Seminar on Sustainable Communities

Rio de Janeiro, June, 16th

CETEM
CENTRO DE TECNOLOGIA MINERAL
NÚCLEO REGIONAL DO ESPÍRITO SANTO

Ministério da Ciência, Tecnologia e Inovação

GOVERNO FEDERAL
BRASIL
PAÍS RICO É PAÍS SEM POBREZA

Risk Assessment and Sustainable Engineering Solutions for Communities

The case of small mining communities

Carlos Cesar Peiter & Nuria Fernández Castro

COORDINATION FOR TECHNICAL SUPPORT TO SMALL AND MEDIUM COMPANIES
CENTRE FOR MINERAL TECHNOLOGY
CETEM/MCTI

RIO+20
United Nations Conference on Sustainable Development

BRAZIL HAS A HUGE MINING PRODUCTION COUNTRY

Global role	*World Trade Share*	Exporter	Self-sufficient	Importer /Producer	Importer
Niobium (1st)	98%	Nickel	Limestone (cement)	Phosphatic Rock	Potasium
Iron (2nd)	19.1%	Magnesium	Industrial Diamond	Zirconite	Sulfur
Bauxite (3rd)	12%	Caolinite	Titanium	Zinc	Metalurgical Coal
Manganese (2nd)	13.3%	Vermiculite	Gold	Diatomite	Rare Earths
Grafite (1st)	8%	Cromium	Wolfram	Copper	
Tantalum (2nd)	16.1%	Mica	Talc		
Ornamental Stones (4th)	4.9%	Alumina			

Source: Brazilian Association for Industrial Development (MDIC). October, 2011.

SPECIAL GOVERNMENT TRADE POLICY TO DEVELOP SMALL AND MEDIUM BUSINESS

L

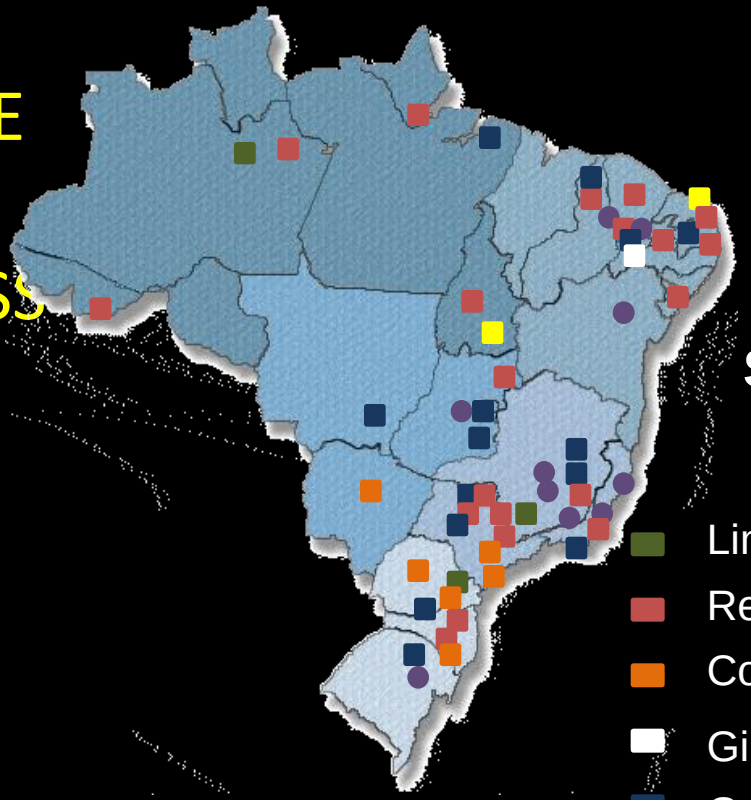
Small mining clusters:

55 have governmental support:

Ceramic, Gems, Ornamental Stones,

Gipsum, Limestone & Lime, Pegmatites,

and Industrial Minerals



Sources: IBRAM, MME, MCTI

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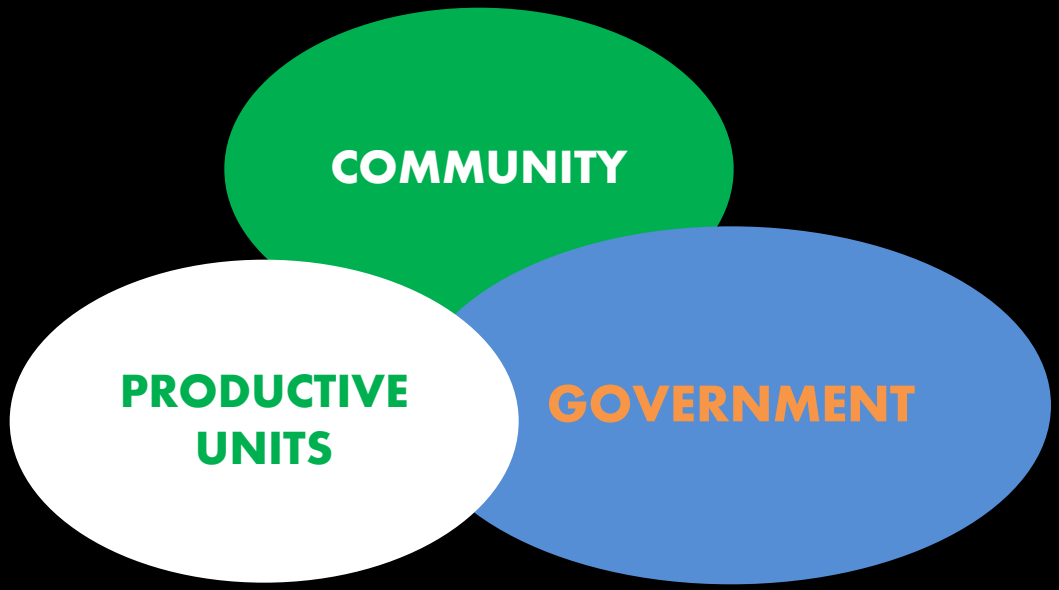
JOINT EFFORT:

This support includes participation of States' Governments, City Halls, NGOs, Workers Unions, Financial Agencies, Universities and Technology Centers.... all stakeholders

SHARED MANAGEMENT:



COOPERATION

GOVERNANCE

CASE STUDIES ON SMALL MINING IMPACTS AND RISKS:

The Cariri Stone Mining Cluster

Natural heritage losses , environmental and social risks

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TECHNOLOGY TRANSFER for better QUARRYING

ARTISANAL

MECHANIZED

TECHNOLOGY TRANSFER – PROCESSING

ARTISANAL

MECHANIZED

TECHNOLOGY TRANSFER – PROCESSING

ARTISANAL

MECHANIZED

Possible uses for quarries waste rock and residues

Abandoned site

Use in the lime and cement factories

TECHNOLOGY TRANSFER – NEW PROCESSES

WASTES

PRODUCTS

The fossils sites are still at RISK !

The possible solution is the new Geopark (Geoparque do Araripe)

GeoPark Araripe

GLOBAL GEOPARKS NETWORK

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Regional economy and jobs under threat : The Padua Natural Stone Cluster

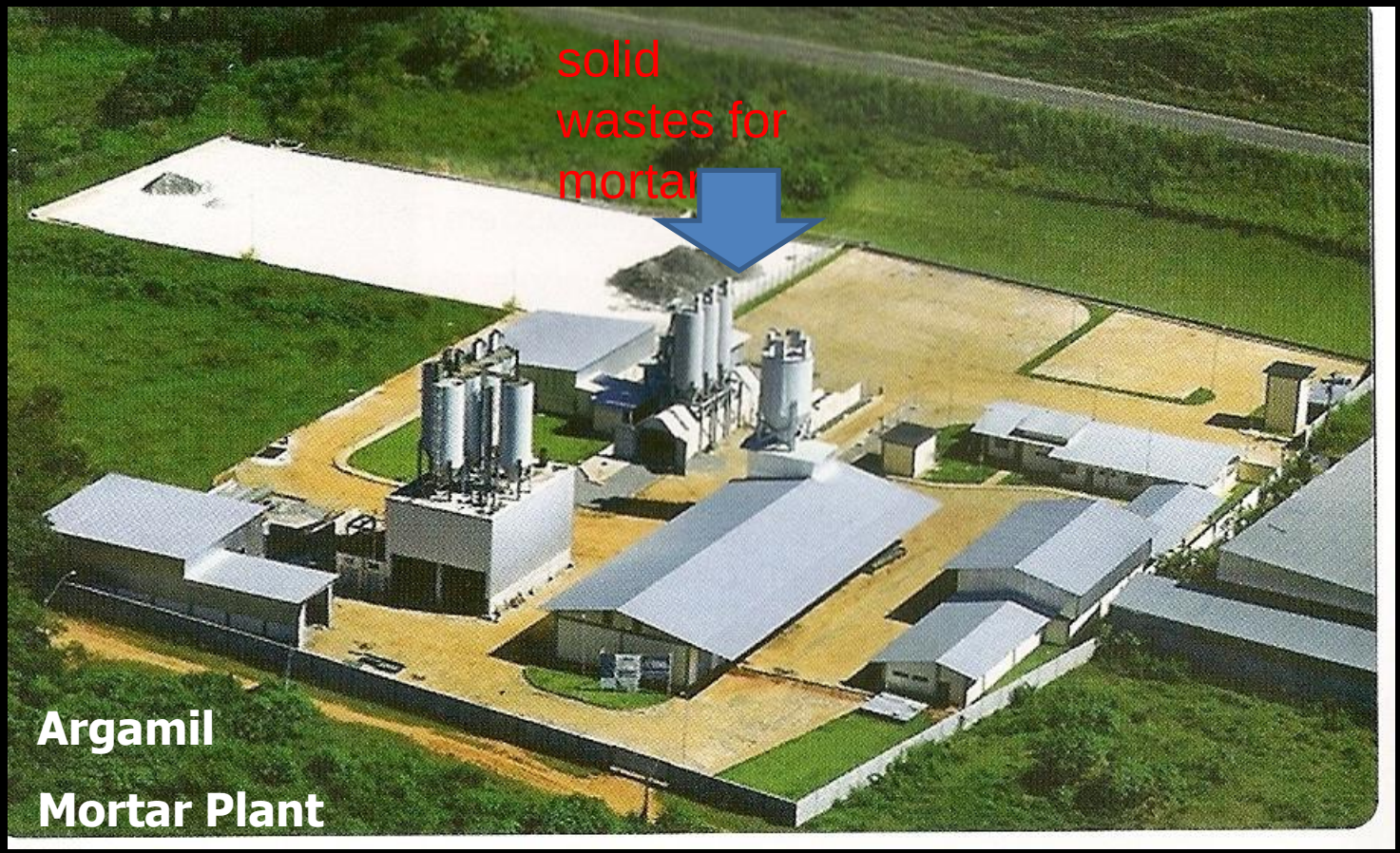
Environmental Agency Warning : No legal environmental license before solving the pollution (water and solid wastes)

CETEM´s TECHNOLOGY TRANSFER – WASTES TREATMENT

WATER RECYCLING THROUGH SIMPLE LIQUID/SOLID SEPARATION

TECHNOLOGY TRANSFER – WASTES TREATMENT

NEW PRODUCTS AND NEW BUSINESS DEVELOPMENT



ORNAMENTAL STONES PRODUCTION - QUARRIES

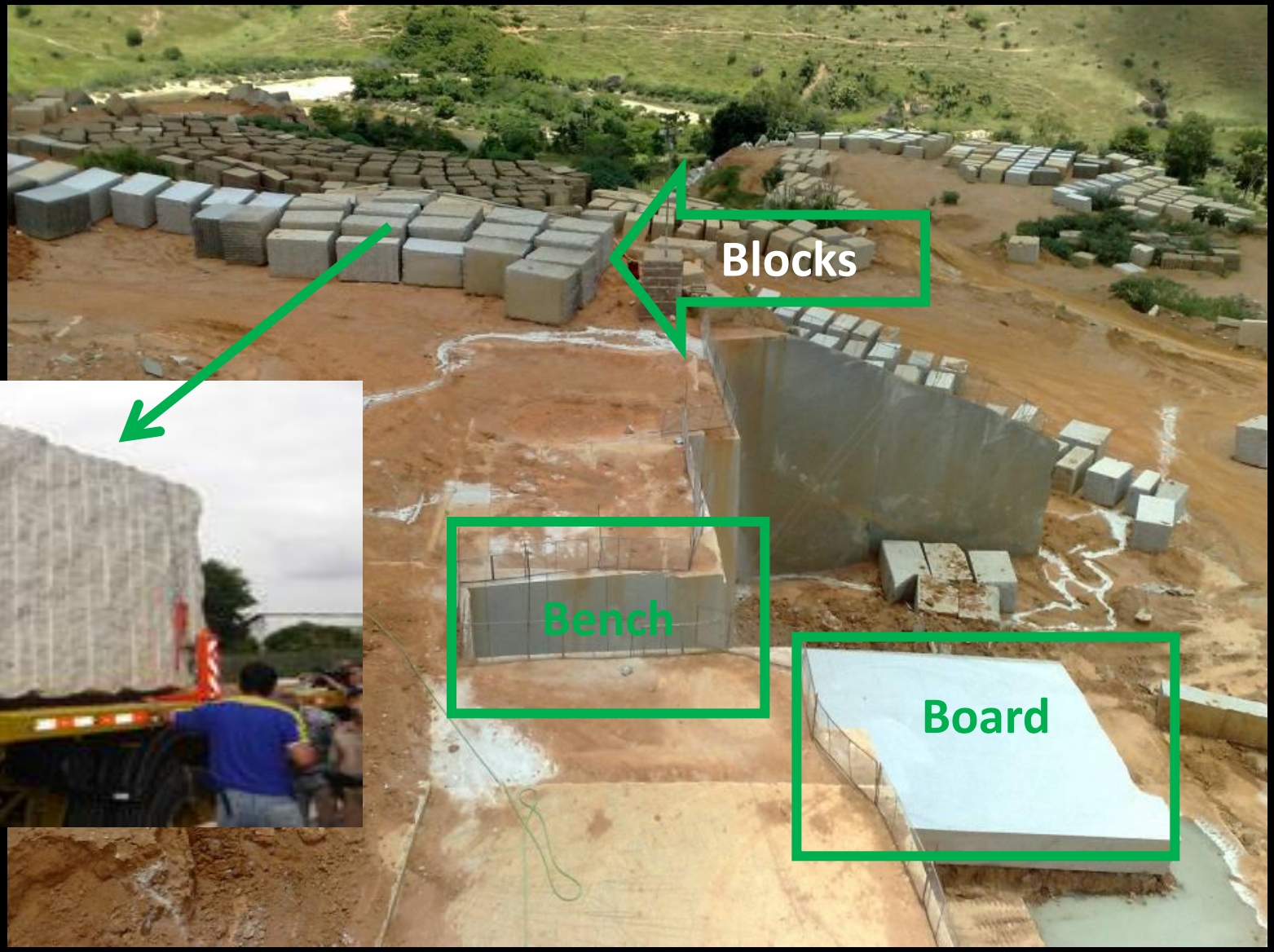
2011 ROM: 9 M t (Cid Chiodi, 2012)

Medium Recovery Rate: 30%

About 30 M t quarry wastes

Granite Quarry, 2011 . PHOTO: CETEM-ES/MCTI

COMMERCIAL BLOCKS PRODUCTION IN QUARRIES



PHOTOS:
CETEM-ES/MCTI, 2011

PROCESSING - SAWMILLS

MULTIBLADE GANGSAW

Fine wastes:

A 9 *cub. m b*lock - 8 tons of sawing wastes

MULTI DIAMOND WIRE GANG SAW

SECONDARY PROCESSING

PHOTOS:
CETEM-ES/MCTI, 2011

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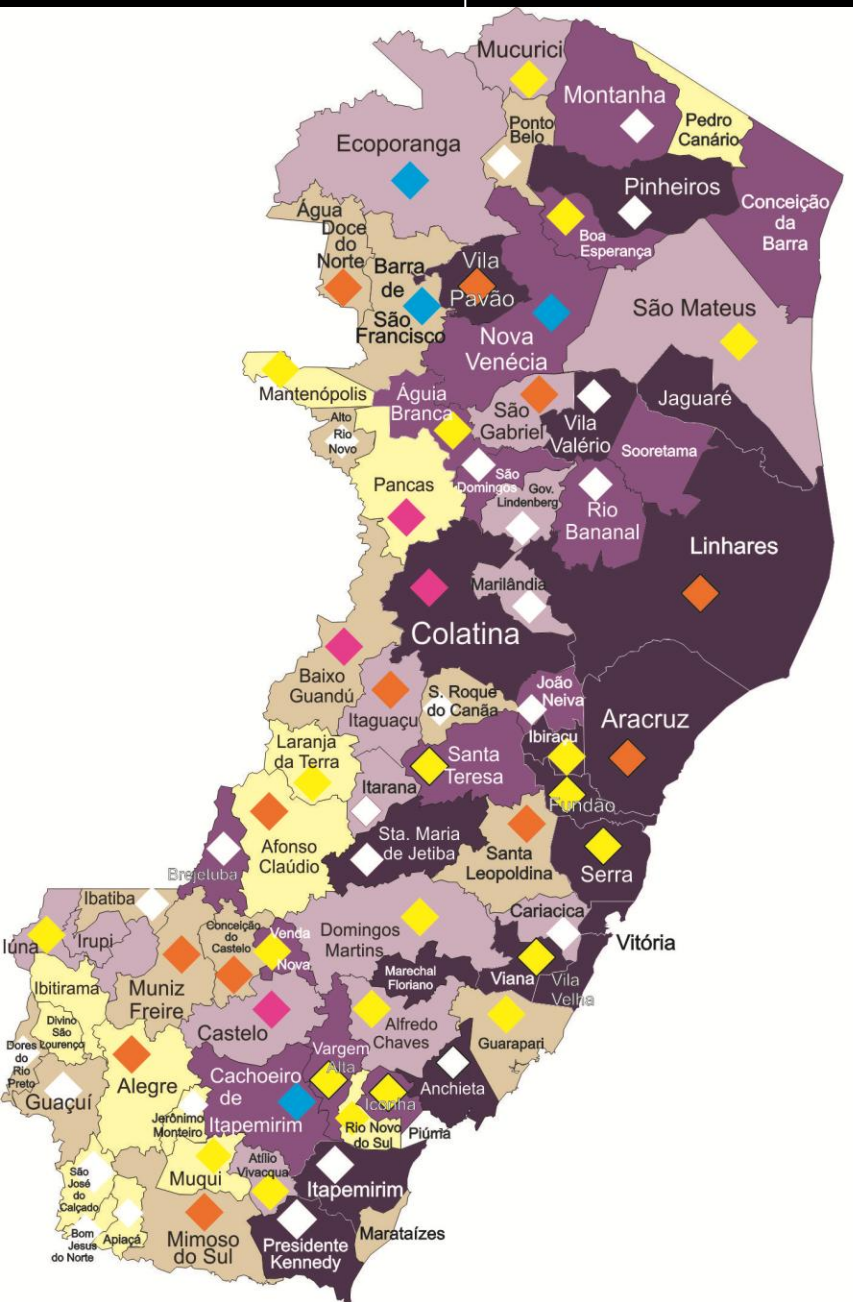
Visual Impact, Vegetation loss, Land-use conflicts

Noise, dust, quarries wastes, processing wastes, heavy transport,
Handling and transporting accidents

PHOTOS:
CETEM-ES/MCTI, 2011



APL – ORNAMENTAL STONES - ES

- 7% of the State's GDP;
- 2,500 businesses;
- 25,000 direct jobs;
- 1 Billion Brazilian Real invested - 2011;
- 66 out of 78 municipalities have quarries

GDP *per capita*
Unit:Brazilian Real
State of Espírito Santo, 2008

Map and Data Source:
Brazilian Institute of Geography and Statistics

- 6,105.06 to 7,475.73
- 7,475.74 to 8,480.73
- 8,480.74 to 10,094.17
- 10,094.18 to 12,808.36
- 12,808.37 to 116,844.79

Ornamental Stones Quarries - 2011
Authors' estimation, from DNPM and IEMA data

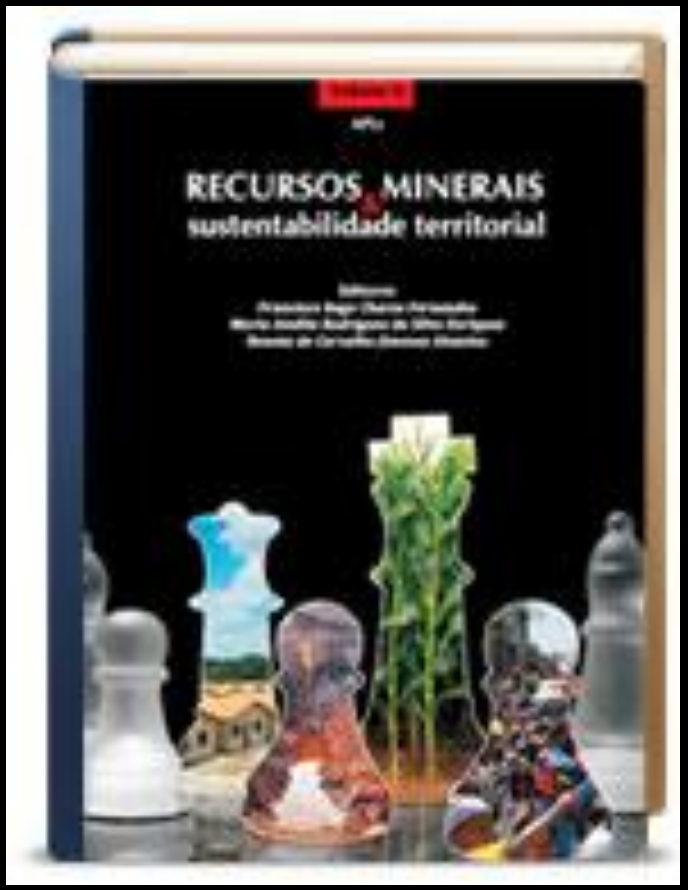
- Less than 10
- 10-25
- 25-50
- 50-100
- More than 100

Case Study Mining x Communities:

Perception of communities on mineral activities' impacts

541 interviews

Mining communities and surrounding communities



Recursos Minerais & Sustentabilidade Territorial: arranjos produtivos locais. 1 ed. Rio de Janeiro: CETEM/MCTI, 2011, v. II, p. 139-176

IDH ES 2000 : 0,750 2010 : 0,802		Pop. (IBGE, 2010)	IDH (UNDP, 1991)	IDH (UNDP, 2000)	% Better Income	% Better quality of life	% Satisfaction with public services	% Satifaction with mining
Mining Municipalities	Cachoeiro de Itapemirim	189.889	0,71	0,77	**74,8**	**81,3**	**45,67**	**64,54**
	Barra de São Francisco	40.649	0,61	0,701	**71,81**	**83,22**	**52,38**	**65,98**
	Nova Venécia	46.031	0,661	0,738				
	Vila Pavão	8.672	0,612	0,688				
Surrounding Municipalities	Jerônimo Monteiro	10.879	0,641	0,706	**71,26**	**77,27**	**52,27**	**65,82**
	São Domingos do Norte	8.001	0,622	0,71	**81,63**	**71,43**	**40**	**83,67**

COMMUNITIES PERCEPTION ON MINING IMPACTS – LAST 20 YEARS

All Economic Indexes have improved

More whealth, more jobs

Infrastrutural, educational, and health problems relay on local governments

Dust and road accidents are the main negative impacts of mining

- Communities are satisfied with ornamental stones activities
- Economic Impact extremely important for the whole State

  • Jobs, Income, Social development;
  • Reduction of unequality;
  • Surrounding municipalities are positively affected.

TO BE TAKEN INTO ACCOUNT :

- Low sensibility to negative impacts
- Improvements are also results of Brazil Economic Growth and Government Investments in Interior Regions

SOME CONCLUSIONS FROM THOSE CASE STUDIES

ECONOMIC AND ENVIRONMENTAL RISKS are the most important for mining clusters by now.

If those two aspects are under control SOCIAL RISKS looses importance for the community

Within mining clusters (APLs) TECHNOLOGY TRANSFER is a starting point in the path of sustainability, though COOPERATION is the key to reach the finish.