

PERÚ:

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Brazilian Gold Mining Industry :

A Technical, Economic and Financial Profile

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BAMBURRA

Planejamento e Economia Mineral Ltda.

Brazilian Gold Mining Industry

- **Historical Highlights**
- **Geological Potential**
- **Mine Operations**
- **Economic and Financial Indicators**
- **Outlook and Perspectives**

Brazilian Historical Highlights

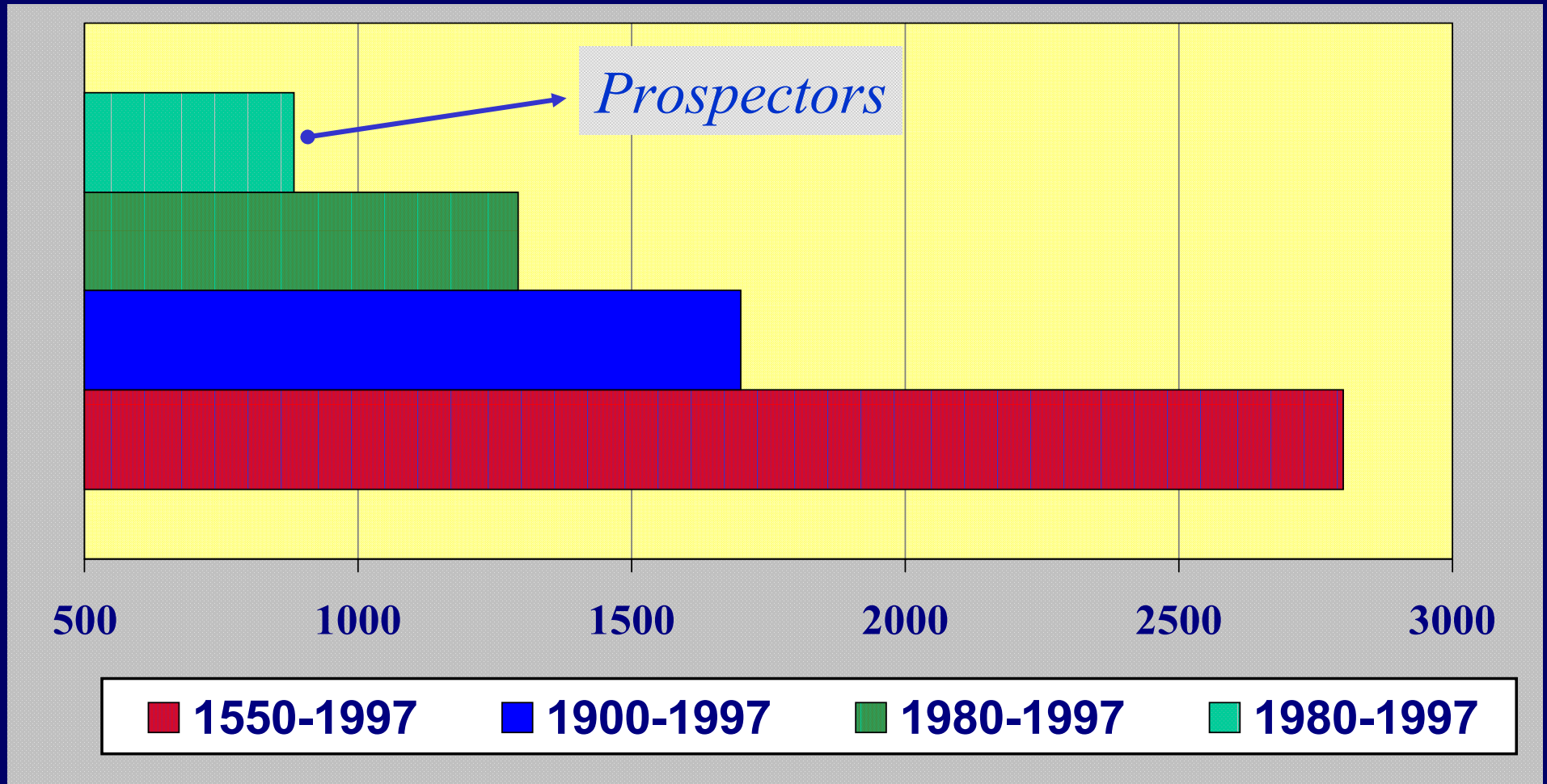
- First information about gold dated 1552, but prominent discoveries by the end of 17th century
- In the 18th century ranked as the major gold producer
- By the end of 19th century production fell facing depletion of *alluvial and superficial* deposits

Brazilian Historical Highlights

- **Accumulated production estimated to be around 2,800 tones until 1997**
- **About 1,700 tones (61%) is the estimated share to 20th century**
- **About 1,292 tones (76%) were produced in the 1980/1997 period**
- **During 1980/97 period the prospectors' activities were responsible for 884 tones (68%)**

Historical Profile of Gold Production

(Tonnes)



Source: DNPM / METAMIG

Geological Potential

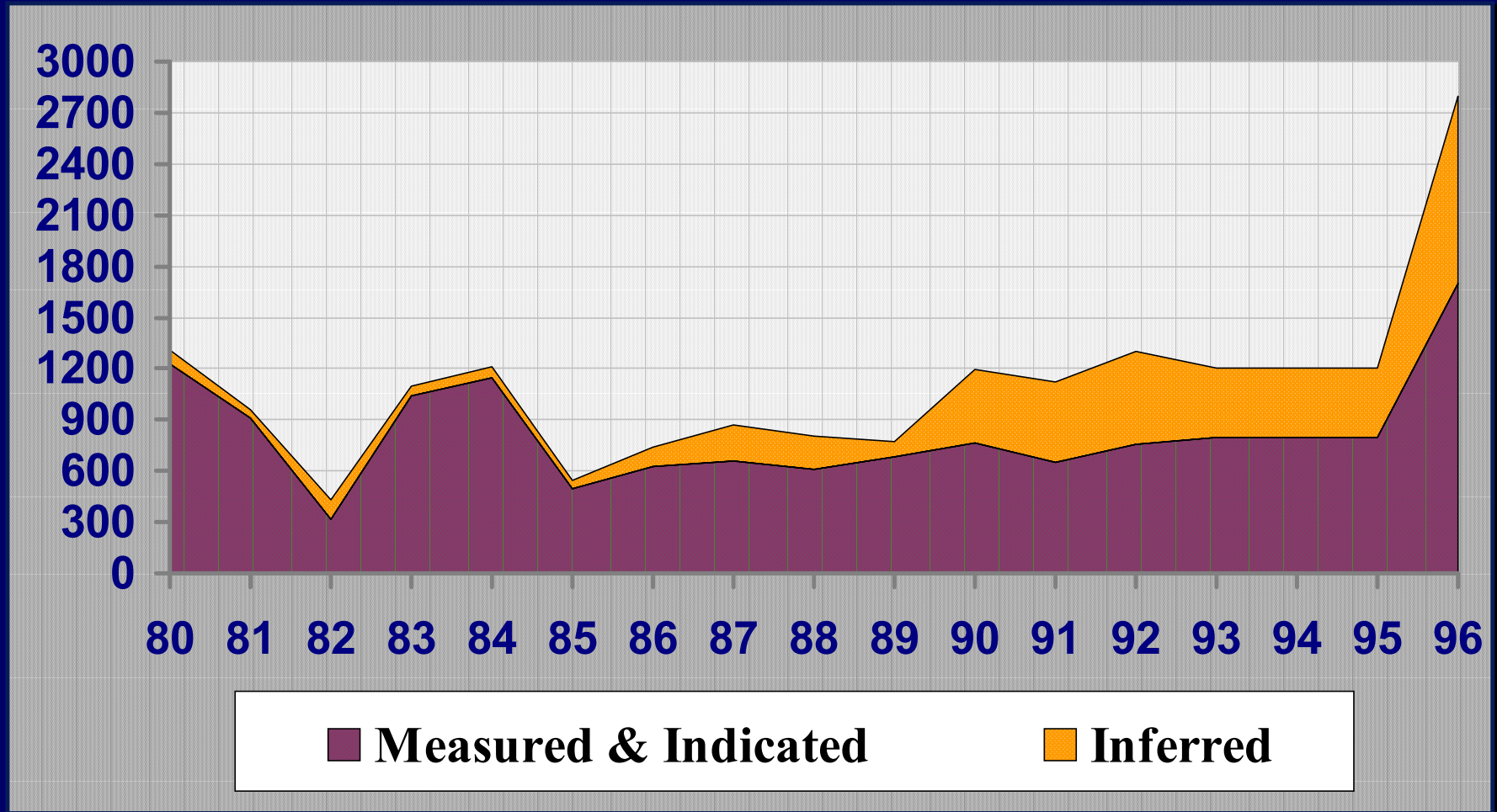
- **Level of Knowledge**
- **Metallogenetic Provinces**
- **Frontiers of Exploration**
- **Resources & Reserves**
- **Government Programs**

Geological Highlights

- **46 % of the Territory Comprising Archean and Lower Proterozoic Cratonic Areas**
- **Total in Situ Reserves of 2,800 t of Gold**
- **Defined Reserves of 1,700 t of Gold**
- **41% of Reserves Associated with Primary Deposits**

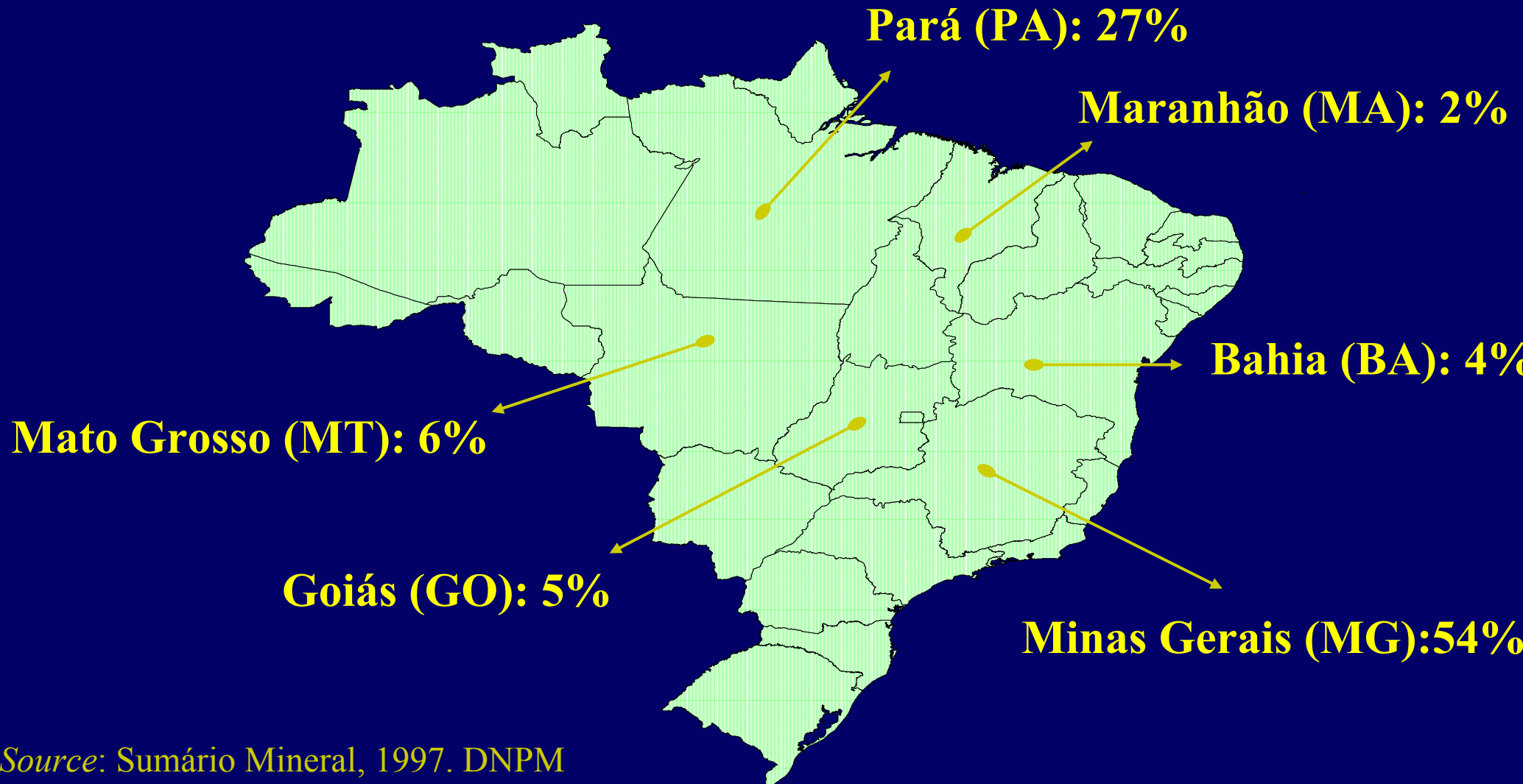
Brazilian Gold Reserves: 1980/96

(Tons of Au)



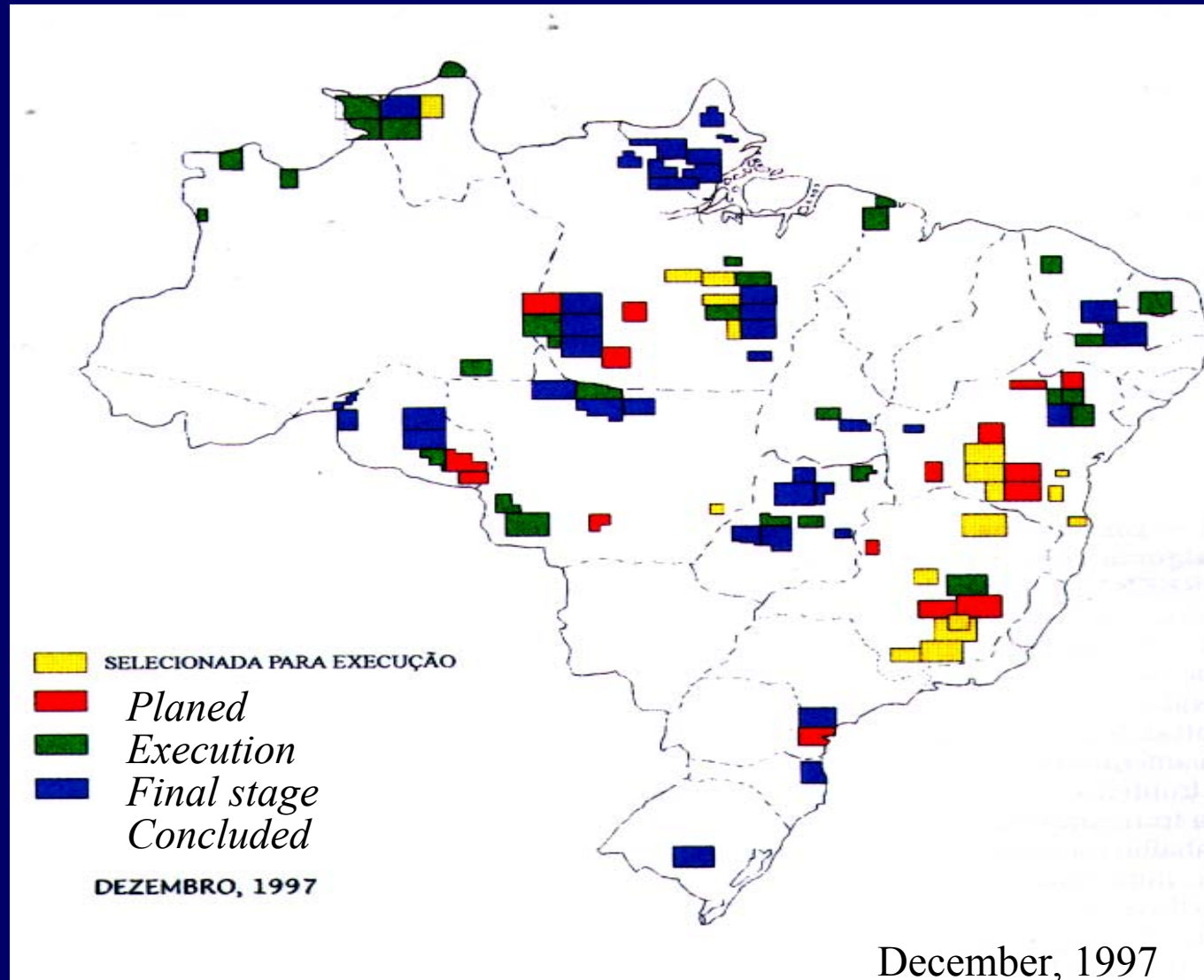
Source: Brazilian Mineral Yearbook. 1981/96. DNPM

Brazilian Gold Measured Reserves



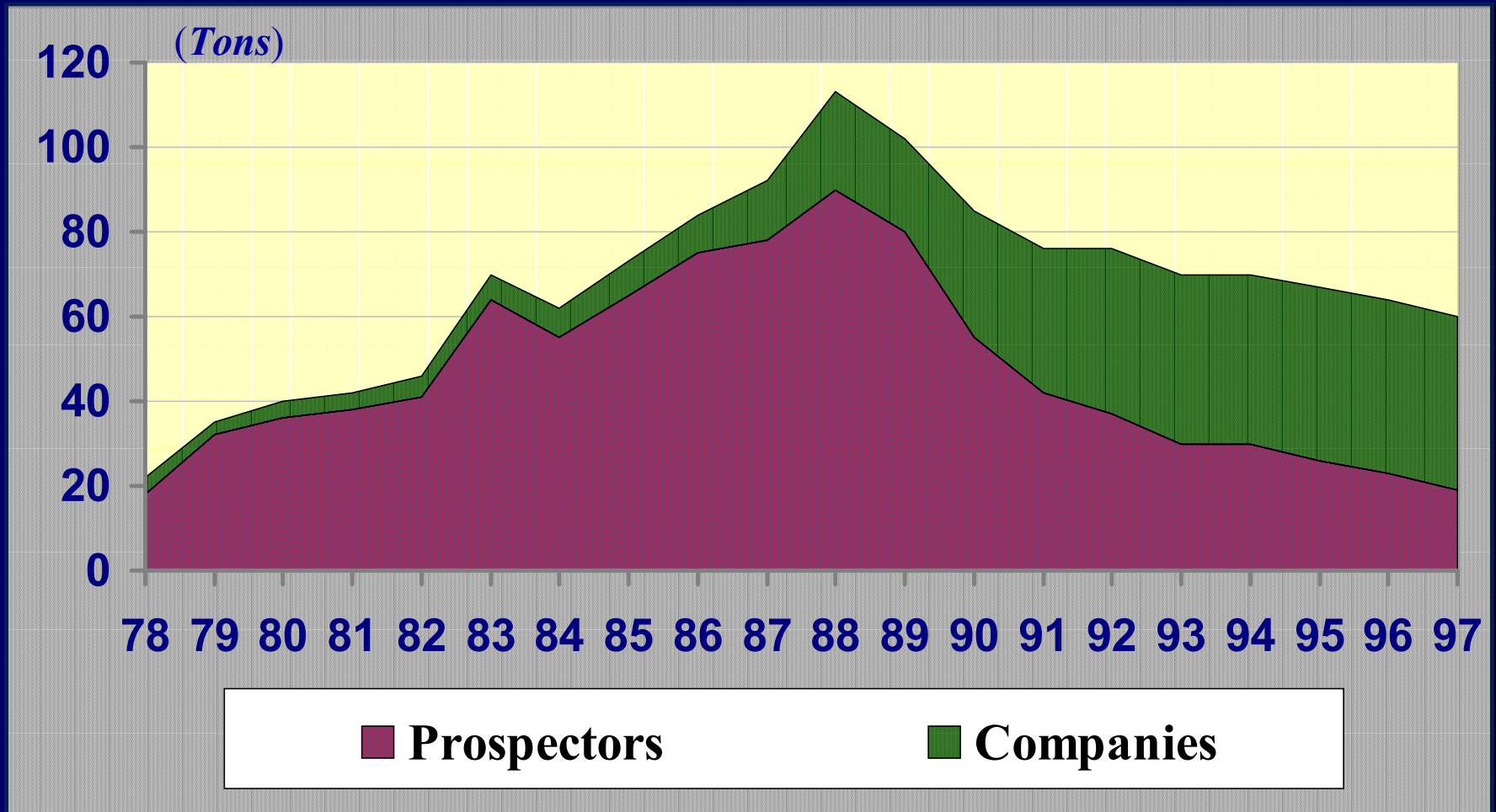
Source: Sumário Mineral, 1997. DNPM

National Program of Gold Prospection



Source: Brazilian Geological Survey - CPRM

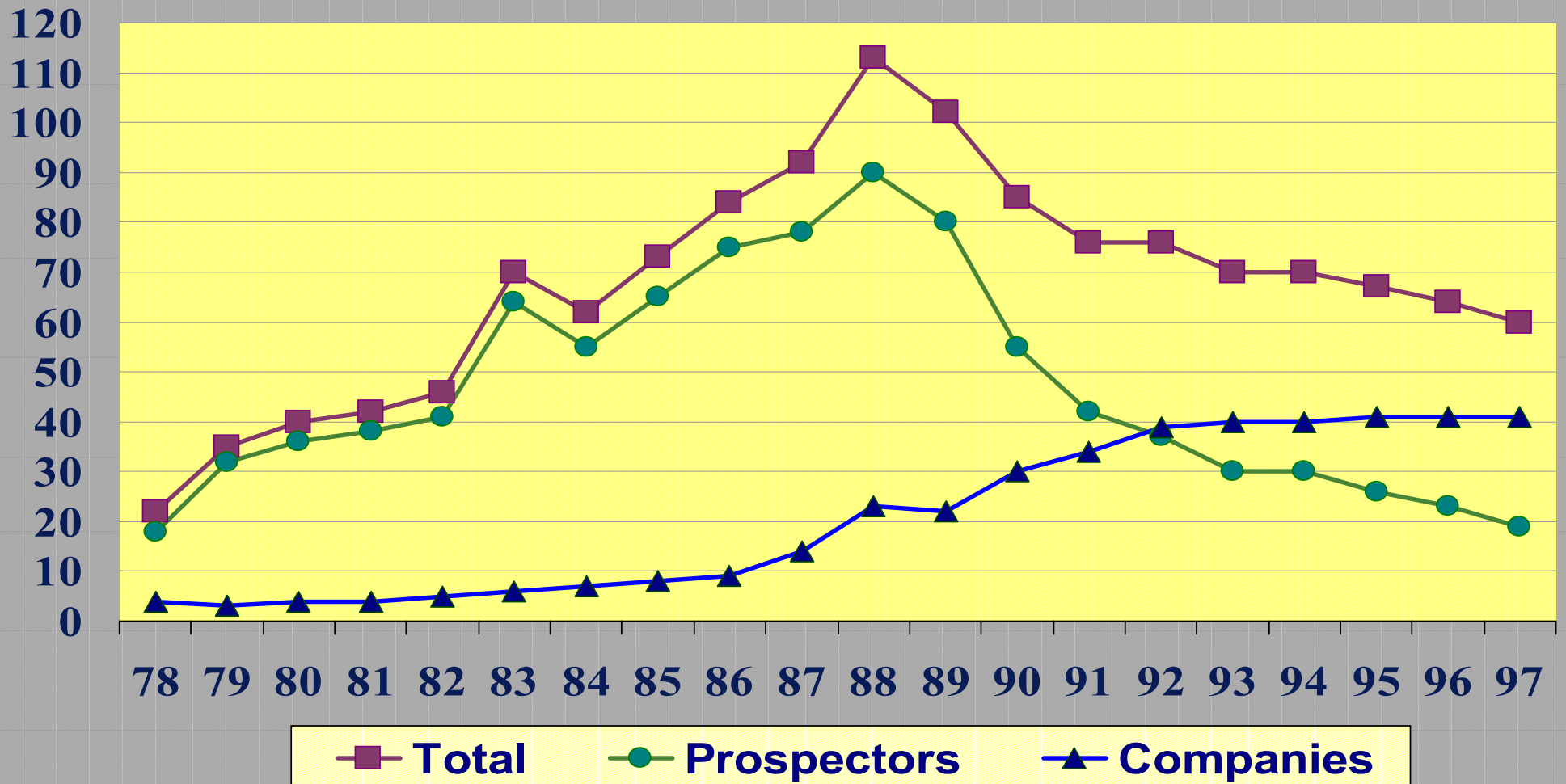
Brazilian Gold Production:1978/97



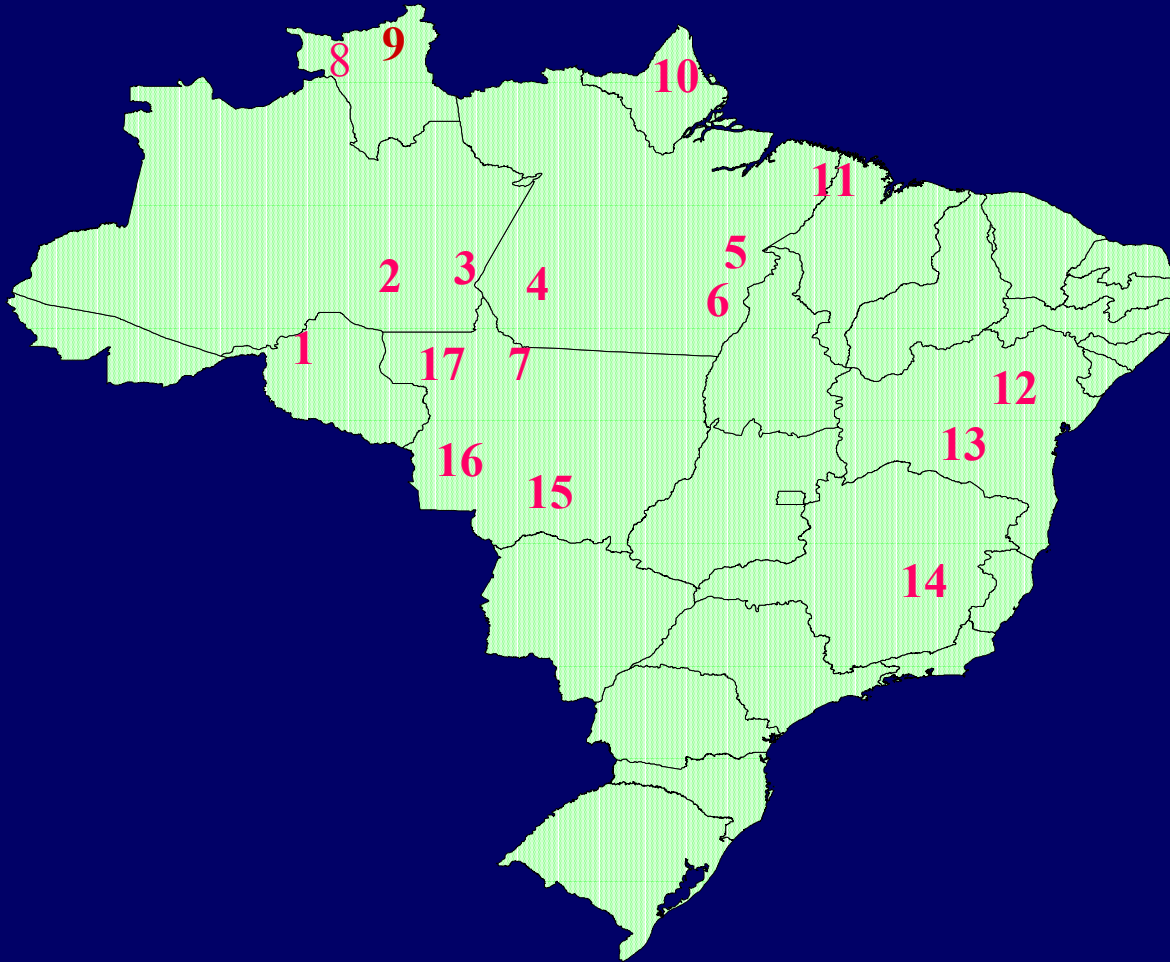
Sources: Brazilian Mineral Yearbook; Sumário Mineral. 1979/96. DNPM - Departamento Nacional da Produção Mineral. Bamburra estimates for 1997.

Brazilian Gold Production:1978/97

(Tons)



Location of Selected Garimpos



- 1 - Rio Madeira (RO)
- 2 - Sul do Amazonas (AM)
- 3 - Parauari / Amana (AM / PA)
- 4 - Rio Tapajós (PA)
- 5 - Serra Pelada (PA)
- 6 - Cumaru (PA)
- 7 - Alta Floresta / Peixoto de Azevedo (MT)
- 8 - Parima (RR)
- 9 - Santa Rosa / Quinô / Maú / (RR)
- 10 - Lourenço (AP)
- 11 - Gurupi (PA / MA)
- 12 - Serra de Jacobina (BA)
- 13 - Chapada Diamantina (BA)
- 14 - Quadrilátero Ferrífero (MG)
- 15 - Cuiabá / Poconé (MT)
- 16 - Pontes e Lacerda (MT)
- 17 - Aripuanã (MT)

Source: Bamburra's database

Location of Selected Mines & Deposits



Source: Bamburra's database

Profile of Selected Mines: 1997

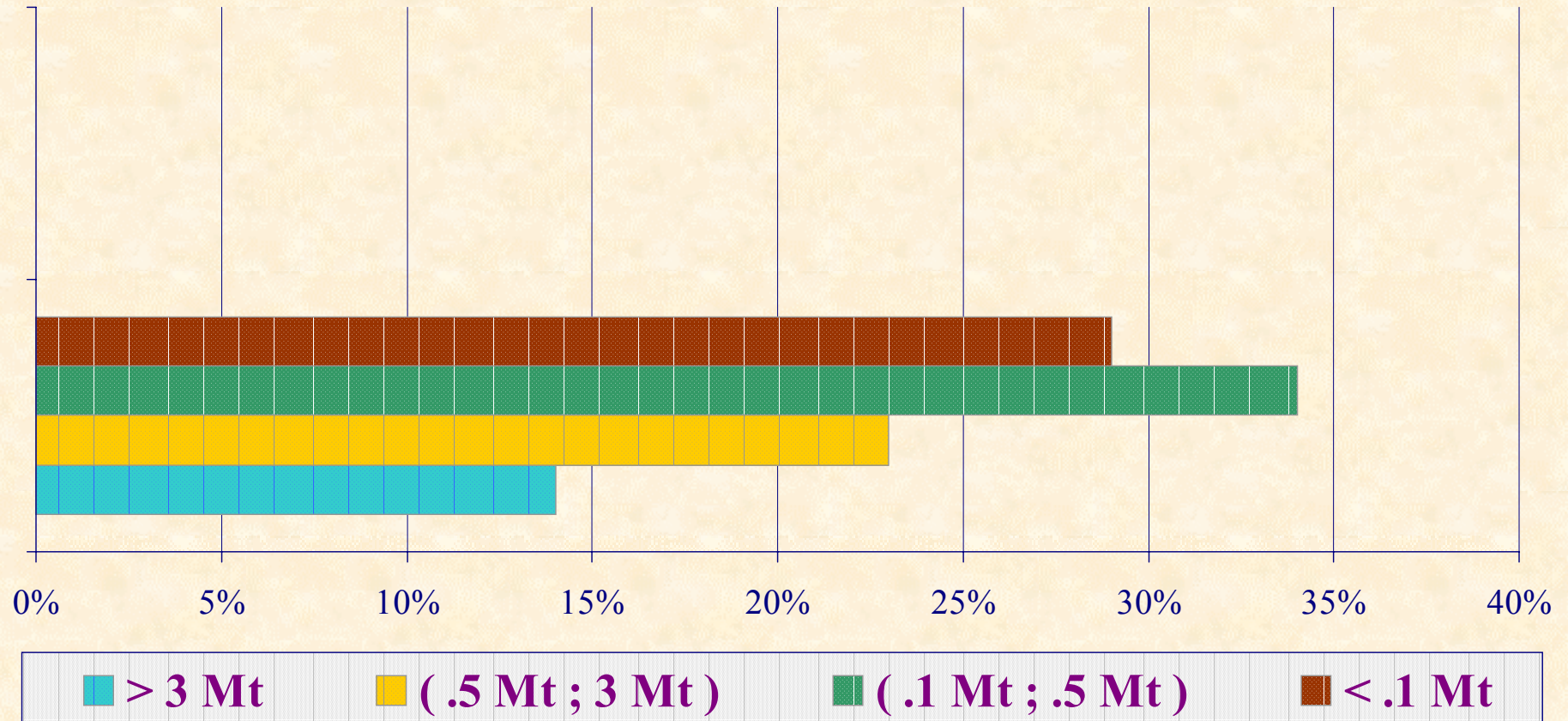
Mines	Start	Reserves	Geology	Production	Expansion
Ig. Bahia	1990	2,100,000	PMB	338,000	-
M. Velho	1834	2,860,000	AGB	238,000	322,000
M. do Ouro	1987	3,280,000	PMB	177,000	257,000
Faz. Brasileiro	1984	859,000	PGB	161,000	-
Crixás	1990	3,700,000	AGB	129,000	-
São Bento	1990	1,061,093	AGB	106,000	135,000
Jacobina	1983	1,500,000	PMB	55,000	73,000
Santa Maria	1998	150,000	AGB	12,000	-

Source: Bamburra's database

Unit: oz.

Mine Sizes Profile

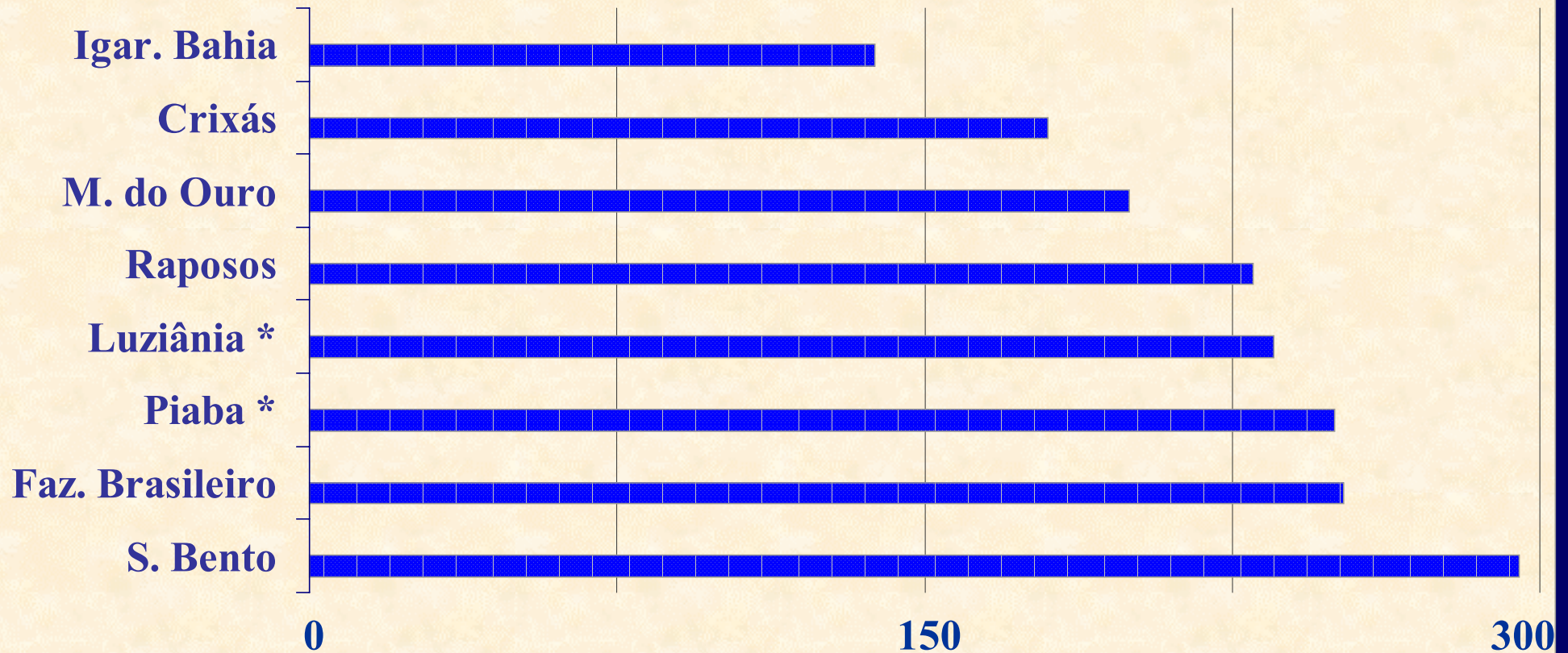
(*Million tons of ROM*)



Sources: IX Universo da Mineração Brasileira. Minérios & Minerales. Sep. 1997. No. 222.
Bamburra's database

Mine Costs Profile

(*Cash Operating Cost*)



(*) Expected

Sources: Bamburra's database

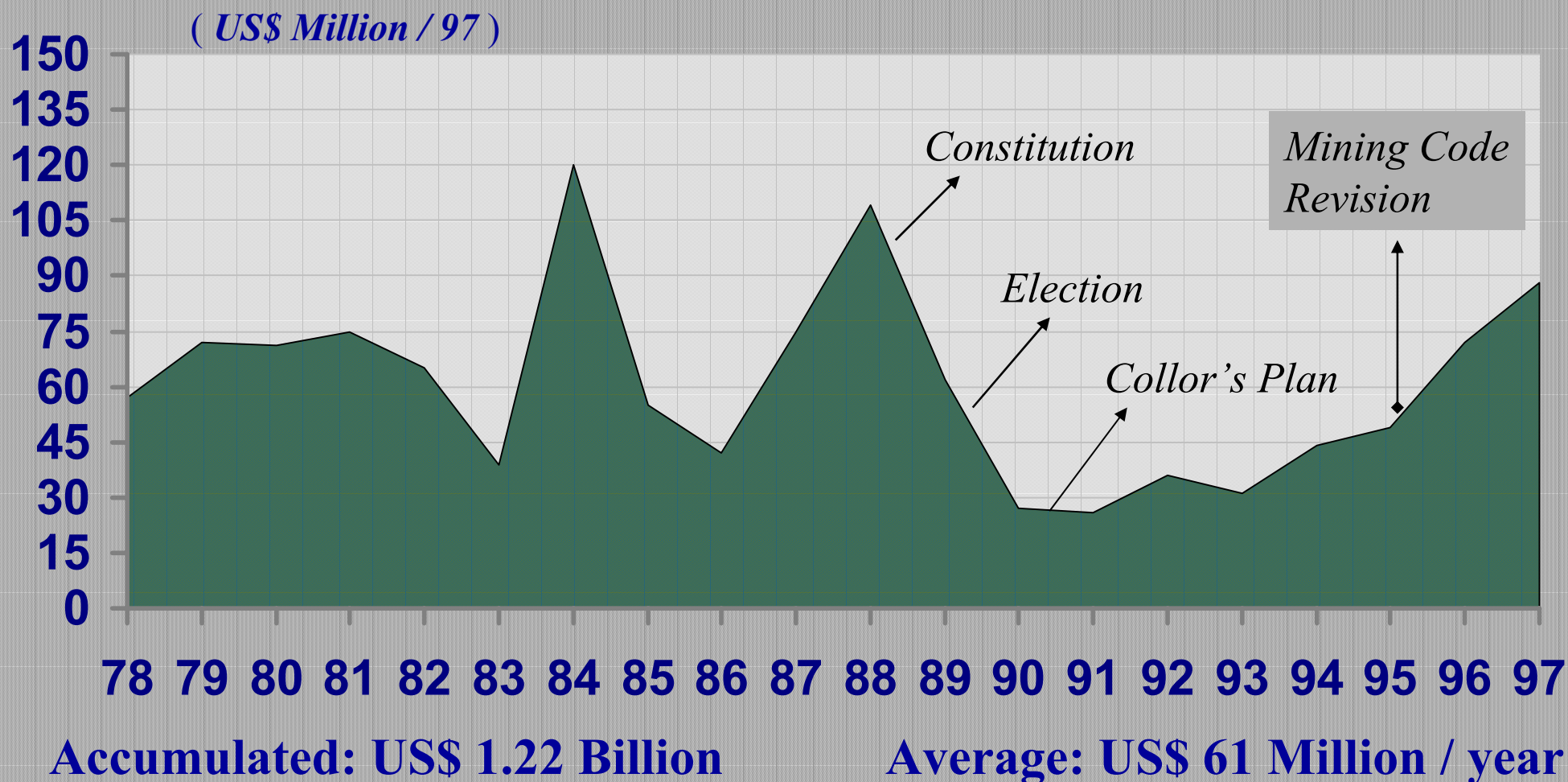
Foreign Investments in Gold Mining

Selected Groups and/or Companies

- ♦ Ambrex, Anglo American, Aurizona, Barrick, Ballad Enterprises,
- ♦ Battle Mountain, Bema Gold, Beringer, Black Swan, Brascan,
- ♦ Brazilian Goldfields, Brazilian Resources, Canyon Resources,
- ♦ Consolidated Dencam, Crystallex, Delpet Resources, Echo Bay, Econ Ventures,
- ♦ ECU Gold, Eldorado Gold, Exploro Minerals, Gold Fields, Gold Standard,
- ♦ Golden Palm, Golden Star, Highland Resources, Homestake, IAMGOLD,
- ♦ International Albany, Jordex Resources, Lysander Gold, Madison Energy,
- ♦ Metallica Resources, Mountain Lake, MK Gold, NDT Ventures, Newmont,
- ♦ NP Energy, Ourominas, Pacific Bay, Pandora, Pegasus, Peñoles, Placer Dome,
- ♦ Rea Gold, Rio Tinto, RJK Explorations, Santa Elina, St. Geneviève, Seahawk
- ♦ Southwestern, South Atlantic, South Duval, Tapajós Gold, Teck, Tiaro Bay,
- ♦ Toucan, TVX, Vanessa Ventures, Verena Minerals, William Resources, WMC

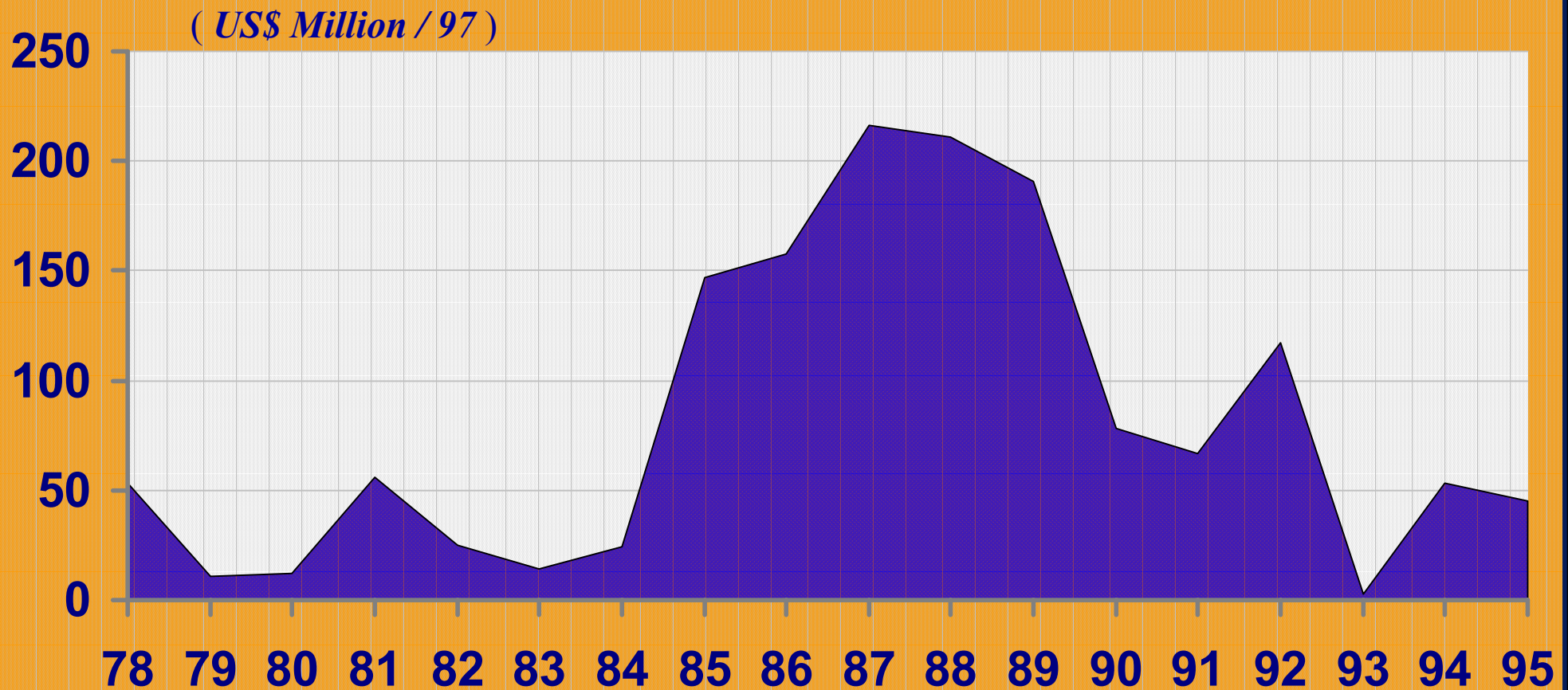
Source: Bamburra's database

Investments in Gold Exploration



Source: Multiyear Plan for Development of the Mineral Sector; Brazilian Mineral Yearbook. DNPM

Investments in Gold Mines



Accumulated: US\$ 1.48 Billion

Average: US\$ 82 Million / year

Source: Multiyear Plan for Development of the Mineral Sector; Brazilian Mineral Yearbook. DNPM

Selected Potential Projects

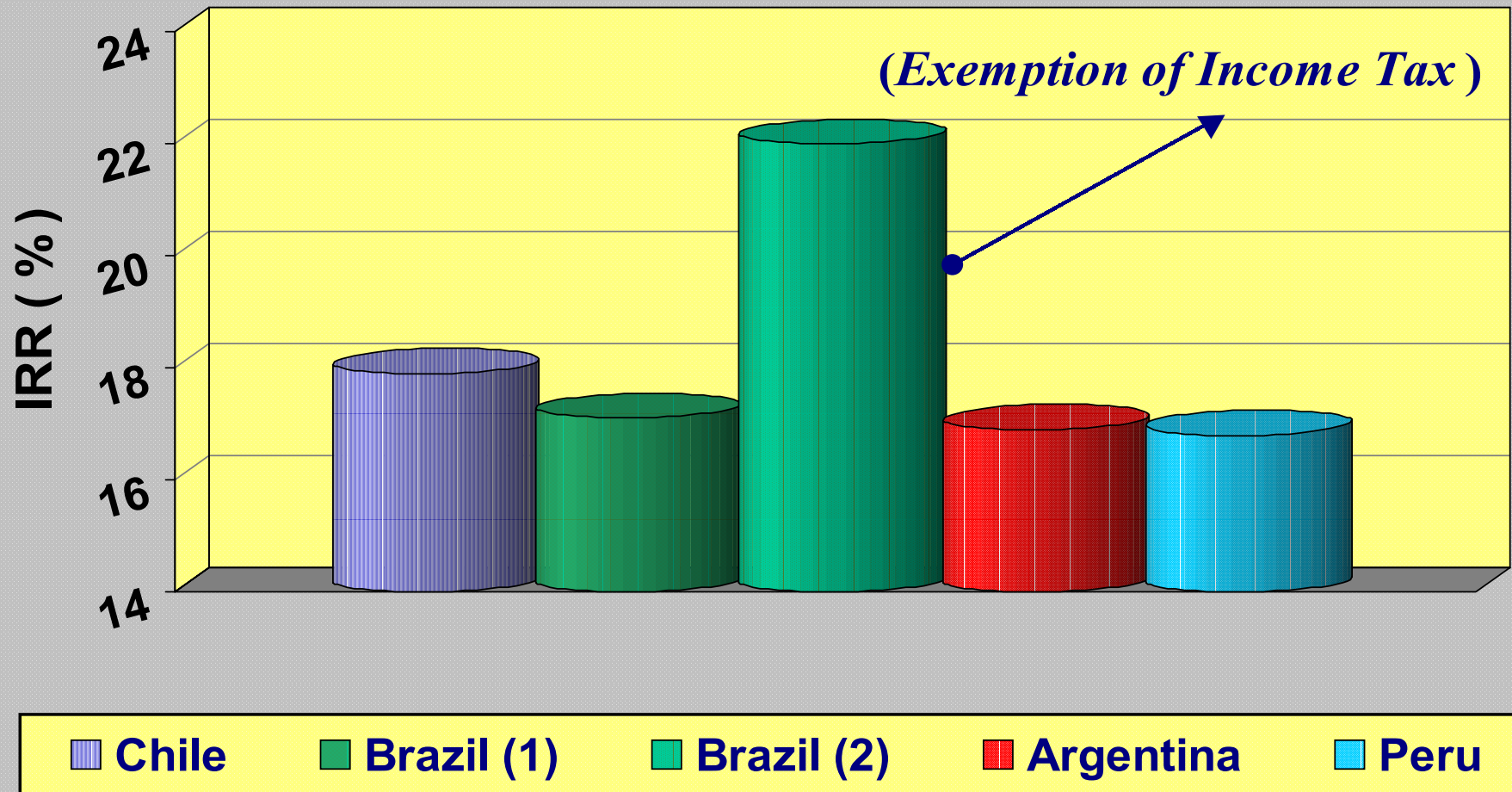
Projects	Group	Resources	Investment	Production
Serra Leste	CVRD	12,862,000 oz.	US\$ 250 M	500,000 oz.
Salobo	CVRD / M. Velho	9,015,000 oz.	US\$ 1,500 M	257,000 oz.
Chapada	Santa Elina / Echo Bay	2,200,000 oz.	US\$ 200 M	209,000 oz.
Gurupi	TVX / Newmont	2,400,000 oz.	na	na
Piaba	Eldorado / Brascan	868,000 oz.	US\$ 90 M	100,000 oz.
Luziânia	Eldorado	780,000 oz.	US\$ 100 M	120,000 oz.
Sabará	Brazilian Res.	927,000 oz.	na	na

Source: Bamburra's database

São Bento



IRR of a Simulated Gold Project: *A Cross Country Profile for 1996*



Source: The Brazilian Mining Climate. Mining Magazine, April, 1997, pps 220-225.

Morro Velho



Morro do Ouro

