Structure of Goan Economy
(NSDP at Current Prices-Sectoral Shares)

Source: CSO, Indiastat.com and Economic Survey Goa (various years)
Structure of Secondary Sector (% share)

- Construction
- Electricity, Gas and Water supply
- Registered Manufacturing
- Unregistered Manufacturing
- Mining and Quarrying
Social Cost & Benefit Analysis

• Social costs of mining – loss of ecosystem services

• Social benefits -- Value of minerals (both export and other processing values), employment generation, etc.
CBA of Mining

- Mining outweighs the losses from forest loss. Net gain from mining is Rs 18422 million per year (NCAER 2010) (1 USD = Rs 54 approx.)

- Opportunity cost of disallowing mining is Rs 14,449 crores measured as net present value (NPV) (NCAER, 2010: 50).

- Deforestation cost due to mining is estimated to be worth Rs 4680 million (at 2008-9 prices), which amounts to Rs 0.16 million per ha of forest area.
Mining Area

- The Western Ghats -- a biodiversity hotspot. A UN Natural Heritage site
- Dense tropical forests,
- One National Park and 6 wildlife sanctuaries (FSI, 2009).
- Watershed for the important water bodies such as Kushawati, Kalay, Uguem, Khandepar, Advoi, Bicholim, Zuari, and Mandovi rivers.
Problems

- Mandovi and Zuari and other watersheds are not fed by glacial melt as in the Gangetic system).

- Mining $\rightarrow$ Denudation of forests $\rightarrow$ Affects hydrological cycle.

- Could cause increased floods

- Salinity ingress in the rivers loss of marine life, etc.
Comparative TEV (Rs Million) of Goa’s forests valued at 2009-10 prices

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<thead>
<tr>
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<tbody>
<tr>
<td>Total Economic Value</td>
<td>Economic Value</td>
<td>Total Economic Value</td>
<td>Economic Value</td>
</tr>
<tr>
<td>54540</td>
<td>6770</td>
<td>40670</td>
<td>5050</td>
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</tbody>
</table>
## Amounts of Compensation Payable for Goa’s forests as per SC mandated values

<table>
<thead>
<tr>
<th>Type of forests</th>
<th>Amount (Rs) per hectare&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Area (sq. kms)&lt;sup&gt;b&lt;/sup&gt;</th>
<th>In Rs (crores)&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Dense Forest</td>
<td>1,043,000</td>
<td>511</td>
<td>53,29.73</td>
</tr>
<tr>
<td>Dense Forest</td>
<td>939,000</td>
<td>624</td>
<td>58,593.6</td>
</tr>
<tr>
<td>Open Forest</td>
<td>730,000</td>
<td>1016</td>
<td>74,16.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2151</strong></td>
<td><strong>18,605.89</strong></td>
</tr>
</tbody>
</table>

Source: <sup>a</sup>: SC (2008); <sup>b</sup>: FSI (2009); <sup>c</sup>: Values of “a” multiplied by “b”

[i] The area under forests stated by FSI (2009) differs from the figure of 1424 sq km used by NCAER (2010) in their calculations.
Understanding Royalty

• Royalty is often perceived as a net benefit (gain).

• Royalty = Resource rent for consuming a natural asset (Opportunity cost of depletion)

• The equilibrium price for an exhaustible resource is:

  Price = Marginal cost of ore extraction + Exhaustibility rent (same as royalty)
Goa’s Mineral Reserves

712 MT of Iron ore reserves
Geological Survey of India (GSI), as on 1.4.2005 (IBM, 2009: 47_2) of which:

- 268 Mt is proven reserves,
- 190 MT (Probable)
- 254 MT (Possible).
Current stocks

- In 2008-9, Goa produced 33 MT of iron ore-estimated value Rs 38.8 billion (IBM, 2009)

- If 712 MT is extracted at 33 MT/year, the resource would exhaust in 21 years.

- Since 2/3 of these reserves are “probable” or “possible”, the “proven” reserves will exhaust in 8-9 years.
THANK YOU