasing inequality of the wealth distribution. Mineral depletion is a hidden poll tax – the loss of wealth on account of mineral depletion applies equally to each and every person in Goa. The per capita annual depletion is around Rs. 60,000, around three times the current national poverty line.

### Governance issues

With such distorted incentives, it is not surprising that the illegal practices abound in Goa. The Supreme Court found that all iron ore mines in Goa were illegal from 22-Nov-2007. It also ruled that a number of other practices were illegal. Similarly, the Expert Advisory Committee of the Ministry for Environment and Forests found a number of environmental

clearances were the environmental impact assessments contained false information. The Chief Minister of Goa has stated in the Legislative Assembly as recently as August 2014 that the mining department of Goa is ridden with corruption (Business Standard 2014). It would be difficult to imagine that the corruption is restricted to the bureaucracy.

### **Comments on the calculations**

It is well known that Goan iron ore has lower FE (iron) content and hence fetches a lower price. However, as Goa is on the coast, its low transportation costs enables it to be competitive. The World Bank data series specifically states that it has been adjusted for FE content<sup>4</sup>. A separate study was conducted using data from annual reports of Sesa Goa. Sesa Goa was the only listed mining company from Goa. It accounted for around one third of Goan iron ore production and exports. We arrived at mineral depletion of Rs. 17,648 crores for a similar period. This will soon be made public.

Our study excluded the three peak years of iron ore exports (2009-10 to 2011-12), during which time 130 mn tons of iron ore was exported (compared with 151 mn tons during the study period). Had this been included, surely the picture would be far, far worse. Arguably the mineral depletion would be as much as the previous 5 years as the international price of iron ore was higher during the three peak years. Also, there has been no valuation of the other non-renewable resource, i.e., the water storage, filtration and regulation services of laterite rock that is destroyed by mining, or the disparate impacts on the environment. If we examine the position including these assets, the results would worsen.

### **How did Goa do ?**

The Goa government has been unable to capture very much of the large mineral depletion. Not entirely surprising as it has never been an objective in either the previous or the current mineral policy. And obviously, the question of where to invest in alternative productive assets hasn't arisen as there hasn't been sufficient capture of mineral depletion. Finally, there has been a very large redistribution of wealth from the masses to a small few rich entities, contrary to Articles 38 & 39 of the Constitution. As the Supreme Court has ruled that IE is a part of the Constitution, it raises the question of what needs to change.

### **Recommendations**

Sustainable development of natural resources is a problem faced by numerous countries around the world due to the China boom in commodity prices. In recent years, there has been a wealth of practical research in this area. A good starting point for implementation is the Natural Resource Charter, which is being developed by a group of international experts in the field of economically sustainable resource extraction. Another useful resource is

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<sup>4</sup> See the "Iron ore" section in "Metals and Minerals Rents", cell A6, [http://siteresources.worldbank.org/EXT/EEI/Resources/Metals\\_and\\_Minerals\\_Rents.xls](http://siteresources.worldbank.org/EXT/EEI/Resources/Metals_and_Minerals_Rents.xls)

*“Rents to Riches? The political economy of natural resource-led development”* (Barma et al 2011) published by the World Bank.

### **Natural Resources as Assets**

Clearly, natural resources are assets, and mining is a de facto sale of assets. All receipts from mining should be treated as capital receipts. However, there are quite a few consequent changes in the government finances generally that need to be made. An alternative may be to adopt Botswana’s approach of a budget sustainability index, which essentially measures the revenue deficit after subtracting all receipts from mining. Yet another approach may be to require reporting a parallel set of accounts for information only which treat these receipts as capital receipts. This regime can continue for a decade, during which time the complete changeover can be planned and implemented.

In a private mining scenario, the lower the geological risk, the higher would be the capture rate. It is therefore imperative that for easy to locate minerals (surface deposits of iron ore or bauxite), the entire nation be surveyed in mission mode. Legislations should require the States to conduct these detailed geological surveys, if available information is incomplete, prior to entering into any mining lease. The entire geological data should be made freely available for the public to analyze.

### **Targets**

There needs to be an explicit target to capture at least 90% of the mineral depletion. Given international experience, this is an achievable goal. The expected capture rate should be stated prior to entering into any mining lease, and calculated post facto annually.

Studies show that too great a reliance on mineral revenues reduces the extent to which the state is responsive to its people. A second target should be that mineral depletion will be maintained at no more than 15% of the state budget (during the period of our study, it had never exceeded 8%, and averaged 3%.)

### **Permanent Funds**

Achieving IE requires investment into productive assets. Most resource rich states do not have a large portfolio of sound investment opportunities. A common solution is the establishment of a permanent fund, on the lines of an endowment or pension fund. Managed well, this would ensure a long term stream of income from community assets. Norway's Sovereign Wealth Fund (technically the Norway Government Pension Fund) is a famous example. It has built up an enormous corpus of \$800-plus billion from North Sea oil revenues, for a population of only five.

Sub-national entities (akin to Goa) have also built funds. For instance Alaska (USA) and Alberta (Canada) have both created funds. In 1976 the Alaska Permanent Fund (APF) and the Alberta Heritage Trust Fund (AHTF) were established to manage part of government

revenues from the exploitation of oil and natural gas. Both funds were established as mechanisms to transform mineral assets into other forms of capital.

On the suggestion of the Goa Foundation, the Supreme Court has mandated that in future 10% of the value of iron ore be deposited into the Goa Iron Ore Permanent Fund. This is a very important first step. Its value as a precedent makes it all the more important. Yet, it does not go far enough. Its mandate should be broadened to all natural resources. And all receipts from natural resources should be deposited in the permanent fund.

### **Asset valuation**

It is clear that mineral resources are extremely valuable assets of the people. As trustee for the public, it is the duty of the State to provide the public with adequate information about their assets, viz., known sub-soil and offshore minerals. Legislation should require all Governments to provide a detailed estimate of the assets of the people – all mineral deposits and minerals within leases, giving volume, quality and estimated value of the mineral reserve. Similarly, all mineral lease holders should have an obligation to make similar disclosures on an annual basis, or more often if these estimates are revised.

There are established methodologies for valuing mineral reserves, as these often constitute the bulk of the value of a mining company. In India, the Ministry of Statistics and Programme Implementation (MoSPI) has recently published its framework for green national accounts in India, which includes a section on valuing mineral reserves. India may consider joining the Wealth Accounting and the Valuation of Ecosystem Services partnership (WAVES partnership). Since 2010, the WAVES partnership has 70 countries and numerous private sector organizations supporting natural capital accounting. For reporting mineral reserves, India may consider joining the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) and adopt the CRIRSCO International Reporting Template.

### **Conclusion**

The adoption of IE as a principle leads through sustainable development to a commonsensical idea behind Hartwick's Rule – if we sell off one asset, we need to invest as much in productive assets to keep our wealth constant and thus ensure IE. There has been a lot of work on the implementation of the idea of sustainable development in the arena of natural resources, and a large number of best practices can be easily adopted by India.

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