

Implementing Intergenerational Equity in Goa

RAHUL BASU

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.

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The Supreme Court has long ruled that intergenerational equity (IE) is a part of our fundamental rights. IE is the principle which says that future generations need to have equal access to resources as the present generation. Hartwick's rule says that as mineral resources are depleted (that is, extracted from the ground), investments in productive assets need to be made to at least the same extent to leave future generations with as much assets as the present generation. Under the Constitution, subsoil minerals are the property of states (not the centre). Therefore, the states are responsible for satisfying Hartwick's rule.

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 from the state. It is clearly unable to meet Hartwick's rule. Further, it is clear that most of the value of the iron ore extracted is cornered by mining leaseholders, resulting in a significant redistribution of wealth from the poor to the rich.

Many countries in 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 well with these issues. A few broad principles can be enunciated. First, the state should maximise its capture of the value of the natural resources extracted – with a minimum target of 90% – because they are owned by the people of the state. Second, this amount should not exceed 15% of the state budget. This is necessary to ensure that the state remains responsive to its citizens. Third, an amount equaling the value of the natural resources extracted should be invested by the state in productive assets. Last, performance on

these aspects should be periodically measured and reported.

IE and Sustainability

Sustainable development and IE are part of our fundamental rights under the Indian Constitution. It is also reflected in the customary concept of an *uttaradhikari* (heir), and the cautionary mythology of Bhoodevi. A key element of this idea is that all people alive now are equal. IE extends the idea to all people from the future are also equal to the 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. Or that we should not leave our children and grandchildren worse off.

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 stated,

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 1987: 8).

Fundamentally, there are two main concepts of sustainability – strong and weak sustainability. Strong sustainability considers those types of capital that cannot be substituted by other forms of capital as critical. Critical capital is usually identified as natural capital such as biodiversity (species). Strong sustainability requires that the stock of critical capital does not decrease. It motivates the precautionary principle – do not cause a catastrophe – that environmentalists apply to climate change, nuclear power, and the like. 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, and so on) 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 – 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. There are at least two key steps in achieving weak sustainability of mineral resources – one, realising the value of the natural resources; and two, investing those amounts earned in productive assets so that the overall wealth does not decline. This is obviously a massive oversimplification. There are many things that governments need to do well to achieve either step.

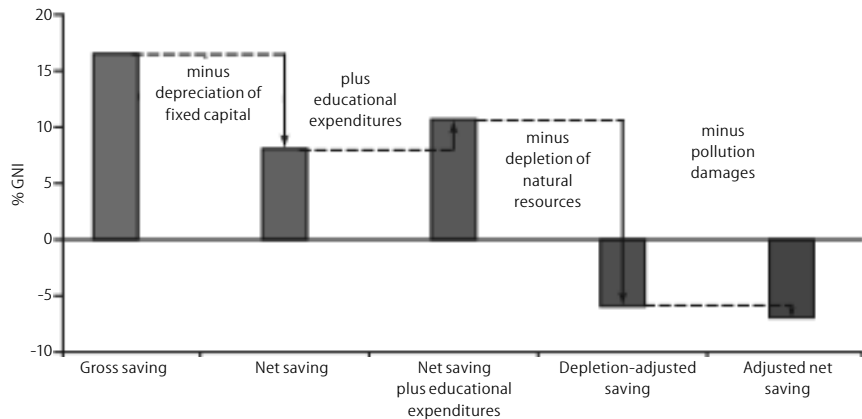
Adjusted Net Savings Approach

The Changing Wealth of Nations study (WB 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” (2011: 37). A method of measuring economic progress is the level of national savings, which reflects an increase in national wealth. By definition

(income-consumption expenditure) = savings = increase in wealth. Increases in national wealth usually enable higher levels of income, and hence are 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

Figure 1: Measuring Adjusted Net Savings



Source: WB (2011: 38).

“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 in Figure 1.

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 because 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.¹ The adjustments calculated to net savings are for expenditure on education (positive savings), as well as depletion in various minerals, forests, and the effect of pollution (negative

savings). These calculations are done for each mineral separately; for each year for the period from 1970 to 2008; and for many countries individually, taking into account their cost of extracting 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 gross domestic product (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 Hartwick's rule been followed, Nigeria would be five times as wealthy as it is. Gabon, Trinidad and Tobago, and Venezuela would each have had per capita assets equivalent to South Korea.

Mining in Goa Sustainable?

Under the Constitution (read along with the Portuguese Mining Code 1906), subsoil minerals in Goa are the property of the state, not that of the central government, the owner of surface rights or the mining lessee. Therefore, we ask whether mining is sustainable in Goa. That is, is the wealth of Goa being maintained? Since the state of Goa is a public trustee for all its residents, the state government ought to implement Hartwick's rule by capturing the rent arising from iron ore depletion and investing it in a productive manner.

In iron ore mining in Goa, there are three assets that are being utilised and depleted.

(a) The iron ore mineral resource. (b) Water storage and filtration after the laterite overburden (what lies above the ore) and iron ore are removed. (c) The overall environment.

later years and thus the volume of iron ore exports from Goa, mineral depletion has increased significantly, both in absolute terms as well as a percentage of GDP. Those of us inured to large scams

tax – the loss of wealth because of mineral depletion applies equally to each and every person in Goa. The per capita annual depletion is nearly Rs 60,000, around three times the current national poverty line.

Table 1: Iron Ore Extraction and Exports from Goa (2004-05 to 2008-09)

	Unit	2004-05	2005-06	2006-07	2007-08	2008-09	Total	Source
Iron ore exports	million tonnes	23.31	25.54	30.89	33.43	38.08	151.25	GMOEA
Iron ore rent	\$/MT	25	52	64	71	127		World Bank
Exchange rate INR/\$	Rs/\$	45.32	44.10	45.31	41.35	43.51		World Bank
Value of mineral depleted	Rs crore	2,630	5,857	8,950	9,785	20,977	48,199	Multiply above
GSDP at current prices	Rs crore	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

All three are part of the inheritance from nature, and the value of their depletion should be subtracted when looking at Goa's income (gross state domestic product, or GDP) or the overall increase in wealth in the state. In this article, we concentrate on the depletion of mineral resources. The results 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 to value the loss of wealth because of depletion of iron ore by mining in Goa.² Due to the non-availability of data on iron ore rent, we have restricted our analysis to the five-year period from 2004-05 to 2008-09 (Table 1). 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 (FY) 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 that published by the Goa Mineral Ore Exporters Association (GMOEA). The World Bank study provides the iron ore rent in dollars per metric tonne for each year from 1970 to 2008 separately for India's cost structure. We have used the annual exchange rate that the World Bank publishes.

Even with very conservative assumptions, Goa is depleting minerals at a significant rate, adding up to around Rs 48,000 crore in just five years. As the China boom affects iron ore prices in

should remember that Goa has a small population – 14,57,723 as per the 2011 Census – and Rs 48,000 crore works out to Rs 3.3 lakh per capita.

...Compared with State Finances

It is instructive to compare the amount of mineral depletion with statistics of the Goa government. It must be noted that this analysis does not include the collection of income tax by the centre, which is also a part of the capture of mineral depletion. However, the use of export-oriented units and contracting with overseas trading parties leads to much lower effective capture of mineral depletion through income tax.

As can be seen in Table 2, the revenues of the state mines department, principally royalty, captured a pathetic 0.3% of the mineral depletion – Rs 161 crore of Rs 48,199 crore. The 0.3% should be contrasted with what many other countries achieve – 60% (Barma et al 2011: 161). In oil and gas extraction, a more capital-intensive business, capture rates in excess of 90% are achieved (Barma et al 2011: 162).

Table 2: Goa State Finances and Mining (2004-05 to 2008-09)

	Units	2004-05	2005-06	2006-07	2007-08	2008-09	Total	Source
Mineral depletion	Rs crore	2,630	5,857	8,950	9,785	20,977	48,199	From above
Mines department revenue receipts	Rs crore	26	27	34	36	36	161	PAC report
Mineral depletion captured	%	1.0	0.5	0.4	0.4	0.2	0.3	Division above
Government's total expenditure	Rs crore	2,182	2,486	2,709	3,175	3,880	14,431	Goa Eco Survey
Fiscal deficit	Rs crore	550	581	529	541	916	3,116	Goa Eco Survey
Government's outstanding debt	Rs crore		3,714	4,690	5,127	5,623	NA	Goa Eco Survey

This also raises questions about the increasing inequality of wealth distribution. Mineral depletion is a hidden poll

Governance Issues

With such distorted incentives, it is not surprising that illegal practices abound in Goa. The Supreme Court found that all iron ore mines in the state were illegal from 22 November 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 for environmental impact assessments that contained false information. The chief minister stated in the legislative assembly as recently as August 2014 that the mining department 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 Goa's iron ore has lower Fe (iron) content and fetches a lower price. However, as Goa is on the coast, its low transportation costs enable it to be competitive. The World Bank data series specifically states that it has been adjusted for Fe content.³ A separate study was conducted using data from annual reports of Sesa Goa, the only listed mining company in Goa. It accounted for about one-third of Goa's iron ore production and exports, and we arrived at a mineral depletion of Rs 17,648 crore for the study period.

Our study excluded the three peak years of iron ore exports (2009-10 to 2011-12), during which 130 million

tonnes of iron ore were exported (compared to 151 million tonnes during the study period). Had this been included, the picture would be far worse. Arguably, the mineral depletion would have been as much as in the previous five years as the international price of iron ore was higher during the three peak years. Also, there has been no valuation of other non-renewable resources, that is, water storage, filtration, the regulation services of laterite rock destroyed by mining, and the various effects on the environment.

How Did Goa Do?

The Goa government has been unable to capture much of the large mineral depletion in the state. Not surprising since this has never been an objective in either the previous or the current mineral policy. Obviously, the question of where to invest in alternative productive assets has not come up as there has been little capture. Finally, there has been a very large redistribution of wealth from the masses to a small few rich entities, contrary to Articles 38 and 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 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 for economically sustainable resource extraction. Another useful resource is *Rents to Riches? The Political Economy of Natural Resource-led Development* by Barma et al (2011) published by the World Bank.

Clearly, natural resources are assets, and mining is a de facto sale of assets. All receipts from mining should be treated as capital receipts, but this requires making changes in government finances. 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 a changeover can be planned and implemented.

In a private mining scenario, the lower the geological risk, the higher the capture rate. It is therefore imperative that the entire nation be surveyed in mission mode for easy-to-locate minerals (surface deposits of iron ore or bauxite). If the available information is incomplete, legislation should require states to conduct these detailed geological surveys before they enter into any mining lease. All the geological data should be made freely available to the public.

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 before entering into any mining lease, and calculated post facto annually.

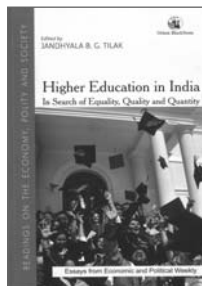
Studies show that too great a reliance on mineral revenues reduces the extent to which a state remains responsive to

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India has a large network of universities and colleges with a massive geographical reach and the facilities for higher education have been expanding rapidly in recent years. The story of higher education in India has seen many challenges over the decades and has not been without its share of problems, the most serious being a very high degree of inequity.

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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 never exceeded 8%, and averaged 3%).

Permanent Funds

Achieving IE requires investment in 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 million.

Sub-national entities (akin to Goa) have also built funds. For instance, Alaska (US) 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 the 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 in April 2014 mandated that in future 10% of the value of iron ore be deposited into a 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 them should be deposited in the permanent fund.

Asset Valuation

It is clear that mineral resources are extremely valuable assets of the people. As the trustee for the public, it is the state's duty to provide the public with adequate information about their assets, including known subsoil 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 their volume, quality, and estimated value. Further, 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) recently published its framework for green national accounts, which includes a section on valuing mineral reserves. India may consider joining the Wealth Accounting and the Valuation of Ecosystem Services (WAVES) partnership. Since 2010, the WAVES partnership has 70 countries and numerous private sector organisations supporting natural capital accounting. For reporting mineral reserves, India may also consider joining the Committee for Mineral Reserves International Reporting Standards (CRIRSCO), and adopt its International Reporting Template.

In Conclusion

The adoption of IE as a principle leads to sustainable development if the commonsensical idea behind Hartwick's rule is met – 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 sustainable development in the arena of natural resources, and a large number of best practices can be easily adopted by India.

NOTES

- 1 See World Bank, <http://bit.ly/1sWtije>, see "The Changing Wealth of Nations", <http://data.worldbank.org/data-catalog/wealth-of-nations>
- 2 See the "Iron ore" section in "Metals and Minerals Rents", http://siteresources.worldbank.org/EXTEEL/Resources/Metals_and_Minerals_Rents.xls
- 3 See the "Iron ore" section in "Metals and Minerals Rents", cell A6, http://siteresources.worldbank.org/EXTEEL/Resources/Metals_and_Minerals_Rents.xls, "Iron ore" sheet.

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