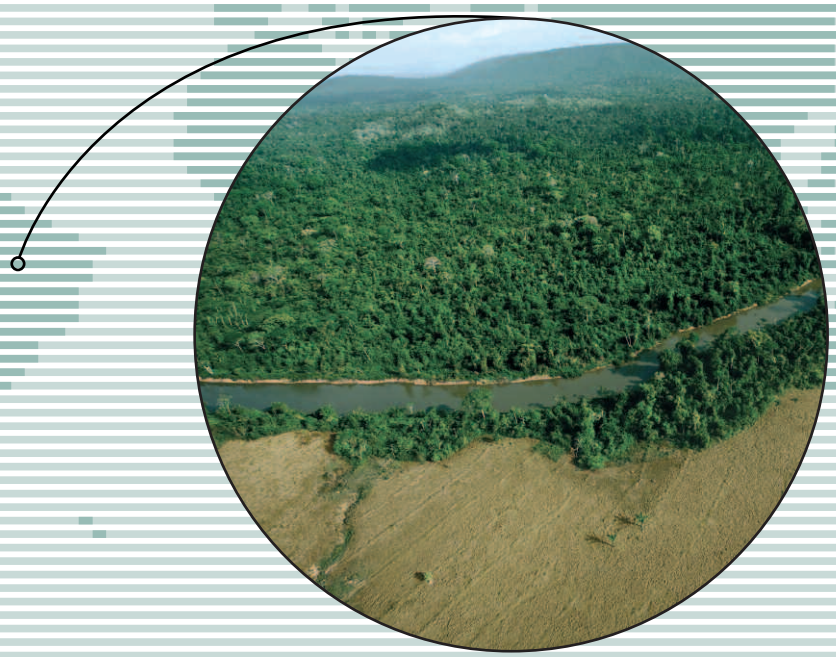
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International Council on Mining & Metals

Report

The mining sector in Brazil: building institutions for sustainable development

Mining: Partnerships for Development
April 2013



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Foreword

Some 50 countries – many of them low- and middle-income – in the world are significantly dependent on mining and metals activities. For the many millions of people in these countries, mining is critical for generating the economic means to achieve their social aspirations.

Yet mineral wealth does not invariably lead to an enhanced economic and social condition for all. Since 2004 ICMM has been conducting research to understand the critical success factors that have enabled some countries to benefit from substantial resource endowments and avoid the so-called resource curse. The analysis of Brazil summarized in this report is ICMM's sixth case study using the toolkit developed for this purpose. It follows earlier case studies on Peru, Chile, Ghana, Tanzania and Lao PDR.

Brazil has seen an investment surge over the past few years, including large investments into new mining projects, as well as attracting foreign direct investment (FDI) in excess of US$10 billion per annum in recent years. Vale's investments alone are the equivalent of almost 5% of total annual national investment.

Vale's support for applying the toolkit in Pará state represents a significant contribution in terms of strengthening our understanding of mining's broader role in society.

Mining has a number of special characteristics including: 1) its long time horizon, (2) its need for both skilled and unskilled labour, (3) its links to regional infrastructure and service development, (4) the importance of the products that it produces. Mining also faces many tough environmental and social challenges along the way. Along with the earlier studies, this report demonstrates that with the right conditions in place, mining makes a positive contribution to sustainable development. For its part, the ICMM *Mining: Partnerships for Development Toolkit* is designed to reveal how companies, governments and their partners working together can maximize that contribution.

We hope that through reading this study others will be motivated to apply the toolkit in other mineral-rich countries.



R. Anthony Hodge
President, ICMM

Executive summary

About Mining: Partnerships for Development

ICMM's Mining: Partnerships for Development initiative focuses on enhancing mining's economic and social contribution. It supports the formal commitment made by ICMM member companies to actively support or help foster multi-stakeholder development-focused partnerships in countries where they are active.

Mining is economically critical for millions of the world's poorest people with some 50 countries being significantly dependent on mining. Yet mineral wealth does not always mean positive economic growth – the so-called "resource curse" theory.

In 2004, ICMM began the Resource Endowment initiative in collaboration with UNCTAD and the World Bank Group. It developed a substantial body of research on why some countries have avoided the "resource curse" and developed practical actions for companies, governments and civil society. It was overseen by an independent international advisory group including the Head of the UN Global Compact and a former Prime Minister of Senegal.

The Resource Endowment initiative showed that the "resource curse" is not inevitable. Mining investments can drive economic growth and reduce poverty nationally and locally. However, companies alone cannot unlock the development benefits from mining – governance is key and multi-stakeholder partnerships can help fill capacity gaps. The findings were based on the application of ICMM's *Resource Endowment Toolkit* (April 2006) in four countries – Chile, Ghana, Peru and Tanzania.

The toolkit has been now been revised, extended and re-published as the *Mining: Partnerships for Development Toolkit*. It responds to a clear need in different parts of the world for a more systematic and objective way to quantify and agree ways to enhance mining's economic and social contribution.

It is currently being applied in a number of countries and can be used by mine managers and those interested in promoting economic and social development (host governments, development agencies and development-focused NGOs).

For more information, visit www.icmm.com/mpd or email us at info@icmm.com.

This report has been prepared based on a study led by OPM for ICMM and IBRAM. Using the framework defined by the ICMM MPD Toolkit V3 (ICMM, 2011a), the objective of this work was to assess the economic and social impacts of mining in Brazil at the national level and at the local level (using Vale's operations in Southeast Pará as a case study).[1]

This report presents the study's key findings, including those relating to the overall quantitative macro-economic as well as local economic and social impacts of mining activity in Brazil. It also examines the complex economic, social and governance challenges faced by remote and often poor regions (such as Southeast Pará) hosting large-scale mining operations.[2] The investments by Vale – Brazil's dominant mining company and one of the world's largest – into Southeast Pará constitute the core of this case study, with examples from other large mining companies operating in Pará State (Alcoa and Hydro) to illustrate the role of partnerships in enhancing the economic and social development outcomes of mining.

The study found that the starting point for the assessment of mining impacts in Brazil is one of significant ***complexity and ambiguity within the Brazilian institutional framework***, across areas of setting government policy, raising revenue, revenue transfers, revenue spending (budget), and policy implementation and administration.

The study also presents evidence of voluntary partnerships that Vale, through its Social Investment Framework, has been engaging in following the arrival of Ferro Carajás in the mid-1980s It shows how partnerships involving Vale and other large mining companies in the region (such as Alcoa and Hydro) work ***strategically within the system*** – to drive positive developmental outcomes in Southeast Pará.

The strategic approach taken by Vale should be extended to seek buy-in from all stakeholders and in terms of scope and coverage. By doing so the mining sector can work with state and non-state partners, to ***help realize the full economic and social contribution of mining*** to long-term sustainable development outcomes.

1 The MPD Toolkit has been applied in five countries to date: Ghana, Tanzania, Chile, Peru and Lao PDR, Brazil represents the sixth application. Full references are at the end of this report. In addition, OPM has conducted similar studies using the Toolkit in Guinea, Romania, Ecuador, Tanzania and the Democratic Republic of Congo.

2 The potential for partnerships involving industry, government (at different levels), non-government organizations (NGOs) and international development agencies to effectively address some of these governance gaps is discussed in ICMM (2006b).

The report is presented in seven sections:

- **Section 1:** country context for the study
- **Section 2:** assessment of macro-economic impacts of the mining sector in Brazil
- **Section 3:** assessment of impacts from large-scale mining in Southeast Pará State in the north of Brazil
- **Section 4:** review of the role of multi-stakeholder partnerships in responding to the opportunities and challenges of sustainable local development in mining areas
- **Section 5:** analysis of changes over time in the incomes and other socio-economic indicators of populations in mining vs. non-mining regions in Southeast Pará
- **Section 6:** discussion of the governance challenges associated with enhancing impacts from mining in Brazil's newer mining regions
- **Section 7:** summary of the main findings and selected policy issues.

Section 1: Country context

At the national level, Brazil is now widely recognized as a highly successful emerging market economy:

- The country today is the world's 6th largest economy and enjoys stable macro-economic conditions, including low formal-sector unemployment, low budget deficits, huge inflows of foreign capital and manageable inflation
- Sustained economic growth and the relatively stable political climate since 1985 have contributed to improved living standards for many of Brazil's citizens, supported by far-reaching social protection policies.

However, the distribution of benefits arising from Brazil's recent rapid growth has been uneven:

- Brazil currently ranks as the seventh most unequal country in the world
- Inequalities run between rich and poor within regions, but also between regions, with the north of the country – including Pará State – performing worse on most socio-economic indicators.

Regionally, the north of the country remains relatively underdeveloped:

- Until the mid-1990s economic development in Pará State was based mainly on environmentally damaging extraction of natural resources, including logging, livestock and agriculture
- Today, much of Brazil's new mining investment is taking place in northern regions, where issues of low socio-economic development, environmental impacts and governance weaknesses are most acutely felt
- It is precisely in underdeveloped areas such as the north of Brazil where mining can have truly transformative impacts. This point is highlighted by the establishment by Vale of the Ferro Carajás mine in Parauapebas (Southeast Pará State) in 1985 – a project that has already had far-reaching impacts that the Brazilian government, the World Bank and the companies involved did not anticipate at the time.

Many of these new mining areas are located in or near to the Brazilian Amazon, which is increasingly recognized as a public good of enormous global significance. The interest of the Brazilian government in reducing deforestation has grown in tandem with the broadening of the global climate change agenda, resulting in far more responsible policies and approaches to economic activity in these areas. This includes far greater explicit and implicit environmental responsibilities for mining companies in the region.

In terms of governance, Brazil's burgeoning reputation as an outstanding economic power has not been associated with any stellar improvements in the country's governance arrangements. Indeed, these are weak in many dimensions and may have actually been a hindrance to the economic achievements that Brazil has nonetheless managed to realize. Based on the World Bank's World Governance Indicators (WGI), Brazil remains far behind OECD countries on most counts, although it generally outperforms other BRIC countries. However, gradual improvements in relation to some aspects of governance – such as the "rule of law" and the "control of corruption" – indicate that government is becoming more adept at dealing with strong political-economic interests that can otherwise undermine the potential to realize mining's full economic and social contribution.

Section 2: The macro-economic contributions of mining

The macro-economic contributions of mining are often significant, but vary greatly across different indicators. To date these impacts have not been well documented, debated and understood – instead, discussions around mining policy reform have often focused narrowly around issues of taxation and the mitigation of negative impacts.

- Brazil's ***minerals exports*** played a key role in the impressive turnaround of the country's overall external balance, from a highly negative position at the height of the "real" currency crisis in the late 1990s to a positive figure of US$50 billion annually by 2010. Minerals (defined broadly to include fuels) grew to account for 33% of Brazil's total exports by 2010 (from around 22% in 1995). The most dramatic change has been in the share of ferrous ores and metals in total exports, which rose from 6.3% in 1995 to 16.7% in 2010
- By sharp contrast to results from previous applications of the Toolkit, the contribution of mining to ***foreign direct investment (FDI)*** in Brazil is typically not large in relative terms. In recent years the share of mining in FDI inflows has varied between 3% and 24% (the lower figure being more typical). The mining sector however does play a larger relative role in terms of ***national investment***
- The mining sector contributes to Brazil's ***government revenues*** through a wide variety of often complex tax measures and the sector faces a relatively high overall tax burden compared to other mining economies. Based on data from the Ministry of Finance, the overall tax contribution of the mining sector accounted for between 1% and 2% of total government tax revenues in 2010 and 2011. This corresponds to the equivalent of between 14% and 16% of gross mining sector output. Although political debates over mineral taxation have focused on the Compensação Financeira pela Exploração de Recursos Minerais (CFEM) "royalty", the analysis here shows that CFEM revenues constitute only a small part of the overall tax take from mining (c.10–15% of total mining taxes)
- In Brazil's relatively diversified economy, the contribution of the mining sector to ***gross domestic product (GDP)*** is modest. In current price terms, the whole extractives sector (including oil and gas) now accounts for some 3% of total GDP and the mining elements account for only around 1.1%

- Total ***direct formal employment*** in 2009 in the extractive sectors (including oil and gas but excluding small-scale mining) accounted for almost 300,000 persons: the mining sector alone accounted for 232,000. While this is a large absolute number, it represents less than 1% of the total occupied labour force of Brazil. In Southeast Pará, however, the total direct employment is highly significant and represents up to 20% of total employment. Moreover, the *indirect* effects are also large, partly as a result of various partnerships in which Vale and other mining companies engage with government and other development partners.

Overall, it is clear that the increasing significance of mining in total national investment, combined with favourably high commodity prices, have resulted in mining exports growing very rapidly. The high recent levels of investment – much of it targeting less-developed and Amazonian regions of Brazil such as Southeast Pará – will lead to continued expansion of mining production, exports and employment.

Section 3: Economic contributions at the local level (case study of Southeast Pará)

The economic contributions of mining at the ***national*** level are large in absolute terms, but moderate in relation to the overall size of the Brazilian economy. By contrast, the economic and social impacts of mining in relation to ***local*** areas in remote regions of Brazil are transformative. Section 3 quantifies the direct impacts of Vale's operations in Southeast Pará, using comprehensive data collected as part of Vale's socio-economic diagnostic studies.

- Vale's forecast ***investment*** for its Southeast Pará operations for the period 2011–2014 of US$15.6 billion represents 32% of the total investment for the whole mining sector of Brazil and some 15–20% of Pará State GDP. This data confirms the rising significance of Pará State and in particular Southeast Pará as a destination for mining investment
- A significant proportion of the ***tax contributions*** from mining now come from Southeast Pará where the Ferro Carajás project remains the largest single contributor. The rates of royalty (CFEM) are attracting most attention in public debates, yet represent only a small share of the total tax contributions. The CFEM is nonetheless highly significant for some individual mining municipalities
- A significant share of inputs is already ***procured from within the state*** relative to what has been found in other countries. Specifically, Vale's procurement from within Pará State in 2010 was expected to be 12.5% of Vale's total procurement from within Brazil. Between 2003 and 2008, on average 22% of procurement for Vale's operations in Southeast Pará was sourced from within the mining operations' host municipalities
- Although the employment effects of the mining sector nationally are relatively small, the introduction of huge mining projects into the rural context has a large effect on local employment. Total ***direct employment*** – people on the company's payroll and employees of on-site contractors – rose sharply between 2003 and 2008 to reach 22,400 employees in Southeast Pará.[3] As a result of planned construction, direct and indirect employment in Southeast Pará were together forecast to increase further to 46,700 by 2012, representing a doubling in four years
- The analysis of the ***indirect*** and ***induced*** impacts for Southeast Pará indicates that for every R$1 in output generated by the mine, an additional R$1.3 of income is generated in the rest of Southeast Pará (i.e. a multiplier of 2.3). The induced employment multipliers are expected to be 3–4 times larger than this
- Big increases in employment opportunities also bring ***risks and challenges*** to host municipalities. Issues of governance explain some of them, such as the fact that migrants arrive in search of employment opportunities long before the project begins generating taxes or royalties (see Section 6). Multi-stakeholder partnerships in migration management and other areas identified by the ICMM MPD Toolkit can, to some extent, help address these challenges (see Section 4).

3 To put this in context, in 2010 Vale's total global workforce was 174,000.

Section 4: Multi-stakeholder responses to local challenges

This section discusses the broad range of initiatives developed by mining companies such as Vale, Hydro and Alcoa in partnership with government authorities and other actors, with the aim of enhancing the positive developmental impacts of commercial mining (see Section 3). These arrangements represent the collective response both to the enormous ***challenges*** of introducing mining into a previously underdeveloped region and also to the ***opportunities*** that large mining investments bring in catalysing sustainable development. These innovative examples of partnerships fit broadly into the six partnership categories identified in ICMM's MPD Toolkit, albeit with environmental management being an additional category in the Brazil case.

- All major mining companies in Pará State pursue a broad range of voluntary (as well as mandatory) commitments to help address the challenges of infrastructure, human capacity limitations and the public administration constraints in their areas of operation
- To illustrate, in 2010 Vale spent approximately US$1 billion on social and environmental investment, of which US$398.5 million was targeted on social projects. Of this total, about a quarter (US$104.8 million) was destined for Pará State
- Vale's social investment framework to guide this spending comprises three parallel processes. A ***mandatory*** process triggered by the environmental licensing process generates an agreed list of social obligations ("condicionantes"). In parallel, the Vale Foundation conducts ***voluntary*** socio-economic diagnostic studies to understand the major gaps in capacities, how these may change and what the main implementable actions are. A third component is Vale's ***Public-Private Social Partnership*** (PPSP) framework, whereby the company engages with Federal Government as well as municipal governments,[4] with the aim of matching the strategic requirements for infrastructure and other services with available federal funding schemes
- As a result of these processes, the Vale Foundation develops Letters of Agreement (LoA) with municipalities where it operates, setting out the roles and responsibilities of different actors in delivering social projects. These are public documents that enhance both accountability and the commitment of all partners. Other mining companies have adopted similar processes of local engagement albeit with important differences of detail.

The case studies of partnership examined for this study – some of which are highly innovative – indicate the following key features of successful partnership initiatives (as discussed at the multi-stakeholder workshop in Brasilia in February 2012):

- A strong focus on training and capacity building of government officials in public administration roles (revenue management, fundraising and implementation of infrastructure projects) and service delivery (education and health)
- A reasonably long-term approach to the resolution of some problems, which contrast with the typical local electoral cycle of around four years
- Active engagement with Federal Government agencies leading to significant increases in Federal Government funding. In the case of Vale, this is facilitated through diagnostic surveys as well as assistance to municipalities to access Federal Government funding
- Interdependencies between partnerships (e.g. migration management provides a basis for urban and infrastructure planning, which helps to reduce speculative real estate bubbles, inflation and the potential for rent-seeking).

These and similar partnership initiatives seek to build on the positive economic influences from large-scale mining and to mitigate the disruptive impacts. In doing so, they contribute to the socio-economic outcomes in the region, including with respect to incomes, education and health.

4 This report uses the terms "municipal government", "local government" and "City Hall" interchangeably.

Section 5: Socio-economic outcomes in mining areas in Southeast Pará

This section analyses the socio-economic performance of municipalities in Southeast Pará to compare performance in mining vs. non-mining municipalities, using secondary household data collected by the Brazilian Census of 2000 and 2010. The findings suggest that the presence of the mine, together with partnership initiatives like those discussed in Section 4, have resulted in significantly improved socio-economic outcomes in the mining municipalities in Southeast Pará. It was found that:

- ***Mining has undoubtedly attracted many more people to the impacted areas and the neighbouring catchment areas.*** Southeast Pará has seen population growth of almost 40% in the last decade. This compares to 22% in the state of Pará and to 12% nationwide. The average population size in the mining-affected municipalities is now at least twice as large as the corresponding average in the non-mining municipalities
- ***Urbanization rates*** also increased rapidly in mining-affected municipalities and today the urban populations in all six municipalities completely out-weigh their rural populations – they have gone from being "rural" to being "urban" in a very short period of time
- ***Average household monthly income*** growth was more rapid between 2000 and 2010 in Southeast Pará than both the national as well as the Pará State averages (statistically significant at 1%). Income levels remain lower in the southeast compared to the rest of the state, however there is evidence of convergence in regional incomes – reducing previous inequalities
- In terms of ***health and education indicators***, there has been a very large improvement in both education and sanitation conditions in the decade since 2000. However, unlike the income gains discussed above, this has been the case across Brazil more generally – mining has certainly played a role through the partnerships discussed in Section 3, but more research is needed to understand the specific role of mining across a broader range of indicators.[5]

Section 6: Governance and institutions

Having dealt with Brazil's comparative aggregate performance on governance in Section 1 (and Annex D), Section 6 summarizes the qualitative challenges that the mining sector has confronted in transforming the impacts of mining into sustainable benefits.

The study suggests that ***the introduction of very large mining projects by Vale, Hydro, Alcoa and others into previously sparsely populated and poorly developed areas could be expected to confront*** – *and to some extent also exert influence over* – ***the structural challenges underpinning Brazil's governance arrangements more broadly***. The arrival of large-scale mining has imposed large internal and external pressures on local mayors and municipal administrative agencies who need to deal with the newly arriving companies and the impacts of their operations. This arrival has also reconfigured some of the incentives faced by these municipal governments. In response, municipal administrators need to develop and adapt their approach to public-sector management as well as their competencies and attitudes towards the mining companies – to maximize the potential influence of mining on promoting development and wealth creation.

A comprehensive and in-depth assessment of the complex Brazilian governance system and mining sector reform agenda lies beyond the scope of the present study. However, the study's findings together with the contributions made by participants at the workshop point selectively to a number of the key governance challenges. These are largely associated with Brazil's complex federalist and decentralized political-administrative set-up. Specifically, they affect fiscal issues, incentives and externalities at the municipal level, challenges faced in scaling up existing partnership initiatives and addressing shortages in educational attainment and skills.

That assessment is discussed further in the Section 7 summary. It suggests that the combination of a sound regulatory structure with a wide variety of innovative support arrangements initiated by mining companies together constitute a strong institutional basis to ensure full capture of the potential developmental benefits of mining – a very sound starting point. However, these mining-specific arrangements are only as good as the broader institutional and governance arrangements within which they need to work. There are a variety of broader policy and institutional improvements that could greatly enhance the effectiveness of the present mining-specific institutional arrangements.

5 The study was limited to the very few municipal-level indicators from the 2010 Census that were available at the time of writing.

Section 7: Main conclusions and implications for policy

The starting point for the analysis of mining's impact in Brazil is one where there is significant ambiguity around the institutional framework, including areas of setting policy, raising revenue, revenue transfers, revenue spending (budget), and policy implementation/administration. Through its Sustainable Investment framework, Vale's presence in Southeast Pará since mid-1980s has helped develop partnerships that work strategically within this complex system, by identifying and working with those parts of the system where capacity constraints are greatest. This strategic approach should be extended to seek buy-in from a broader coalition of stakeholders. Successful initiatives should be promoted and scaled up.

In the area of ***mining and social investment***, the support provided to municipal governments to access federal funds is a unique feature of the Brazilian case, and reflects the particular institutional features of the present sub-national fiscal arrangements in Brazil. Through the PPSP initiative, integrated with the objectives of the mandatory "condicionantes", Vale helps municipalities to raise federal funds for investment into "hard" as well as "soft" infrastructure, as well as to improve public services. By focusing also on building revenue-raising capacity at the municipal level, these particular partnerships go well beyond the direct mining investment (of Vale) to focus on building the *capacity* of local governments. Since its inception the initiative has evolved to include institutional arrangements involving non-government actors (civil society and communities) focusing on participatory urban planning and local sustainable development.

More funding to local municipal authorities will not necessarily be translated into effective investment unless there is strong municipal capacity in the area of effective ***revenue management***. Some partnerships are working with public administrators to strengthen systems, processes and skills, yet are limited by current policies at the national level which concentrate funds raised from mineral taxation (especially the CFEM revenues) in the host municipalities – with limited funds going to the state-level authorities. This arrangement neglects the fact that the impacts and development potential of mining – as argued also by workshop participants in Brasilia – extend well beyond the borders of any single municipality, as well as the timing problem whereby municipalities are impacted well before revenues from mining start flowing.

Effective ***regional development planning*** is needed to provide infrastructure to integrate the vast rural areas where mining is taking place, in order to connect markets and broaden opportunities for economic integration with the mining sector. Mining companies partnering with state and non-state actors can play a key role, as evidenced by the example of effective coordination and planning around environmental management in the sensitive Amazonian region. For example, the Pará State "green municipalities" program coordinates between states and municipalities, supported by NGOs and industry, in order to address the challenges of deforestation. This positive example should be evaluated carefully for lessons on regional planning and coordination more generally.

Effective innovative partnerships designed to promote economic diversification and increased ***local content in the mining sector*** include Vale's INOVE initiative. Like many other partnerships in Pará, INOVE responds partly to the social regulatory obligations on local procurement and employment arising from the "condicionantes", while at the same time serving the commercial interests of the company in securing an improved future supply base. The strong alignment of incentives between the legal requirements and the voluntary objectives provides a good basis for the local economy to take advantage of new mining activities in build a more diversified, viable and sustainable economy – although the full potential for Pará's local businesses to benefit from mining remains constrained by infrastructure deficits and other factors.

The role of ***mining in poverty reduction*** appears to have been significant in Southeast Pará, based on evidence from Census data presented in Section 5. Mining municipalities have grown faster, and have seen significantly higher rates of urbanisation, than non-mining municipalities. Although there are variations within these two groups, mining municipalities now exhibit significantly higher 2010 household real income than non-mining municipalities.[6] The impacts on other socio-economic indicators in health and sanitation also appear to be positive, although Brazil overall has witnessed rapid changes in social indicators such as the Millennium Development Goals during the last decade.

6 This result is statistically significant at the 1% level. By contrast, in 2000 there was no statistically significant difference between the two groups.

This assessment points to the following policy implications and recommendations:

- Government agencies at all levels working together with mining companies and others have learned to organize their development efforts within the financial and political framework established in particular by the 1988 Constitution. These partnerships have instituted innovative solutions to various mining-related challenges presented by the 1988 Constitution which have led to improved development outcomes. However, the policy environment still constrains the capture of the full social and economic benefits of mining in the less developed regions.
- There appear to be challenges within the present system for ***allocating*** revenues (to both state and municipal levels of government) in terms of the adequacy of the receipts needed to fully ***address the local and regional development challenges and opportunities*** arising from mining. This is a challenge with respect to the sharing of revenue receipts ***in general*** rather than the absolute level of taxation in the mining sector – the overall tax burden is perceived to be high and contributes to perceptions that Brazil's tax regime constitutes a mild-to-strong deterrent to investment (see Section 2.3).
- The expected future expansion of the mining sector in erstwhile less-developed regions of Brazil will require more ***systematic attention to regional development planning***. Positive examples of how this might work in practice exist and could be built on, including the Federal government's "red municipalities" programme, and the subsequent "green municipalities" programme of Pará State – both of which show the potential for effective regional coordination across multiple levels of government, private sector and civil society.
- Maximizing minings development contribution requires a clearer definition of the public versus private ***roles and responsibilities*** for addressing specific issues around mining and development – with public roles that go beyond those of the Ministry of Mines and regulatory agencies. Assessing this question could be an important early task for Brazil's proposed new National Mining Policy Council.
- There is a need to crystallise a vision of how much the mining sector can realistically grow in particular regions in terms of capacity and scope, and to enhance ***information sharing*** between older and newer mining regions; between companies and government; and between different levels of government. The workshop discussions identified a range of specific suggestions for improving arrangements for greater collaboration, highlighting the convening role of IBRAM.
- Ensuring adequate levels of capacity on the part of government agencies and their implementing partners is critical, and the availability of funds is not, *per se*, the main constraint on development initiatives at the municipal level. Rather, the workshop discussions were unanimous in seeing the need to strengthen ***municipal governance capacity*** as an important priority.
- Whilst the results from comparing socio-economic indicators in Southeast Pará indicate that ***mining municipalities are experiencing better socio-economic outcomes***, future research is needed to validate and elaborate these initial results by involving more mining companies – including the distribution of these impacts between and within communities.
- Above all, there is a strong case for a ***more holistic vision for the institutional arrangements of the sector***. This broadened approach should consider matters including the role of the mining sector in generating demand for jobs, the ability of the education system to supply the necessary training, the geographical scale at which key planning decisions are made, and the adequacy of the existing fiscal provisions combined with private mining finance to provide both the infrastructure and an enabling environment for business. Any attempt to address such a broad range of issues can learn much from the partial arrangements that are already in place (as reflected in Section 4), and from the strengths and weaknesses of these arrangements. An improved solution will almost certainly require a combination of effective mining policy dialogue and multi-stakeholder partnerships at all levels.

Abbreviations

BRICS
Brazil, Russia, India, China, South Africa

CEDAC
Comunidade Educativa

CFEM
Compensação Financeira pela Exploração de Recursos Minerais (Financial Compensation for the Exploitation of Mineral Resources)

DNPM
Departamento Nacional de Produção Mineral (National Department of Mineral Production)

FDI
Foreign Direct Investment

FIEPA
Federação das Industrias do Pará (Federation of Industries of Pará)

FUNDEB
Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação (Fund for the Development of Basic Education and Valuing of Education Professionals)

GDP
Gross Domestic Product

HDI
Human Development Index

IBAMA
Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute of Environment and Renewable Natural Resources)

IBGE
Institute of Geography and Statistics

IBRAM
Instituto Brasileiro de Mineração (Brazilian Mining Association)

ICMM
International Council on Mining and Metals

ICMS
Imposto sobre a Circulação de Mercadorias e Prestação de Serviços de Transporte Interestadual e Intermunicipal e de Comunicação (Tax on Goods and Services)

IDEB
Basic Education Development Index

IDURB
Instituto de Desenvolvimento Urbano e Habitação (Institute for Urban Development)

IPEA
Instituto de Pesquisa Economica Aplicada (Institute of Applied Economic Research)

LoA
Letter of Agreement

MDGs
Millennium Development Goals

MPD
Mining: Partnerships for Development

NGO
Non-Governmental Organization

OPM
Oxford Policy Management

PAC
Programa Acelerac_a_o do Crescimento (Growth Acceleration Program)

PAM
Programa de Assistência Migrante (Migrant Assistance Program)

PSPM
Public Sector Management Strengthening Initiative

PPSP
Public–Private Social Partnership

REDES
Redes de Desenvolvimento de Fornecedores do Pará (Supplier Network Development Program of Pará)

SEBRAE
Serviço Brasileiro de Apoio às Micro e Pequenas Empresas (Service to Support Micro and Small Enterprises)

SEDES
Secretaria De Desenvolvimento Social (Department of Social Development)

SEGESP
Secretaria de Gestão de Pessoas (Department of Management and Planning)

SEMED
Secretaria Municipal Da Educação (Municipal Department of Education)

SEMSA
Secretaria Municipal Da Saude (Municipal Department of Health)

SENAI
Serviço Nacional de Aprendizagem Industrial (National Industrial Learning Service)

SESI
Serviço Social da Indústria (Industry Social Services)

SMEs
Small and Medium Enterprises

SUAS
Sistema Único de Assistência Social (Unified System for Social Services)

UNDP
United Nations Development Program

WGI
World Bank World Governance Indicators



1

COUNTRY CONTEXT

1. Country context

This section sets out the overall country context within which the Brazilian mining sector is analyzed. It charts the recent economic, social and environmental performance of Brazil, as well as the country's governance context. The section then provides a brief history of mining in Brazil, followed by a profile of Vale and its operations in Southeast Pará.

1.1 Economic performance

Brazil is now widely recognized as a highly successful emerging market economy – one of the four "BRICs" (together with Russia, India and China). Following a period of macro-economic instability during the 1990s, the country today enjoys stable macro-economic conditions including low formal-sector unemployment, low budget deficits, huge inflows of foreign capital and manageable inflation. This macro environment has bolstered economic growth during the 2000s, enabling Brazil to overtake the UK in December 2011 to become the world's 6th largest economy. The return to stability – political and economic – has helped to encourage an investment surge in the past few years, including large investments into new mining projects.

The country's natural resource wealth combined with flourishing manufacturing and service sectors have enabled Brazil to achieve impressive growth rates in the past 10 years. Brazil's GDP has now exceeded US$2 trillion – an increase in terms of current prices from US$500 billion in 2002. Income per capita in 2010 was US$10,710, meaning that the average Brazilian for the first time enjoyed a higher income than the worldwide average (by then US$9,216). The growth rate that made this possible was variable through the 2000s but typically above the global average and in the range of 3% to 6% per annum. However, 2009 was an aberration when the global financial crisis caused the country to experience negative growth for the first time since 1992.

A summary of Brazil's macro-economic performance since 2005 is shown in Table 1.1. This performance is in stark contrast to the state of economic crisis in which Brazil found itself in the late 1990s, in the aftermath of the financial crisis that first impacted Mexico (1994) and then spread to East Asia (1997) and other Latin American economies.

Figure 1.1: Map of Brazil



Key

Major urban centres

- Country capital
- State capital
- Municipal capital

Access routes

- Paved roads
- Dirt roads
- Railway network

Boundaries

- State border
- International border

Source: IBGE.

1.2 Social performance

Brazil had a population of over 191 million in 2010, representing population growth of 12.3% in the decade from 2000 to 2010. Over 84% of the population now lives in towns and cities and the previously high rate of urbanization has decreased.[7]

Sustained economic growth and the relatively stable political climate since 1985 have contributed to improved living standards for many of Brazil's citizens. This improvement has been supported by the many innovative social programs introduced by the Cardoso presidency and intensified under President Lula from 2003, including the use of conditional cash transfers (e.g. through the nationwide Bolsa Familia program launched in 2003).

More recently, these initiatives have moved beyond social protection programs to focus on infrastructure development and support for the private sector. In 2007, the Growth Acceleration Program (Programa de Aceleração do Crescimento, PAC) was launched as a federal strategic investment program combining management initiatives and public works. In its first phase it called for investments of US$349 billion (R$638 billion), to be followed by a second phase program covering 2011–2014. PAC focuses its allocations of funds in the specific areas of logistics, energy and social development and represents an important resource for rural and less-developed areas of Brazil whose infrastructure deficits and lack of service provision may act as deterrents to investors.

Brazil is widely expected to meet most, if not all, of the United Nations' Millennium Development Goals (MDGs) by 2015. This progress is reflected in a substantial improvement in Brazil's Human Development Index (HDI) from 0.549 in 1980 to 0.718 in 2011, placing Brazil 84th out of 187 countries.[8] Box 1.1 provides a summary of the key social performance features in relation to the MDGs.

Table 1.1: Summary of macro-economic performance (2005–2011, US$)

	2005	2006	2007	2008	2009	2010 (Preliminary)	2011 (Projected)
GDP Growth (%)	3.2	4	6.1	5.2	-0.6	7.5	4.1
Inflation Rate – CPI (%)	6.9	4.2	3.7	5.7	4.9	5	6.6
Fiscal Revenues – Federal (% of GDP)	26.2	26.1	25.5	24	26.6	27.2	26
Fiscal Balance – Primary (% of GDP)	3.8	3.2	3.4	4	2.1	2.4	2.9
Fiscal Balance – Overall (% of GDP)	-3.5	-3.5	-2.7	-1.4	-3.1	-2.9	-2.8
Current Account Balance ($ billion)	14	13.6	1.6	-28.2	-24.3	-47.4	-57.9
Current Account Balance (% of GDP)	1.6	1.3	0.1	-1.7	-1.5	-2.3	-2.4
– Exports (US$ billion)	118.3	137.8	160.6	197.9	153	201.9	259.9
– Imports (US$ billion)	73.6	91.4	120.6	173.1	127.7	181.7	239.4
Foreign Direct Investment (US$ billion)	12.5	-9.4	27.5	24.6	36	36.9	55.5
GDP Level (US$ trillion)	0.88	1.09	1.37	1.65	1.59	2.09	–
GDP per Capita (US$)	4,741	5,787	7,185	8,609	8,230	10,710	–
External Debt (% of GDP)	19.1	15.8	14.1	11.8	12.2	12.3	11.9

Source: IMF Public Information Notice concerning the Article IV Consultation with Brazil (3 August 2011) and World Bank World Development Indicators.

7 In the decade from 1991 to 2000, the urban population grew by 7.5%. In contrast, from 2000 to 2010 it grew by 3.2% (IBGE 2011).

8 See http://hdrstats.undp.org/en/countries/profiles/BRA.html.

Box 1.1: Brazil and the MDGs

It is widely held that Brazil will meet most, if not all, of the MDGs. The United Nations Development Program (UNDP) Brazil country office reports the following:

- **MDG1 (poverty and hunger): the proportion of the population living on less than US$1/day fell by more than half, from 25.6% in 1990 to 4.8% in 2008**
- **MDG2 (education): with a net enrolment rate of 96.9% in primary education, Brazil has almost reached the goal of universal basic education**
- **MDG3 (gender equality): gender disparity in primary and secondary education has been eliminated, with the ratio of girls to boys with at least secondary education at 1.054**
- **MDG4 (health): the target for infant mortality has largely been met with a reduction from 47.1 per 1,000 births in 1990 to 19 in 2008; UNDP estimates that the target of 17.9 will be met by 2015**
- **MDG5 (maternal health): maternal mortality fell by almost 50% from 1990 to 2007, from 140 per 1,000 births to 75**
- **MDG6 (HIV/AIDs): Brazil is the first country to make access to antiretroviral drugs universal and free. An estimated 0.5% of the population is HIV positive**
- **MDG7 (environment, water and sanitation): Brazil has reduced its rate of deforestation and production of global warming gases and has increased its energy efficiency by using more renewable sources of energy. The target of universal access to drinking water is likely to be met. The target to universalize basic sanitation is the biggest challenge to Brazil as standards continue to be low in many rural and remote areas**
- **MDG8 (global partnerships): Brazil is proactive and innovative in its promotion of global partnerships using South-South co-operation as a vehicle. This includes acting as a principal moving force behind the creation of the G20 group of nations.**

Brazil's record in meeting, and in some cases surpassing, the MDGs is impressive. However, these figures are national averages and as such mask big variations among groups of people and regions of the country.[9] The distribution of benefits arising from Brazil's recent rapid growth has been uneven and, as a result, Brazil's high rate of income inequality continues: it is currently ranked as the seventh most unequal country in the world. These inequalities run between rich and poor within regions, but also between regions, with the north performing worse on most socio-economic indicators. This stark reality presents numerous challenges for any economic development, especially in poorer regions. The pressures to find instruments to address poverty and inequality are considerable both on government as well as indirectly on mining companies operating in poorer rural regions such as Pará State.

The socio-economic performance of these areas and the potential for mining to promote improvements is reported on in more depth in Section 6 (with more detailed results in Annex B).

1.3 Environmental issues

Brazil's challenge of economic and social development in poorer remote regions is juxtaposed with a range of complex issues associated with safeguarding the natural environment. The exploitation of Brazil's vast natural resource endowment is a key driver of economic growth, but also brings major environmental challenges especially in the northern areas that are now seeing increased mining sector investment. Until the mid-1990s, economic development in Pará State was based mainly on environmentally damaging extraction of natural resources, including logging, livestock and agriculture. Land conflicts in the Amazon basin were common, largely due to immature property rights institutions, the absence of effective and accountable local government and the conflictive nature of production and exchange relations between big landowners and smallholder farmers (see Simmons, 2004; Cornejo et al, 2010; Hall, 1989).

9 They may also conceal deficiencies, for example in the quality of education provided by the public education system.

More recently, however, there has been growing recognition amongst policy makers as well as by the public (especially since the Rio 1992 Earth Summit) that the Brazilian Amazon represents a public good of enormous global significance. Its richness in terms of biodiversity and environmental services is unparalleled. In particular, the interest of the Brazilian government in reducing deforestation has grown in tandem with the broadening of the global climate change agenda. This has resulted not only in far more responsible policies and approaches to the traditional non-mining activities, but also greater environmental responsibilities imposed on all mining operations in the region.

Brazil has also become a ***pioneer internationally in developing cross-ministerial integration arrangements to address specific environmental problems such as deforestation***: this task now engages 14 ministries including the Ministry of Environment. That same ministry is also attempting to mainstream sustainable development through a policy of economic and environmental zoning that captures within that approach a more explicit recognition of the role of mining.[10] Figure 1.2 provides just one visual example of the manifestations of this newer and more responsible approach: the contrasts between the environmental degradation associated with some (older) non-mining activities around Carajás National Forest and the forest itself (managed by the Brazilian Government and protected with Vale support).

Figure 1.2: Protected area where Vale mining operations help to protect forest in contrast with degraded areas by other economic activities



2009 – Carajás National Forest and its immediate surroundings, Pará State. Photographer: João Marcos Rosa.

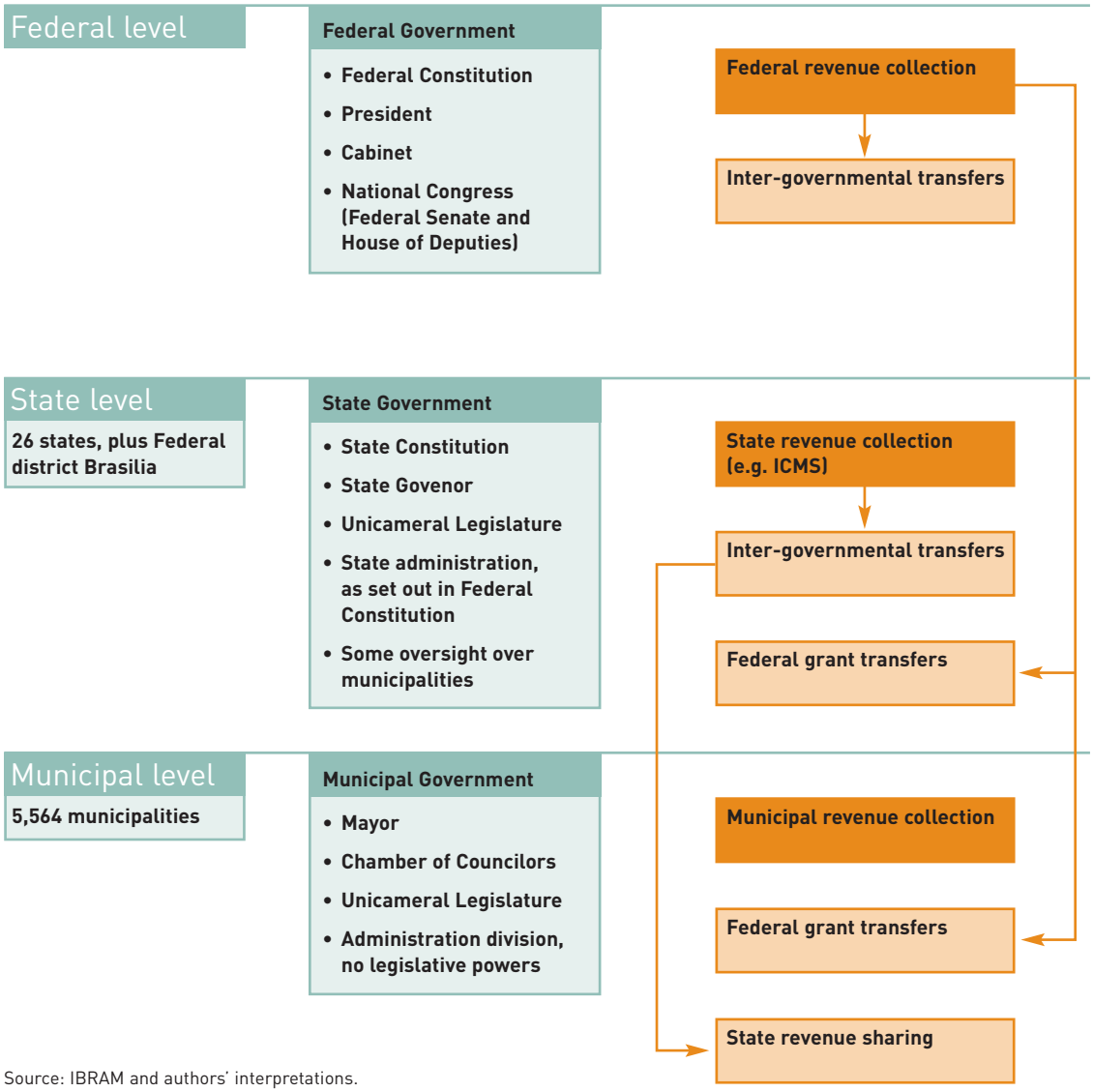
10 This policy framework, which intends to facilitate sustainable management of natural resources and concrete actions, had yet to be elaborated at the time of writing. See www.mma.gov.br/estruturas/PZEE/_arquivos.

1.4 Governance

Governance in Brazil is shaped by the 1988 Constitution, which sets out a rather complex political-administrative system around a federal presidential constitutional republic with a representative democracy. This system was devised as a response to the military dictatorship that preceded it and it grants relative autonomy to 26 state governments and one federal district and nearly 5,600 municipalities. Given the country's vast territory, the average size of municipalities is relatively small and on average each comprises some 35,000 inhabitants, although there are large variations.

Responsibilities for public revenue collection and public goods and service provision are split vertically across the three levels of government. Each of these tiers holds taxing powers and so taxation varies across states and also across municipalities. There is also a largely formula-based system of inter-governmental transfers in place, which is set out in the Constitution (see Annex F for further details on the 1988 Constitution and its fiscal implications). Earmarked inter-governmental transfers are particularly prescriptive in the social areas of education and health. For example, the complexity of this system on the expenditure side is illustrated in the education sector, where municipalities are responsible for primary education, state governments are responsible for secondary education and the Federal Government is supposed to fund universities. There are various exceptions to these rules relating to historical arrangements which predate the 1988 Constitution.

Figure 1.3: The Brazilian political-administrative system



Source: IBRAM and authors' interpretations.

Box 1.2: Mining and the Allocation of Revenue and Expenditure Responsibilities

With the introduction of the 1988 Constitution, Brazil's political-administrative system and its associated public financial management system have become very complex and in various respects ambiguous with respect to the responsibilities shared between the federal, state and municipal governments. This box explains the five key characteristics of this system. These are:

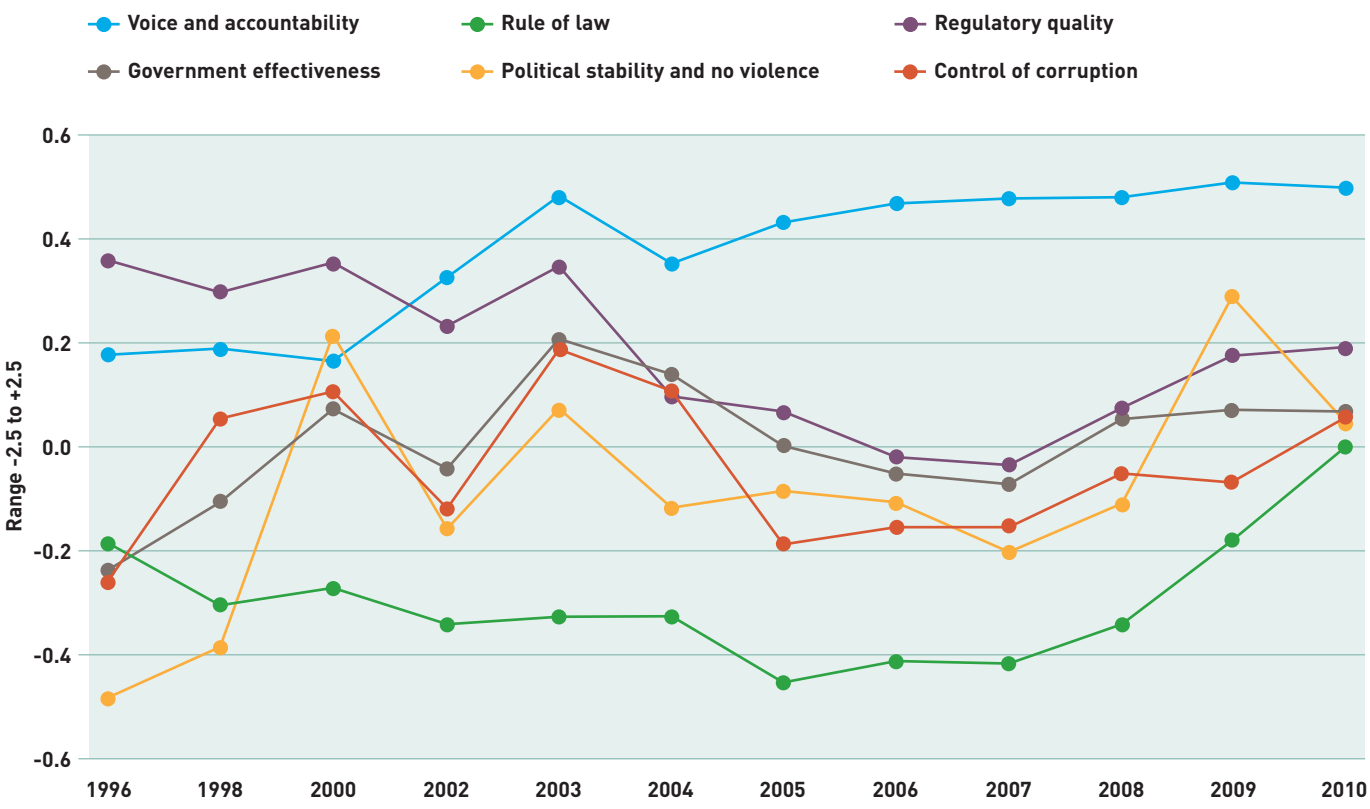
- **Fiscal decentralisation – the 1988 Constitutions introduced fiscal decentralisation, whereby all three tiers of government (federal, state and municipalities) have taxing powers. This means that for certain types of taxes each level of government can set its own tax rates, for example states set the rates for the value-added tax ICMS. Or, at least to some extent, each level of government can introduce new taxes or tax related fiscal instruments (e.g. tax incentives schemes).**
- **Revenue sharing – the Brazilian fiscal system knows various forms of revenue sharing, where a tax or non-tax revenue item is collected at one tier of government and then shared with another tier via various forms of intergovernmental transfer systems, such as those involving earmarked funds (fundos). Examples include the federal taxes such as the IR and the IPI that are shared with both states and municipalities, and the state-level value added tax ICMS (as well as other taxes) that states are obliged to share with municipalities. Revenue sharing also applies to the mining royalty CFEM, which is collected by DNPM and then re-allocated to those states and municipalities where mine production has taken place.**
- **Grant transfers – prior to the 1988 Constitution, Brazil's public expenditure management system was based on grant transfers from the national to sub-national administrative entities. The 1988 Constitution has retained and enhanced this feature, and in recent years its importance has been increased, not least with the introduction of specific social and infrastructural programmes introduced at the federal level (e.g. Bolsa Familia, the PAC etc.).**
- **Intergovernmental transfers – the combination of revenue sharing and grant transfers means that the sub-national tiers of government – in particular municipal government – receive substantial amounts of intergovernmental transfers. This is the case particularly for municipalities benefiting from revenue sharing associated with the mineral fiscal regimes, i.e. those that are in receipt of the mining royalty CFEM.**
- **Shared responsibilities for public policy – a further complexity and a source of ambiguity in the Brazilian political-administrative system is that responsibilities for particular public policy areas are shared across the three tiers of government, whereas in other federal systems there is a clearer separation of which tier of government looks after which public policy resort. For example, each tier of government looks after some segments of the education system, and in addition in each state there are exceptions to the general rule.**

Huge mining investments in relatively underdeveloped regions of Brazil have made the situation more complex because (i) via the revenue sharing system they have directly enhanced the fiscal resources of some municipalities and (ii) companies' own large spend on various goods and services that are elsewhere provided by the public sector (e.g. education, health and the environment) have introduced an additional source of funding for social and other spending, which ideally should be coordinated with the allocative decisions underpinning the public financial management system.

Figure 1.3 aims to capture in broad terms the Brazilian political-administrative structures. It shows the three levels and the broad features of the executive and legislative powers at each of these levels. There is not only a Federal Constitution but also state constitutions as well as legislative bodies at both these levels, while the municipal level is mainly administrative with limited legislative powers. The right hand side of Figure 1.3 indicates the fiscal decentralization system, showing the independent revenue collection powers of each level as well as the various inter-governmental and revenue-sharing transfers. Box 1.2 provides a brief description of some of the difficulties that the multi-tiered governance system of Brazil potentially creates for the effective absorption of new mining activities especially in less developed regions. Extensive use of these materials is made in later sections of the report.

The complexity and associated challenges of Brazil's multi-level fiscal and expenditure system as described in Box 1.2 are reflected also in perceptions of the quality of the country's national-level governance more generally. On the one hand, Brazil has a burgeoning reputation as an outstanding economic power and is now the sixth largest economy in the world. On the other hand, when compared to OECD countries, its perceived performance on most aspects of governance remains modest. Based on the World Bank's WGI, the country is placed around the median out of c.190 countries (for a detailed cross-country comparison see Annex E). While on various indicators Brazil outperforms other "BRIC" countries (China, India and Russia), the country's absolute scores in other areas have not seen marked improvements since the mid-1990s (see Figure 1.4 and for more details also Annex E). This suggests that the governance systems of the country may have actually been a hindrance to, and not a main driver behind, the country's strong overall economic performance. Only from 2005 onwards does there appear to be the onset of a trend that points to governance improvements. But even then many of the weaknesses and ambiguities have remained.

Figure 1.4: Governance performance (1996–2010)



Source: World Bank.

The more subtle points resulting from a national-level assessment of Brazil's quality of governance are threefold.

- First, over the past 15 years there have been improvements with respect to the perceived levels of ***voice and accountability*** and ***political stability***. This suggests that more political constituencies feel encouraged to participate in politics and policy-making processes, compared to the situation in earlier years
- Second, both ***rule of law*** and ***control of corruption*** indicators have improved since 2005. This could be a sign of growing cohesion in policy making and achievements in aligning potentially strong political-economic interests with the government's developmental agenda
- Third, the lesser progress in ***government effectiveness*** and the deterioration in ***regulatory quality*** suggest that policy implementation and public service delivery have been more challenged.

Given Brazil's long-term positive growth outlook, there should be scope for political and economic constituencies to align themselves around support for wider developmental objectives at the local, state and federal level. At the same time, given the relative importance accorded to municipal administrations under the 1988 Constitution paired with the more squeezed resource base at the state level (see Box 1.2), the onus is heavily on the municipal level to garner such alignments. Section 6 summarizes and explores in more depth the national versus sub-national governance challenges facing the mining sector.

1.5 Mining in Brazil

Commercial mining in Brazil has had a very long and chequered history stretching back at least 500 years. It is only in the past 10–15 years that sustained progress has been made towards linking mining activity with sustainable economic, social and environmental development.[11]

The Portuguese Crown actively encouraged numerous expeditions to find gold in the hinterlands away from the initial northerly points of settlement. These attempts were largely disappointing and unrewarding. It was only in the latter part of the 17th century that significant gold deposits were discovered in the mountains of what is now the state of Minas Gerais (literally "general mining"). Thereafter and until the middle of the 19th century, the known alluvial gold deposits gradually depleted and no major new techniques emerged to enable the mining community to discover and exploit a broader range of minerals and on a wider geographical scale.

However, after the First World War strong sentiments of resource nationalism, aligned with populist politics, began to surface. These sentiments became more open and explicit with the political coup that brought to power the government of Getulio Vargas in 1930. In the build-up to the Second World War and through the period of the war itself, Vargas used the Allies' urgent need for minerals to implement an actively interventionist government policy that included the nationalization of the large British-owned Itabira Mines in Minas Gerais along with other major mining-related assets such as the Vitoria-Minas Railroad. These actions provided the basis for the company that today is known as Vale.[12]

From the 1930s through to the 1980s, large-scale organized mining in Brazil was essentially a government-run business. As such, it suffered with the vagaries of the country's economic situation and the periodic financial difficulties facing the government. Among other things, this restricted the potential for new supportive infrastructure investments. Mining at that time (in common with other Brazilian industry) relied heavily on government protection, subsidies and other favours, and was subject to pervasive regulations and extensive governmental interference. This active industrial policy served to create the base of an industrial economy, but also had some negative effects on industrial investment, efficiency and growth. For example, in spite of the emergence of much more powerful mining technologies internationally, only a small part of Brazil's huge mineral potential was even by then identified. Hence, the contribution of mining to the country's total production and GDP remained small: the estimated mining GDP contribution in 1950 of about 0.4% rose to only about 1.0% by 1980 (Triner 2011).

In the mid-1990s, Brazil undertook radical macro-economic and structural reforms under the stewardship of the government of Fernando Collor de Mello. Liberalization, led by technocrats, opened the Brazilian economy to international trade and removed much of the protectionism and special favours granted to domestic industry. This created new opportunities for foreign-owned firms to enter the Brazilian mining sector. Another significant change in this new climate was the privatization in 1997 of the Companhia Vale do Rio Doce (CVRD, now Vale), with its new mandate to become more modern, efficient, transparent and global. Today, in spite of massive investments in recent years, there is little doubt that enormous Brazilian mineral resources remain to be exploited (see Figure 1.7). Mining investments have continued to concentrate geographically in the traditional mining region of Minas Gerais, but data from IBRAM illustrate the rising importance of Pará State in the north of Brazil as an important destination of current and future mining investment. This "new" mining area is characterized by below average economic and social development and hosts the Brazilian Amazon rainforest, an area of immense environmental sensitivity. This serves to integrally connect the two agendas of poverty reduction and environmental protection.

11 This historical account of mining in Brazil draws mainly on Triner (2011).

12 The Vargas government also began to use more active import substitution policies to industrialize Brazil and to build up major industries – including mineral-using industries such as steel – often via public ownership. This broad approach was sustained post-war with another huge state company Petrobras being established in 1953 to monopolize the exploration, production and refining of oil and gas (see Triner 2011).

1.6 The participating mining operations

Overview of Vale

CVRD was founded as a public company by the Brazilian Federal Government on 1 June 1942. Vale is now the dominant mining company in Southeast Pará. It began to commission the huge Ferro Carajás project there in the mid-1980s. More recently, a combination of high commodity prices and geological discoveries have prompted significant further mining company investments in Pará State. These include the large Juruti project developed by Alcoa and the bauxite and alumina operations acquired by Hydro from Vale in the municipality of Paragominas. However, Vale has remained the major investor in the area and so is the main focus of the assessment included in this present report.

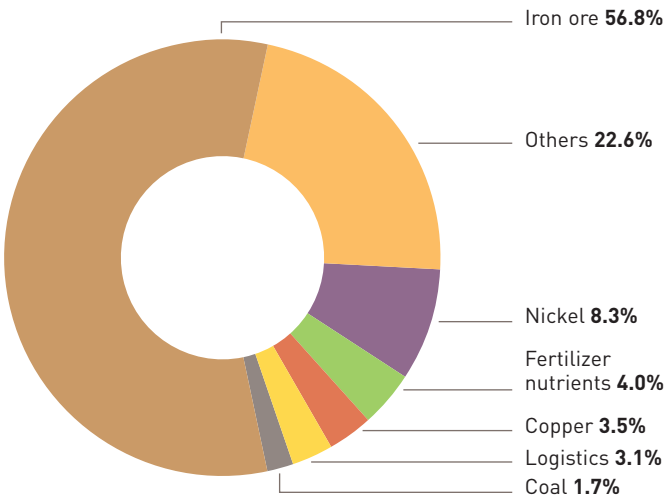
Following its privatization in 1997, CVRD began to focus more intensely on its mining-related operations, divesting a number of more peripheral activities. It continued to own, control and operate an extensive range of energy, transport and other logistical activities (railroads, ports etc.). These investments were seen as a means to reduce the costs and risk of its mainstream operations rather than as revenue-generating activities in their own right.[13] This integrated model of mining continues today and is a major distinguishing feature of Vale's business operations within Brazil as well as abroad. Based on Vale's stellar financial progress in the past few years, it also seems to be a commercially viable model. However, from the viewpoint of local and regional development, this model does carry the risk of creating excessive dependence on mining activities especially in formally under-developed regions such as Pará State. Such a risk needs to be diffused by a pro-active promotion of diversification activities by both government agencies and companies. Some of the partnership initiatives discussed in Section 4 implicitly recognise and seek to mitigate this risk.

In the past 10 years, Vale has pursued an explicit and aggressive growth strategy which helps to explain the generally strong growth trend in the Brazilian mining sector overall.[14] Highlighting the company's rapid growth, The Economist in 2010 suggested it was *"perhaps the biggest firm you have never heard of"*.[15] At the time of its privatization in 1997, the company had a stock market capitalization of US$7.4 billion and on this basis was the eighth largest mining company in the world. By 2011 this had risen to US$123.6 billion and Vale was the second largest mining company by market capitalization after BHP Billiton.

This growth has been achieved through a large investment program especially in the six years 2005 to 2010, when Vale invested a total of US$79 billion in new developments and acquisitions. The US$11 billion investment budget for 2008 was thought at the time to be the largest ever for any mining company, but was soon followed by larger budgets of US$19 billion in 2010 and a forecast of US$24 billion for 2011. The majority of the investments still take place inside Brazil but a growing share is committed to operations elsewhere in the world.

Vale's production is dominated by its iron ore operations, as illustrated in Figure 1.5. The company is easily the largest iron ore producer in the world, with controlled production of 309 million tonnes in 2010 (Rio Tinto, the second largest, produced 182 million tonnes). Non-ferrous metals and logistics also play a significant and growing part – Vale forecast in late 2011 a five-fold increase in its copper production to 1 million tonnes in 2015 (roughly the size of Zambia's total copper production).

Figure 1.5: Vale's operating revenues (2010)



Source: Vale.

13 The ownership of energy assets is particularly significant given the high costs of electrical energy in Vale's operations (in 2010 some 6.4% of total operating costs, in part due to high government tariffs and charges).

14 This new approach has involved, among other things, aggressive growth targets focusing on profitability and value creation; a new organizational structure that has centralized many corporate services such as purchasing, human resources and IT; increased product portfolio diversification; and a more active strategy of internationalization.

15 The Economist, 23 September 2010.

Profile of Vale operations in Southeast Pará

The first iron ore deposit at Carajás in Southeast Pará was discovered in July 1967, but it was not until 1985 that Vale began to explore the site. This was soon after the 900 kilometre Carajás railroad to the port terminal at Ponta Madeira at São Luís was inaugurated in the neighbouring northerly state of Maranhão, to provide an export route for the company's products.

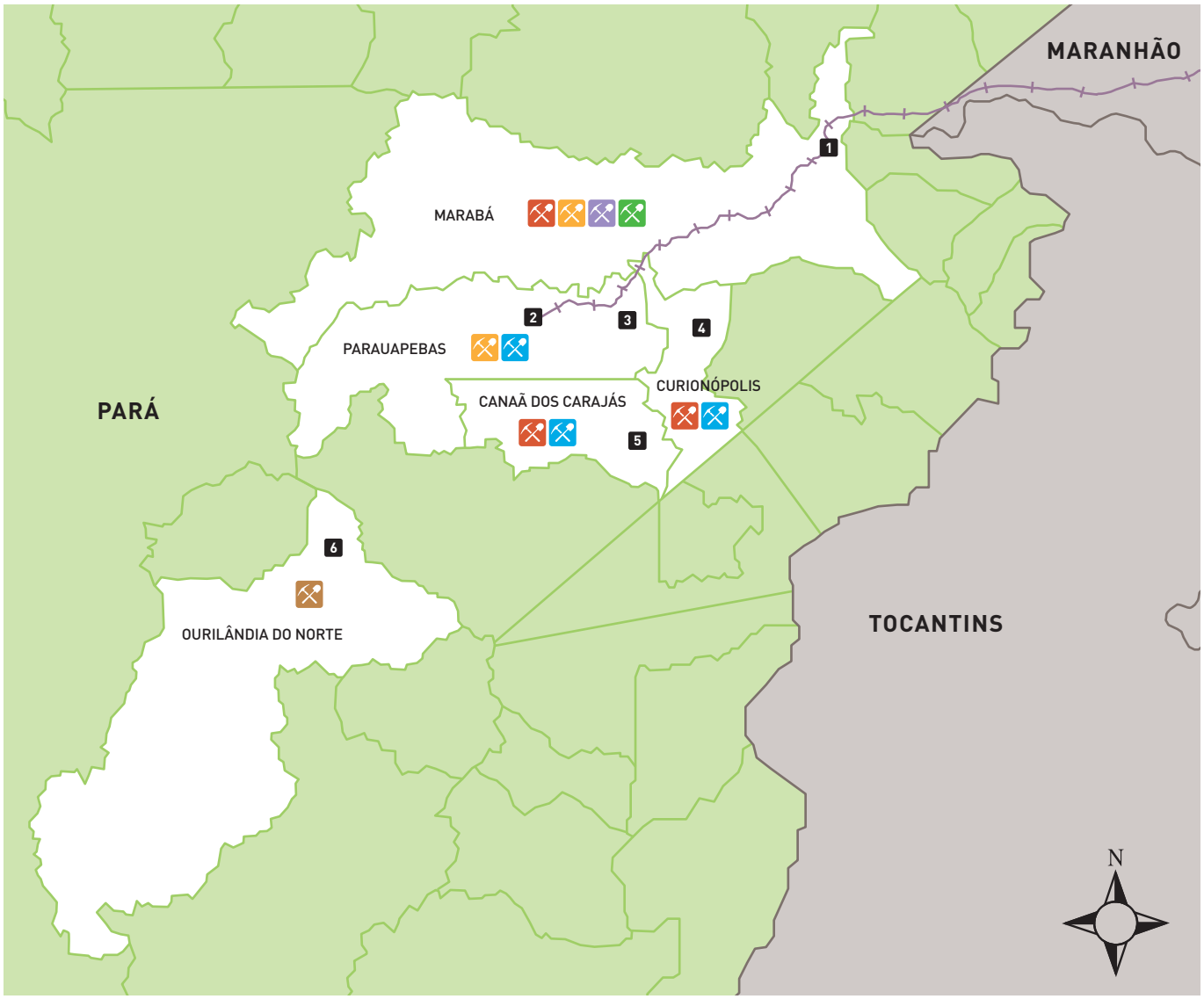
The World Bank co-funded part of this Ferro Carajás infrastructure program. The project brought local economic benefits by opening up previously isolated areas to trade and investment, creating employment in the construction and mining sectors and providing access to transportation along the corridor between Carajas and São Luís (Redwood 2002). However, the establishment of this large project, in a largely underdeveloped rural area, also led to adverse social and environmental consequences. These included rising property prices, concentration in land ownership, pressures on the native forests (from which pig iron producers extracted charcoal) and high in-migration (resulting in the supply of public services failing to meet demand).

Vale's arrival in Pará was a major geographical move by a company that had originally had most of its activities in the southeast of Brazil – and especially in the traditional Itabira district and the Quadrilatero Ferrifero (Iron Quadrangle) in the state of Minas Gerais. However, it was a move that has rapidly established Pará State as a leading global producer of iron ore and related products. Vale's operations in the southeast of Pará State today include the Ferro Carajás iron ore plant (the world's largest iron ore plant) and various more recent developments (see Figure 1.6). Investment into Southeast Pará for 2011–2014 is forecast at US$15.6 billion, mainly representing the development of the huge S11D iron ore project in Canaã dos Carajás and the ALPA steel mill in Marabá. These investments have enabled the company to gradually build up a strong presence in its headquarter area in Carajás (in a company town just north of Parauapebas) and in the areas and municipalities further to the south and west.

Vale's investment schedule not only is expected to create many more direct incomes but also to raise many new opportunities for local small-scale enterprises to provide goods and services to the firm.

The company's total employment (people on the company's payroll and workers provided through outsourcing agreements) in Southeast Pará reached 22,400 employees in 2008 – representing c.14% of Vale's total workforce of 165,000 employees. Employment in Southeast Pará was forecast to increase further to 46,700 by 2012. This represents almost a tenth of the 2010 total population of 459,940 in the five municipalities in Southeast Pará where Vale currently operates, highlighting that a large proportion of citizens in these municipalities will obtain their salaries directly or indirectly from Vale.

Figure 1.6: Vale's main mining activities in Southeast Pará

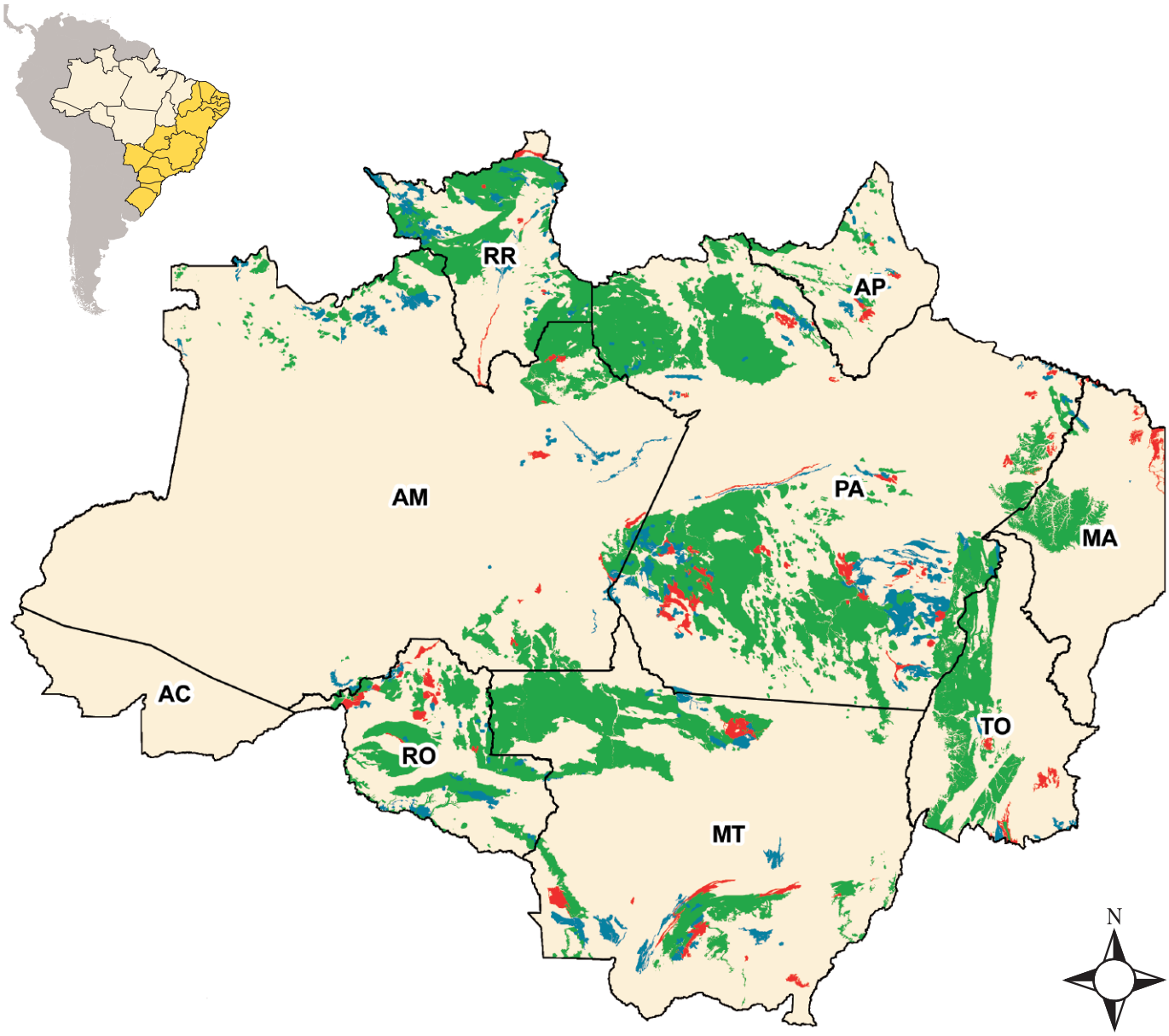


Key

- Copper
- Iron ore
- Pig iron
- Manganese
- Nickel
- Steel
- EFC Railroad
- Pará municpialities studied
- Pará municpialities
- State border
- 1 Marabá
- 2 Carajás
- 3 Parauapebas
- 4 Curionópolis
- 5 Canaã dos Carajás
- 6 Ourilândia do Norte

Source: Integrated Socioeconomic diagnostic – Southeast Pará, Diagonal (2010).

Figure 1.7: **Areas of relevant mineral interest**



Key

Areas of verified mineral development

Areas of indicative mineral development

Areas of geological vocation for development

Given the huge geographical areas involved, the actual footprint of mining is very small – most of the green areas for example are unlikely to be mined.

AC – Acre
AM – Amazonas
AP – Amapá
MA – Maranhão
MT – Mato Grosso
PA – Pará
RO – Rondônia
RR – Roraima
TO – Tocantins

Source: IBRAM based on Ministry of Mines and Energy.



2

THE MACRO-ECONOMIC CONTRIBUTIONS OF MINING

2. The macro-economic contributions of mining

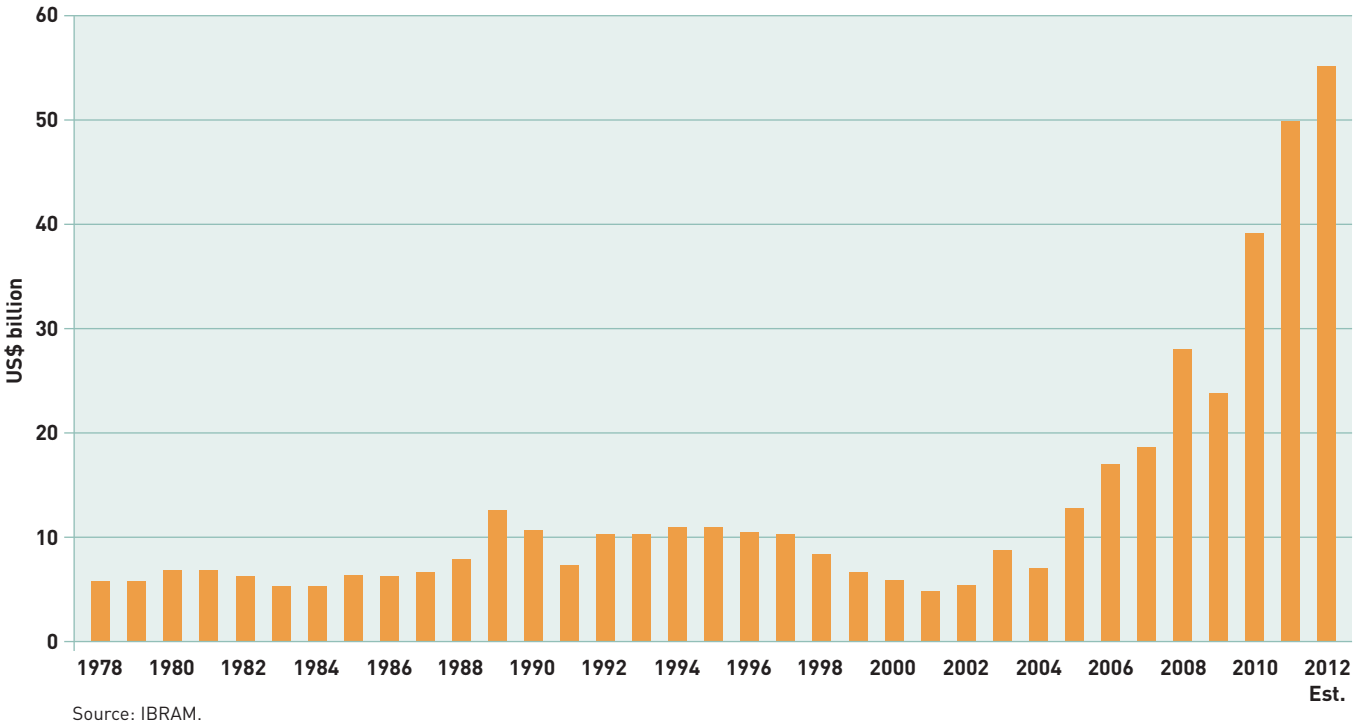
Brazil has a highly diversified *national* economy and no one single industry sector dominates. Nevertheless, the mining sector is significant: it is the largest in some dimensions and one of the fastest-growing, allowing it to play an important role in Brazil's future economic and social development. Previously, the sector's *overall* macro-economic impact – in all dimensions – had not been well documented, debated and understood. Discussions around mining policy reform in Brazil, as in many other countries, appear to be focused quite narrowly around issues of taxation and the mitigation of negative impacts and far less on a broader appreciation of the multifarious potential impacts of the sector.

This section seeks to be much more broad-based in its coverage, considering five national-level indicators of mining sector impacts: mining production levels, balance of payments impacts, government revenues, national income (GDP) and employment and wages.

2.1 Mining production levels

There has been a substantial acceleration of the growth of total mining production from 2000 and especially since the mid-2000s in Brazil. Data provided by IBRAM (see Figure 2.1) indicates an increase from less than US$10 billion of production value in 2000 to around US$50 billion by 2011. This more rapid recent growth is a function of both strongly favourable world prices, especially for iron ore, but also of the strong growth in levels of physical production. Specifically, the physical tonnage of iron ore production doubled from 157 million tonnes in 2000 to c.310 million tonnes by 2010. The majority of this five-fold increase in production values can be accounted for by price rises.[16] This rapid growth in production has generated a significant change in some of mining's contributions to the macro economy, as explored next.

Figure 2.1: Mining production values (1978–2011, US$ billion)



Source: IBRAM.

16 The price of iron ore rose to more than US$160 per metric tonne by the end of 2010 before declining somewhat thereafter – most of that increase occurred since December 2007 when the world price was US$36 per metric tonne.

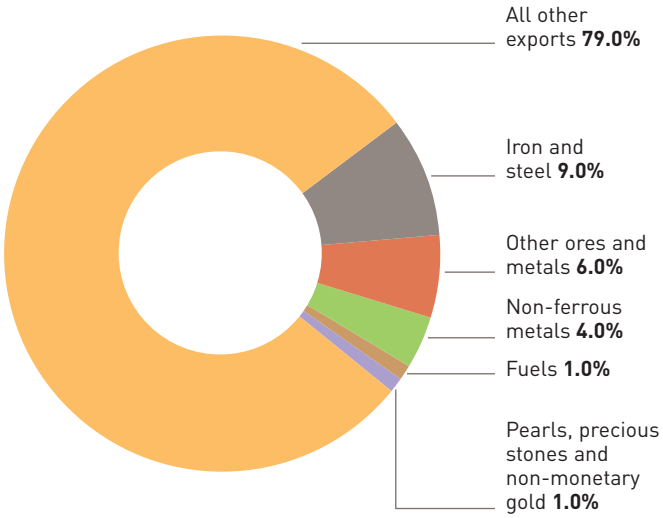
2.2 Balance of payments

Mining has clearly played a key role in contributing to the most impressive turnaround in Brazil's overall external balance from a highly negative position at the height of the "real" currency crisis in the late 1990s to a positive figure of US$50 billion annually by 2010. ***The rising export contribution of mining has been critical in that regard***. As Figure 2.2 and Figure 2.3 illustrate, minerals (defined broadly to include fuels) grew to account for 33% of Brazil's total exports by 2010 (from around 22% in 1995). The most dramatic change has been in the share of ferrous ores and metals in total exports, which rose from 6.3% in 1995 to 16.7% in 2010. A second significant change was the rise in the share of fuels (from less than 1% of the total in 1995 to 9.8% by 2010).

Minerals are currently contributing one-third of Brazil's total export earnings, with a 23% contribution from non-fuel minerals – mainly iron ore. This level of contribution is somewhat lower than seen in less developed economies such as Lao PDR, Ghana and Tanzania (see ICMM 2007c, 2007d and 2011).

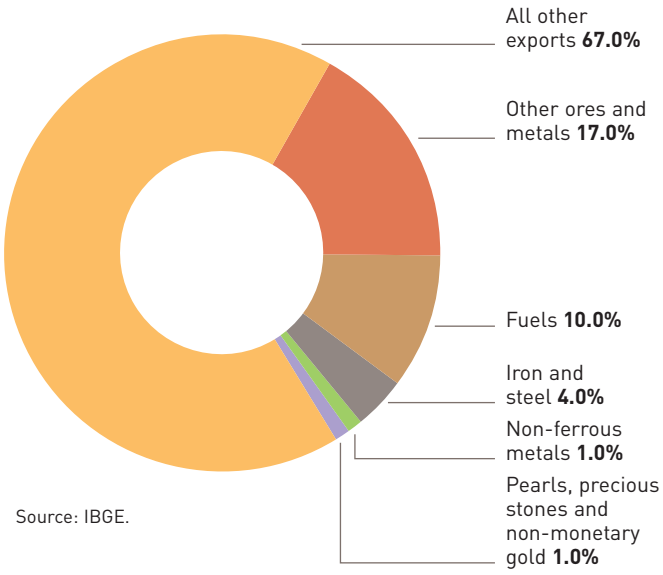
The rising share of export contributions from mining has enabled the sector to finance a large part of Brazil's trade balance. The cumulative increase in all categories of annual mineral exports from 1995 to 2010 amounted to almost US$60 billion, which is ***larger than the total turnaround in the country's trade balance (for all goods and services) seen in that same period*** (see Annex G for more detail). Furthermore, more than half of that mineral increase in dollar terms is attributable to iron ores and metals. The net contribution by mining to Brazil's trade balance over more recent years is illustrated in Figure 2.4, which shows a constant trade balance surplus. It is clear then that these exports have been of central importance to Brazil's macro-economic improvements during this period.

Figure 2.2: Mineral shares in total exports (1995)



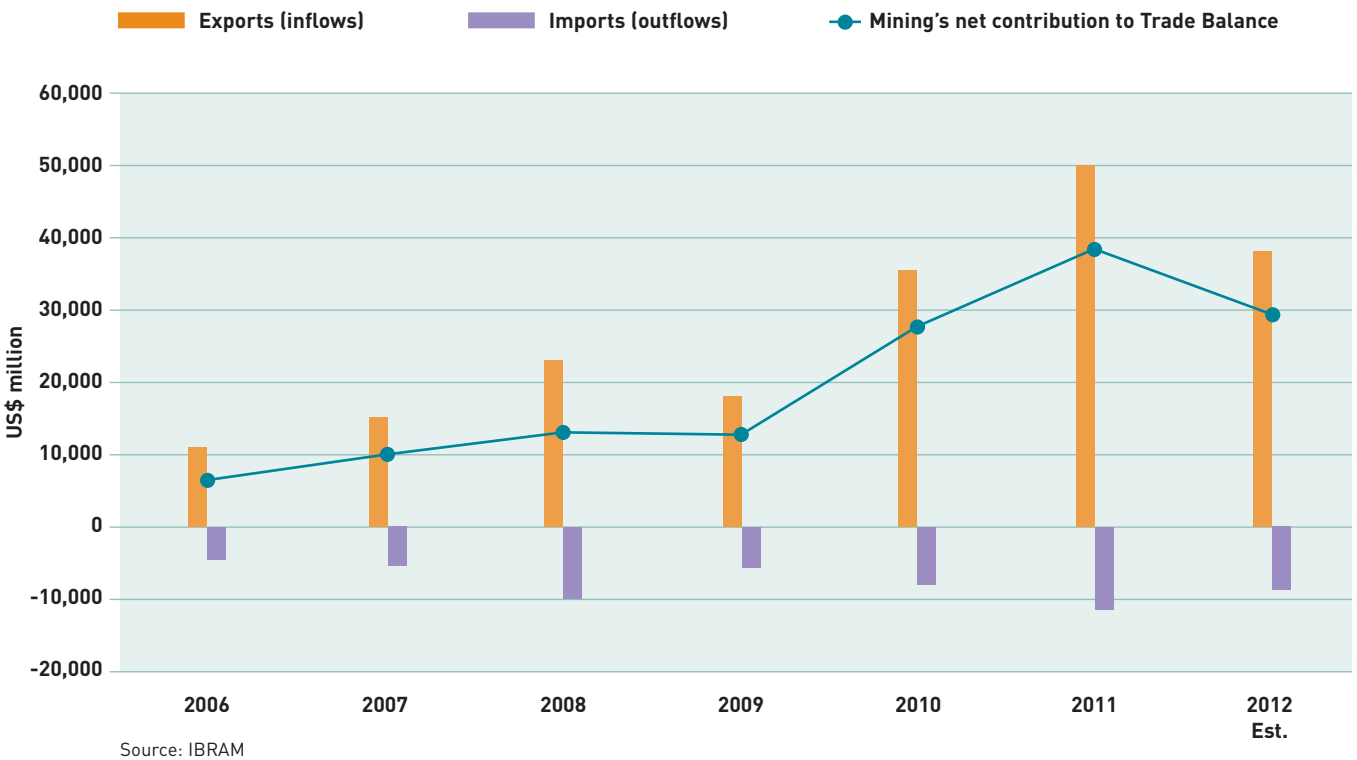
Source: Institute of Geography and Statistics (IBGE).

Figure 2.3: Mineral shares in total exports (2010)



Source: IBGE.

Figure 2.4: Mining sector contribution to Brazil's trade balance in US$ million (2006–2010, estimates for 2011)



Source: IBRAM

A further contribution of mining to the country's Balance of Payments comes in the form of *FDI*. Brazil differs from many other mining countries in this regard because a very high proportion of its recent mineral investment is attributable to the country's large domestic companies, including Vale (in mining) and Petrobras (in oil and gas). Hence, Brazil does not see the same large percentage contribution from mining to total FDI that is seen in many lower- and middle-income mining countries.

The 2000 Census conducted by the Brazilian government estimated the ***total FDI stock*** at US$103 billion, with only c.US$1 billion of this attributable to ores and non-metallic minerals (c.1% of the total FDI stock). A similar amount was attributable to oil and gas. Although more recent data are not available, it is known that the total stock of FDI has increased significantly since 2000.[17]

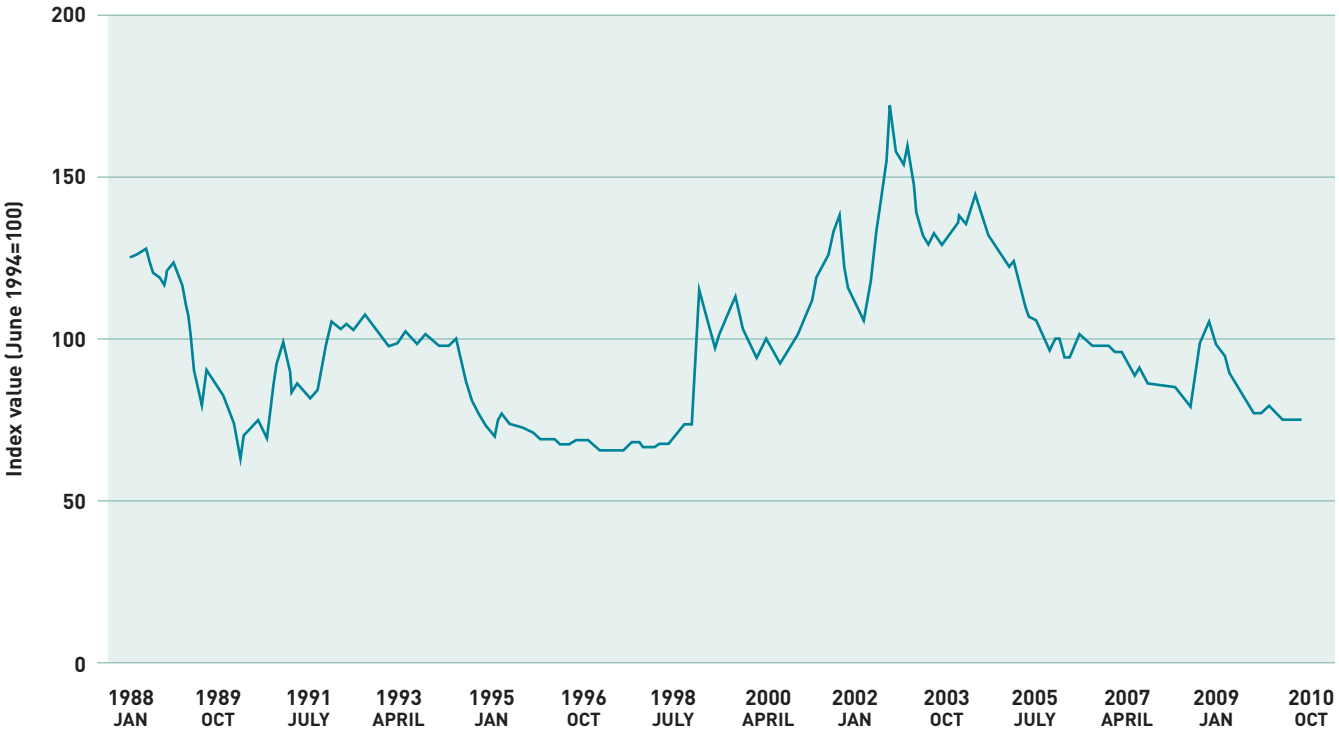
Within those large annual totals, mining FDI has varied from year to year. More recently the oil and gas sector has become a major attraction for FDI, in several years accounting for 10% or more of total FDI. By contrast, the inflows to the mining sector have more typically represented only around 3% of total FDI. Nonetheless, in recent years mining FDI has become much larger, mainly due to acquisitions by foreign companies – for example in 2010 FDI into mining was US$10.7 billion, or 24% of total FDI, in large part due to the acquisition by Hydro of Vale's alumina operations in Paragominas in Southeast Pará.

Overall, this data indicates that the ***foreign contribution does not account for a large proportion of the total new investment*** into the Brazilian mining sector. But how much does the total investment in the mining sector (by foreign as well as national firms) contribute to investment overall in Brazil? The investment rate in Brazil's economy as a whole across all sectors has been variable over the past 15 years, ranging from a low of 15.8% of GDP (in 2003) to a high of 20.7% of GDP in 2008.[18] While data on total annual mining sector investment is not readily accessible, Vale alone has seen its share of national investment rise from the equivalent of 2.6% of the total in 2005 to the equivalent of 4.9% in 2010. This domestic mining investment (over US$19 billion in 2010) easily dominates any of the FDI flows into mining seen to date.

17 Banco do Brasil reports that annual *flows* of total *new* FDI into Brazil have increased from some US$4 billion per annum back in 1995 to over US$60 billion in 2011. This alone is evidence that the stock of FDI has been increased very significantly since the 2000 Census.

18 The latter figure corresponds to total national investment of R$627 billion (or about US$350 billion). In the past five years, the ratio has been generally rising (albeit with a growth-related dip in 2009) from around 16% of GDP to around 20% estimated for 2011.

Figure 2.5: Brazil's exchange rate (1998-2010)



Source: Central Bank of Brazil

The macro-economic findings are clear: mining is making a very large overall contribution to Brazil's Balance of Payments position. The contribution to the ***current account*** from exports makes mining one of the single most important sources of foreign exchange earnings. Even with appropriate allowance made for the imports needed in mining and mineral processing, the net contribution of the sector remains high. By contrast, in most years there is a relatively modest contribution to the Balance of Payments through FDI and the ***capital account***. While contributions from exports constitute a benefit with respect to Brazil's macro-economic management, they also create risks in the form of exchange rate appreciation that will need ongoing and careful monitoring.

The academic literature has highlighted the potential negative macro-economic as well as political-economic impacts from a large presence of minerals in the economy. Some of these studies use the label of the ***"resource curse"*** to categorize some of these negative effects, including exchange rate appreciation that undermines the competitiveness of local manufacturing.[19] A question to ask is therefore whether Brazil is at risk of the macro-economic dimensions of the resource curse? Exports of minerals including fuel have grown rapidly to reach 33% of exports in 2010, while Brazil currently enjoys very large capital inflows and still has unusually high interest rates. These factors all contribute to put pressure on the real effective exchange rate to appreciate, which can undermine the competitiveness of non-mining tradable sectors where many more people are employed than in the mining sector.

As Figure 2.5 shows, the real exchange rate in 2010 had appreciated by some 25% relative to its June 1994 level. The strengthening of the currency has been much stronger since the time of elections in 2003 and in the subsequent period of booming global commodity prices – putting pressure on other traded sectors to improve labor productivity in order to retain competitiveness. However, at the present time it is not the mining sector as such that is at the core of this potential danger but rather the likelihood of large new exports from pre-sal oil and gas finds. The authorities are well aware of the risks of future over-valuation that could damage some of Brazil's other export industries and are managing this in a variety of ways. This includes measures to introduce tight local content rules to slow the pace of the pre-sal investments and an apparent readiness to use monetary policy loosening to discourage excessive capital inflows.

19 ICMM (2006d) provides a review of the resource curse literature. For a review of the experience in previous country case studies, see ICMM (2006c).

The conclusion from this present assessment is that mining is merely one aspect of the mix of factors that could possibly cause a resource curse dilemma for Brazil in the years ahead – unlike in other country case studies where it has been more central. The other factors include above all the increasing revenues from the pre-sal oil and gas finds. In the immediate short term, the danger is limited because of the weakening of Brazil's industrial output performance and its trade balance in the second part of 2012. These factors may well require some reduction of interest rates which, if anything, will weaken the real in the short term at least.

2.3 Government revenues

The mining sector contributes to Brazil's fiscal revenues through a wide variety of often complex tax measures. Specifically, the study has revealed at least 12 separate taxes and fiscal charges applied to mining by both federal and local (state and municipal) tax administrations. The World Bank "Doing Business" indicators for 2012 rank Brazil at 150 out of a total of 183 countries in terms of the level and complexities involved in paying taxes: this represents a deterioration relative to the 2011 ranking (see Annex E).

The overall tax contribution of the mining sector (circa US$15 billion in 2011) accounted for between 1% and 2% of total government tax revenues in 2010 and 2011, respectively (based on data from the Ministry of Finance and the National Department for Mineral Production – Departamento Nacional de Produção Mineral, DNPM). Tax payments from mining have in recent years has been equivalent to between 14.2% and 16.6% of gross mining sector output and the preliminary data for 2011 indicate a continuation of this trend.[20] More detail regarding the evolution of mining taxes paid is presented in Table 2.1.

Table 2.1: Tax collections from the mining sector (2005–2011)

	2005	2006	2007	2008	2009	2010	2011 (Estimated)
Extraction of Coal	18.8	22.6	20.8	30.3	25.1	25.6	38.1
Metallic Minerals	2,852	3,697	4,639	4,771	4,476	7,206	11,788
Non-metallic Minerals	314	333	369	469	517	703	818
Mineral Support Activities	305	336	364	620	1,007	1,154	1,266
Total Taxes (Rs millions)	3,489	4,389	5,394	5,891	6,025	9,088	13,910
DNPM levied	461	543	637	970	852	1,213	1,697
of which CFEM Revenues	406	465	547	858	743	1,083	1,545
Total Taxes and DNPM	3,950	4,932	6,031	6,861	6,877	10,301	15,607
Mineral Production (US$ million)	13,500	17,500	19,500	28,000	24,000	39,000	50,000
Mineral Production (R$ million)	25,093	32,528	36,245	52,045	44,610	72,491	92,937
Total Taxes (% of Production)	15.7%	15.2%	16.6%	13.2%	15.4%	14.2%	16.8%
CFEM (% of Production)	1.6%	1.4%	1.5%	1.6%	1.7%	1.5%	1.7%

Source: Ministry of Finance.

20 At the time of preparing this study, the official Ministry of Finance data for 2011 covered only a part of that year. In addition, there was a need to adjust the data for a very large exceptional payment of disputed back taxes in July 2011. This means data for 2011 should be treated with caution.

21 For example Ernst & Young (2008) showed that taxes accounted for around 20% of gross iron ore sector revenues, ranking Brazil as the third highest among 10 countries studied.

For reasons related to Brazil's federalist political-administrative set up, political debates over mineral taxation in Brazil have often focused on the CFEM "royalty". Yet the data in Table 2.1 indicate that CFEM constitutes only a small part of the overall tax take from mining in Brazil: CFEM revenues of around $R1.5 billion (US$800 million) in 2011 represents the equivalent of 1.7% of the value of Brazil's total mineral production. ***Other taxes on mining (equivalent to some 15% of total production) are far larger and more significant to the government at the national level.***

Previous studies have pointed to a high tax burden in the Brazilian mining sector, particularly when compared to other countries' fiscal regimes.[21] The perceived complexity of a tax regime – as summarized, for example, in the Doing Business indicators (see Annex E) – can certainly act as a deterrent to some investors. The Fraser Institute survey of mining executives on the deterrents of investment reports that 39% of respondents consider Brazil's tax regime to be a "mild" to "strong" deterrent restricting investment. Brazil also ranks behind many of its comparator countries in this regard, including Peru, Chile and Colombia, as illustrated in Figure 2.6.

Figure 2.6: Fraser Institute survey of perceptions on tax regimes (2010, selected countries)



Source: Fraser Institute.
Figure shows proportion of mining executives surveyed who consider the tax regime to be a deterrent against investment in selected countries.

2.4 National income (GDP)

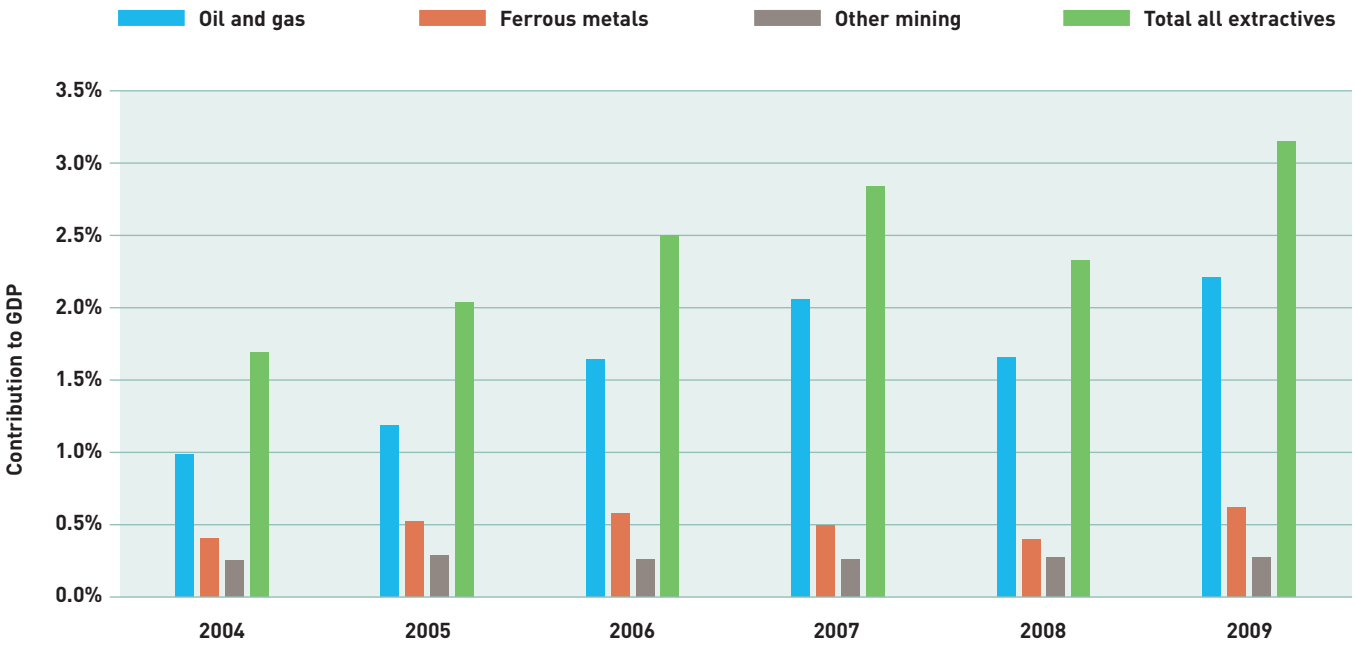
The generally large macro-economic contributions of Brazil's mining sector seen above do not extend to its contributions to GDP. In current price terms, the extractives sector now accounts for some 3% of total GDP and the non-oil and gas elements on their own account for around 1.1%. In spite of recent growth, the contribution of minerals to total GDP still represents a low percentage contribution compared with the mining sector's contribution to exports and investment, largely due to the high capital intensity of modern mining.

The detail on this point is provided graphically in Figure 2.7, which indicates that mining in recent years has become a relatively more important source of total national production and income generation. However, it does not manifest as a very large absolute percentage contribution to GDP. Nor can it be expected to in future in spite of the large new investments that are currently taking place, given the sectoral diversification of the Brazilian economy at the national level.

2.5 Employment and wages

Brazil's mining sector is a relatively small direct employer of labour at the national level, as is typical for modern capital-intensive mining worldwide. Data from IBGE shows that total direct formal employment in 2009 in all the extractive sectors (including oil and gas but excluding much small-scale mining) accounted for almost 300,000 persons and the mining sector total (excluding oil and gas) amounted to 232,000 in 2009. While mining sector employment is a large absolute number, it represents less than 1% of the total occupied labour force of Brazil. In Southeast Pará, however, the total direct employment is highly significant – in particular during the construction of large new projects, when Vale's operations may generate up to 20% of formal jobs in mining-affected municipalities. In addition, at the regional and local levels the indirect and induced effects are large, supported by multi-stakeholder partnership initiatives initiated by Vale. More detail on the national situation is provided in Table 2.2. The regional employment situation is discussed in detail in Section 3.

Figure 2.7: Mining's contribution to GDP (2004–2009, constant prices)



Source: IBGE.

2.6 Macro-economic contributions in summary

The discussion above presents five dimensions against which the macro-economic contribution of mining in Brazil is assessed. Previous applications of the ICMM MPD Toolkit have synthesized these findings graphically in order to identify a pattern to an otherwise complex set of effects. The pattern identified is that of an inverted pyramid, shown in Figure 2.8, where the typical rates of contribution found in other country case studies are shown alongside those found for Brazil.

The inverted pyramid shows a large percentage contribution to foreign exchange earnings (c.20%), and relatively smaller contributions to government revenues (c.2%), GDP (c.1.5%) and direct employment (<1%). As discussed above, the relatively small contribution to national revenues reflect the large and diverse nature of the Brazilian economy. The findings illustrate that compared to other activities in the economy the mining sector appears to be more highly taxed – given that the sector contributes 1.5% to GDP but c.2% to government revenue. Moreover, at the local level (see next section) the revenue contributions are significantly higher.

In the case of Brazil, the macro impacts identified above broadly fit the shape of this pyramid with one main exception: ***the FDI contribution of mining in Brazil is much smaller proportionally than in all other country case studies to date***. In addition, most of the other macro impacts are somewhat smaller than found elsewhere in less diversified and industrialized economies. Although very large in ***absolute*** dollar terms, the macro-economic contributions in ***relative*** terms are generally quite small – the exception being the significant contribution of mining to Brazil's total export earnings.

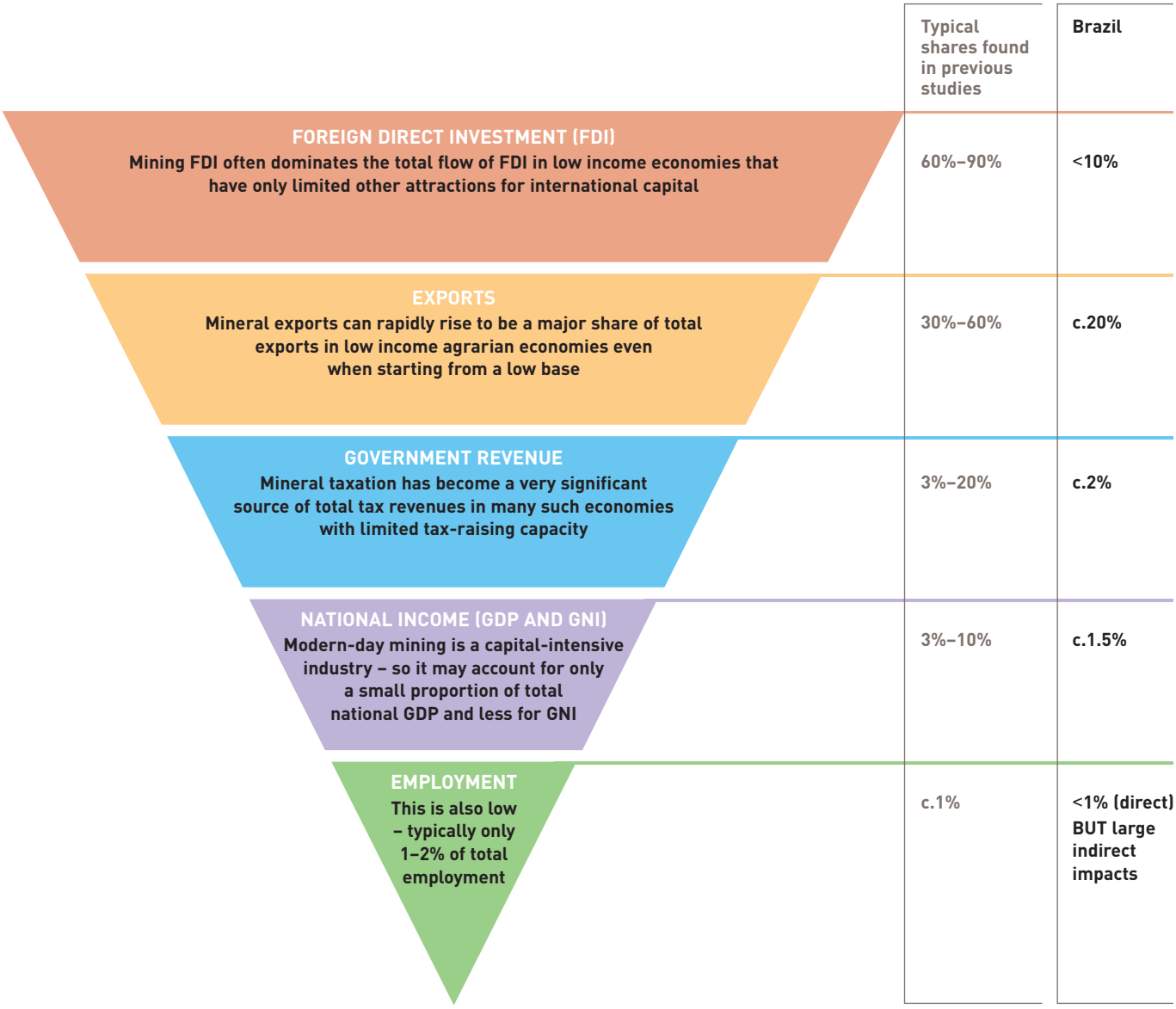
Mining is nonetheless an important and growing part of Brazil's macro economy. The rapid growth of the mining sector has helped develop the economy and reduce poverty in the poorer regions of Brazil (see the discussion in Section 6 in particular). Mining is one of several sectors that have supported the country's outstanding recent economic performance at the ***national level*** and in some dimensions such as exports it is a leading sector. The story regarding the economic and social impacts of mining is quite different, however, in ***local areas*** where mining is economically much more significant in both absolute and relative terms, e.g. in the southeast of Pará State. The following three sections of the report seek to address the question of how a relatively

Table 2.2: Mining's contribution to employment (2004–2009, R$)

		2004	2005	2006	2007	2008
Numbers employed						
Ferrous metals	**'000**	**22.7**	**25.4**	**28.7**	**32.6**	**37.4**
Oil and gas	**'000**	**40.3**	**43.8**	**48.7**	**53.7**	**58.8**
Other extractive industries	**'000**	**211.2**	**206.5**	**193.7**	**208.2**	**198.4**
Total Brazilian employment	**'000**	**88,252.5**	**90,905.7**	**93,247.0**	**94,713.9**	**96,232.6**
Total exatractives	**% of**	**274.2**	**275.7**	**271.1**	**294.5**	**294.6**
Extractives (% of total)	**Total**	**0.31%**	**0.30%**	**0.29%**	**0.31%**	**0.31%**
Average annual wages plus other incomes						
Ferrous metals	**R$**	**33,771**	**32,440**	**35,737**	**36,465**	**41,219**
Oil and gas	**R$**	**99,963**	**105,322**	**110,677**	**118,521**	**129,271**
Other extractive industries	**R$**	**7,657**	**8,751**	**10,126**	**11,144**	**13,409**
All Brazilian employment	**R$**	**8,923**	**9,704**	**10,551**	**11,729**	**13,171**
Extractives – weighted average	**R$**	**23,385**	**26,276**	**30,900**	**33,526**	**40,065**
Extractives – (% of national average)	**%**	**262.1%**	**270.8%**	**292.9%**	**285.8%**	**304.2%**

Source: IBGE.

Figure 2.8: **The inverted pyramid of mining's macro-economic effects (as shares of national totals)**



Source: ICMM (2007a, 2007b, 2007c, 2007d, 2009, 2011), OPM (2009).

poor and underdeveloped region such as Southeast Pará can absorb and maximize the developmental benefits from a huge injection of mining activity, specifically by:

- Identifying and quantifying where possible the ***direct economic and social impacts*** from Vale's operations in Southeast Pará as seen to date or that can be reasonably anticipated by 2014 – see Section 3.
- Examining those ***multistakeholder partnerships*** initiated by mining companies in Pará that aim to enhance social and economic development outcomes – see Section 4.
- Analyzing local impacts by examining socio-economic indicators from 2000 and 2010, to assess how the ***incomes and broader social conditions*** of the populations of Southeast Pará have changed over the years as mining has become more significant – see Section 5.



3

ECONOMIC AND SOCIAL IMPACTS OF MINING AT THE LOCAL LEVEL

(CASE STUDY OF SOUTHEAST PARÁ)

3. Economic and social impacts of mining at the local level (case study of Southeast Pará)

The economic contributions of mining at the *national level* are large in absolute terms, but moderate in relation to the overall size of the Brazilian economy. By contrast, the impacts of mining in relation to *local areas* in remote regions of Brazil are extremely large. However, the ability of poorer and less-developed regions such as Southeast Pará fully to capture the economic and social benefits associated with new mining investments is influenced by a wide range of development challenges. These include the starting conditions of the region in terms of many lagging socio-economic indicators, large infrastructure deficits, weak education and health provision and often limited administrative capacities, especially at the municipal level.

Large-scale mining projects by Vale, Hydro and other companies in Pará include a wide range of investments in minerals such as iron ore, copper, nickel, bauxite and manganese production, as well as in the rail and other logistics infrastructure that connect these operations with the port from which materials are exported. These investments have already had, and will continue to have, a profound impact on these small, rural economies. To illustrate, between 1999 and 2006 the share of the GDP attributable to seven municipalities that were "directly impacted" by Vale's operations in Southeast Pará (Diagonal 2006, 2010) rose from 8.4% of Pará State GDP to 15.2%.[22]

New mining investments have also been associated with large-scale in-migration: whereas the population of Pará overall grew by 22.4% in the decade to 2010, on average across the state's 144 municipalities, the population of the six mining municipalities grew by 60.2%. Further details about the social and economic situation in Southeast Pará in general, and mining municipalities in particular, are presented in Section 6.

3.1 Methodology and data

The analysis in this section draws principally on data provided in previous socio-economic diagnostic studies conducted by Diagonal for Vale (see Diagonal 2006, 2010) as well as data from 2000 and 2010 Census results provided by IBGE. The socio-economic studies provide historical data from 2003 to 2008 and forecasts up to 2014 and cover municipalities where Vale had operations, including Parauapebas and Canaã dos Carajás (bordering the track of the Carajás/EFC railroad), the area impacted by the Salobo project, the main town of Southeast Pará (Marabá) and the urban areas of the municipalities of Curionópolis and Ourilândia do Norte (see Figure 3.1). These socio-economic studies form part of Vale's social investment framework and are used to assess the gap between the existing provision of social services and future needs once operations are established. They also attempt to address backward and forward economic linkages.[23]

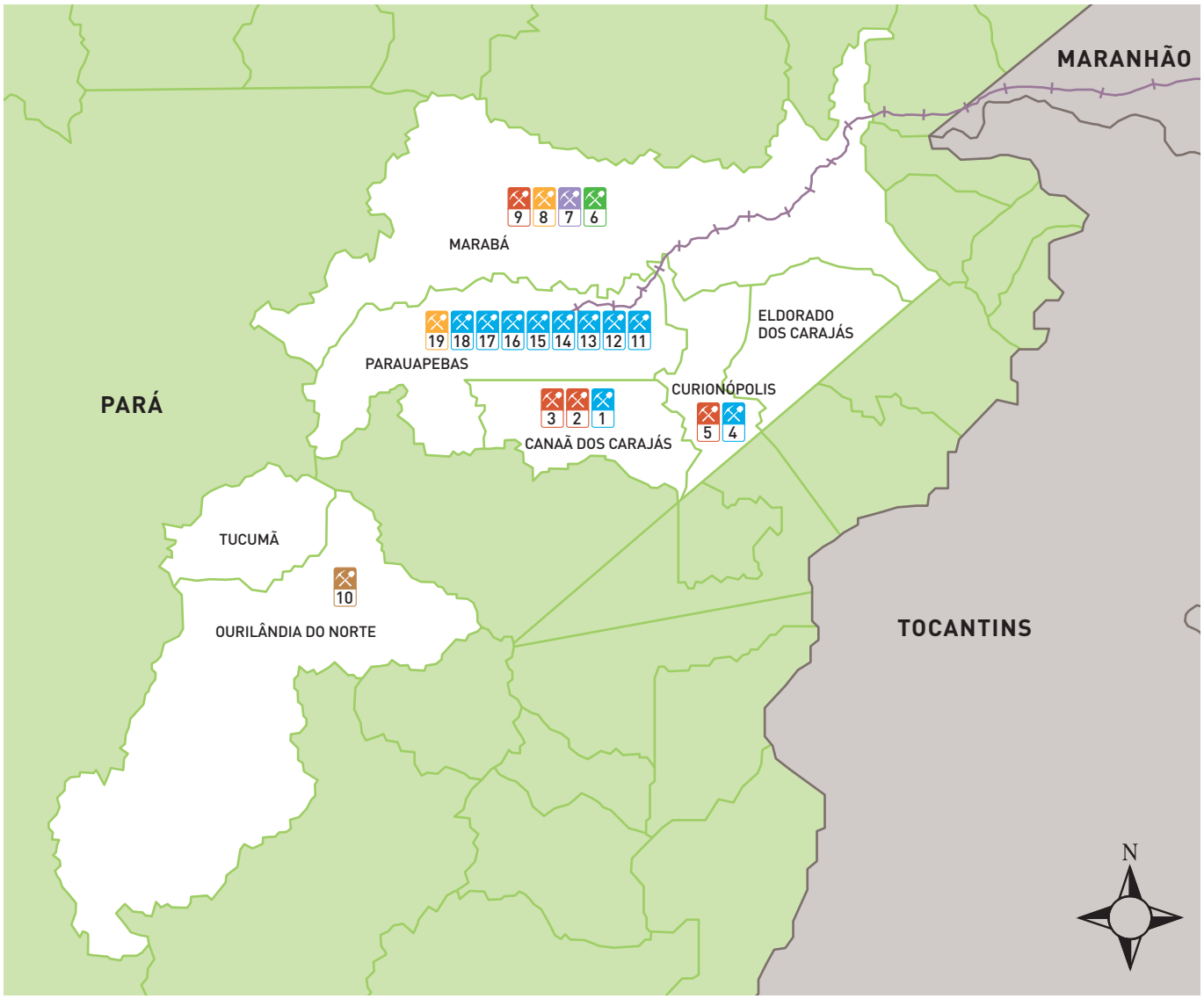
3.2 Mine-level economic and social contributions in Southeast Pará

The historical and forecast economic and social impacts of mining operations in Southeast Pará are discussed across five indicators: investment, production, government revenues, procurement and employment (including training and other human capital development). As Vale is the only mining company operating in Southeast Pará, these contributions are a direct result of Vale's operations.

22 These seven municipalities are: Canaã dos Carajás, Curionópolis, Eldorado dos Carajás, Marabá, Ourilândia do Norte, Parauapebas and Tucumã. Of these, all but Eldorado dos Carajás and Tucumã had mining operations within the borders of the municipality.

23 The 2006 Socio-Economic Diagnostic study involved a team of 40 researchers who collected primary data on urban planning and infrastructure and made use of an Input–Output model developed by Professor Francisco de Assis Costa at IPEA to estimate backward linkages between the mining sector and other sectors of the local economy.

Figure 3.1: **Map of Southeast Pará and Vale operations**



Key

- Copper
- Iron ore
- Pig iron
- Manganese
- Nickel
- Steel
- EFC Railroad
- Pará municpialities studied
- Pará municpialities
- State border

Project/Operation

1 S11D
2 Sossego
3 UFCH10
4 Serra Leste
5 Cobre Cristalino
6 Unidade Gusa
7 ALPA
8 Manganese Pellet Plant
9 Salobo
10 Onça Puma
11 Ferro Carajás
12 Adicional 10
13 Adicional 30
14 N5Sul
15 Locotrack
16 Pellet Feed Carajás
17 PUCC
18 Estério – Spreader
19 Azul Mine

Source: Diagonal (2010).

3.2.1 Investment

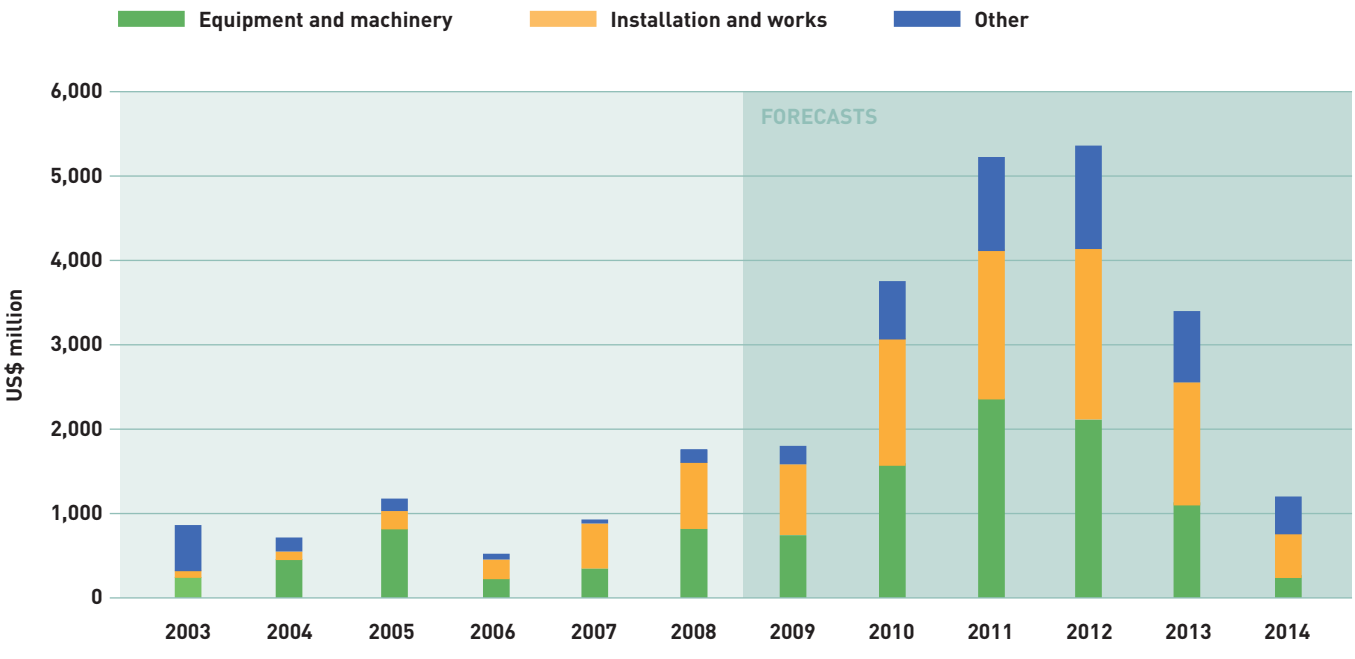
Vale's investment into Southeast Pará in the years between 2003 and 2008 was very large both absolutely and relative to national figures, with an average of around US$1 billion per annum, including investment in machinery, engineering, installation and services. Data on Vale's ongoing and future investment is based on the company's program of investment in the period from 2009 to 2014: a program in which investment was expected to reach over US$5 billion in 2011 and 2012. This large increase was and is due mainly to the development of the huge S11D project in Canaã dos Carajás and the ALPA project in Marabá (see Figure 3.2). In spite of some rescheduling as a result of the global financial crisis, this level of future investment is still anticipated.

Vale's initial investment forecast for its Southeast Pará operations for the period 2011–2014 of US$15.6 billion represents 32% of the total investment forecast for the mining sector in Brazil during this period. This implies not only the continued prominence of Vale in the Brazilian mining sector but also the rising significance of Pará State and in particular Southeast Pará as a destination for mining investment (and an alternative to the "traditional" mining region of Minas Gerais). ***For Southeast Pará these volumes completely dominate any other economic activity that is seen in the area*** – mining constitutes a driver of economic development that no other sector can match.

Investment in 2010 to 2013 represents – in each year – c.15–20% of the GDP of Pará State. About 40% of investment in the main expansion years (2010–2013) was forecast to be spent on equipment and machinery, where local supplier firms from within Pará may struggle initially to compete (because of the specialized nature of much of the machinery that is required). However, an estimated 38% is forecast to be spent on installation and works: areas that can more easily be provided by firms from within Pará State. To prepare local companies for this further upcoming demand, various multi-stakeholder partnerships to address local supplier development needs have been initiated by Vale and contributed to by others (see Section 4).

The large scale of these investments, together with the heavily concentrated implementation schedule, poses many risks and challenges. These include issues of security and poverty associated with large numbers of people attracted into mining municipalities without the guarantee of jobs and the risks of rising unemployment in subsequent years when mining operations scale down. As was noted earlier, through their partnership activities, the mining companies have implicitly recognized this risk. Certainly, the more embryonic mining municipalities cannot easily address these challenges unsupported. While welcoming the boost to their area's growth, municipal representatives express much anxiety about unwanted side effects from large-scale mining. Some of the efforts to address these challenges via partnership between companies and other stakeholders include Vale's Migrant Assistance Program (Programa de Assistência Migrante, PAM) (see Box 3.1) and Hydro's "Friendly Hand Project". These partnerships are discussed in Section 4.

Figure 3.2: Current and forecast investments (2003–2014)



Source: Diagonal (2006, 2010). Based on actuals for 2003–2008.

Box 3.1: The PAM Programa de Assistência Migrante (Migrant Assistance Program)

As the investments around Ferro Carajás expanded after 1985, many people arrived into the area through the rail and road systems put in place to service the project (Redwood 2002). This led to a growing contingent of low-income households settling in the otherwise-affluent Parauapebas area. Canaã dos Carajás is currently witnessing a similar population boom, with a large influx of migrants. The PAM was developed to strengthen the administrative capacity of the local government both to monitor migration and also to provide public services and protection to migrants.

In this case, Vale sub-contracted a specialist consultancy to develop migration management tools, to help local government implement the tools and to hold workshops with the Department of Social Development (SEDES) for technical training of the teams that service migrants. SEDES, in turn, is responsible for making available technical staff to be trained and for providing information on how PAM tools can be used in the day-to-day work of public servants.

In the case of PAM, the incentives of Vale and its government interlocutors are closely aligned. From Vale's point of view, the incentive to support PAM arises from the company's legally binding social obligations (negotiated through the environmental licensing process), as well as its inherent interest in mitigating any negative social impacts in the communities where it operates.

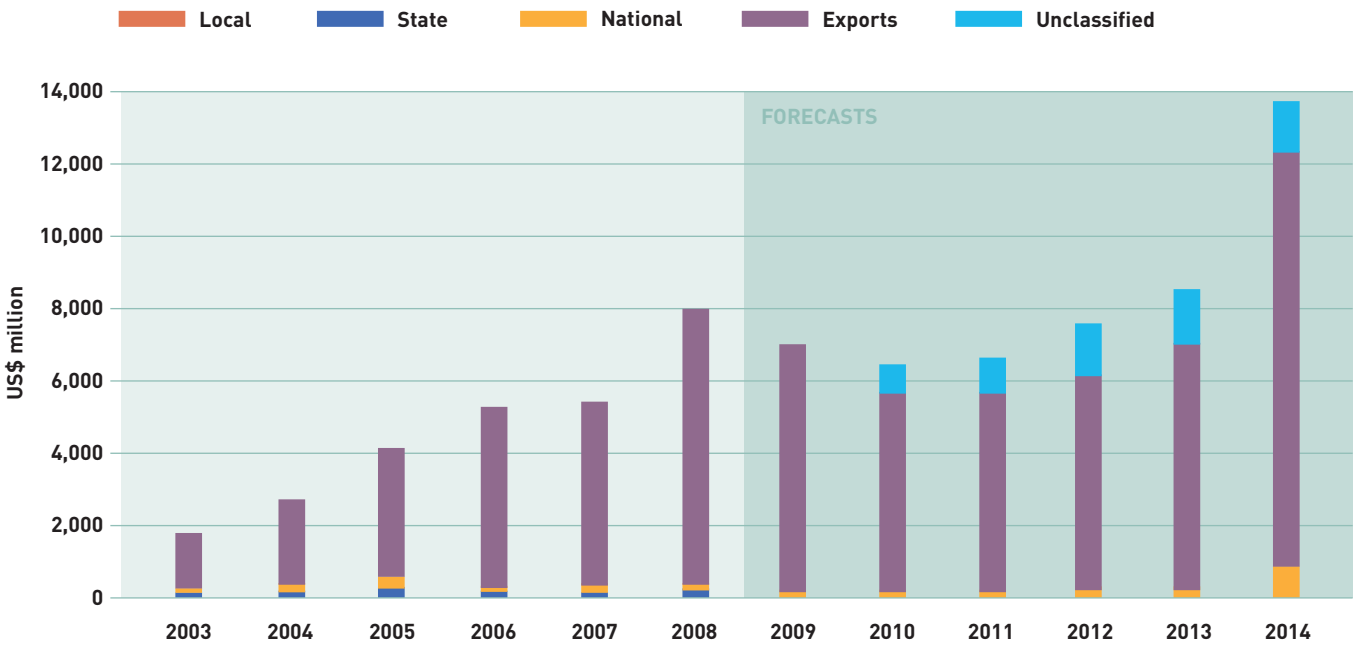
PAM partnerships around these shared objectives have resulted in positive outcomes, including integration of instruments for migrant attendance with Brazil's Unified System for Social Services (SUAS). This has allowed migrants to benefit more easily from federal social protection programs. Yet challenges remain regarding the capacity to sustain the initiative, with concerns that the SEDES team is not yet sufficiently structured and empowered to mainstream the initiative within local government.

3.2.2 Current and forecast production

Figure 3.3 shows that total mineral production in the region has been growing steadily and in line with the huge volume of investments in the period 2003 to 2008. The decline in forecast production in subsequent years is explained by the temporary scaling back of planned projects following the financial crisis of 2008. Many of these projects have since been re-instated but were nonetheless delayed.

Vale's production in Southeast Pará was forecast at US$6.3 billion in 2011, representing 13% of the estimated total mining production of Brazil for that year. It is notable that the new S11D and ALPA projects together account for 56% of this expected production increase. This is further evidence of the rising significance of Southeast Pará in the Brazilian mining sector overall. Most of this production was sold or is forecast to be sold to the export markets. The share of the production that was destined for value addition within Brazil is small and has fallen over time: from 16% in 2004 to just 3% by 2008. The initial 20th century vision of the iron ore industry as one that would predominantly supply the needs of a local steel and industrial sector has in large measure been replaced by the strong export focus that is driven above all by voracious demand from the Chinese and other international markets. This is not of itself a problem since ore supplies to local markets remain sufficient.

Figure 3.3: Current and forecast production (2003–2014)



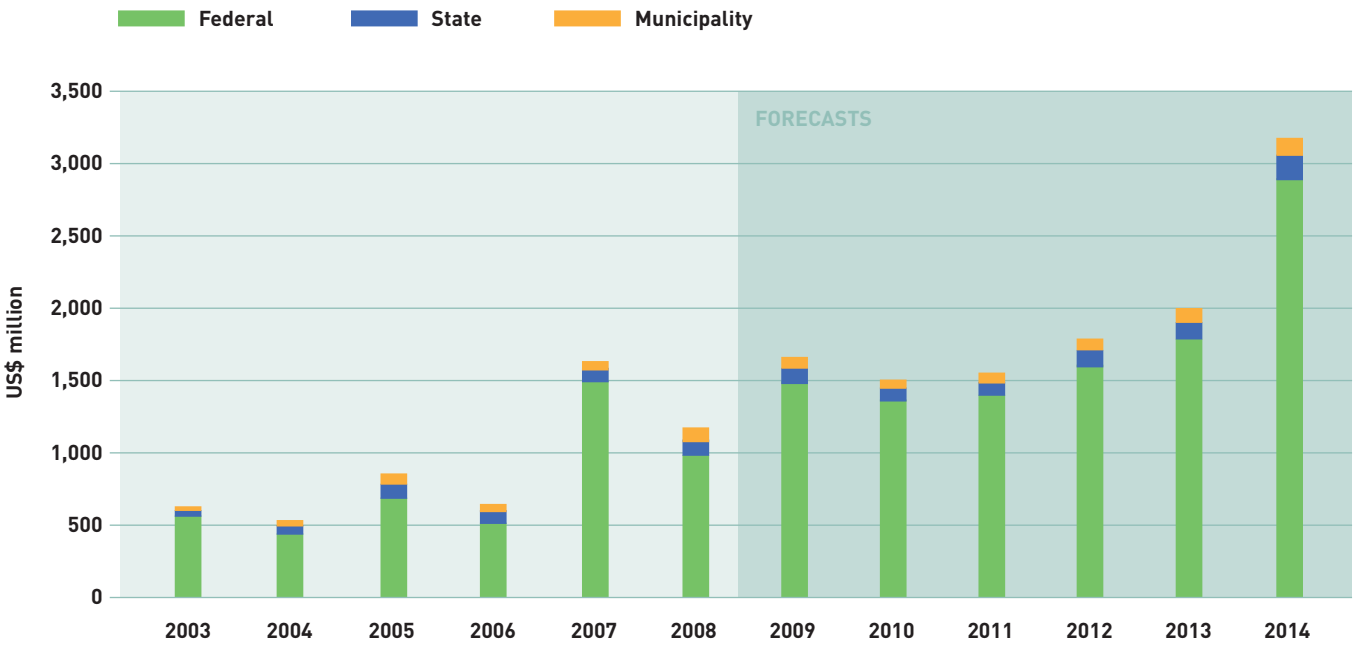
Source: Diagonal (2006, 2010). Based on actuals for 2003–2008.

3.2.3 Government revenues

As was noted in Section 2.3 taxes are levied on mining operations in many different ways. The total tax contributions from Vale's operations in Southeast Pará have increased sharply over the last few years, as new operations have matured and begun to pay taxes (see Figure 3.4). A significant proportion of the total national tax take accruing from the mining sector now come from the operations in Southeast Pará. The Ferro Carajás project remains the largest single contributor to tax, accounting for around 80% of all tax payments made in the region. Between 2003 and 2008, state and municipality taxes averaged 8.3% and 7% respectively of the total taxes paid. This total rose from US$600 million in 2003 to c. US$1.5 billion by 2011. As is shown in Figure 3.4, the taxes paid to federal government comprised the bulk of all tax payments through that same period: for example, 85% or c.US$1.4 billion by 2011. Similarly to other case study countries, a high proportion of the taxes paid by local mining accrue at least initially to the central/federal authorities. From that initial main point of collection there is a significant redistribution of funds to lower (state and municipal) levels according to the complex system that is briefly described in Box 1.2 and in more detail in Annex F. However, this is a generic system for the whole country (see Annex F) and it is geared in only a limited manner to the specific needs of mining-affected areas.[24] This creates certain challenges for the effective use of these revenues as a means to stimulate broader economic development in the mine-affected regions. These challenges are explored further in Section 6. Annex D provides a comparison of Brazil's fiscal regime for mining with that of other countries where the ICMM MPD Toolkit has been applied.

The data also confirms that CFEM, which is attracting the most attention in the current national debates around taxation in the mining sector – of which 87% are captured by the municipal and state governments – represents only a small proportion of the overall local tax payments by mining companies (confirming the national-level assessment in Section 2). It is certainly not as important a component in the tax and transfer receipts of Pará state as a whole.).

Figure 3.4: Current and forecast tax payments (2003–2014)



Source: Diagonal (2006, 2010). Based on actuals for 2003–2008.

24 This represents a challenge for local administrations. It means in practice that the local areas impacted by mining rely heavily on systems of central-to-local government transfers to address some of the public good issues that they face following the arrival of large-scale mining. This matter is discussed further in Section 7.

Specifically, in 2008 all the municipalities in the state as a whole received R$152 million from the CFEM but more than $R4 billion from the various other transfer incomes including their share of the ICMS revenues. The ICMS revenues alone provided almost six times as much revenue to them as did the CFEM. Even in the seven main mine-affected municipalities (Diagonal 2010), the transfer revenues at $R385 million were three times the level of CFEM revenues (see Annex F). CFEM revenues constitute a highly significant share of tax and transfer receipts for at least two of the main mining municipalities studied. This contrasts sharply with the population size of these municipalities. Specifically, in 2008, Parauapebas received 70% of the total CFEM revenues paid to municipalities within Pará State, despite only accounting for 1.9% of its population. In actual terms, the state of Pará received total CFEM payments of R$152 million in 2008 (the last year for which actual data were available), of which R$106 million went to Parauapebas and R$6 million went to Marabá. So, although total CFEM revenues in macro-economic terms are relatively minor, ***the pattern of their distribution renders these revenues highly significant for just a handful of mining municipalities***. There is very little logic or equity in such arrangements since, as the analysis in Section 5 shows, the main beneficiary municipalities are among the most prosperous in the whole of the state.

This pattern of CFEM revenue redistribution matches what has been found for other types of tax revenue under Brazil's present system of fiscal decentralization: Tax arrangements for the ICMS (value added tax on goods and services), the FPM (Fundo de Participação dos Municípios, Municipal Participation Fund) and the ***CFEM "royalty" greatly favour municipalities that have already achieved a relatively higher level of socio-economic development***.[25] In particular, these municipal administrations are given additional financial means to pursue growth on top of the natural increase coming from the new jobs and procurement that are associated with mining. By contrast, the present system does not give adequate support to those municipalities still at a lower level of development, or where nascent mining operations are attracting potential employees but not yet producing and paying taxes. These arguments together constitute a strong overall case for reform (see further discussion in Section 6

Box 3.2: Mining and revenue management: public management strengthening program

Since 1988, municipalities in Brazil have been constitutionally responsibile for providing many public services, including infrastructure projects, yet they suffer from severe capacity constraints in implementing such projects. The Vale Foundation's Strengthening Public Management (PSPM) initiative aims to strengthen public financial management capacity within the municipalities where it operates.
The PSPM was launched in early 2011 across six cities[26] and aims to diagnose and understand the public management of operational, administrative and health services and to propose actions aimed at institutional strengthening. In the PSPM, Vale works with consulting firms and sub-contractors to support development of these various aspects of municipal financial management systems. Focus areas include activities to develop budget preparation diagnostics, payroll reform, and advice and tools on how to improve procurement processes, contract management and budgetary and financial management.

The project presents a novel approach to building broad-based local revenue management capacity, but highlights the importance of longer-term engagement with local government at all levels, including the development of relationships of trust with local political leaders. Some of the challenges encountered include:

- **Lack of technical staff (availability and skills) in the cities**
- **Reliance on paper records rather than digital databases**
- **Fragility in existing procedures of data retrieval**
- **Some reluctance among local bureaucrats to open up books to consulting teams.**

25 See for example Mendes et al. (2008).

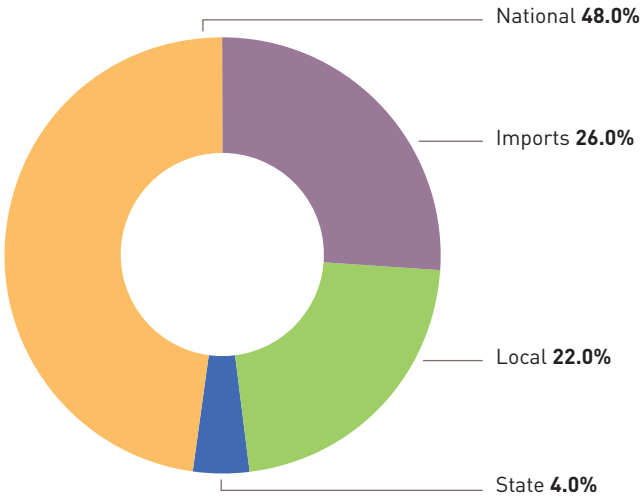
26 The program was implemented at the City Halls of Marabá, Eldorado dos Carajás, Curionópolis, Canaã dos Carajás, Parauapebas, Ourilândia do Norte and Tucumã.

3.2.4 Local content (procurement of local goods and services)

Brazil's relatively well developed economic and industrial base enables a large proportion of Vale's inputs to be procured nationally rather than imported. Available data for 2003–2008 indicate that Vale's average annual procurement for its operations in Southeast Pará was R$1.3 billion. Based on this data, about a quarter was imported and almost half came from outside of Pará but from within Brazil. This is significantly more than has been seen in most previous applications of the ICMM MPD Toolkit. The final quarter was sourced from within Pará State. This percentage is significant in the context of previous ICMM studies (see Annex D) and has risen further in the past few years. Indeed, based on forecasts prepared in 2008, the number in 2010 was expected to be R$507 million (US$304 million) or 12.5% of Vale's total procurement from within Brazil that year. This rise is attributable at least in part to the substantial proactive partnership efforts made in this area, involving mining companies as well as government and other development partners (see Box 3.5 and discussion in Section 4).

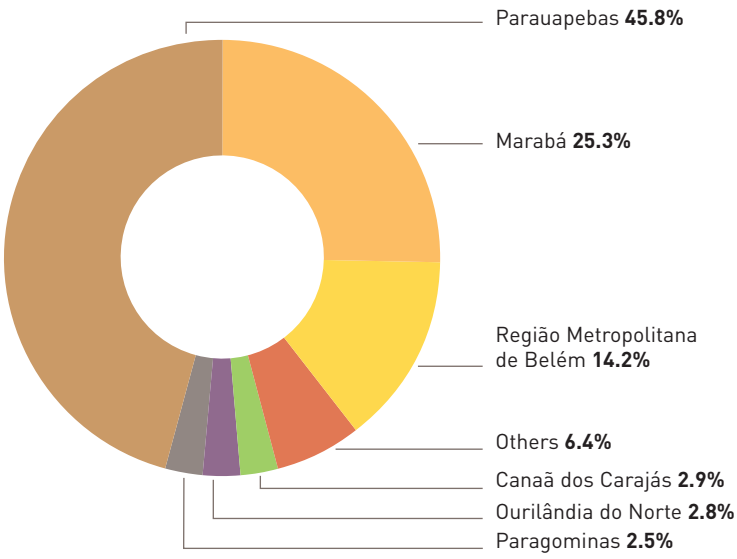
Within the area of Southeast Pará, procurement is highly concentrated around the more industrialized areas of Parauapebas, Marabá and Belem, as shown in Figure 3.6.

Figure 3.5: Overview of Vale procurement by operations in Southeast Pará



Source: Diagonal (2006, 2010). Yearly average based on actuals for 2003–2008.

Figure 3.6: Procurement from within Pará for Vale's operations in Southeast Pará (2011)



Source: Vale INOVE, based on data for the first half of 2011.

Box 3.3: Mining and local content: the Pará State REDES initiative

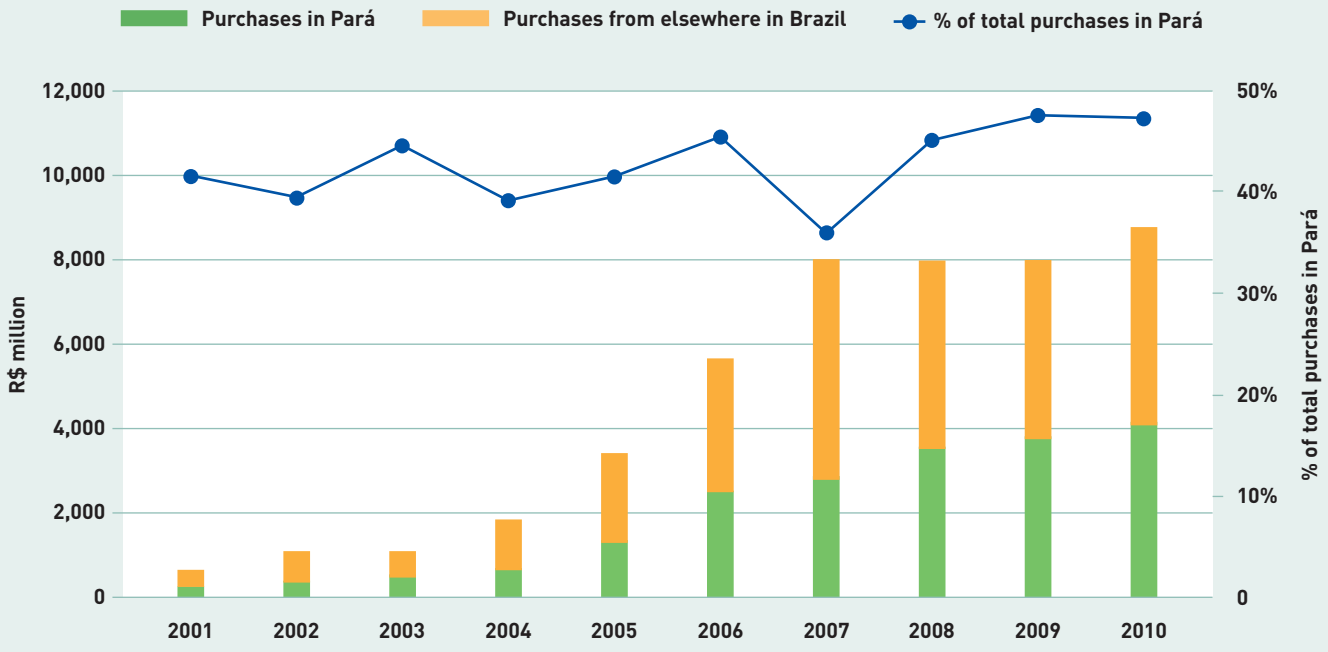
The rapid progress achieved in raising local levels of procurement owes much to the Pará State Government's state-wide supplier development program REDES, managed by the Pará State business association FIEPA. REDES emerged in response to the perceived economic opportunities associated with large investment arriving into the state and has the objective of increasing the competitiveness of Pará-based companies in supplying large investors from any sector.

REDES sources funding from the 15 large companies that constitute FIEPA's "funders", operating in various sectors (mining, energy, food, etc.).[27] These funders pay monthly fees to support the activities of REDES, participate in the initiative by setting targets for local purchases and collaborate with REDES in monitoring these targets.[28] Within the REDES partnership, the role of FIEPA is primarily to convene stakeholders interested in supplier development, by bringing together the demand and supply side of local manufacturing and service providers. REDES also provides diagnostic reports (e.g. maps of expected future demand), dissemination activities (to share information to would-be suppliers of how to access large buyers) and training (through SENAI and SESI).

State government provides support by approving REDES decisions and providing the overall policy framework for small- and medium-sized enterprises (SMEs). The state government has engaged directly in some local supply chain initiatives, including promoting market access by local firms to Vale contracts, e.g. by encouraging Vale to agree framework contracts with various construction service providers.[29] However, as FIEPA/REDES wishes to be seen as a non-partisan technical initiative, it does not obtain funds directly from the state government.

The REDES supplier development initiative has been successful in developing industrial capacity to serve large investors in Pará. Membership has grown rapidly, from 216 in 2004 to 1,640 in 2010. The absolute amounts of procurement from within Pará have also increased rapidly (from R$379 million in 2001 to R$4.161 million in 2010) and the proportion of total procurement from firms with their principal business operations in Pará has increased somewhat (from 41% in 2001 to 49% in 2010), as shown in Figure 3.7.

Figure 3.7: Procurement from within Pará for Vale's operations in Southeast Pará



Source: FIEPA/REDES.

27 ALBRAS, ALCOA, ALUNORTE, CELPA, CAP, Serra Pelada, Dow Corning, MRN, Norsk Hydro, IMERYS, PPSA, Rio Tinto, Schincariol, SINOBRAS, Vale and Votorantim Metals.

28 SMEs participate as members of REDES and also make an annual financial contribution.

29 The Project Director for Sossego, which was being constructed in 2004, adopted this approach to source civil construction goods and services.

3.2.5 Employment and training

As noted in Section 2, at the national level, the employment effects of the mining sector overall are typically small relative to total employment. However, Southeast Pará covers a vast geographic area, with only a relatively small population and, as such, the introduction of large-scale mining projects has had a ***very large effect on local employment*** (direct and indirect) in both absolute terms and with respect to increases in average incomes.

The current and forecast employment generated by Vale's operations in Southeast Pará is depicted in Figure 3.8. Specifically, total ***direct employment*** – representing people on the company's payroll and outsourced activities – rose sharply between 2003 and 2008 to reach 22,400 employees, representing 14% of Vale's global workforce of 174,000 employees (Vale 2010). Direct employment in Southeast Pará was forecast to increase further to 46,700 by 2012, representing a doubling in four years. That figure compares with the total population of 460,000 (2010 Census data) in the five main municipalities where Vale has operations.[30] Assuming continued population growth, and that half the population are of working age, these data indicate that up to one in five residents may derive their incomes directly from Vale by 2012.

The social obligations ("condicionantes") associated with the granting of mining licenses require local employment targets to be met according to sliding scales (see Box 3.5). In addition, many ***indirect*** jobs have been and continue to be created as a result of Vale's procurement needs and the procurement needs of its suppliers. Furthermore, spending by employees of Vale as well as their suppliers in the local economy creates demand for goods and services that generates further ***induced employment***. This "wage linkage" is significant due to the high share of employees sourced from local communities and neighbouring municipalities and the fact that Vale employees are typically more highly paid than local unskilled or semi-skilled workers.[31]

The broad magnitudes of these ***indirect and induced*** employment effects have been estimated using Input–Output tables developed for Southeast Pará by Professor Francisco de Assis Costa as part of the 2006 Socio-Economic Diagnosis commissioned by the Vale Foundation. Based on these tables (and using data from 2004), estimates have been made of Type 1 and Type 2 multiplier effects from mining on both economic output and on employment (see Box 3.4).

Box 3.4: The theory behind multipliers

In addition to the direct and indirect jobs of contractors referred to above, jobs are created indirectly by the presence of mining through the economic spill-over effects arising from the activities of mining companies. For example, the expenditures on construction of a new mine will initially impact on a limited number of sectors (the construction sector itself and key raw material suppliers and services) but will then have further effects on other sectors as well as on local labour markets. Multipliers provide a way for calculating the total direct and indirect effects of an initial stimulus.

Multiplier effects are calculated using Input–Output tables that show the inter-relationships both between the sectors of the local economy and those in the rest of the country. Output multiplier effects measure the gross output generated in the economy that results from R$1 spent within a particular sector. *Type 1 multiplier* effects are due to the interdependencies between production sectors. These Input–Output effects arise because any extra demand for domestically produced goods or services will lead to an increase in the demand for raw materials which, in turn, will prompt further supply.[32] *Type 2 multiplier* effects are those arising from the increase in household income, as well as the subsequent spending by households, leading to a further stimulus to output and income. The multiplier analysis normally makes various assumptions:

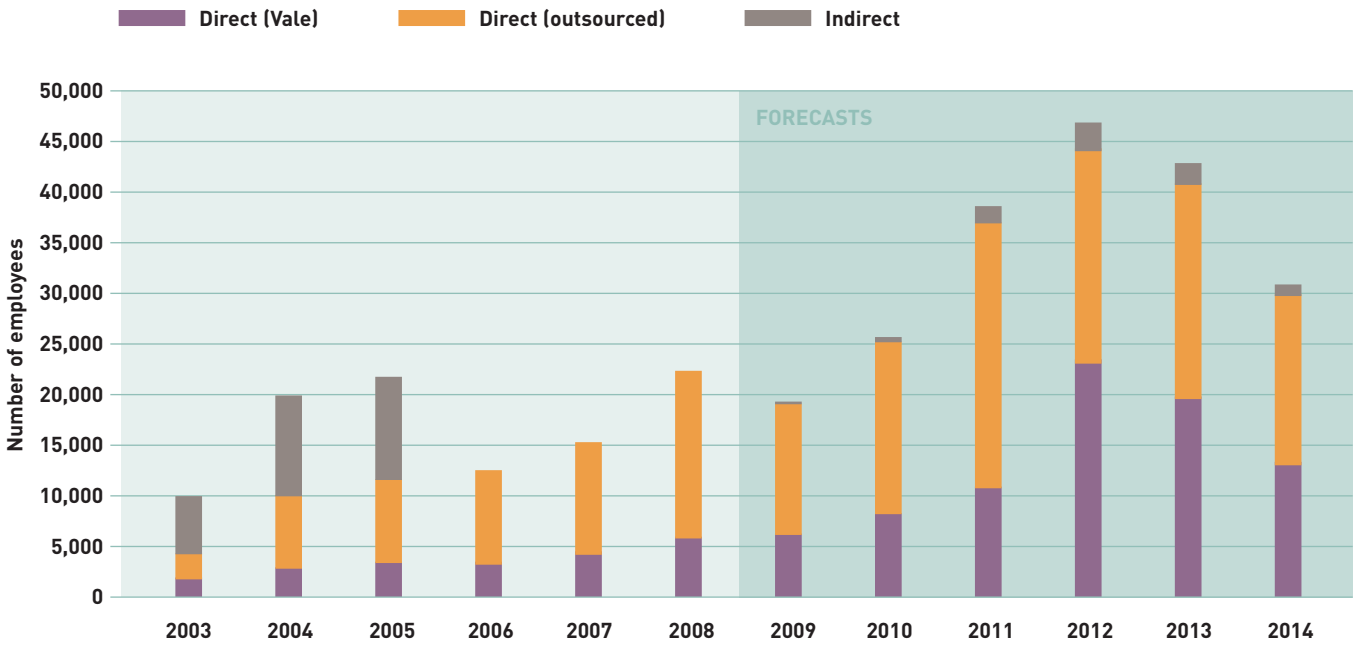
- **A simple linear relationship between inputs and outputs. Applied over a longer period this might not hold because input technologies might change or relative prices might change, leading to substitutions between inputs**
- **There may be supply constraints in some domestic sectors or in the availability of certain kinds of labour. If so, then the multiplier effects obtained will be overestimates of the true output or income response**
- **Type 1 multipliers exclude dynamic responses, so there is no indication of how long it might take for the multiplier effects to work through the system or whether the output responses might require (and hence precipitate) further investment (i.e. fixed capital formation)**
- **The size of Type 2 multipliers depends on assumptions of the marginal propensity to consume and thereby makes implicit assumptions regarding "leakages" in the form of taxes, savings and imports.**

30 The five municipalities where Vale had large-scale mining operations in 2010 were: Canaã dos Carajás, Curionópolis, Marabá, Ourilândia do Norte and Parauapebas.

31 Moreover, Vale has strong incentives to promote more local employment among administrative and more skilled personnel: many of these currently come from outside of Pará but turnover can be high, as employees commonly do not want to stay in rural areas far away from their families.

32 See Bulmer-Thomas (1982); Miller and Blair, (2009).

Figure 3.8: Current and forecast direct and indirect employment (2003–2014)



Source: Diagonal (2006, 2011). Based on actuals for 2003–2008.

Table 3.1: Estimated output multipliers for Southeast Pará

	Type 1 multipliers	Type 2 multiplier
Patronal agriculture	1.3	2.4
Peasant agriculture	1.2	2.3
Mining	1.2	2.3
Primary intermediate	2.0	3.1
Primary processing	1.8	3.0
Manufacturing	1.9	3.0
Wholesale	1.2	2.3
Retail and services	1.6	2.8

Source: Authors' estimations.

The results indicate that for every R$1 in output that is generated by the mine, there is an additional R$1.3 of income generated in the rest of the Southeast Pará economy (see Table 3.1). Given that salary levels are often much higher in mining than elsewhere in the local economy, this implies that every additional mine worker employed may generate employment opportunities for 3–4 people in Vale's supply chain and elsewhere in the local economy (a result similar to that found in previous ICMM MPD Toolkit applications).

Yet the ability of local employees to respond to the demand created by mining is constrained by the limited supply of relevant skills. The mining sector in Brazil nationally faces significant skills shortages, which have deepened in recent years as growing demands from other sectors such as oil and gas have confronted a still relatively weak national system of technical education. To at least partly address this constraint in the area of Southeast Pará, Vale initiated INOVE to work in partnership with government agencies to develop skills that will help Vale meet its social obligations ("condicionantes") (see Box 3.5 and Section 4).

Box 3.5: "Condicionantes" and local employment at the Onça Puma mine

Brazil's environmental licensing process includes extensive consultation processes that lead to reasonably well-defined "condicionantes", or social obligations, which companies are obliged to adhere to. In the case of the ferronickel mine development at Onça Puma, the objectives stipulated in the company's "condicionantes" include reaching 70% "local employees" in two years and 100% locals within seven years. Vale appears to have been successful thus far in meeting these targets. The core mining operations of Onça Puma employ some 1,500 employees, of which 50% are from within the local municipalities. Salaries can be R$1,100/month plus benefits, which is three times what an unskilled worker with informal employment can expect (but appears to be similar to what formal-sector employees would earn in the absence of higher education/qualifications). There are substantial administrative difficulties in monitoring such local employment conditions, however. One of these is that as soon as somebody moves to the area, they become "local" in the government statistics – challenging the meaningfulness of targets for local employment as set in the "condicionantes".

Sharp increases in employment opportunities bring risks to host municipalities and these need to be carefully managed. First, ***the job opportunities tend to be heavily concentrated around a limited number of municipalities***, some of which started off initially with very small populations. So, as employment opportunities grow, the increases in populations due to in-migration – and the challenges they bring – have been and will in future be proportionally very large. In particular, local administrations need to address the requirements for new public infrastructure to service both the needs of the new economic activities (improved roads, telecommunications, etc.) and the needs of the expanded populations in terms of homes, schools, health services and leisure facilities. Second, ***local governments as well as companies will have to prepare for reductions in direct employment in later years once development of new projects has been completed***. This is likely to represent one of the biggest and most difficult challenges for the management of the economy of the area. When the period of construction ends there will be some reversal in job opportunities and the potential increase in unemployment will need to be addressed by way of other (non-mining) activities.

3.3 Summary of local impacts

The various direct economic and social contributions of mining in Southeast Pará are impressive, given the relatively recent arrival of mining companies into a region that was still relatively underdeveloped and with limited industrialization in the late 1990s. Pará's transition away from traditional agricultural activities into more industrial activity in the past decade has been rapid and is strongly linked to the arrival of mining. Vale and the other large mining companies have been able to rapidly achieve a rate of procurement from local suppliers equivalent to almost half of their total national procurement, representing greater local procurement than seen in most other MPD country case studies to date. This is attributable in part to the huge volume of new investment that mining has introduced into the region – as well as to proactive approaches to stimulating local employment and local supplies. By 2012, mining was clearly established as the leading direct employer in the area.

Nevertheless, there are challenges associated with this rapid economic and social transition. These challenges are manifest in anxieties expressed by some municipal authorities about the societal pressures that mining has inevitably placed upon their areas. As was noted above, these pressures include but are not confined to the need to find resources for new public infrastructure to service both the needs of the new economic activities and the needs of the expanded populations for homes, schools, health services and other facilities. There are, in addition, anxieties around the likely excessive levels of in-migration – as new workers arrive in excess of the numbers of available jobs – and the likelihood of increased crime rates that will confront limited police and security capacities. The magnitude and complexity of these challenges should not be underestimated. Nor can the responsibility for addressing these challenges be assigned solely either to the often small and low-capacity local governments or to the mining companies.

Ensuring that the impressive local economic and social contributions from mining evolve into sustainable gains in living standards requires concerted action by a broader set of stakeholders, including state and Federal Government agencies. Some actions are clearly the domain of governments, such as the nature of policy reform in the areas of fiscal decentralization and national education policies. Yet there are many complementary actions and initiatives that can be undertaken by companies in partnership with government agencies, civil society, other firms and international organizations. The next section discusses some of the innovative partnerships currently underway in Pará with the aim of addressing the issues highlighted in the previous discussion.



4

MULTI-STAKEHOLDER RESPONSES TO LOCAL CHALLENGES

4. Multi-stakeholder responses to local challenges

This report thus far has documented and analysed a range of economic and social impacts from large-scale mining in Brazil, in the process highlighting some of the challenges of managing these impacts – in particular in Brazil's mineral-rich but less-developed rural north. These challenges give rise to a series of policy and planning questions for stakeholders to address in a collaborative manner, articulated in the following interrelated questions:

- **How does a relatively poor region, with large infrastructure deficits and limited municipal government capacity and experience, absorb the impacts of massive investments by large mining companies? Key impacts include:**
  - **Impacts from inward migration and the need for increased urban housing, water, roads and schools; and**
  - **Impacts from environmental disruptions due to new mines.**
- **How can a relatively poor region take advantage of new mining activity to build a diversified and sustainable economy to enhance living standards for its expanding populations? Key considerations include:**
  - **Attracting new industries to complement and eventually replace the impetus from mining; and**
  - **Enhancing the quality of government institutions to support economically sustainable communities.**

Addressing such questions requires concerted efforts with important roles and responsibilities for a range of government and non-government stakeholders (see ICMM 2009). The mining companies active in Pará State, including Vale, Hydro and Alcoa, are already engaged in a range of partnership activities that are helping to build municipal and other capacity to respond to the challenges and maximize the positive contributions of mining.

This section first presents a case study of Vale's approach to sustainable investment. Second, a selection of partnership initiatives are reviewed, to highlight the successes as well as the challenges of engaging across the main "partnership themes" identified in ICMM's MPD Toolkit. Specifically, the section describes some of the institutional structures through which companies such as Vale, Hydro and Alcoa work with others to strategically address the challenges described above. These companies operate in distinct geographical regions within Pará and do not cooperate directly in implementing the partnerships discussed below. Nonetheless, these partnerships illustrate different ways to strategically address issues around mining and development.

Finally, the section discusses the distinguishing features of successful multi-stakeholder partnerships with the potential for strengthening economic and governance institutions.

4.1 Case study: Vale's sustainability model

Vale's Sustainability Development Department and other departments[33] – as well as Fundo Vale and Vale Foundation – are engaged in a range of initiatives and work programs that aim to extend the benefits from mining activity and to ensure the sustainability of the company's commercial activities. In 2010, Vale spent approximately US$1 billion on social and environmental investment, of which US$398.5 million targeted social projects. Of this total, about a quarter (US$104.8 million) was destined for Pará State – an increase of 64% over the corresponding number for 2008. In both of these years, the Vale Foundation accounted for approximately half of Vale's social investment spend.

Within the municipalities in Southeast Pará where Vale operates, the social investment spend by the Vale Foundation has grown rapidly in recent years from R$2.5 million in 2003 to R$34.4 million in 2010 (see Figure 4.1).

Vale's initiatives are developed as part of overlapping *mandatory* and *voluntary* consultative processes between the company, communities and other stakeholders. The mandatory process of establishing social obligations is triggered by the environmental licensing process superintended by the environmental regulator Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) or by provincial agencies. An agreed list of social obligations ("condicionantes") is developed in negotiations between communities and the companies, and is mediated by the municipal public prosecutor. These social obligations are then incorporated into the environmental license, which becomes a public document (see "Mandatory process" in Figure 4.2).

In parallel to this process, the Vale Foundation conducts voluntary socio-economic diagnostic studies to understand:

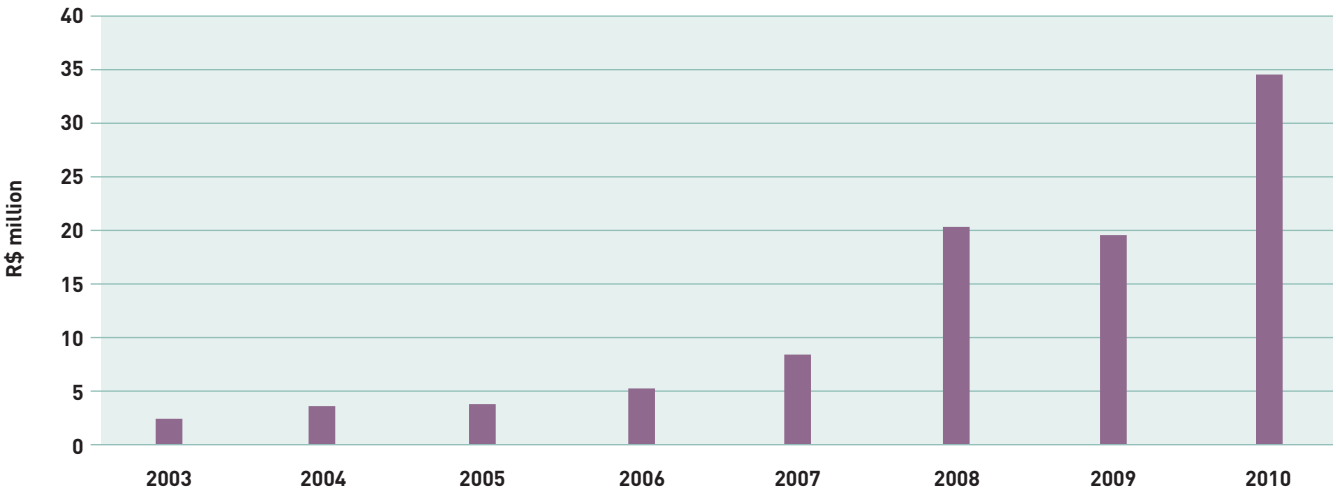
(1) The current gaps in infrastructure and public services

(2) How these constraints are likely to change in the future because of the influence of mining (e.g. by estimating how populations will grow due to new mining activities)

(3) What the main implementable actions are to mitigate potential problems and exploit new opportunities.

This approach helps to establish some common framework and evidence base in order to support the undoubtedly complex and potentially contentious discussions around key issues. It also provides some reasonable assurance that social obligations are closely aligned with the real needs for social and physical infrastructure. In this way, the diagnosis is used to counter-balance the potentially unstructured requests for social projects arising out of the environmental licensing process. Alcoa's Juruti model of engagement employs an even more elaborated arrangement for connecting the facts of a community's socio-economic situation with the programs that are jointly developed (see Section 4.2).

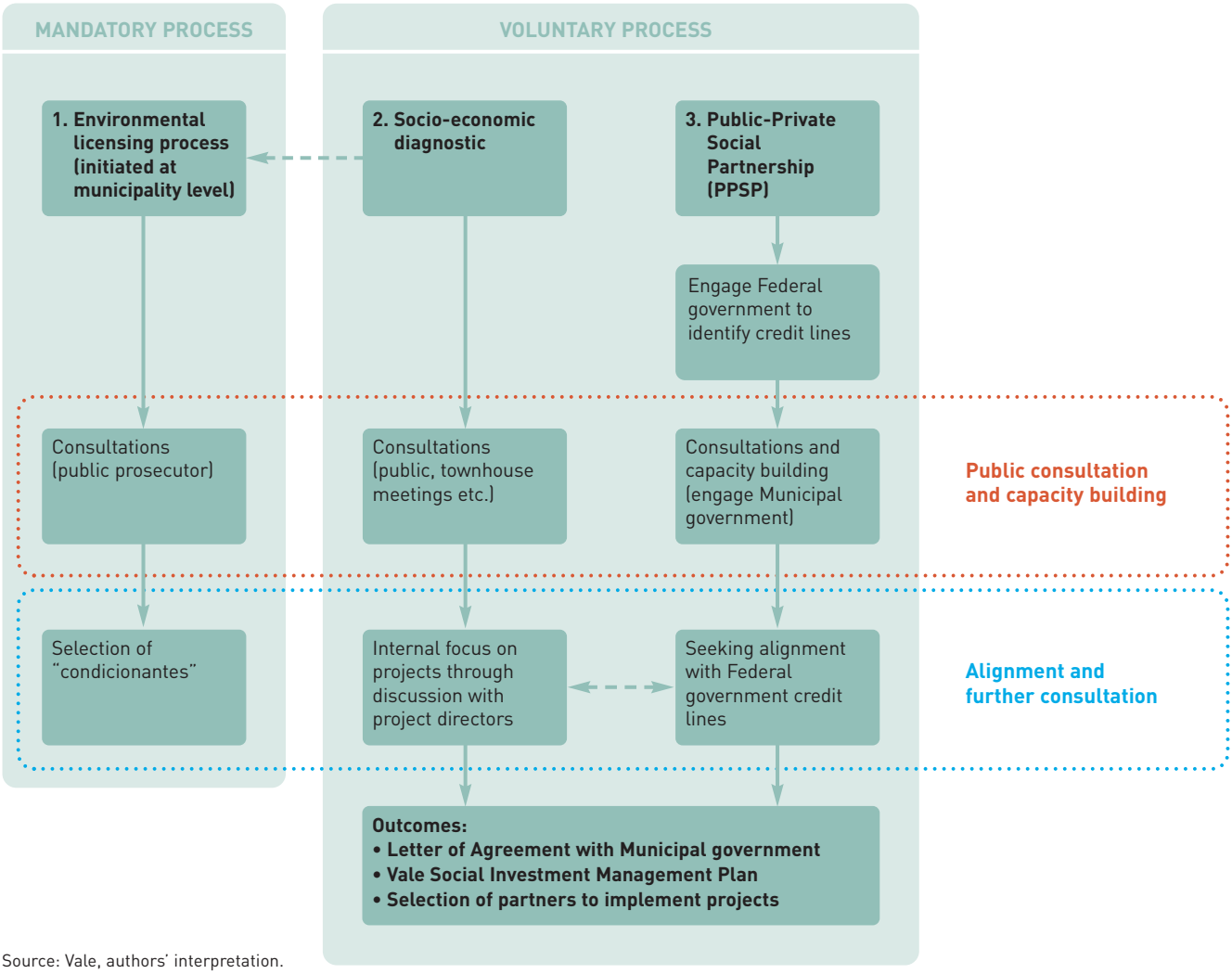
Figure 4.1: Vale Foundation spending on selected social projects (2003–2010, R$ million)



Source: Vale

33 These include the Environmental Department, Community Relations Department, Social Responsibility Department and Suppliers' Relations Department (including INOVE).

Figure 4.2: **The Vale Foundation's social investment framework**



Source: Vale, authors' interpretation.

The third component in the Vale approach is the PPSP framework, whereby Vale seeks to improve local development outcomes by engaging with federal-level funding programs, as well as helping municipalities improve public services. In this approach, the Vale Foundation engages with Federal Government as well as municipal governments, with the aim of matching the strategic requirements for infrastructure and other services within mining municipalities (as identified in the socio-economic diagnostics) with the available federal funding schemes. Since its inception the PPSP has evolved into a more systemic approach including engagement through cross-sector institutional arrangements (involving civil society and community organisations) – supporting the work with NGOs to deliver public services and developing a participatory urban planning agenda.

As illustrated in Figure 4.2, these overlapping processes result in a Letter of Agreement (LoA) between the Vale Foundation and the municipalities where it operates, which sets out the roles and responsibilities of different actors in delivering social projects. The LoA also becomes a public document that increases the accountability and commitment of the firm as well as its local government partners, by making transparent what the social investment consists of and how it will be delivered. As a result, the design of specific programs contained in Vale's Social Investment Management Plan incorporates a clear definition of the partner organizations that need to be involved (including the Federal Government agencies when appropriate) and also the roles and responsibilities of each partner.

4.2 Partnership case studies

Previous research by ICMM suggests that mining companies and other stakeholders can enhance development and governance outcomes by working together across six partnership themes (see ICMM 2006b):

- Mining and revenue management
- Mining and regional development planning
- Mining and social investment
- Mining and poverty reduction
- Mining and local content
- Mining and dispute resolution.

Having reviewed Vale's Social Investment Framework, this sub-section discusses selected examples of mining partnerships in Pará that aim to address the challenges and opportunities set out at the beginning of the section.

Mining and Revenue Management: PPSP initiative to apply for federal funds

Following reforms in the Federal Constitution in 1988, which sought to decentralize public services to municipal and state levels, municipalities in Brazil now have significant responsibilities for providing certain defined public services. To encourage responsible implementation of this broader mandate, municipalities are also bound by the Fiscal Responsibility Law ("Lei de Responsabilidade Fiscal" – LRF), which aims to institutionalize fiscal discipline at all levels of government. As a result of these new legal arrangements – the Constitution and the LRF – sub-national governments now receive a substantial amount of their own revenue (as judged against international standards) and also receive relatively large transfers from higher levels of government.

Revenue transfers from central to local government require alignment between processes at the federal level and at the level of municipalities. Often, the municipalities lack the technical know-how and the management systems to identify available federal funds, to apply for transfers, and to implement projects.

Vale's PPSP initiative has sought to address these problems through two parallel processes. First, Vale advocates directly with the ministries involved in disbursing federal funds, e.g. through the PAC (see Section 1.2). In doing so, Vale is able to support municipalities' efforts to gain access to federal funds. Second, Vale engages with municipal governments to help build capacity (through various sub-contractors) in applying for funds and implementing projects using these funds. Within the technical co-operation work stream (see Table 4.1), local governments have been able to build improved capacity to map demand, supply technical information for project design and develop monitoring tools to help manage the release of funds. During this process, City Hall remains ultimately responsible for the execution of the work.

This is a relatively unusual set of arrangements for a mining company to engage with, but one that responds directly to the specific features of Brazil's system of federal support for municipalities. Vale has devoted a significant volume of resources to help its host municipalities gain the capacity to access federal funds. There is evidence of successes, but also examples of key constraints. These constraints relate above all to the challenge of scaling up of Vale's PPSP initiative, to delays and discretion in awarding PAC funds, and to the effectiveness of spending once funds have reached the municipal level.

Table 4.1: Selected PPSP areas of technical cooperation

Mapping	**Monitoring spending plans and mapping the demand from local governments**
	Mapping funding sources
Technical support	**Technical support on preparing Terms of Reference for the projects**
	Technical support for City Hall to complete the registration for fundraising
Monitoring	**Monitoring of funded resources**
	Project review and monitoring of the works (whose support may consist of technical assistance for hiring and supervision of works, as well as accountability for the application of resources)[34]

Source: Vale

34 At this stage Diagonal has no formal monitoring responsibility, but monitors by maintaining dialogue with stakeholders and communicates with Vale on the progress of initiatives (for Vale's internal and external reports, announcements etc.).

Mining and Regional Development Planning: Hydro Projeto Mão Amiga (Friendly Hand project)

The establishment of a bauxite mine operation in Paragominas in 2004 was seen as at risk of attracting a large number of migrants, which if left unchecked could have derailed the relative improvements in social indicators and in public management standards that the municipality was enjoying at the time.

To address this challenge, the Hydro "Friendly Hand" project was developed by Paragominas Social Assistance Secretariat (SEMAS) in partnership with the mining operation, the police force, Public Prosecutor, Tutelary Council and the administration of Paragominas Municipal Bus Station. The initiative aims to reduce in-migration and to support access to social services to migrants who stay but cannot find a job (by linking the initiative to the Brazilian Social Assistance National Policy). SEMAS' responsibility was to provide administrators to perform the practical activities in the Paragominas municipality with support from the other institutions. The role of the mining company was to provide funding and technical assistance.

In practice, the staff from SEMAS approached migrants as they arrived (normally via road) to identify their skills and ability to participate in works related to mining activities. The skilled migrants were directed to the contractor companies involved in the works. The others were advised of the lack of professional opportunities and offered access to the social/assistance services available in Paragominas (if necessary) and also bus tickets to return to their original town. Moreover, the SEMAS technical staff also engaged with beggars in the streets of Paragominas and offered to either direct them to the local social services or provide a bus ticket to return to their home town.

The initial agreement was signed in 2005 and, due to the positive results, was extended until 2011, when the impact of the migration flow connected to the mining activity was considered finished. During this period, more than 8,000 people were approached and advised by the SEMAS technical team. Municipal government reports have assessed that the migration process did not have a negative social impact on the city, partly because the possibility of return to the original towns was offered by the project to the immigrants. The "Friendly Hand" project also appears to have reduced levels of social exclusion and homelessness in the city and has helped to gather social data to inform public planning and social policy making within the municipality.

Mining and poverty reduction: Escola que Vale and Ação Educação

The objective of the Vale Foundation's ***Escola que Vale program*** is to support public education and primarily education at kindergarten and elementary school (grades 1–5) level through training of teaching staff. The program focuses on reading and writing skills in the Portuguese language, as well as mathematics, the arts and school management. More specifically, it aims to:

- Provide a local framework to build awareness and capacity of would-be teacher trainers about Escola que Vale's curriculum requirements
- Integrate the Escola que Vale support into the Municipality's Department of Education's (SEMED) overall training support program
- Support teachers during content and methodologies training.

The Vale Foundation is responsible for intermediating with City Hall to formalize the partnership, while NGO partner Comunidade Educativa (CEDAC) is responsible for preparing, planning and implementing the Escola que Vale program in partnership with SEMED and for providing training to public school teachers. SEMED, in turn, is responsible for formalizing the training requirements and monitoring the program.

To complement Escola que Vale's "hands-on" support to public-sector teachers, the Vale Foundation also engages in a program to improve public administration in education through ***Ação Educação (Education Action)***. In this partnership, Vale works with the municipal governments (again through the NGO CEDAC) to implement and monitor education programs from the federal and state governments. Initial set-up costs are covered by Vale, after which Vale continues to fund CEDAC's activities with the Municipal Government taking over responsibility for all the costs of its participants. The partnership provides training to public servants, including courses for education department technicians and for training school administrators. It also supports municipalities with technical assistance for developing and adhering to an Articulated Action Plan (PAR) for the education sector (required by Ministry of Education policies) and with help when applying for federal funds (see also the first example above). Ação Educação operates across seven target municipalities in Southeast Pará. Public servants are trained on sector management and rotated around the headquarters of the participating cities in Southeast Pará.

Table 4.2: INOVE partners and activities

Partner	Activities
Buisness development initiatives	**SEBRAE (the Brazilian Service to support Micro and Small Businesses) supports Vale in the development of micro and small businesses. In return, Vale provides financial support amounting to 50% of its joint activities (the remainder paid for by its members) focused on consulting, training and support for the formalization of companies.**
Professional associations	**A range of trade associations work with INOVE in a dissemination and convening role, enabling INOVE to speak to local publics through these associations.**
National education institutions	**Two national educational institutions – SENAI (National Service of Industrial Learning) and SESI (Industry Social Service) – work with INOVE to develop technical training activities (classroom-based and long-distance) targeting identified areas of supply chain constraints. Vale assists in identifying relevant courses and programs.**
The financial sector	**Banks have provided working capital loans to SMEs through INOVE. By lending through Vale rather than directly to these businesses, the banks can lend at lower rates and reduce the bureaucracy of making many small loans to many small companies.**
State Government	**FIEPA supports INOVE by providing information about existing manufacturing capacity in Pará, using its vast database of companies in the State of Pará. Given the State's influence across the municipalities where Vale operations, FIEPA can support INOVE in facilitating communication and institutional relationships.**

Source: INOVE.

The results of the Escola que Vale program are measured against the Ministry of Education indicators (the "Proof Brazil" indicators) – a national assessment of the quality of education in the Portuguese language, including reading and mathematics. In addition, classroom training assessments are conducted through discussions and exchanges of experience. The existing Basic Education Development Index (IDEB) data from Proof Brazil indicate that cities in Southeast Pará that receive Vale's teacher training appear to outperform other areas with similar socio-economic conditions (although there are large variations across municipalities). The Ação Educação initiative also appears to have been effective in enhancing the dialogue between education specialists across the municipalities and is facilitated by close co-ordination whereby CEDAC conducts bi-weekly meetings with the Municipal Director of the Department of Education and all the co-ordinators of the system.

Yet challenges remain in scaling up the Escola que Vale and Ação Educação initiatives. These include the recurring problem of ensuring that funding is sustainable and sufficient to support the changing circumstances of mining municipalities. In the past, large social investments during the early years of the program in Canaã dos Carajás were not sustained adequately. Combined with high levels of immigration and demand, this reduced the program's effectiveness.

Mining and local content: INOVE supplier development program

Supply chain linkages can facilitate the economic integration of mining and generate employment in ancillary industries around mining. However, local suppliers (particularly in rural areas) often suffer from shortages of capital and technical/managerial skills and face high transaction costs due to inadequate and poorly maintained infrastructure.

The supplier development program INOVE was initiated by Vale in 2008 to address existing constraints on local suppliers.[35] The initiative operates in partnership with a range of stakeholders (see Table 4.2). It seeks to align Vale's current and forecast demands for workers with the existing supply base and local vocational skills and, where necessary, to identify initiatives to address the identified gaps. It also tries to attract suppliers from other states to establish a presence in Pará. INOVE engages with suppliers through various modalities, including:

- Funding, through invoice factoring and working capital loans. Vale partners with commercial banks to provide funding through Vale: this responds to the difficulties faced by suppliers in meeting Vale's 90-day payment terms

35 The INOVE initiative involves the participation of many actors, from within Vale and in partnerships with other organizations. Within Vale, INOVE involves the Procurement department, Valer (training), Vale Foundation (social investment), Environment Directorate. These different departments are involved at different levels of the strategic, tactical and operational management of INOVE

- Information dissemination, through "supplier kits" with preferential procurement conditions on critical items provided by Vale´s suppliers or potential vendors and also through the identification and attraction of new potential suppliers to remote mining areas
- Training, implemented through the INOVE Capacitation Platform (www.inoveedu.com.br), which covers a range of management skills through online learning. Vale's Valer and INOVE programs partner with national education institutions (SENAI and SESI) to develop technical training activities. These training activities build capacity among local suppliers to respond to Vale demand, thus increasing the local indirect economic benefits of mining activities.

The INOVE program has registered some important successes since its establishment in 2008, including an increase in supplier financial credit lines to R$115 million by the end of 2011. INOVE helps Vale go beyond just tracking the proportion of inputs that are sourced from *within* Brazil (a more common approach to defining "local" content) by tracking the content sourced from Pará State where it operates (based on companies with some presence in the state). In the first three months of 2012, the local content defined in this way was R$993 millions, an increase by 39% from the corresponding period in 2011 (R$602 millions). Despite these efforts, infrastructure constraints remain a critical challenge to attempts to broaden further the supplier base throughout Pará State. A 2011 study commissioned by INOVE to map demand and supply in Southeast Pará highlighted infrastructure deficits as a critical constraint preventing both further supplier development and also greater regional integration in Pará and Maranhão. To address these challenges, INOVE was restructured with Vale creating an internal committee focused on Vale's north system (Maranhão and Pará) to provide greater attention to infrastructure works.

Mining and social investment: Hydro Professional Education Centre

The low level of professional training among people in the north of Brazil presents challenges for locals to get better jobs and income, as well as for the mining industry in its recruitment. Hydro Paragominas decided to address this challenge by establishing the Centre for Professional Education (Centro de Educação Profissional, CEP) to train people from the local population and from other municipalities in the region.

Hydro partnered with the City of Paragominas and SENAI to set up the CEP. The municipality offered land of 34,000 square metres where the building was erected. Hydro Paragominas was responsible for the construction of the building, the purchase of equipment used in the centre and for developing the curriculums. SENAI (National Service for Industrial Learning) took over the responsibility to manage CEP and the implementation of training activities offered to the population (including a broad range of courses, including industrial mechanics, electric, safety, civil construction, automation and IT).

Hydro invested R$7.8 million (around U$4.7 million) to establish the CEP, which includes four laboratories and five classrooms and has the capacity to train around 600 people per month. The CEP was inaugurated in June 2011, allowing Paragominas and other municipalities from the region to benefit from a dedicated area for training and skills development, thus helping them prepare for opportunities offered by the mining or other economic sectors. The partnership with SENAI, a well-known Brazilian institution, ensures that training services are implemented in a way that is locally appropriate and demand driven. Up to July 2012, a total of 109 courses have been offered and 2,046 people have been trained in CEP's facilities – of which some three-quarters represented workers involved in mining sector.

Mining and environmental management: the green economy and forestry conservation

Although partnerships to address environmental issues have not been included in previous ICMM Toolkit applications, the prominence of environmental concerns in Brazil's broader sustainability agenda is significant. These challenges are being addressed through both public-private initiatives and multi-stakeholder partnerships.

To address challenges of conservation in southeastern Pará Vale works with government to protect all five federal protected areas comprising the Mosaic of Conservation Units in the Carajás Region (more than 8.6 thousand km^2). Only two of these areas contain Vale operations, which directly affect an area which representing c.1.6% of the entire area that is protected in the "Mosaic of Carajás". The company also manages and maintains the Carajás Zoo-Botanical Park, within Carajás National Forest. The Park was opened in 1985 and carries out ex situ conservation projects and environmental education activities, representing an important area of leisure to local community.

Fundo Vale is a non-profit association that engages in multi-sector partnerships with the objective of promoting the sustainable use of natural resources, conservation and preservation of biodiversity. The Amazon biome is a strategic focus of the activities developed by Fundo Vale, which includes a partnership with Imazon (Amazon Institute of People and the Environment) that aims to radically change the strategies used to combat deforestation in the Amazon.[36] The Imazon system monitors deforestation as well as other changes in land use, including timber harvesting, cattle ranching, mining, forest typologies and roads, using a combination of monthly satellite-based remote-sensor monitoring and analysis of both natural factors (such as soil type and forest composition) and socio-economic issues in each region. The system provides forecasts of 95% reliability to be made of areas most likely to suffer from deforestation in a one-year period. This allows partners involved to plan and/or intensify actions to combat deforestation in the identified areas. The Imazon/Fundo Vale partnership also engages with the state government to feed its analysis into public policy in the Pará State more generally, a partnership that has evolved over time in response to the challenges faced by Pará municipalities in reducing deforestation (see Box 4.1).

Box 4.1: Evolution of the Pará State "Green Municipalities" program

In 2007, a cross-ministerial initiative led by the Ministry of Environment was set up to stop funding municipalities on a "red list" where deforestation was rampant. The red list was supported by formal monitoring and enforcement institutions: a federal government law prevented the Central Bank from lending to municipalities registered on the red list. There were 48 municipalities on this list at the end of 2011.

Paragominas (in Southeast Pará) was on the red list and had long been unable to tackle rampant deforestation. Faced with the threat of reduced federal funding, the new Mayor of Paragominas came to Imazon for help in monitoring deforestation. Imazon now produces monthly maps for public consumption that are linked to the land registry (environmental cadastre), enabling the municipal government to sanction the owners of the land where deforestation is taking place.

These and other partnership activities involve a range of NGOs and local government agencies in addition to Imazon and Fundo Vale, including The Nature Conservancy, Imaflora and the Paragominas Rural Producers Union. As a result of these various initiatives, Paragominas reduced the rate of deforestation by 92% and was removed from the red list. Based on this success, the State Governor of Pará adopted this monitoring system as part of a state-wide "Green Municipalities" initiative covering 89 municipalities in Pará, where Imazon now tracks and monitors performance.

36 During the period 2009–2012, Fundo Vale is expecting to provide R$15 million to Imazon.

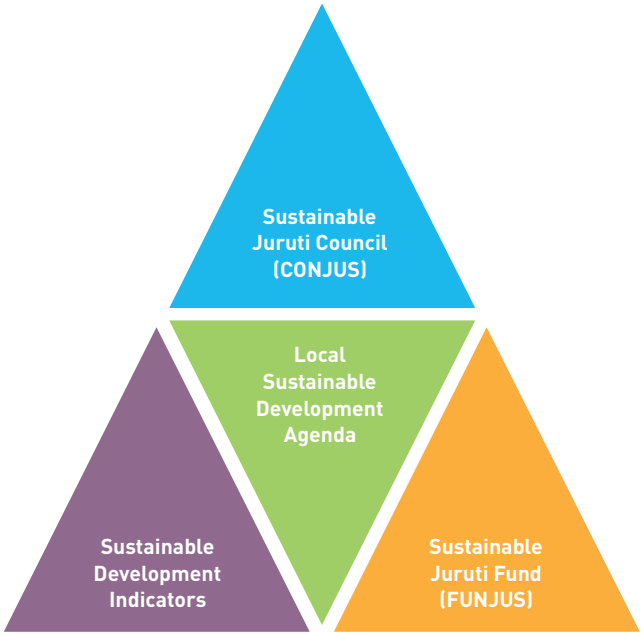
An integrated partnership framework: Sustainable Juruti Framework

When Alcoa arrived in 2007 to set up its R$3.5 billion project in Juruti, the municipality had a population of 35,000. Around 60% of that population lived in rural areas and the economy relied mainly on subsistence farming, fishing and small-scale commerce and services. The company invested US$110 million in the period 2007–2011 and now employs 2,200 people, 81% of whom were born in Pará State. The company has promoted a broad social development agenda, developed through partnerships with a range of government and non-government actors. It represents an innovative case study of how a social investment framework can be developed to address the joint issues of revenue management, institutional capacity building and local content.

The overarching institutional partnership for ***strategic social investment*** around Alcoa's mines has three components: the Sustainable Juruti Council, Sustainable Development Indicators and a Sustainable Juruti Fund (see Figure 4.3). Together, the three constitute the "Sustainable Juruti" model that shapes the social investment and sustainability agenda for the region.

Mining and conflict resolution. When Alcoa arrived there were tensions between the company and various community groups and local government agencies opposed to the project. The establishment of the Sustainable Juruti Council (the "Council") has helped to reduce these tensions. The multi-stakeholder Sustainable Juruti Council formulates a long term agenda for sustainable development in the region, based on engagement across a broad spectrum of stakeholders, including government, NGOs and the private sector. The Council – with 15 seats, representing 80 organizations – is the locus for dialogue on Alcoa's social and environmental investments, and helps to connect these to investment decisions by the Municipal government.

Figure 4.3: The Sustainable Juruti framework



Source: Fundação Getulio Vargas, Funbio and Alcoa (2008).

Mining and revenue management has been supported by the Sustainable Juruti Fund, a partnership between the Municipal administration, local civil society organizations, Alcoa and the Bank of Pará (with the technical support from the Brazilian Biodiversity Fund). The fund obtains funds from private and public sources (taxes, charges, CFEM, Private Social Investment) and has to date funded 21 projects by mobilizing US$550,000, with US$3.5 million of funds under management (Abdala 2012). The Sustainable Juruti Fund finances activities prioritised by the Council and mobilises resources for an endowment fund – thereby complementing government financing of public policies. The Council also operates in partnership with the municipal government in deciding on spending priorities for CFEM revenues generated by the project.

Institutional capacity building and evidence-based decision making. To inform debate at the Council, Alcoa developed a monitoring framework comprising over 100 sustainable development indicators and began to conduct broad household surveys every two years. The data from these surveys are used as a basis for decision making by the Council regarding priorities of the Sustainable Juruti Fund. The indicators were initially developed and monitored by Fundação Getulio Vargas (FGV), but responsibilities for monitoring are currently being transferred to the local municipality (which will continue to receive support from FGV, for example through training, manuals for indicator development, etc.).

The linkage between ***mining and local content*** is similarly crucial. Whereas manufacturing capacity was previously very limited in the region, Alcoa has partnered with the Pará State confederation of industry (FIEPA) to promote the establishment of supplier companies in close proximity to the mining operations, and to provide training for businesses.

The Juruti approach – in place since 2007 – has been widely hailed as successful and has even has been called a "new sustainability paradigm". However, the success of the program may be linked to the characteristics of the area as being very rural and with a small formal economy. Nevertheless, the model highlights the importance of building a shared understanding among disparate stakeholders of the benefits and challenges of modern mining, and ensuring gradual capacity building and transfer of responsibilities to local government.

4.3 Discussion of partnership responses

The examples presented in this section were chosen as representative of the broader range of partnership activities involving mining companies in Pará in Northern Brazil. As noted in the introduction to this section, they are designed to both address some of the social obligations ("condicionantes") arising from the formal environmental licensing agreements with IBAMA and to further address the multiple challenges of integrating large mining operations into communities that are – initially at least – small, economically underdeveloped, weakly resourced and lacking in administrative capacity. Indeed, the approach taken by Vale in particular, but also Alcoa, illustrates the potential for integrating the mandatory social obligations with a broader evidence-based framework developed through socio-economic diagnostic studies and consultations.

The discussion above highlights the following key features of successful partnerships as they are currently constructed in Pará State:

First, the partnerships typically involve a ***strong focus on training and capacity building of government officials***, with an emphasis on administrative personnel that do not change during the political cycle (i.e. public employees that are selected through Brazil's public-sector entrance examination, rather than political appointees). This capacity building takes place through direct public management support (e.g. the PAM discussed in Box 3.1 and Vale's municipal master-planning initiative discussed in Box 6.1) and by supporting local government's service delivery (e.g. though Escola que Vale and Ação Educação). Training provided to public officials covers the monitoring and mapping of spending and funding plans, technical support in preparing Terms of Reference for projects, registration for federal funding and monitoring of public works.

These capacity-building initiatives have greater potential to succeed when they involve co-ordinated efforts across several municipal governments, such as in the attempts through the Ação Educação partnership to promote the regional integration of education policy across seven municipalities.

Second, there is ***active engagement with the Federal Government agencies*** in Vale's PPSP, through which the company advocates to Federal Government on behalf of municipal governments regarding their development needs. Through this engagement, Vale seeks to integrate local and national government agencies more effectively, in part by using an established fundraising department within the Vale Foundation. This closeness with the Federal Government also helps the Vale Foundation align itself with public policy in its areas of operations. Through the PAM, for example, Vale has helped to integrate federal and local government systems, by developing tools for migrant monitoring that are integrated with Brazil's federal SUAS.

Third, these partnerships indicate ***recognition that public-sector capacity building is a long-term process***, slowed down by limited skills and IT systems, and various bureaucratic hurdles (e.g. in federal systems for approving funds). As noted in ICMM (2008), investments into infrastructure and systems are sometimes made before there is capacity to manage these effectively.

Fourth, there are often ***strong interdependencies between these partnerships***, which provide for synergies in their implementation. For example, by actively managing migration, there is less real estate speculation and local administrators may face less pressure from interest groups to engage in rent-seeking, thereby facilitating public administration reform. Similarly, when municipalities obtain technical assistance on how to access federal PAC funds, they are also increasingly able to improve their access to other federal funding sources (such as education sector funds from FUNDEB). Vale's PSPM has a further but indirect role in improving the fundraising capacity of local municipalities, by helping local governments to balance municipal accounts – this in turn facilitates the implementation of PPSPs, since balanced public finance accounts are one criterion used in the application process for federal funds.

The case studies presented above clearly reveal that there are many challenges in implementing and sustaining such partnership initiatives. There is no suggestion that the Vale, Hydro, Alcoa and other initiatives fully address or fully resolve the multiple challenges articulated at the beginning of this section. However, in areas such as local procurement, improved local planning and also in relation to the environmental agendas, they can make important inroads into addressing these complex problems. The incompleteness of the solutions is not surprising. The introduction of several very large new mining projects into a poorly developed area such as that found around Carajás would be expected to confront some of the broader problems of Brazil's governance arrangements at the national level. The report returns to this topic in Section 7 to assess more fully some specific governance challenges in translating the impacts from mining into sustained improved outcomes for the national and local economies.



5

ECONOMIC AND SOCIAL OUTCOMES IN SOUTHEAST PARÁ

5. Economic and social outcomes in Southeast Pará

This section seeks to quantify the level and nature of the socio-economic impact of mining in Southeast Pará. In doing so, it provides an initial assessment of whether the huge investments of Vale and other companies (as discussed in Section 3), combined with the partnership initiatives in which they engage (Section 4), have achieved tangible benefits in economic and social terms. In other words, have those municipalities that have been exposed to the mining activities benefited from mining in terms of various socio-economic indicators, such as household incomes, health and education? How does their performance in these areas compare with that seen in other non-mining municipalities, in Pará State as a whole and indeed in the whole of Brazil?

This section begins with a brief description of the methodology used, followed by an assessment of mining's performance in relation to socio-economic indicators. It first considers the broad population and income trends in Southeast Pará relative to other parts of Brazil. Second, it assesses how these trends are reflected in the performance of the six municipalities in Southeast Pará hosting large-scale mining operations (to be termed "mining municipalities").[37] Third, it evaluates the performance of mining municipalities as a group, compared to non-mining municipalities in Southeast Pará, across available socio-economic indicators. A more detailed discussion of this data is provided in Annex C.

5.1 A note on methodology

The main methodological approach adopted is one of comparing the trends over time in certain relevant indicators such as income, poverty, health, sanitation etc. (a) across mining municipalities and (b) between mining and non-mining municipalities.

Assessing these trends in isolation does not of course answer the more difficult question, namely ***what developments would have happened in mining areas if mining had not existed?*** There are significant methodological challenges in answering this counter-factual question (as discussed in more detail in Annex C). The analysis as presented here should therefore be regarded as an initial logical approach to exploring broad differences from the (a) and (b) comparisons above and drawing inferences which can then be the subject of more intensive study. Our approach examines five main socio-economic indicators for which municipal-level data from the 2010 Census were available.

Although poverty indicators for Brazil as a whole, as discussed in Section 2, have improved dramatically, there are no directly comparable MDG data available at the local state and municipal level. This section therefore uses average household incomes, literacy rates and sanitation levels as proxies for poverty indicators.

37 These are the five main mining-affected areas from earlier Diagonal studies plus Paragominas.

5.2 Broad trends in population and income

The first point to note is that Southeast Pará has experienced a very high rate of population growth of almost 40% in the last decade. This compares to 22% in Pará State and to 12% nationwide (see Table 5.1). ***Mining has undoubtedly attracted many more people to the impacted areas and the neighbouring catchment areas***. As a result of in-migration, Southeast Pará has undergone a process of rapid ***urbanization***. Specifically, there has been a 15 percentage point rise in the urban population from 2000 to 2010 and most workers and their families associated with the new mines live in towns. This degree of urbanization is significantly lower than the nationwide average and slightly slightly lower than for Pará State as a whole. However, these pronounced demographic trends seem certain to continue as mining companies continue to invest and initiate new large mining projects in the years ahead.

Table 5.2 shows that ***average household monthly incomes*** have grown substantially more rapidly in Southeast Pará since 2000 than has been the case in the rest of Brazil and also in the rest of Pará State. Income levels still remain lower in Southeast Pará compared to the rest of Pará and are still significantly lower than at national level, but there is evidence of convergence in regional incomes, which is reducing previous income inequality.

5.3 Comparisons across mining municipalities

This section examines in a little more detail the six municipalities that currently host large-scale mining in Southeast Pará. These areas are the ones most likely to receive direct impacts from the mining activities in terms of their socio-economic development over time. They vary greatly in population size with three very small municipalities (population in 2000 < 20,000 people) and three much larger ones (Parauapebas, Marabá and Paragominas). Five of these mining-affected municipalities experienced rapid population growth between 2000 and 2010. Parauapebas, which was the most affected by Vale's earlier projects, more than doubled its population and so too did Canaã dos Carajás even though the mining projects directly impacting that municipal area started to arrive much later (See Table 5.3). Urbanization rates also increased rapidly in most of the other areas but especially in Canaã dos Carajás, easily the least urbanized municipality back in 2000. Today, the urban populations in all six municipalities completely out-weigh their rural populations: they have gone from being "rural" to being "urban" in a very short period of time.

Table 5.1: Population and urbanization

	Population (million)			Urbanization (%)		
Area	**2000**	**2010**	**Growth (%)**	**2000**	**2010**	**Variation**
National	**169.8**	**190.7**	**12.3**	**81.2**	**84.4**	**3.2**
Pará	**6.2**	**7.6**	**22.4**	**66.5**	**68.5**	**1.9**
Southeast Pará	**1.1**	**1.5**	**38.9**	**46.0**	**60.9**	**14.9**

Source: IBGE Census 2000 and 2010.

Table 5.2: Monthly household income

	Average per capita monthly household income (real R $)		
Area	**2000**	**2010**	**Growth (%)**
National	**297.2**	**349.8**	**17.7**
Pará	**168.6**	**200.6**	**19.0**
Southeast Pará	**149.5**	**175.8**	**22.9**

Source: IBGE Census 2000 and 2010.

Table 5.3: Population growth and the urbanization rate

	2000		2010		2000–10
Municipality	Population	Urbanization rate (%)	Population	Urbanization rate (%)	Population growth (%)
Canaã dos Carajás	10,922	35.9	26,716	77.6	144.6
Curionópolis	19,486	68.0	18,288	68.5	-6.1
Marabá	168,020	80.0	233,669	79.7	39.1
Ourilândia do Norte	19,471	49.8	27,359	72.8	40.5
Parauapebas	71,568	82.8	153,908	90.1	115.1
Paragominas	76,450	77.5	97,819	78.2	28.0

Source: IBGE Census 2000 and 2010.

Table 5.4: Monthly household income by municipality

	Average per capita monthly household income (Constant, 2000 US dollar)		Income growth (%)
Municipality	2000	2010	2000–10
Canaã dos Carajás	167	238	42.3
Curionópolis	108	163	51.1
Marabá	189	242	28.6
Ourilândia do Norte	154	213	37.9
Parauapebas	221	279	26.0
Paragominas	166	195	17.3

Source: IBGE Census 2000 and 2010.

With respect to ***average household income*** (measured in real terms), the growth rates seen in the six municipalities since 2000 are higher than the national and the state-level averages in all cases other than that of Paragominas (see Table 5.3 and Table 5.4). In 2000, average real monthly household income in the six areas ranged between R$108 and R$221. By 2010, this range has been elevated to between R$163 and R$279. By comparison the 2010 state-wide average household income of R$200 per month is easily exceeded in four of the six areas – only Curionópolis fell significantly below the average. However, significantly Curionópolis enjoyed a faster rate of growth of income than any of the other five areas and thereby narrowed the earlier income gap, suggesting a reduction in intra-municipality inequality. Two other municipalities also enjoyed much higher income growth rates than did the state as a whole, namely Canaã dos Carajás and Ourilândia de Norte.

The Census figures presented here are *averages* across individual municipalities. Therefore, while the findings above are evidence that overall incomes in the mining municipalities have increased, and more so in municipalities starting from a lower base, they do not reveal how many families benefitted from these generally large increases. In particular, the mere presence of Vale's own employees – many of whom will be much more highly paid – will distort the picture of what has happened to the remainder of the population.

To address the important question of whether the observed income growth has been shared equally between people in the region, an examination of poverty and inequality indicators is necessary. While these indicators can in principle reveal changes in the income levels of the poorest segments of the population and in the distribution of wealth,

respectively, the data available for this study was constrained by the following:

- Realistic and comparable measures of ***poverty*** (e.g. the number of people below the poverty line) at the municipality level were not available, because the methodology used to construct Brazil's poverty line is calibrated by comparing individual monthly household income against the *administrative* minimum wage. When this minimum wage is fixed to rise faster than inflation – as has been the case during the past decade – the poverty incidence can seem to increase even when people are enjoying higher real incomes. We therefore exclude this indicator.
- With respect to ***inequality***, there are some direct measures from the Census data that could in principle be used. Based on 2000 Census data, the mining municipalities clearly suffered from a high level of inequality (see Annex C); but at the time of writing municipal-level indicators of inequality from the 2010 Census were not available. The absence of recent inequality data prevents conclusive analysis on the distributional welfare trends in mining and non-mining municipalities.

5.4 Mining versus non-mining municipalities

Having considered the socio-economic development of the six municipalities that host mining activities, the outcomes for these affected municipalities are compared with those of a selection of municipalities without large scale mining within their borders, as well as with outcomes in Pará State as a whole, in Southeast Pará and at the national level. This approach is designed to isolate the impact of mining in the six mining municipalities.

Population growth

The ***average population size*** in the mining-affected municipalities is now at least twice as large as the corresponding average in the non-mining municipalities (see Table 5.5). The mining-affected municipalities have also experienced much faster population growth rates than non-mining municipalities, a consequence likely to be partially explained by new inward migration induced by mining. In terms of ***urbanization***, mining municipalities are, on average, substantially more urbanized than non-mining municipalities. However, compared to the Pará State level, urbanization has been significantly more rapid in both mining and non-mining municipalities.

Table 5.5: Population and urbanization: mining versus non-mining municipalities

	Population			Urbanization (%)		
Area	**2000**	**2010**	**Change**	**2000**	**2010**	**Change**
Brazil	**169,799,170**	**190,755,799**	**12.3**	**81.2**	**84.4**	**3.2**
Pará	**6,192,307**	**7,581,051**	**22.4**	**66.5**	**68.5**	**1.9**
Southeast Pará	**29,360**	**40,781**	**33.7**	**46.0**	**60.9**	**14.9**
Mining municipalities	**60,986**	**92,960**	**60.2**	**65.7**	**77.8**	**12.2**
Non-mining municipalities	**25,037**	**33,023**	**28.7**	**43.4**	**58.4**	**15.0**

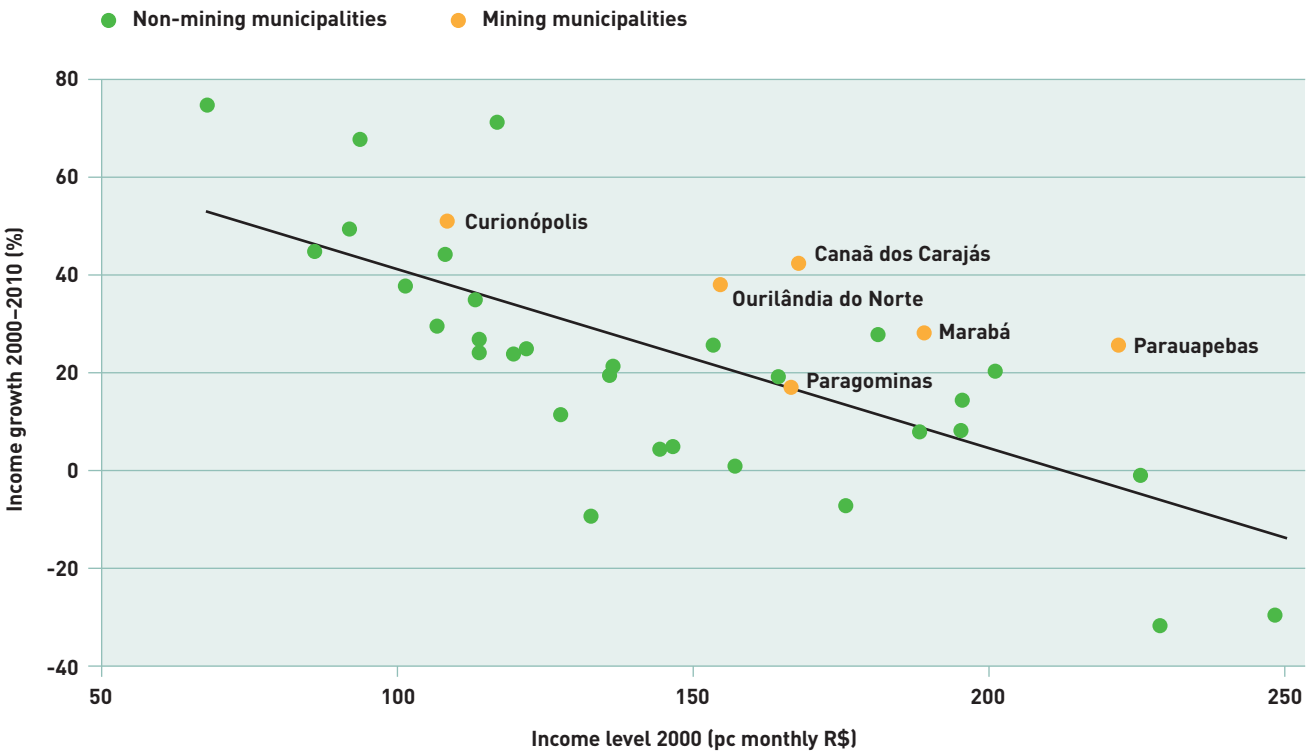
Source: IBGE Census 2000 and 2010.

Table 5.6: Household income and income growth by area: mining versus non-mining municipalities

	Average monthly household income (constant, 2000 R dollar)		
Area	**2000**	**2010**	**Change**
Brazil	**297.2**	**349.8**	**17.7**
Pará	**168.6**	**200.6**	**19.0**
Southeast Pará	**149.5**	**175.8**	**22.9**
Mining municipalities	**167.6**	**221.8**	**33.9**
Non-mining municipalities	**146.7**	**168.0**	**20.8**

Source: IBGE Census 2000 and 2010.

Figure 5.1: Income levels and income growth rates by municipality



Source: IBGE Census 2000 and 2010.

Incomes

A comparison of real household incomes across mining and non-mining municipalities reveals that the former clearly enjoy the highest income level in the region, with an average household monthly income of R$221.8 in 2010 as compared to the average for Southeast Pará of R$175.8. Income growth between 2000 and 2010 has also been much higher in the mining municipalities than in non-mining municipalities. These results are strongly indicative of some positive income benefits from the presence of mining and are consistent with previous studies (see ICMM 2007a and Aragon and Rud 2011).

Figure 5.1 shows the income levels in 2000 and the income growth rates over the period 2000–2010 in different municipalities. Mining municipalities (yellow, with labels) have experienced higher income growth than non-mining municipalities that started from similar levels of income in 2000. In addition, there is evidence of convergence across average municipality household incomes: *income* growth has been generally higher among municipalities with lower income levels in 2000.

Literacy and sanitation

Any assessment of the impacts of mining across municipalities should, if possible, include a range of indicators capturing the education and health status of these populations. At the time of writing there were not enough such indicators available from the 2010 Census to do so in a fully comprehensive manner. However, it is useful to examine the performance of proxy indicators for both education and health, such as the rates of adult illiteracy and the percentage of households with inadequate sanitation, respectively. Table 5.7 provides the comparisons.

There has been a very large improvement in both education and sanitation conditions in the decade since 2000 in mining municipalities. However, unlike the income gains discussed above, this has been the case across Pará State and Brazil more generally. Therefore, improvements shown in the table may be attributable to broader policy efforts to assist poorer regions and less closely tied to the advent of large-scale mining. Mining may nevertheless have played a role in unblocking constraints in the system of delivering public services (e.g. through targeted partnership initiatives such as Escola que Vale, see Section 4), thus enabling municipalities to achieve lower absolute rates of illiteracy and inadequate sanitation.

5.5 Discussion

This section has provided some indicative evidence in support of the proposition that mining municipalities have performed better than other municipalities in Southeast Pará on average, across a range of socio-economic indicators. In order to establish a stronger case for confirming the impacts we have found so far, a future study should establish, and control for in greater detail, the overall influence of Brazil's broader economic and social development trends during the period from 2000 to 2010. Moreover, a future study should assess these impacts in the context of more recent indicators of inequality, taking into account the effect of Brazil's extensive Federal income transfer programs (e.g. Bolsa Familia) on such indicators. Nevertheless, the assessment clearly points to number of interim conclusions that would justify such deeper research and analysis:

- First, the municipalities hosting large-scale mining operations are more developed across several dimensions than municipalities in Southeast Pará without mining operations. Four of the six municipalities in question have significantly higher incomes than the average in both Southeast Pará and in Pará State as a whole.
- Second, although the average household income in mining municipalities was higher than in non-mining municipalities back in 2000, faster rates of income growth in the six mining municipalities between 2000 and 2010 has worked to increase this advantage – only one of the six increased household income more slowly than Southeast

Table 5.7: Illiteracy and sanitation by area

	Illiteracy rate (%)			Inadequate sanitation (%)		
Area	**2000**	**2010**	**Change**	**2000**	**2010**	**Change**
Brazil	13.6	9.6	-4.0	14.0	8.1	-5.9
Pará	16.8	11.7	-5.1	33.7	21.8	-11.9
Southeast Pará	25.0	17.1	-7.8	55.9	33.3	-22.6
Mining municipalities	20.5	12.2	-8.3	39.9	16.7	-23.1
Non-mining municipalities	25.7	17.9	-7.8	57.8	35.6	-22.1

Source: IBGE Census 2000 and 2010.

Pará and Pará State as a whole. Importantly, these changes result from a combination of direct income effects (salaries of mine workers) and collaborative efforts to enhance incomes beyond those directly with mining (see, for example, Box 5.1).

- Third, although there have been apparent gains in both education and health indicators (based on our proxy indicators), these gains seem less likely to be explained by the arrival of large-scale mining than by broader Brazilian trends in social services provision.

Box 5.1: Mining and Poverty Reduction: Hydro's handicraft income-generation project

Prior to the arrival of large-scale mining in Paragominas, the small sector of handcraft manufacturers and traders were operating informally and without stable incomes. To help the local handicraft industry formalize and grow, while discarding its waste in a sustainable manner, Hydro supports "Talentos em Movimento" (Moving Talents) .

Key characteristics of the program include:

- **First, Hydro has used its organizational processes to collect and distribute wood pallets used in delivery of supplies to producers of artisanal products using discarded materials as raw material for local handcraft production**
- **Second, the initiative involved formalizing the sector and setting up a legal association, by assisting with legal requirements and refurbishing its facilities. The result was that an entity named "Talentos em Movimento" was legally established, gathering together a group of artisans responsible for the production and management of the initiative**
- **Third, since 2009 Sebrae (a well-known Federal institution that trains entrepreneurs) conducts training sessions and consultancy services for the local artisans' association. To incentivize artisans to join the training scheme, the association pays the Brazilian minimum wage of c.R$5 per hour (c.US$3).**

These activities have resulted in some sustainable outcomes, albeit on a small scale. Outcomes include the establishment of a legal "Talentos em Movimento" association and the ongoing training of artisans. The project has resulted in diversification of the sector, including sale of new products such as educational games, flash disks and business card cases. At the same time, the recycling of wooden pallets helps to reduce the firm's environmental impact. Both Hydro Paragominas and Paragominas municipal services management became buyers of the handcraft products, which are used as gifts on a variety of occasions.



6

GOVERNANCE AND INSTITUTIONS

6. Governance and institutions

Previous sections – in particular sections 2 and 3, and the discussion of partnership initiatives in Section 4 – have examined the impacts of the mining sector at the national, the state and the municipal level and have found that there have been improvements in local socio-economic outcomes. Section 6 provides a selective assessment of the numerous governance challenges present in Brazil which some of the aforementioned partnership initiatives have helped to overcome. The present arrangements (combining the official regulatory structures, the established tax and other transfers to local areas and the partnership initiatives of the large companies) provide a strong and in many senses an innovative response to the challenges of local development based on mining. However, these present arrangements also have certain weaknesses and gaps which if corrected could result in even more impressive outcomes.

This section also serves to complement the discussion around national-level governance indicators presented in Section 1. While this provides useful context for discussions of institutional strength in a large country like Brazil, such a 'national-level' assessment says very little about the nature of the influence that governance has *locally* on mining and on economic development. Moreover, as highlighted in the ICMM MPD Toolkit and previous ICMM studies (Annex E) such assessments fail to capture the inherently dynamic relationship between mining and governance, whereby the presence of large mining activity can also influence the evolution of the prevailing arrangements.

The section first elaborates on the overall mining sector governance framework, followed by a discussion of key governance issues facing the sector.

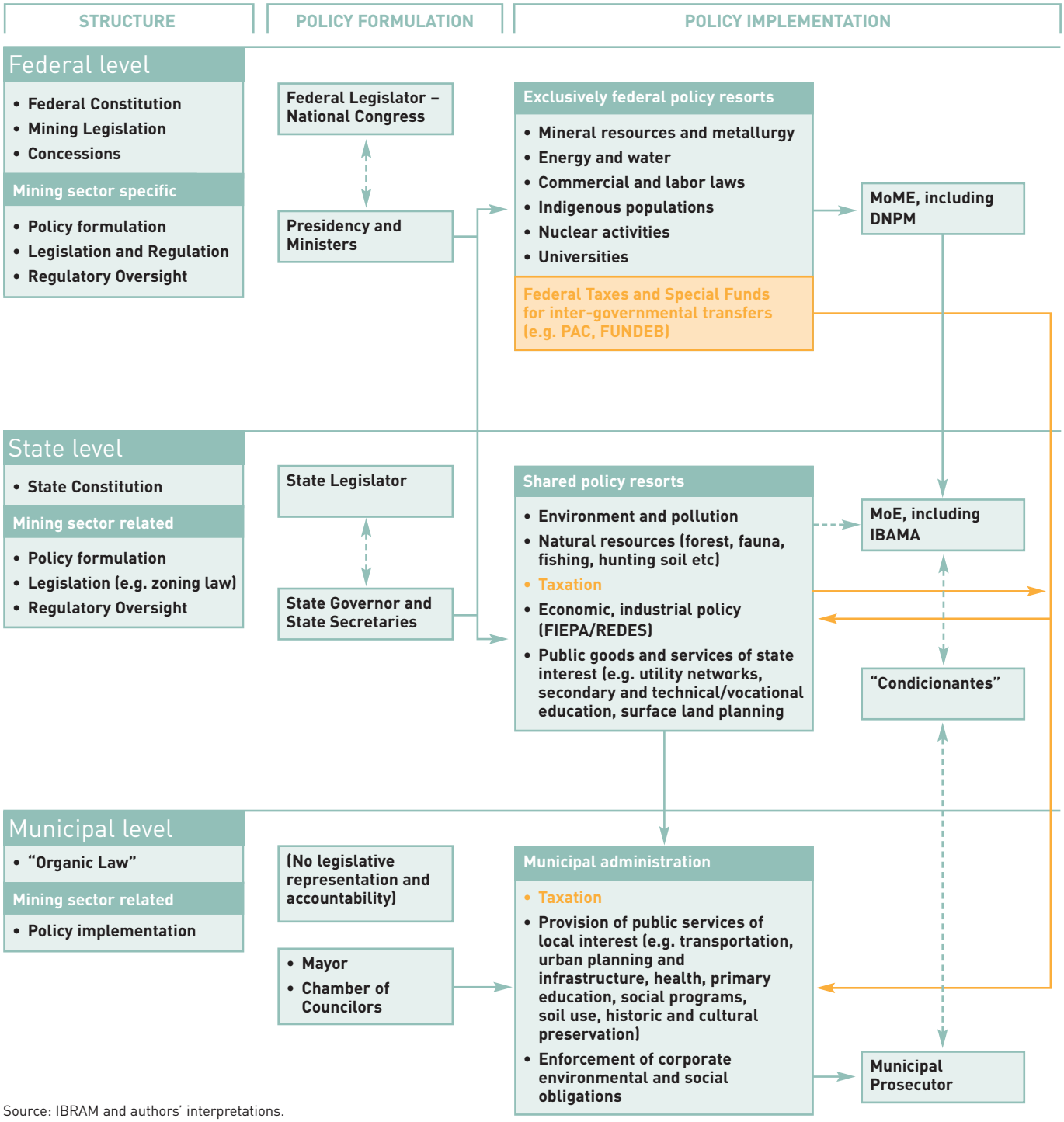
6.1 The overall mining sector governance framework

The relationship between large-scale mining and governance is always complex and more so in a large, diverse and federally constituted country like Brazil. The discussion around Brazil's federalist and decentralized political-administrative system in Section 1.4 highlighted how this system puts the onus on *state governments* and local government *municipalities* to create a policy environment that supports the development of positive linkages between mining, economic growth and socio-economic development. Under these arrangements, the state governments bear considerable policy responsibilities for regional development, but are somewhat more limited in their financial resources. At the same time, the municipalities benefit in principle from constitutionally enshrined intergovernmental transfers that flow from both the federal and the state levels down to the municipalities.

Over time actual practice in Brazil has diverged somewhat from the *de jure* situation to make the task of both state and municipal governments rather more difficult. In part this is because the Federal Government has had incentives to introduce new forms of taxation that are not subjected to the constitutional rules for revenue sharing in the form of inter-governmental transfers. This appears to have left the state governments especially more squeezed in terms of financial resources. But this has changed neither their *de facto* responsibilities nor the implementation expectations with respect to policy areas that ideally require substantial regional planning and cross-sectoral coordination. Municipal administrations for their part have fared better financially from their constitutional rights to receive substantial tax-based and other transfers, but have neither the scale nor the capabilities to fully absorb the broad-based functions nominally assigned to the state level.

Figure 6.1 illustrates the Brazilian political-administrative system in more detail. It seeks to underpin the core argument that while mining policy is set at the *federal* level, positive achievements at the local and state level are fundamentally dependent on local-level relationships and bottom-up coordination between municipal governments and their local constituencies including mining companies, and the state and federal government.

Figure 6.1: Responsibilities for mining sector governance across three tiers of government



Source: IBRAM and authors' interpretations.

A critical feature of the Brazilian system is that at the municipal level, administrations are unevenly funded, not least because revenue sharing transmits the volatility inherent to revenue collected from the natural resources sectors down to municipal administrations. This in turn makes long term strategic planning and policy implementation more difficult. In addition, those municipal governments that are better funded typically face some political disincentives – some linked to the political cycle – to plan and spend their revenue strategically: those incentives often encourage a non-strategic, short-term focus.

A further constraining factor is that many mining municipalities also face deficits in terms of their technical capabilities and the organizational abilities of their public administrations to engage in medium-to-long-term policy and financial planning and implementation. Particularly new mining municipalities are often ill prepared for dealing with the population surges and other physical challenges associated with the introduction of large-scale mining. Concurrently, municipalities today face new technical public policy challenges that the national government itself has to reconcile, for example those associated with Brazil's responsibility towards global 'public goods' around the sustainable management of the Amazon region.

There are large political economy challenges which need to be recognized and addressed in any attempts at reform and capacity building. To illustrate, any increase in fiscal flows from royalties (CFEM) has been disproportionally large in regions with little previous economic activity and has thus provided previously unseen opportunities for municipalities to engage in community development projects targeting groups most likely to deliver political support. At the same time, increased inward migration and the associated appreciation in property prices has strengthened the influence of landowners, thereby making these a stronger lobbying force.

6.2 Governance challenges facing the mining sector

The research work conducted for this report as well as the insights gained from the workshop held on 29 February 2012 in Brasilia (see Annex B for workshop proceedings) indicate a fairly widespread acceptance of the complexities and the ambiguities inherent in the present three tier system of governance as explained in Box 1.2 in Section 1.

Large mining companies such as Vale and Alcoa have made innovative efforts to work within the frameworks of governance created, for example, by the arrangements in the 1988 Constitution. They have for example shown an unusual willingness (relative to most mining companies around the world) to work with all three tiers of government in various capacities (see examples in Section 4). Less well articulated is the fact that the frameworks currently in place are sub-optimal in some respects and together constitute constraints on what could be achieved in development terms on the back of large new mining investments.

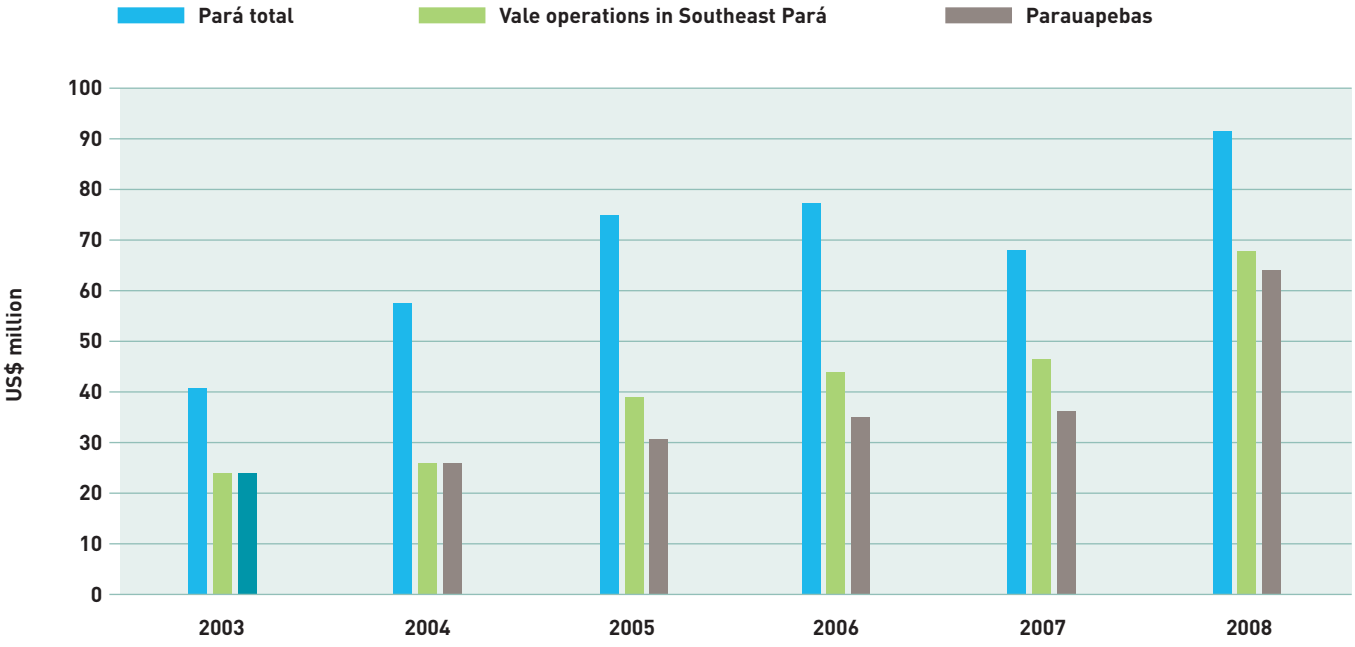
Although it is beyond the scope of this report to analyze and assess all aspects of mining and governance in Brazil, the remainder of this present section attempts to highlight some of the more critical issues for further consideration, including fiscal issues, externalities, and incentives. Addressing these issues more explicitly could promote governance arrangements that more effectively exploit the huge economic and social development potential in the less-developed mining regions of Brazil.

Fiscal issues

There are various challenges with respect to how public revenues are collected, shared and translated into productive physical and social investment. As set out in Section 1 and further substantiated in Annex F, Brazil's 1988 Constitution involves a highly complex system of public revenue and financial management across the three tiers of government (federal, state and municipal), including decentralized revenue-raising powers as well as substantial revenue sharing and earmarked expenditure grants that result in large hypothecated federal (and also state) transfers.

Because responsibilities for specific policy areas are shared vertically across the three tiers of government, with unequal and often inadequate funding, policy co-ordination is a first major challenge, both administratively as well as politically (e.g. when different political parties are in power at the respective tiers). The distribution of fiscal resources constitutes a second part of the problem, as there are huge variations in benefits that are seen ***between*** neighbouring municipalities. The table in Annex F illustrates the high level of variability of tax and transfer receipts across the seven municipalities designated in Vale's 2010 diagnostic study as 'directly impacted' (i.e. Areas de Impacto Directo, see Diagonal 2010).

Figure 6.2: CFEM contribution in Pará State (2003–2008, US$ millions)



Source: Diagonal (2010).

The overall revenue transfer benefits enjoyed by the municipal governments (see Annex F) are clearly overshadowed by the CFEM revenues (royalties) which are highly concentrated and constitute large financial injections into some of the municipalities where mining occurs. For example, Parauapebas – where Ferro Carajás is located – accounted for 70% of all the CFEM tax paid within Pará in 2008 (see also Figure 6.2), but is a municipality accounting for only 1.9% of the state's population. As shown in Annex F, total CFEM payments to the five municipalities in Southeast Pará hosting Vale's mines were R$112.6 million in 2008, of which no less than R$106 million went to Parauapebas.

The table in Annex F shows that CFEM represents about a quarter of the total incomes of the seven municipalities designated "directly impacted" by Vale's operations in Southeast Pará (R$112 million), with the rest arising from the non-CFEM tax and other transfers (R$385 million). Even Parauapebas and Marabá received more from these sources than they did from the CFEM. Critically important are the ICMS transfers which according to the same table accounted for R$152 million of the R$385 million of tax and other transfers. Among the non-tax transfers, the role of the educational fund – FUNDEB – is particularly important (with total transfers of R$128 making it larger than total CFEM revenues). In short, the one mining-specific transfer to the municipalities is both unevenly shared and represents around a quarter only of their available fiscal resourcing. The capacity to access appropriate amounts from the other sources is a critical part of municipalities' ability to address the often transformative local impacts of large-scale mining.

A third problem is that the present arrangements do not adequately reflect the geographical scope over which many public-sector mining-related activities need to extend. In particular, there is limited formal provision for the fact that many of the important public investments to support mining and other commercial activities (e.g. transport infrastructure) cannot easily be delivered by, or contained within, the borders of any one municipality – however well-funded via the CFEM or in other ways. This situation, arising from the post-1988 fiscal decentralization, poses a major problem particularly in a vast underdeveloped region with large infrastructure deficits such as Pará State. Companies can play an important role in supporting coordination between different levels of government, but this requires that ***official agencies provide a transparent and clearly defined environment for doing so***.

Finally, in common with most large-scale extractive industry investments, there are ***timing issues*** associated with current revenue transfers, given that much of the demand for public services arises long before CFEM and other revenues arrive. As this study has shown, the CFEM "royalty" greatly favours municipalities that have already achieved a relatively higher level of socio-economic development. So too do some of the formulaic arrangements associated with the other large revenue streams such as the ICMS (see Annex F).

Externalities – roles and responsibilities

There are many externalities and market imperfections arising from large-scale mining activity, including both positive and negative economic (e.g. clustering of economic activity), social (e.g. migration) and environmental (e.g. pollution) externalities. Free market solutions are poorly equipped to address these issues. Hence there is widespread acceptance of the need for comprehensive systems of both regulation and support to the sector and its affected communities – in Brazil and similarly in other mining economies. There remains, however ambiguity about the specific roles and responsibilities that need to be assigned to address this generic set of issues.

Although Vale has been a private company since 1997, its operations in regions with weak government capacity have required it to take on some roles of public-sector capacity building that might be considered the mandate of government. Alcoa and the other large companies have also faced similar requirements. The question is not whether large mining companies should take on such quasi-governmental functions – indeed multi-stakeholder partnership initiatives discussed in this report can be very effective (see Section 4 and Box 6.1). Rather, as discussed by participants at the workshop, this implicit role of companies in government capacity building should be built upon through a more explicit and strategic definition of roles and responsibilities. The example of the difficulties over the master plan for just one municipality (Canaã dos Carajás) in Box 6.1 is merely one illustration of a more general problem.

Box 6.1: Mining and regional development planning: Canaã dos Carajás municipal master-planning initiative

The task of integrating large mining projects into municipal master plans has long been seen as a challenge and it is one recognized explicitly by the Ministry of Mines and Energy. Initiatives to develop a municipal master plan in Canaã dos Carajás provide a case study of how this challenge is being addressed in practice. This initiative seeks to address the large impacts expected from the future S11D project (in the licensing process at the time of writing).

The company is building on similar studies undertaken when Sossego was first commissioned in Canaã dos Carajás in 2004 to support municipal capacity to integrate sanitation, solid waste and housing into city planning. Vale engages a specialist firm to lead the process of consolidating the diverse policies and programs of the municipality and manage public consultations around revisions to the master plan. To ensure that the new master plan follows existing city directives, the consultant works with the Urban Development Institute (IDURB), which leads the technical revisions of the master plan. The Municipal Department of Social Development (SEDES), in turn, makes available technical staff to be trained on information management tools and how to use these tools in routine work.

The initiative helps both the company and the local governments to understand and build capacity in how to address the challenges of irregular expansion and land use, as economic growth attracts new people in search of jobs. Such tensions around land use are a common feature in mining areas, as highlighted by previous ICMM case studies (see Annex D). In this case the initiative has had some early successes but faced difficulties in bringing stakeholders together, as well as some opposition from interest groups who would lose out from greater regularization of housing and land markets in the municipality.

Incentives

The task of addressing the negative externalities arising from large-scale mining is compounded by a variety of problematic incentives that complicate the task of achieving sound solutions to particular problems. In other words, even when roles and responsibilities are clearly assigned, these may not be followed if the incentives that confront key company officials, public officials and other stakeholders are not aligned with the underlying objectives of policy interventions:

- First, irrespective of the Fiscal Responsibility Law referred to above there remains a common perception of limited transparency and rent-seeking in the public financial management of local government, partly driven by low salaries among public servants. Although there is considerable variability in performance across municipalities, it was significant that workshop participants saw this as one of the most important issues militating against greater benefits from mining.
- Second, there are undoubtedly some interest groups within the local communities and local governments that benefit from the status quo even though it is visibly inadequate in some respects. Since many of the desirable reforms (e.g. of the existing fiscal arrangements) are likely to reduce the opportunities for rent-seeking, certain groups may have incentives to oppose these changes.
- Third, the operational managers of the large mining companies (who are closer to communities and their demands) may also see benefits in shorter-term projects that provide direct and visible impacts, whereas other parts of the organization might place more emphasis on longer-term capacity building.
- Fourth, as large mining companies retain an overarching interest in stable relations with government at all three tiers, they may be reluctant to get involved in the detailed management of these partnerships, for fear of being seen as "pushing too hard". The challenge they face is therefore to identify at an early stage who the reform champions might be, who are the opponents and how these competing groups influence policy decisions and policy outcomes.
- Fifth, as highlighted by participants at the workshop, the time horizons of local politicians – if not public officials – can typically be very short term. By contrast, designing policy to build on the catalytic impacts of large-scale mining calls for a long-term vision of regional development.

The on-going reform of governance arrangements affecting municipal decision making highlights the need to identify and engage with *all* relevant interest groups – and to work within their frameworks of incentives. This requires attentive and skilled leadership combined with some ability/willingness to compensate – in a fair and transparent way – those parties who may lose out from municipal reform (e.g. the real estate sector). Some key aspects of Vale's particular approach to this issue are outlined in Box 6.2.

Box 6.2: Vale's strategy for aligning incentives across partners

Vale itself takes a three-pronged approach to addressing the incentive issues discussed here. This approach is designed to align the incentives of the various actors involved, to enhance the commitments and accountability of those different parties and to diversify their influence across regions where Vale is and is not itself operating.

First, Vale always seeks to align its social investment activities with the municipal agenda. As Vale's own operations are impacted negatively by poor infrastructure development and weak management capacity in mining areas, it has a strong interest in supporting the capacity building of municipalities, including through increased regularization and transparency. Doing so also helps to provide host municipalities with greater access to funding in the future and places the focus on "increasing resources" rather than "re-distributing existing resources". This approach may also help to bring on board some of those who are opposed to reform.

Second, Vale's approach seeks to enhance commitments from its partners by engaging simultaneously in three types of consultation processes: the (mandatory) environmental licensing process, the (voluntary) socio-economic diagnostics and the engagement with local and central government through its PPSP initiatives (see Section 4.2). This helps to strike a balance between short-term high-impact projects and longer-term capacity building.

Third, Vale seeks to overcome constraints on scaling up of its initiatives by operating across multiple regions and areas. Fundo Vale is a core part of this strategy and operates with the aim of developing and scaling up local initiatives in areas where Vale does not have direct operations, e.g. through Fundo Vale's work on the Green Municipalities program that covers 12 municipalities in Pará State.

6.3 The way forward: Scaling up partnership initiatives to address governance challenges

Mining companies and their partners in various local government agencies have been innovative in designing their various programmes to support local communities. They have done so within the complex context of the prevailing governance framework discussed in this section. These company-initiated multi-stakeholder partnerships, working in concert with regulatory arrangements, have shown what can be achieved. Indeed in many respects they constitute a model that, if adopted by other less-developed mining regions and countries could greatly improve positive developmental outcomes.

However, these multi-stakeholder partnerships face a formidable challenge in ***scaling up*** and ***extending*** existing initiatives to more fully address the governance challenges posed by Brazil's complex political-administrative system as well as the externality and incentive issues. These partnerships, effective as many of them are on their own terms (see Section 4), mostly involve a limited or constrained catchment area and stakeholder group. Their broader effectiveness would require their work to be scaled up and replicated by some other official agency(ies) with broader mandates, including some such as the state government that currently have limited resources for such purposes. The example of the difficulties over the master plan for just one municipality (Canaã dos Carajás – see Box 6.1) illustrates that the broader planning of infrastructure and development activities over a larger geographical region – perhaps Southeast Pará as whole – would be inherently more problematic.

More broadly, Brazil still faces systemic challenges in improving education, including weaknesses in educational spending and delivery, with serious adverse impacts on industrial development in less-developed regions. Vale's partnership initiatives in the area of education (the Vale Foundation's primary area of focus until 2004) are backed up by powerful incentives. By strengthening education, Vale and other mining companies recognise that they can increase their own future supply of workers. However, these partnerships – and similar programs initiated by other large firms – are only partial responses to challenges in the Brazilian education system that present distinct issues for the less-developed regions of the country.

A more holistic vision for the institutional arrangements of the sector is needed – in relation to both the education challenge and the various other impact areas of mining more broadly. This broadened approach should consider matters including the role of the mining sector in generating demand for jobs, the ability of the education system to supply the necessary training, the geographical scale at which key planning decisions are made, and the adequacy of the existing fiscal provisions combined with private mining finance to provide both the infrastructure and an enabling environment for business. Any attempt to address such a broad range of issues can learn much from the partial arrangements that are already in place as reflected in Section 4 above, and from the strengths and weaknesses of these arrangements. An improved solution will almost certainly require a combination of effective mining policy dialogue and multi-stakeholder partnerships at all levels.



7

MAIN CONCLUSIONS AND IMPLICATIONS FOR POLICY

7. Main conclusions and implications for policy

The ICMM MPD toolkit provides a comprehensive and integrated approach to the analysis of mining and its impacts. This approach seeks to broaden the debates around mining and development by seeing mining companies not only as a source of commercial incomes and profits for their workers and shareholders, but also as a critical *developmental force* that can help to accelerate the growth and structural change of the host economy. This is particularly the case in remote, less-developed regions such as Pará, where much of Brazil's mining investment takes place. This approach, first, forces some recognition of the fact that *mining companies operating in poorer regions have roles and responsibilities that go well beyond their narrow commercial concerns*. Second, it forces explicit recognition of the point that a wide array of government polices – beyond those relating narrowly to the Ministry of Mines and regulators such as IBAMA and DNPM – have a critical bearing on whether or not a large mining sector can be an effective force for advancing development in such areas.

7.1 National and local contributions of mining to the Brazilian economy

Based on the statistical evidence assembled for this report, there is just one major macro-economic impact where mining emerges as the single most important contributor to the ***national economy*** of Brazil. This is the mining sector's contribution to total national exports. Specifically, in the recent past mining's export contribution has grown to account for almost one-quarter of all Brazilian exports by value (2010 data). In US$ value terms, the US$60 billion increase in foreign exchange earnings from minerals since 1995 has been equivalent to the total turnaround in the country's overall external trade balance (for all goods and services) seen in that same period. ***The mineral sector in that sense has been a truly critical part of the country's impressive macro-economic recovery***.

Mining's contributions to other macro-economic variables are also large in ***absolute*** terms. However, when those contributions are set in the context of the totality of Brazil's very deep and diverse productive sectors, it seems more accurate to describe mining's ***relative*** contribution to the Brazilian economy as a significant rather than as a dominant force. In relation to GDP, employment, investment, government revenues and even FDI, the mining sector's recent annual contributions amount to around 1–4% of the ***national*** totals in most years. These findings contrast with those found in ICMM case studies in a range of other countries, where mining's contributions to at least some non-export indicators have been significantly higher.[38]

In contrast, at the ***local level*** in Brazil where mines operate in rural and often less-developed areas, the evidence from this report is that mining is often the dominant economic activity. This conclusion has far-reaching implications both for the mining companies and for the authorities. In such areas, including parts of Pará State where Vale, Alcoa, Hydro and others have invested heavily, mining can and does have a ***transformative impact***. The employment impacts illustrate the profound role of mining in the economic life of local populations. Although the share of total national employment associated with mining is less than 1%, the number of mining sector jobs created in Southeast Pará (46,700 by 2012 in Vale alone) can reasonably be expected to provide employment for up to one in five of the present adult population in that region.

38 For example, shares of mining in total government revenues of over 10% and in FDI in the range from 60–90% (ICMM 2012).

7.2 Local impact, sustainability and outcomes

The assessment of mining's impact at the local level, using indicators such as total investment, procurement, employment and government tax payments, show that ***mining activity is the stand-out contributor to local incomes, employment and revenues in the Southeast Pará region***. At the same time, it is well understood that some impacts from mining are disruptive. Immigration, for example, puts pressure on small municipal administrations, which often struggle to respond – especially in the earlier stages of any new mining investment before revenue streams boost the financial resources available to the affected municipalities. Similarly, the negative environmental impacts can be large, especially in very sensitive environmental areas as those found in the Amazon region.

In Brazil, as in previous ICMM country case studies, the critical factors in determining the full social and economic contribution of mining (and its status as developmentally beneficial to a locality or not) is the nature and quality of the institutional framework that is mobilized to manage the impacts from mining. A truly effective *institutional framework* also requires broad-based collaboration across government at different levels (federal, state and municipal), non-government and industry actors to address these multi-faceted and often complex issues. In keeping with earlier applications of ICMM's MPD Toolkit, this study has assessed the nature and quality of current efforts to manage mining impacts in Southeast Pará by reference to ***partnership themes*** (see the start of Section 4.2). The main results are summarized next. These seek to highlight both the *opportunities* as well as the *challenges* for collaboration between mining companies, government and other development partners in enhancing the impacts of mining.

First, this study has confirmed that the Southeast Pará region faces an urgent need for public ***investment in social and physical infrastructure*** to help support and absorb the impact of the massive investments by the large mining companies. Mining company support to government efforts in this area is merely one example of the collaborative arrangements (government and companies) that have emerged in the past few years. In particular, Vale's support to municipal governments to access federal funds is a unique feature of the Brazilian case, reflecting the particular institutional features of the present sub-national fiscal arrangements in Brazil. Through the PPSP initiative, integrated with the objectives of the mandatory "condicionantes", Vale provides significant help to municipalities to raise federal funds for investment into "hard" as well as "soft" infrastructure. By focusing also on building revenue-raising capacity at the municipal level, these particular partnerships go well beyond the direct mining investment (of Vale) to focus on building the *capacity* of local governments.

The present arrangements for ***revenue management*** concentrate CFEM revenues in host municipalities, with no transfers to neighbouring municipalities and limited transfers to state-level authorities. This arrangement neglects the fact that the impacts of mining – as argued also by workshop participants in Brasilia on 29 February 2012 – extend well beyond the borders of any single municipality. Neither do the present arrangements address the timing issue: municipalities impacted by migration or other early pre-production stages of new investment receive little or no fiscal support to address these impacts. There is a case, therefore, for carefully reconsidering these *national* fiscal arrangements with respect to mining, bearing in mind that the overall tax burden of the sector is already high and perceived by some investors as a deterrent to investment (see Section 2.3).

However, as explained in Section 6, more funding at the level of local municipal authorities is often not a complete solution to the problem of infrastructural deficits in mining areas. Additional funds are unlikely to translate into effective investment unless there is strong municipal capacity in the area of effective revenue management – including processes for allocating revenues to projects and then spending effectively on a range of infrastructure and social projects. Recognising this, initiatives such as the Vale Foundation's PSPM project (see Box 3.2) work with public administrators to strengthen systems, processes and skills.

The revenue issues in turn represent only one aspect of the broader institutional challenges that condition the eventual sustainability of a mining-led approach to development. Systematic ***regional development planning*** is an additional challenge for the north of Brazil. Such planning can address some of the existing infrastructure and human capital constraints, thereby connecting otherwise separated markets and boosting economic integration across different regions more generally. Such planning requires co-ordination and joint initiatives involving government at all three levels, and existing policies and institutional arrangements in Brazil address these challenges only to a limited extent. Whilst some municipalities are capable of effectively working with development partners, smaller municipalities in particular often suffer from fragility in their public administration. Partnership initiatives like Ação Educação do attempt to address the lack of cross-municipality co-ordination on, for example education policy (see Section 4.2). A positive example of effective regional co-ordination and planning around environmental management in the sensitive Amazonian region is the case of the Pará State "green municipalities" program. This highlights how effective co-ordination between states, municipalities, NGOs and industry can be in helping to address the challenge of deforestation across the various municipalities in Pará State. Such a positive example should be evaluated carefully to see if it provides any lessons for regional planning and co-ordination more generally.

There also is an impressive set of partnership arrangements designed to promote economic diversification and increased ***local content in the mining sector***. A leading example of this is Vale's INOVE initiative which responds partly to the social regulatory obligations on local procurement and employment arising from the "condicionantes", while at the same time going further on a voluntary basis to ultimately serve the commercial interests of the company in securing an improved future supply base. The strong alignment of incentives between legal requirements and voluntary objectives provides a good basis for the local economy to use new mining activities to build a more diversified, viable and sustainable economy and enhance living standards for its expanded population. The full potential for Pará's local businesses to benefit more fully from such initiatives – thereby generating more jobs and expanding the tax base – is however constrained by factors including infrastructure deficits and failings in other dimensions of the institutional framework.

The overriding judgement about the developmental impacts of mining in any economy should relate to the impacts seen in terms of the incomes and general well-being of local citizens i.e. the role of ***mining in poverty reduction***. The evidence based on Census data and presented in Section 5 indicates that mining has delivered tangible benefits in socio-economic terms to the local populations of Southeast Pará over the period 2000–2010. Mining municipalities have grown faster and have seen significantly higher rates of urbanization than non-mining municipalities. Although there are variations within these two groups, mining municipalities now exhibit significantly higher 2010 household real income than non-mining municipalities.[39] The impacts on other socio-economic indicators in health and education also appear to be positive. However, Brazil generally has witnessed rapid changes in social indicators – as captured by the MDGs – during the last decade and as such, progress in the areas of health and education improvements may be due to national policies and factors other than mining. A more complete assessment using a broader selection of socio-economic indicators, and including other mining municipalities, is recommended in order to inform and validate these findings.

This study has examined in some considerable depth the modalities and instruments that large mining companies including Vale, Hydro and Alcoa employ to address the developmental and institutional challenges identified above (see Sections 4 and 6). These approaches include significant common features such as a focus on capacity building for local civil servants, the willingness to take a long-term view of the capacity-building needs, and a high level of interdependencies across different programs. These approaches are innovative, as judged against the general record of international mining companies. The obligations to which these partnerships respond are partly ***legal requirements*** arising out of the environmental licensing process, which sets out the *de jure* obligations of the firms. Importantly, they are also part ***voluntarily accepted commitments*** including a range of support to local government and communities, which the companies perceive as necessary to retain their *de facto* social licenses to operate. In the case of Vale's Social Investment Framework (see Figure 4.2), the widespread consultation activities involved in both the mandatory and the voluntary processes helps to ensure an on-going and self-critical assessment of the work that is required. The Letters of Agreement with municipalities that arise out of this process help to clarify the roles and responsibilities of different actors. However, the results of these various arrangements, in combination with existing regulatory arrangements can only be as good as the broader institutional and governance arrangements within which they need to work. The report, and especially Section 6, has identified a number of challenges with those broader arrangements.

39 This result is statistically significant at the 1% level. By contrast, in 2000 there was no statistically significant difference between the two groups.

7.3 Main lessons for policy

The Brazilian economy is richly endowed with a wide range of valuable minerals, many of which are located in poorer regions. This fact has been broadly recognized for many centuries. But until very recently the investments to exploit this wealth and convert it into improved economic and social welfare had been limited – with respect to both direct mining investment and the vital supporting investments in infrastructure. With the mineral boom of recent years, this situation has started to change but the institutional structures needed to maximize the commercial potential, and protect local populations from possible negative externalities, have been slower to respond. A positive institutional response has been forthcoming – as a result of coordinated efforts by companies and government – but this study also highlights the nature of remaining challenges in ensuring mining contributes to sustainable and equitable economic and social development.

First, the challenges of large and less-developed regions with mining as the key driver are inherently open-ended. It was broadly agreed at the February 2012 workshop that a more holistic policy approach going forward requires a clearer definition of the public versus private ***roles and responsibilities*** for addressing specific issues, with the public roles assigned not only to the obvious ministries such as the Ministry of Mines and the designated regulatory agencies. Assessing this question could be an important early task for Brazil's proposed new National Mining Policy Council.

Second, this report – supported by the workshop discussion – also highlights the need to crystallize a vision of how much the mining sector can realistically grow in particular regions in terms of capacity and scope, including with respect to local business opportunities. Participants pointed to the need for ***more information sharing***, between older and newer mining regions, between companies and government, and between different levels of government.[40] Although consultation is relatively well established with respect to specific mining projects, it is less complete with respect to broader agendas. The workshop discussions identified a range of specific suggestions for improving arrangements for ***greater collaboration***, highlighting the convening role of IBRAM.

Third, even when roles and responsibilities are more clearly defined, a further challenge is to ensure adequate levels of capacity on the part of government agencies and their implementing partners. In this context, the workshop participants argued that the availability of funds – while a significant problem – is not, *per se*, the main constraint on development initiatives at the municipal level. Rather, they were unanimous that strengthening ***municipal governance capacity*** is an important priority. The companies have made their own contributions to helping municipal capacity building, but scaling up of these efforts is a task that must involve higher levels of government (i.e. State and Federal).

Fourth, there are various challenges to the way in which the present system ***allocates revenues*** to both state and municipal levels of government, with limited attention to indirect impacts beyond a host municipality's border and the long gestation period before production starts to generate revenues. Although this raises issues that extend well beyond the scope of "mineral policy", it was argued that a careful review of the present system of sub-national fiscal finances would be welcome – bearing in mind that the overall tax burden in the mining sector is perceived to be high amongst domestic and foreign investors.

Fifth, the rapid expansion of the mining sector in formally less-developed regions of Brazil requires revising existing arrangements for ***regional development planning***, given that new mining investment within a host municipality will have positive and negative externalities that reverberate beyond its borders. Positive examples of how this might work in practice already exist and could be built on, including the Federal government's "red municipalities" program and the subsequent "green municipalities" program of Pará State. Both of these examples show the potential for effective regional co-ordination across multiple levels of government, private sector and civil society (see Box 4.1).

Finally, further efforts are needed to document and analyze the outcomes of mining investments (combined with whatever institutional framework is currently in place) on the incomes and general well-being of affected populations. This present report has presented merely an initial set of results comparing ***socio-economic indicators*** between mining and non-mining municipalities in Southeast Pará. The results suggest *inter alia* that mining municipalities are growing more quickly and with significantly higher levels of household real incomes. Future research is needed to

40 The challenges lie both in identifying the procurement needs of the mining sector (where companies can help by sharing information) and building capacity to meet the needs (where government can build capacity, in partnership with firms, civil society and others). Luiz Pinto of Pará State's REDES initiative pointed out that even if only half of the R$129 billion forecast spending by large companies (as estimated by FIEPA) materializes, this represents a massive injection of capital into Pará State.

validate and elaborate these initial results by involving more mining companies, municipalities and indicators, including an assessment of distribution of impacts across and within municipalities. As Alcoa's operations in Juruti (see Section 4.2) demonstrate, comprehensive socio-economic indicators can provide a basis for informed ***evaluation of partnership initiatives*** and decision making in areas such as revenue allocations, social investment and regional development – whilst promoting a broader understanding of mining and its impacts.[41]

7.4 Last words

The overriding take-away point from this report is that there is a strong case for a more holistic policy approach towards the institutional arrangements affecting the mining sector – in order to enable mining to reach its full developmental potential. This broadened approach should consider the role of the sector in a wide range of areas where various aspects of government policy (beyond mining policy in its narrow sense) impinge on mining's impact and its ability to drive local economic and social development. These areas include policies that could help to generate demand for jobs, the ability of the education system to supply the necessary training and skills, and the adequacy of the existing fiscal provisions combined with private mining finance to provide both the infrastructure and an enabling environment for business.

Any future attempt to define a broader holistic approach and to address such a broadened range of issues – relative to traditional mining sector policy – can learn much from the partial arrangements that are already in place. Through sound basic mining policies and progressive partnership approaches to challenges faced, Brazil has pioneered a unique approach to economic and social sustainability from which other mining economies and international mining companies could learn much. This report provides evidence and examples to support this point while also highlighting some of the weaknesses of the present arrangements. These arrangements are best seen as an impressive starting point for developing a leading-edge solution to the multifarious aspects of mining's impact in poor regions. An improved solution will almost certainly require a combination of more broadly based dialogue and then mining policy improvements at the national level. But it will also ideally call for some reform of relevant non-mining-specific policies (e.g. those pertaining to fiscal transfers and educational systems in underdeveloped regions) and further development of multi-stakeholder partnerships at the municipal and state levels.

41 A representative from FGV at the workshop pointed out that the mere process of engagement with communities and building awareness around concepts behind the Juruti indicators was effective in generating support for this model for managing the impacts of mining.



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ANNEXES

Annex A
Workshop program

Program for the multi-stakeholder workshop held in Brasilia on 29 February 2012, entitled "Exploring the economic and social impacts of mining in Brazil".

From	To	Duration	Title	Presenter/Moderator
08.30	09:00	00.30	Registration	
09:00	09:15	00.15	Opening speech	Cláudio Scliar, Secretary of the Ministry of Mines and Energy; Representative of the Commission of Mines and Energy, National Congress.
09:15	09:30	00.15	Welcoming remarks	Rinaldo Mancin (IBRAM); Robert Court and Kathryn McPhail (ICMM) Edson Mello (Ministry of Mines and Energy);
09:30	10:10	00.40	Presentation on the findings from the Brazil Country Case Study (macro-level impacts)	Professor Alan Roe (OPM)
10:10	10:40	00.30	Coffee break	
10:40	11:20	00.40	Presentation on the findings from the Brazil Country Case Study (local/social impacts)	Professor Alan Roe (OPM)
11:20	12:00	00.40	Q&A discussion on findings	Full panel
12:00	13:30	01.30	Lunch break	
13:30	15:15	01.45	Breakout session 1: Mining and revenue management; Mining and poverty reduction	Chair: Pablo Santos, Ministry of Finance Officer
13:30	15:15	01.45	Breakout session 2: Mining and social/environmental investment; Mining and dispute resolution	Chair: Maria José Salum, Professor at Federal University of Minas Gerais, former Director of Sustainability of Ministry of Mines and Energy
13:30	15:15	01.45	Breakout session 3: Mining and regional development planning; Mining and local content	Chair: Luiz Pinto, Industry Federation of Pará – FIEPA
15:15	15:45	00.30	Coffee break	
15:45	17:00	01.15	Feedback from breakout sessions and identification of opportunities for collaboration	Chairs from breakout sessions
17:00	17:15	00.15	Final discussion and closing remarks	Robert Court (ICMM) Edson Mello (Ministry of Mines and Energy) Rinaldo Mancin (IBRAM)

Annex B
Workshop proceedings

Overview of the event
The purpose of the workshop was to serve as a forum to: (1) discuss and debate the initial findings from the study and (2) discuss and identify practical opportunities for multi-stakeholder collaboration – where companies, government, international organizations and civil society could work together to improve social and economic outcomes from mining in Brazil. The workshop was attended by over 120 people, representing a broad cross section of government, industry and civil society.[42]

The workshop began with a morning plenary session. Following introductions by Rinaldo Mancin, (Acting Executive Director of IBRAM), Alan Roe (OPM Project Director) presented the draft findings of the study (see the workshop program in Annex A). This was followed in the afternoon by breakout sessions, where participants split into three groups to exchange ideas and discuss the practical steps that could be taken to strengthen partnerships for development in the Brazilian mining sector.

Breakout sessions

- Breakout session 1: "Mining and revenue management" and "Mining and poverty reduction"
- Breakout session 2: "Mining and social/environmental investment" and "Mining and dispute resolution"
- Breakout session 3: "Mining and local content" and "Mining and regional development".

The breakout sessions were structured to focus on ***existing arrangements***, the main ***challenges*** faced and ***opportunities*** for possible initiatives (including new partnership initiatives) that could enhance the potential contribution of mining. Each session was chaired by a distinguished practitioner with excellent knowledge of the mining sector and related issues. Each breakout session also included a professional moderator tasked with ensuring productive discussions.

Breakout session 1
(chaired by Pablo Fonseca dos Santos from the Ministry of Finance)

Existing arrangements: the group identified a wide range of existing initiatives that speak to the underlying challenge of revenue management and/or poverty reduction Public sector-led programs include the Agenda 21 program,[43] the Bolsa Familia and other cash transfer systems, and the PAC infrastructure funds. The private sector has also led some innovative arrangements including a range of private–public partnerships supporting improved governance (including budget management), and the SENAI technical schools programs.

Main challenges: the group identified challenges to further increasing and enhancing mining's social and economic contribution in Brazil. These included: weak municipal capacity both in terms of finance and skills; limitations in the manner in which different levels of government (Federal, State and Municipal) interact to solve particular problems; corruption and more generally low levels of public accountability; a less than efficient use of local CFEM revenues; and the poor education levels of large parts of the local population explained in part by the low level of training and poor pay of teachers.

Opportunities: the group collectively felt that there was considerable scope to build on and improve existing Private–Public Partnerships at all three levels of government. It proposed that the mining industry could enhance information sharing and further support capacity-building activities at the municipal level. It was suggested that this could be progressed via IBRAM. The group recognized the opportunity to strengthen participatory planning of infrastructure and other requirements at the local level, including a clearer definition of roles and responsibilities. In particular, it argued that efforts should be made to ensure that local communities owned their master plans (to regularize and implement city planning and development) – this would involve assigning some responsibility to both the appropriate part of government and to private sector players. The group suggested that the present arrangements for the use of mineral royalties (CFEM) should be studied in depth with the objective of improving the present unsatisfactory arrangements for the use of these important revenues. This work could build on the specific weaknesses that are briefly highlighted above in the section on challenges.

42 The full list of participants is available on request.

43 Agenda 21 is an action plan for sustainable development that was an outcome of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in 1992. The Agenda 21 movement now comprises a broad and loose coalition of civil society organizations and government partners working across a range of areas relating to environmental sustainability, community rights and socio-economic development.

Breakout session 2
(chaired by Professor Maria Jose Salum of the Federal University of Minas Gerais, former Director of Sustainability of Ministry of Mines and Energy)

Existing arrangements: the group noted the importance of the existing social and environmental impact assessments, the licensing requirements imposed on companies that enforce specific social and environmental requirements, and the range of communication programs that disseminate information about these matters more broadly.

Main challenges: the group identified the strikingly different planning time horizons adopted by most agencies of government (rarely more than four years) and the mining companies (often 30–50 years) as a key challenge wherein government perspectives can be excessively short term. A related challenge identified by the group was the low levels of civil servant training and skills which can adversely impact joint public-private work. A further challenge noted by the group was the need to improve the quality of implementation of social and environmental impact assessments and broaden access to their findings.

Opportunities: the group had three main suggestions. First, it is important for stakeholders, particularly government agencies, to make every effort to examine social investment needs in geographical areas far larger than those directly impacted by individual mining projects. Second, systematic efforts should be made to develop and monitor comprehensive indicators for assessing the socio-economic situation of populations in the mining-impacted areas and beyond. It was recommended that this approach build on the work on socio-economic indicators that is a crucial element of the Juruti sustainability approach. Third, a more proactive effort to build awareness of the actual and potential contributions of mining investment to social development – such case studies could further gain credibility by using the improved monitoring indicators that the group also recommended.

Breakout session 3
(chaired by Luiz Pinto of FIEPA)

Existing arrangements: a range of existing supplier-development initiatives exist, ranging from company-led programs to those managed by government. These include the Vale INOVE program as well as the Pará State FIEPA/REDES program, both of which have shown some success in fostering greater economic integration of mining with other sectors within Pará State. Reflecting the large participation of companies in this breakout session (including Rio Tinto/Alcan, RTZ/Peru, Hydro, Vale and firms from other sectors), discussions included how companies could collaborate even more to enhance local content and regional development, in partnership with government and civil society (e.g. chambers of commerce).

Main challenges: the group agreed there was an opportunity for companies to produce, harmonize and share information on expected future procurement to enable SMEs to plan ahead. It was recognized that companies have historically been reluctant to share such forecasts. Participants also pointed to local skills shortages as being a critical constraint that can limit companies' direct employment as well as the capacities of local suppliers. The group agreed that weak infrastructure throughout rural areas of northern Brazil reduces the competitiveness of local suppliers and acts as a disincentive to investment.

Opportunities: Luiz Pinto, Manager of the REDES program at FIEPA, gave a short presentation on the REDES supply chain development initiative, highlighting the recent forecast of investment into Pará State of R$129 billion – making the point that even if only half of this materializes, it represents a massive opportunity for small-scale suppliers. Some industry participants identified an opportunity to harmonize pre-qualification system processes across companies. This would reduce transaction costs for SMEs that currently must complete different administrative steps with different companies in order to register on separate pre-qualification databases. The group argued for the establishment and maintenance of a central database of pre-qualified suppliers that companies could collectively use for less complex inputs.

Some participants pointed to a possible opportunity to learn from the cases of Chile and Norway where suppliers have been encouraged to develop skills enabling them to go from being merely local to becoming international suppliers. The experiences of Chile and Norway point to particular skills and capacities that must be developed for this transition to take place. Some raised the question of whether different standards across companies prevented such collective action (for example, regarding quality or safety). Representatives from some companies pointed out that standards were not typically very different. It was suggested that, as long as standards were transparent, it did not matter if they were not identical because companies would know the basis for which any supplier had been pre-qualified.

Annex C
Brazil's socio-economic performance

This annex presents the methodology and results of the study's attempt to quantify the level and nature of the socio-economic impact of mining on Southeast Pará. It assesses whether municipalities exposed to mining activities have benefited from the presence of mining through improvements in key socio-economic indicators, such as household income, health and education, at the levels of national, Pará State, Southeast Pará and in mining and non-mining municipalities.

The annex is structured as follows: first, the socio-economic context and provision of social services within Southeast Pará is discussed, focusing on health, education and infrastructure. The aim is to provide a qualitative background for the large mining investments taking place in the region, drawing on the comprehensive economic and social "diagnostic" study commissioned by Vale in 2009 (Diagonal 2010) and additional work commissioned by OPM for this study. Second, the annex discusses some of the methodological challenges involved in assessing the quantitative impacts of mining. Third, it provides an assessment of the recent performance of individual municipalities in Southeast Pará where mining operations are located. Last, it assesses the performance of mining municipalities as a group relative to other municipalities in the region, as well as to Pará State and Brazil overall.

C.1 Social and public services in Southeast Pará

The provision of social and public services in Southeast Pará is challenged by limited capacity to provide services, including in the areas of health, education and urban infrastructure. The work conducted in previous studies and corroborated in work for this report indicates that the ***municipal health systems*** in Southeast Pará are often poorly equipped and staffed. This prevents the municipalities from dealing effectively with the rapid population growth that has occurred since the late 1980s and early 1990s and points to potential challenges in dealing with the further growth expected as mining investment in the region increases. Particular challenges are seen in the area of ***primary health care facilities***, resulting in higher infant mortality rates in Southeast Pará compared to Pará State as a whole.

In terms of ***educational services*** in Southeast Pará, the provision of places in primary school is currently sufficient and enrolment rates are considered high. The deficiencies are more serious in terms of the ***quality*** of education in public schools in Southeast Pará compared to national figures: the Ministry of Education's IDEB shows that all but one of Southeast Pará's mining municipalities scored lower than the national average in the 2005 and 2009 index rankings. Moreover, access to secondary education has lagged behind primary education, especially in rural areas, partly explained by the physical location of these schools combined with a lack of public transport (primary schools are spread throughout rural municipalities, while secondary schools are located in towns). There are some opportunities for higher (tertiary) education offered by campuses in Marabá and Parauapebas, but there is limited supply of vocational training focused on the skills needed for the industrial and service sectors, including the technical skills needed for mining. At present, the main option for acquiring such skills is through long-distance undergraduate courses offered by the Open University of Brazil and technical courses in selected private schools.

The ***provision of urban infrastructure*** by local governments has broadly failed to keep up with the fast and continuous pace of population growth and urbanization in Southeast Pará. Consequently, there are serious deficiencies in town planning, water supply, sewage and solid waste collection, lighting, paving and drainage, road networks and public transportation. Many cities lack sewage systems; instead, cesspools and dry pools are taken into use even though these should only be used in isolated rural areas. Water for drinking purposes is generally of low quality, treated only by simple chlorination, and the groundwater supply is frequently compromised by the inadequate treatment of sewage. Solid waste is usually disposed in unregulated and inappropriate landfills. Inadequately tarmacked roads are frequently in poor repair, damaged by heavy rainfall, and dirt roads are often altogether impassable after heavy rains. This inadequate public infrastructure provision has negative externalities for the community, as it prevents (in particular poor) people from accessing other public services such as healthcare facilities and education.

C.2 Methodological challenges and data used

As noted above, the socio-economic situation in Southeast Pará is generally very challenging. In this context, the benefits of large economic activities such as mining can be significant. The challenge, however, is to establish the role mining might play in shaping socio-economic indicators over time. As with all impact assessments this requires – in theory at least – establishing a counter-factual scenario, i.e. answering the question of what would have happened in the mining municipalities if mining had not existed. This is particularly important where there are a *priori* expectations that the situation would have changed due to external (non-mining) circumstances relating to poverty reduction, policy reform, improved social protection and economic growth at the broader level of the country. Brazil's strong performance in economic and social development suggests a *priori* reasons for expecting improvements across all areas (mining or otherwise) and complicates the isolation of the effects of mining *per se*.

Establishing a counter-factual scenario can be done by identifying municipalities that had similar characteristics at the starting point of the analysis and comparing their performance with mining municipalities. However, such an exercise is highly complex and made more difficult by the different characteristics exhibited within the group of mining municipalities. Instead, we take an approach based on comparing the performance in socio-economic indicators across mining municipalities, followed by comparisons between mining and non-mining municipalities over time.

We use ***IBGE Census data to describe the socio-economic development*** over time compared across geographical areas at national, state and municipality level. The analysis focuses on the five socio-economic indicators from the 2010 Census for which municipality-level data were available at the time of writing and compares these to 2000 data (an assessment going back further in time would have been useful, but is complicated by the fact that the boundaries of many municipalities changed during the 1990s).

These indicators, listed below, cover income data as well as indicators of other aspects of human well-being:[44]

- Population
- Urbanization
- Monthly household income in real terms[45]
- Illiteracy rate (proxy for educational performance)
- Household sanitation type (proxy for health performance).

The use of Census data means that our analysis relies on ***averages that conceal important information regarding differences within the municipality and between the different segments of the population***. To capture differences in and development of, for example, poor/rich, gender and employment status, micro data is necessary. Such data was unavailable for this study. Moreover, at the time of writing only a limited number of indicators had been released for the 2010 Census, not including an inequality measure comparable with previous estimates. ***The lack of inequality data prevents us from drawing a conclusive analysis on the distributional welfare trends in the municipalities analysed***.

C.3 Socio-economic analysis of mining municipalities

This section describes the socio-economic development over time of the six mining municipalities in Southeast Pará, with operations managed by Vale and Hydro.

As Table C.1 shows, there is significant variation across mining municipalities in terms of their population in 2010, ranging from 18,000 in Curionópolis to 234,000 in Parauapebas. With the exception of Curionópolis, all mining municipalities experienced substantial ***population growth*** between 2000 and 2010 (between 28% and 144%). Notably, Parauapebas and Canaã dos Carajás more than doubled their population figures. The negative population growth in Curionópolis may be explained by the closure of the Serra Pelada *garimperios* gold mine, where the closure and suspension of production may have caused a net out-migration.

On average, ***real monthly household income*** ranged between R$108 and R$221 in 2000 and R$163 and R$279 in 2010 (see Table C.2). Marabá and Parauapebas exhibited the highest values in 2000 and continued to do so in 2010. Although ***income has grown significantly in most areas*** (ranging from 17.3% to 51.1%), growth has been more pronounced in the municipalities with low income in 2000 (such as Curionópolis and Canaã dos Carajás).

The Census figures presented here are averages across individual municipalities. Therefore, while our findings are evidence that overall incomes in the municipalities have increased, they do not reveal how and who benefitted from this increase. In particular, ***the mere presence of Vale's own employees, who will be much higher paid, will distort the picture of what has happened to the majority of the population***. To address the important question of whether the observed income growth has benefitted even the poorest segments of the population, the assessment should include an assessment of inequality indicators.

We look at ***inequality*** to describe the distribution of wealth across the population. Inequality increases when more wealth moves from the bottom end of the distribution to the upper end and vice versa. Currently, inequality data at the municipal level from the 2010 Census is not available. Table C.3 shows the data available on inequality at the municipal level for 2000, reporting the income share received by the bottom and the top 20% of the population. Although this does not cast light on how inequality has changed due to the presence of mining, it does show a highly unequal income distribution that calls attention to issues of distribution in assessing the performance of these municipalities.[46]

44 In addition to these indicators, the 2010 IBGE Census also provides data on poverty and extreme poverty. However, these indicators are calculated based on the legislated minimum salary, which has grown rapidly in recent years, in excess of inflation rates. This implies that data may indicate increased "poverty" even though real living standards have increased and we therefore exclude these indicators from our analysis.

45 To allow comparability over time, the nominal figures of household income provided by the Census are converted into real terms by using 1993 Consumer Price Index.

46 This data is broadly comparable to that for Brazil as a whole, where more recent data indicates that the richest 20% of the population account for 64.1% of income. To put these figures into context, in 2009 the bottom 20% of UK citizens accounted for 5.3% of the country's total income, while the top 20% accounted for 46% of income. See http://www.poverty.org.uk/09/index.shtml

Table C.1: Population and urbanization rate

	2000		2010		2000–10
Municipality	Population	Urbanization rate (%)	Population	Urbanization rate (%)	Population growth (%)
Canaã dos Carajás	10,922	35.9	26,716	77.6	144.6
Curionópolis	19,486	68.0	18,288	68.5	-6.1
Marabá	168,020	80.0	233,669	79.7	39.1
Ourilândia do Norte	19,471	49.8	27,359	72.8	40.5
Parauapebas	71,568	82.8	153,908	90.1	115.1
Paragominas	76,450	77.5	97,819	78.2	28.0

Source: IBGE – Census 2000 and Census 2010.

Table C.2: Monthly household income

	Real monthly household income (Constant, 2000 R$)		Growth (%)
Municipality	2000	2010	2000–10
Canaã dos Carajás	167	238	42.3
Curionópolis	108	163	51.1
Marabá	189	242	28.6
Ourilândia do Norte	154	213	37.9
Parauapebas	221	279	26.0
Paragominas	166	195	17.3

Source: IBGE – Census 2000 and Census 2010.

Table C.3: Inequality measure (shares of income)

	2000	
Municipality	Bottom 20%	Top 20%
Canaã dos Carajás	1.8	64.1
Curionópolis	1.2	61.0
Marabá	1.8	66.9
Ourilândia do Norte	0.4	65.2
Parauapebas	1.3	70.9
Paragominas	2.4	64.9

Source: IBGE – Census 2000 and Census 2010.

Education and health are analysed using two proxy variables of adult illiteracy rate and the share of households with inadequate sanitation (see Table C.4). The table illustrates an improvement in both indicators for all six mining municipalities. The adult illiteracy rate decreased by 5–10 percentage points (pp). and the proportion of households with access to inadequate sanitation dropped in all the municipalities, although the improvement is larger where we observe relatively worse initial conditions, with Canaã dos Carajás and Ourilândia do Norte showing substantial improvements with a reduction in the last decade between 30 pp. and 60 pp. Parauapebas and Paragominas show the best performance, with low adult illiteracy rates and access to inadequate sanitation levels, followed by a positive development over time.

C.4 Socio-economic analysis of mining versus non-mining areas

The previous section focused on the socio-economic development of the six municipalities that, by hosting mining activities, are considered the most directly impacted areas. To assess the impact of mining on the development of the six municipalities, these municipalities (collectively referred to as mining municipalities) are compared to non-mining municipalities in Southeast Pará. Before the arrival of mining most of these municipalities would have shared many socio-economic characteristics. However, the timeframe for comparison prevents a starting points prior to mining activity in the area, as large operations have been in place and exacting an impact since the 1990s.

Due to high in-migration, largely for the job opportunities offered by the mines, Southeast Pará has experienced high ***population growth*** – almost 40% in the last decade, compared to 23% in Pará State and 12% nationwide. Much of this population growth has taken place in mining municipalities which also experienced higher population growth than non-mining areas between 2000 and 2010. Note from Table C.5 that, on average, mining municipalities have populations that are twice as large as non-mining municipalities.

Southeast Pará has also undergone a rapid process of ***urbanization*** with a 15 pp. rise in the urban population from 2000 to 2010, as most workers associated with the mines live in towns. Nevertheless, reflecting the underdeveloped nature of the region relative to the far-off state capital, the degree of urbanization remains much lower than nationwide and slightly lower than for the entire Pará State. These demographic trends are expected to continue as Vale installs new mining projects in the region.

Mining municipalities are, on average, more urbanized then the non-mining municipalities and Southeast Pará, although non-mining municipalities experienced slightly larger increases in their urbanization rate of 15 pp. compared to mining municipalities' increase of 12.2 pp. This highlights a tendency for urban growth in Southeast Pará, with or without mining.

In terms of ***regional inequalities***, the north of Brazil performs poorly in most socio-economic indicators relative to the national figures. This finding also holds for the municipalities in Southeast Pará and Pará State as a whole: the average monthly household income is significantly lower in Southeast Pará than nationally, even compared to the state of Pará, at respectively R$176, R$201 and R$350 (see Table C.6). Southeast Pará lags behind despite a more rapid increase in average household income from 2000 to 2010 in comparison to national and Pará State figures. Mining municipalities enjoy higher income levels than non-mining areas, with an average household monthly income of R$222 in 2010. Income growth between 2000 and 2010 was also much higher in mining municipalities (33.9%) compared to non-mining municipalities (20.8%), indicating the potential income benefits derived from mining activities. This should be put into context with average monthly household income growth of 17.7% in Brazil overall.

Table C.4: Adult illiteracy rate and access to inadequate sanitation[47]

	Adult illiteracy rate (%)			Access to inadequate sanitation (% of households)		
Municipality	2000	2010	Change (pp)	2000	2010	Change (pp)
Canaã dos Carajás	18.5	9.9	-8.6	71.5	13.2	-58.3
Curionópolis	26.9	18	-8.9	51.3	40.4	-10.9
Marabá	17.1	11.4	-5.7	29.4	16	-13.4
Ourilândia do Norte	22.4	12.6	-9.8	56.7	17.9	-38.8
Parauapebas	16.3	8.1	-8.2	9.9	2.8	-7.1
Paragominas	21.7	12.9	-8.8	20.4	10.1	-10.3

Source: IBGE – Census 2000 and Census 2010.

Table C.5: Population and urbanization

	Population			Urbanization (%)		
Area	2000	2010	Growth (%)	2000	2010	Change (pp)
Brazil	169,799,170	190,755,799	12.3	81.2	84.4	3.2
Pará	6,192,307	7,581,051	22.4	66.5	68.5	1.9
Southeast Pará	29,360	40,781	33.7	46.0	60.9	14.9
Mining municipalities	60,986	92,960	60.2	65.7	77.8	12.2
Non-mining municipalities	25,037	33,023	28.7	43.4	58.4	15.0

Source: authors' calculation from Census 2000 and Census 2010.

Table C.6: Household income by area

	Average monthly household income (constant, 2000 R$)		
Area	2000	2010	Growth (%)
Brazil	297.2	349.8	17.7
Pará	168.6	200.6	19.0
Southeast Pará	149.5	175.8	22.9
Mining municipalities	167.6	221.8	33.9
Non-mining municipalities	146.7	168.0	20.8

Source: authors' calculation from Census 2000 and Census 2010.

47 The illiteracy rate is defined as the proportion of people aged 15 or above who cannot write and read. As a proxy for health conditions, we look at the percentage of households who report sanitation facilities that are considered inadequate by international standards.

Table C.7: Adult illiteracy and access to inadequate sanitation by area

	Adult illiteracy rate (%)			Access to inadequate sanitation (%)		
Area	**2000**	**2010**	**Change (pp)**	**2000**	**2010**	**Change (pp)**
Brazil	13.6	9.6	-4.0	14.0	8.1	-5.9
Pará	16.8	11.7	-5.1	33.7	21.8	-11.9
Southeast Pará	25.0	17.1	-7.8	55.9	33.3	-22.6
Mining municipalities	20.5	12.2	-8.3	39.9	16.7	-23.1
Non-mining municipalities	25.7	17.9	-7.8	57.8	35.6	-22.1

Source: authors' calculation from Census 2000 and Census 2010.

As in the previous section, proxy variables are applied to assess ***education*** and ***health*** trends, by looking at the ***adult illiteracy rate*** and lack of ***adequate sanitation*** (see Table C.7). The adult illiteracy rate of Southeast Pará (17.1%) is higher than in Pará State (11.7%) and nationally (9.6%) in 2010, although adult illiteracy rates decreased more in Southeast Pará compared to the national and Pará State levels. Southeast Pará also fares poorly on the indicator of households with ***inadequate sanitation***, with 33.3% compared to 21.8% in Pará State and 8.1% nationally.

Southeast Pará has, however, made great strides in combating both illiteracy and inadequate sanitation (although the two groups of mining and non-mining municipalities had different starting points in 2000). In 2010, the illiteracy rate was 12.3% in mining municipalities and 17.9% in non-mining municipalities. In sanitation too, there remains a significant discrepancy between the performance of mining and non-mining municipalities. The share of the population facing inadequate sanitation is more than twice as large in non-mining municipalities.

C.5 Discussion

A comparison of socio-economic indicators between mining and non-mining municipalities, shows that ***mining municipalities were, on average, more developed than non-mining municipalities in 2010. This was also the case in 2000***. Progress over time, in terms of income, education and health has been more substantial in mining areas than in non-mining municipalities. Overall, comparing mining with non-mining municipalities, the former fare relatively better, suggesting that the presence of mining activities has a positive impact on the socio-economic indicators of the host municipalities.

However, these results should be seen as evidence of the ***direction of influence of mining*** on the development of local areas, rather than precise magnitudes of impact. More detail on the precise impacts requires much deeper analysis on the overall influence of Brazil's broader economic and social development trends during the period 2000–2010.

Moreover, distributional impacts need to be assessed more rigorously, as they determine how the benefits of mining are experienced within local communities. Clearly, ***the impact of Vale itself has a significant influence*** on the averages presented in municipal-level indicators: Vale employees will tend to have higher-than-average salaries, education etc. As such, the impact of these employees – in particular in smaller municipalities like Canaã dos Carajás – is pronounced. The Lao PDR country case study (ICMM 2011b) showed that income in mining communities can grow at the same time as inequality falls. The lack of recent indicators prevents a similar assessment for mining municipalities in Southeast Pará.

Annex D
Lessons on mining impacts – international comparisons

In ICMM (2006a), the ***Synthesis of the Four Country Case Studies: Findings and Recommendations***, six problematic issues were identified that appeared to feature across the different countries' case studies. They consisted of the following:

- The adequacy/fairness of the tax regime for mining in the host country
- The system for allocating revenue towards public spending – whether it constrains or supports the efficient and effective use of public resources, including those generated by mining
- Conflicts over land use and property rights
- Environmental damage and concerns
- Conflicts between large-scale and artisanal mining
- Dealing with prospective mine closures.

Based on expectations and domestic pressures around delivering wider benefits in host countries, two further pertinent issues have been added to this list:

- Local employment in the mining and other sectors
- Local procurement.

The results for the six ICMM case studies conducted to date are summarized in the Table D.1 overleaf. Despite some commonalities around these pressure points, it is noticeable that differences in initial and institutional conditions have prompted variations in outcomes and responses.

Table D.1: Country comparison table Note: italics indicates findings in spring 2012.

Problematic issues	Ghana (published July 2007)	Tanzania (published July 2007 and update report from 2009)	Peru (published July 2007)	Chile (published March 2007)	Lao PDR (published April 2011)	Brazil (published December 2012)
Adequacy of the tax regime	• The mining tax regime had initially been revised in the 1980s as part of wider economic reforms. It has remained stable until recently. • Local NGOs maintained that mining is under-taxed compared to tax regime applicable in earlier decades. • *Higher mining tax rates have been introduced in early 2012.*	• Limited local knowledge of actual tax regime has led to claims that foreign companies make large profits and pay little tax. • Particular contention around tax holidays granted to encourage FDI as part of mining sector reforms in 1990 (some companies voluntarily gave up these tax holidays). • *Until recently the large new mines were still recovering large upfront investments, but have now started to pay corporate income tax.* • *The mining legislative framework was revised in 2009.*	• The mining tax regime was initially revised in the 1990s as part of Peru's wider economic and mining sector reforms. • Since the political changes of the late 1990s, which also introduced decentralisation, the mining legal and fiscal regime continues to be heavily subjected to political debate. • In particular abolishment of royalty in the 1990s has been questioned, as has the granting of tax exemptions (royalties have since been reintroduced for the benefit of regional governments).	• The public financial management system is centrally managed and a generally applicable mining fiscal regime is set at the national level. • There has been some pressure to increase mining tax rates, but to date there have been no major revisions. • More recently the Chilean Congress has been debating whether mining companies are under-taxed.	• The two companies covered by the case study contribute significant tax and dividend payments to government. • There are high expectations that large tax and dividend payments will continue to be received in forthcoming years. • To date there have been no calls for revisions to the mining tax regime.	• The mining tax regime is considered relatively complex by the Fraser Institute and other industry observers. • There has been an on-going policy debate in Congress about a general overhaul of country's fiscal system, including that which applies to mining and other extractive sectors. • Political debates have focused mainly on royalty, which comprises only a small share of the overall mining revenue collection. • Royalties are nonetheless hugely significant for local municipal governments, as 65% of royalties are redistributed to municipalities in which mining takes place.

Table D.1: Country comparison table *continued* Note: italics indicates findings in spring 2012.

Problematic issues	Ghana (published July 2007)	Tanzania (published July 2007 and update report from 2009)	Peru (published July 2007)	Chile (published March 2007)	Lao PDR (published April 2011)	Brazil (published December 2012)
Allocation of mining revenue toward public spending	• Mining revenue collected at the national level, with the Mineral Development Fund (MDF) re-allocating 30% of mining revenue to local political leaders. • Weak administrative and public expenditure management capabilities at the sub-national level. • As a result, outcomes at the local level, resulting from spending from the MDF, are poor. • Perceptions that re-allocated mining revenue generate limited positive benefits at the local level.	• Mining revenue collected at the national level – no earmarking of mining revenue to sub-national governments. • With the introduction of decentralized public expenditure in the late 1990s, management at the sub-national level appears to have improved. • However decentralisation reforms did not include decentralized revenue mobilization. Hence, limited political debates around greater earmarking/hypothecation of mining revenue. • The 2007 study found generally limited contention around this issue, *but this has changed in more recent years.*	• Substantial amounts of mining corporate income tax collected at the national level are shared with sub-national governmental entities based on a formula (the Canon Minero). • Repeated revisions have been made to the formulas applied, but limited evidence of improved spending decisions at the local level, where administrative and public financial management capabilities are weak • The study found continued politicisation around the redistribution of mining revenue to various tiers of sub-national governments.	• Mining revenue collected at the national level – no earmarking of mining revenue to sub-national governments. • Allocation of mining revenue generally not considered a problematic issue in Chile.	• Mining revenue collected at the national level – no earmarking of mining revenue to sub-national governments. • Public financial management in general not transparent, including large off-budget spending. • Companies provided some funding directly to communities through development funds and other local spend. • Such direct corporate spend has been met with budget cuts for provincial governments – defeating the purposes of compensatory direct spend for noise and other nuisances and disruptions.	• Federalist set-up features an extremely complex tax system in which taxes are collected at the federal, the state and the municipal level. • The federal government makes earmarked grant transfers – though only to municipalities hosting mines, not to indirectly affected ones. • As common across mining operations in all countries countries, timing is an issue, as negative impacts often occur before municipalities receive this revenue. • State governments receive very little mining revenue, but are responsible for infrastructure developments.
Conflicts over land use/rights	• Local complaints that areas covered by mining concessions are too large, and threaten the livelihoods of local communities. • Some conflicts between mining and agricultural and pastoral land users. • Informal land use rights at odds with land access granted by national government. • Resettlements have been contentious.	• Local grievances around negative impacts on rural livelihoods, in particular over artisanal miners' access to land. • Some contention with agriculture and pastoral land users. • Some conflicts between mining and artisanal miners, including violent protests. • Informal land use rights are at odds with land access granted by national government.	• Local grievances and complaints around negative impact on rural livelihoods and land-based cultural rights of indigenous people. • Mining legislation is at odds with traditional claims over land/ mountains. • Considerable contention over land, with respect to both indigenous rights and agriculture/pastoral land users.	• Location of mining primarily in sparsely populated desert areas, and conflicts over land have been limited. • Limited conflicts have occurred in other parts of the country. • Mining legislation does not conflict with surface land rights.	• Some perceptions among communities that agricultural land is taken for mining.	• Land tenure and use is highly inequitable, sometimes exacerbated by property price inflation due to in-migration into mining areas. • Expansion of mining has increased connections between previously unconnected areas, including previously "untouched" areas. • Greater regularization around land use planning is conflicting with vested rural interests.

Table D.1: Country comparison table *continued* Note: italics indicates findings in spring 2012.

Problematic issues	Ghana (published July 2007)	Tanzania (published July 2007 and update report from 2009)	Peru (published July 2007)	Chile (published March 2007)	Lao PDR (published April 2011)	Brazil (published December 2012)
Environmental damage and anxiety	• Environmental legacies include environmental abuses in the past. • Legislation and practices have improved significantly in recent years. • As a result, contention over environmental issues with respect to large-scale mining has decreased.	• Environmental damage not major current priority; limited environmental legacies. • There are occasional (unsubstantiated) accusations of poisoned mine water.	• Environmental legacies arise from various past incidences of environmental abuse. • Legislation has improved but enforcement challenges remain. • *In the past there appears to have been limited contention around this issue. This has changed more recently, but unclear whether concerns are genuine or part of a political agenda.*	• Environmental legacies due to various past incidences of environmental abuse. • More recently, improved legislation and corporate practices.	• Some anxieties among communities around potential chemical spills. • Such chemical spills have rarely occurred at the large mines, but have highlighted the dependence of local communities on fishing and agriculture.	• Negative environmental policy legacy in the region, following pro-deforestation policies up to the 1980s. • Growing understanding of the value of biodiversity and environmental services. • Anxiety has reduced due to institutionalised consultations built into the robust environmental licensing process.
Artisanal mining	• "Galamsey" mining poses serious challenges, including negative environmental impact of such mining. • The rights of artisanal miners are unclear and/or informal. • Conflicts with "galamsey" miners are on-going.	• The rights of concession holders are seen to be at odds with those of artisanal miners. • Forceful removals of informal miners from concession areas have taken place. • The rights of artisanal miners are unclear and/or informal.	• Small-scale mining co-exists with large-scale mining, without much contention. • The rights of artisanal miners are relatively clear. • Small-scale mining receives some corporate and government support.	• At present not a contentious issue. • Rights of small-scale miners are relatively clear and formal. • Small-scale mining is insignificant, and is partly mechanised.	• Occasional problems with trespassers on mine sites. • Inexperienced mining operations setting up on areas designated by Mineral Exploration and Production Agreements.	• Southeast Pará has a history of large-scale "garimpeiro" activity around Serra Pelada • Recently more limited importance, in particular around mining of minerals other than gold.

Table D.1: Country comparison table *continued* Note: italics indicates findings in spring 2012.

Problematic issues	Ghana (published July 2007)	Tanzania (published July 2007 and update report from 2009)	Peru (published July 2007)	Chile (published March 2007)	Lao PDR (published April 2011)	Brazil (published December 2012)
Mine closure	• Limited government planning for mine closure and economic and social sustainability thereafter. • Not a prominent issue at the time of study.	• Limited government planning for mine closure and economic and social sustainability thereafter. • This is currently not featuring as an issue, because the sector is still very young.	• Mine closure legacies from earlier decades have prompted early thinking around future mine closures, but government policies are unclear. • Legacies have prompted some encouraging thinking on environmental and social sustainability around mine closure.	• Not a prominent issue at the time of study.	• Some anxiety at the community level regarding future mine closures, but not a major issue in mining debates.	• Not a prominent issue at the time of study.
Local employment in the sector and beyond	• Most employees are Ghanaian. Just over 2% of directly employed staff are expatriates. • Large in-migration – the majority of national employees are from elsewhere in the country.	• Some 90% of direct employees are Tanzanians. • Mining companies face serious skills shortages, e.g. low quality secondary education and limited access to higher education. • Companies have been investing in local vocational training facilities and courses. • A large number of people are working in artisanal and small-scale mining.	• Most mine employees are Peruvian. But nearly 80% are not from the locality – but from elsewhere in the country. • Just over 15% of direct employees, and 25% of contractor employees, are from districts around the mine, but expectations of the local population have not been met. • The workforce of local communities suffers a skills gap, and companies and contractors invest in training locals.	• About 99% of employees are nationals. • The economy of Region II is almost completely dominated by mining which accounts for 12% of total employment. • Literacy rates in Region II are very high and above the national average. • Chile has education attainment close to OECD standards, and skills shortages are not flagged as an issue. • The companies invests in developing mining clusters.	• About 90% of employees are nationals. • 80% of the country's workforce is still working in agriculture. The two large mines alone represent 5% of the non-agriculture formal workforce. • 35% of the mine employees are from within the local district. • Employment in the public sector has expanded in the local district as a result of mining operations, to supply the extra demand in public services.	• Employment dependent on in-migration due to low population density and low skill levels in mining areas. • There are significant skills shortages in the country, at a time when the mining sector is expanding rapidly. Highly skilled labour is very costly. • Brazil's education sector struggling to produce the skilled labour force, in particularly in the rural northern areas, including Southeast Pará. • Vale invests significantly in skills development and training.

Table D.1: Country comparison table *continued* Note: italics indicates findings in spring 2012.

Problematic issues	Ghana (published July 2007)	Tanzania (published July 2007 and update report from 2009)	Peru (published July 2007)	Chile (published March 2007)	Lao PDR (published April 2011)	Brazil (published December 2012)
Local procurement	• Circa 50%of the mine's procurement retained in the country, but very little sourced from within the mining area. • Local sourcing limited to construction, transport, the production of lime, and local financial services.	• 50% of procurement comes from within the country, including imported goods bought through local agents. • Relatively undiversified production base and high reliance on subsistence agriculture – limiting local procurement opportunities.	• 85% of Antamina's 1,500 contractors providing goods and services are based in the capital Lima. • The ten top vendors supply nearly 50% of the procured goods and services. • Very weak local supply base as surrounding areas are largely agricultural. • Companies investing in increasing local procurement.	• 80% of procurement requirements are met from within Chile; almost half are from within the region. A portion of this procurement is imported goods bought from local agents. • Chile is recognised for having developed an internationally competitive mining sector supply industry, through partnerships between government and companies in developing mining clusters.	• 50% of goods and services are procured through national contractors. • In the case of the longer established mine MMG Sepon, just below 30% of the 2009 procurement was national, the remainder was from abroad, including expat labour. • The SME sector is facing various constraints and challenges that undermine their ability to participate in procurement opportunities.	• Given Brazil's well developed industrial base, three quarters of the inputs procured for Vale's mining operations in Southeast Pará are sourced from within the country. • Of the Brazilian content, 12.5% is from within Pará state, despite its relative underdevelopment relative to other Brazilian states.

Annex E
Governance indicators – international comparisons

This annex provides three high-level perspectives of Brazil's aggregate performance on recognized governance indicators that are considered relevant for understanding the potential role that mining can play in driving Brazil's continued economic and social development. It focuses on the following:

- The World Bank's Doing Business rankings
- The World Bank's WGIs (absolute performance over time for Brazil)
- The World Bank's WGIs (country rankings over time, comparing Brazil with selected countries.)

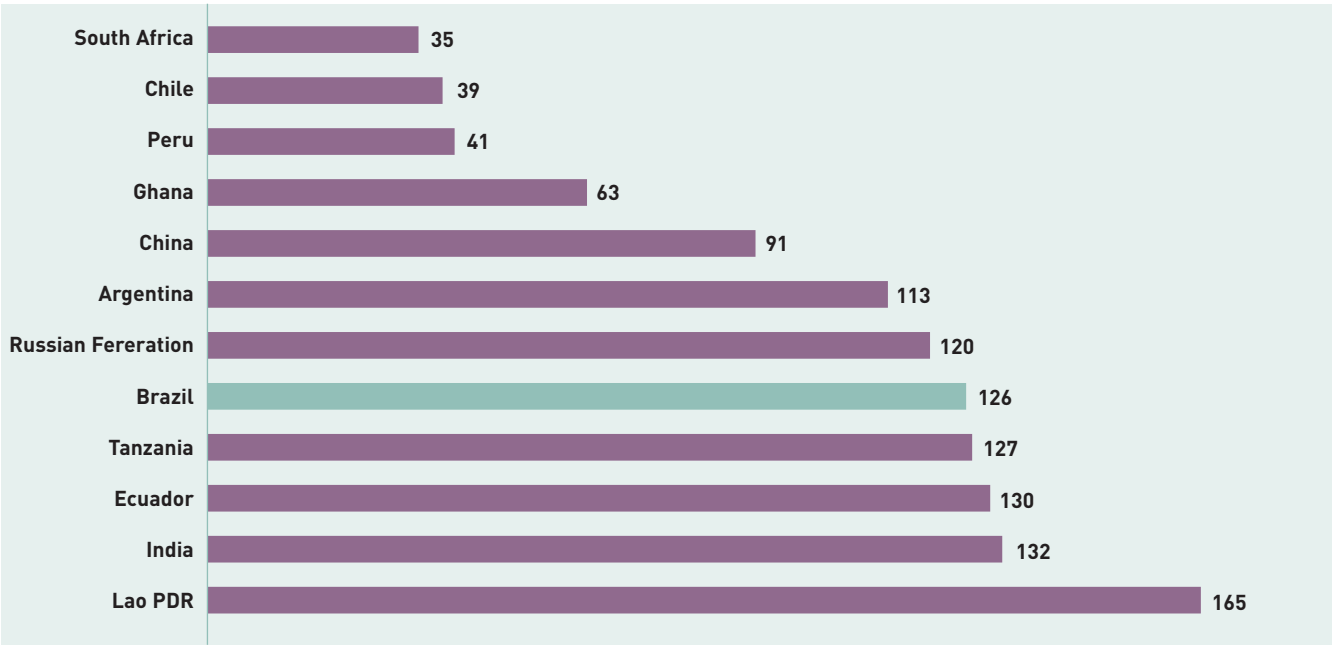
A review of the data provides an initial view of the current quality of governance in Brazil and the evolution of governance in the relatively recent past.

E.1 World Bank's Doing Business Index

The World Bank ranks 184 different economies against its Doing Business Index, which is calculated by combining the average percentile ranking of each country on each of the 10 topics included in the Index.[48] This is used to benchmark Brazil's performance against other economies in the Doing Business sample. A high ranking indicates that a government has created a regulatory environment that is conducive to operating a business.[49]

Figure E.1 shows the 2010 ranking of Brazil against a number of relevant comparator emerging market economies, including the fellow BRICS economies and other large exporters of mineral products. Brazil's low ranking here highlights the complexities of doing business in the country: only Ecuador and India rank lower. This may, in part, be a reflection of the complexity of Brazil's federalist and decentralized political-administrative system with its vertical sharing of responsibilities across different public policy spheres, including revenue mobilization and many areas of public expenditure.

Figure E.1: 2012 Ease of Doing Business ranking, selected countries (out of 183)



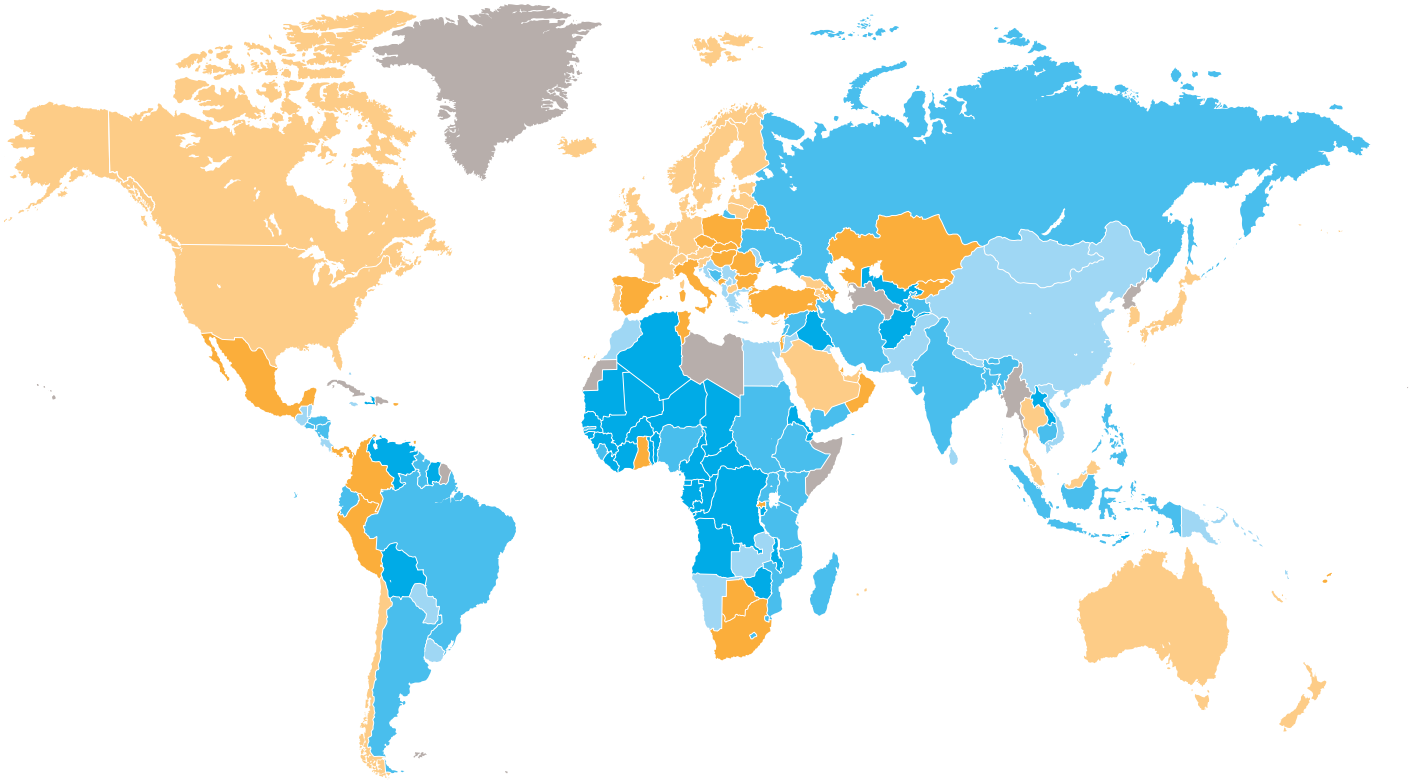
Source: World Bank *Doing Business 2012*.

48 These are: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency.

49 It should be noted that this does not measure every aspect of operating a business and should therefore only be used as a relative indicator. Moreover, the ranking of any one economy might change due to developments in other countries and therefore not be a result of internal government regulatory reforms. Equally, an economy may also fail to rise in ranking despite regulatory reform if another country's reforms generate a more significant impact.

To put these rankings into a broader global perspective, Figure E.2 provides ranking by percentile range for all countries covered in the 2012 Doing Business Index. This presentation of data also shows Brazil in the lower half of the distribution, well behind OECD countries such as those in North America, Europe and Australia, but also behind many countries in East Asia and Colombia, Chile and Peru in South America.

Figure E.2: Global comparison: Ease of Doing Business



Key

- **Rank 1–37**
- **Rank 38–74**
- **Rank 75–111**
- **Rank 112–148**
- **Rank 149–185**
- **Not in the Doing Business sample**

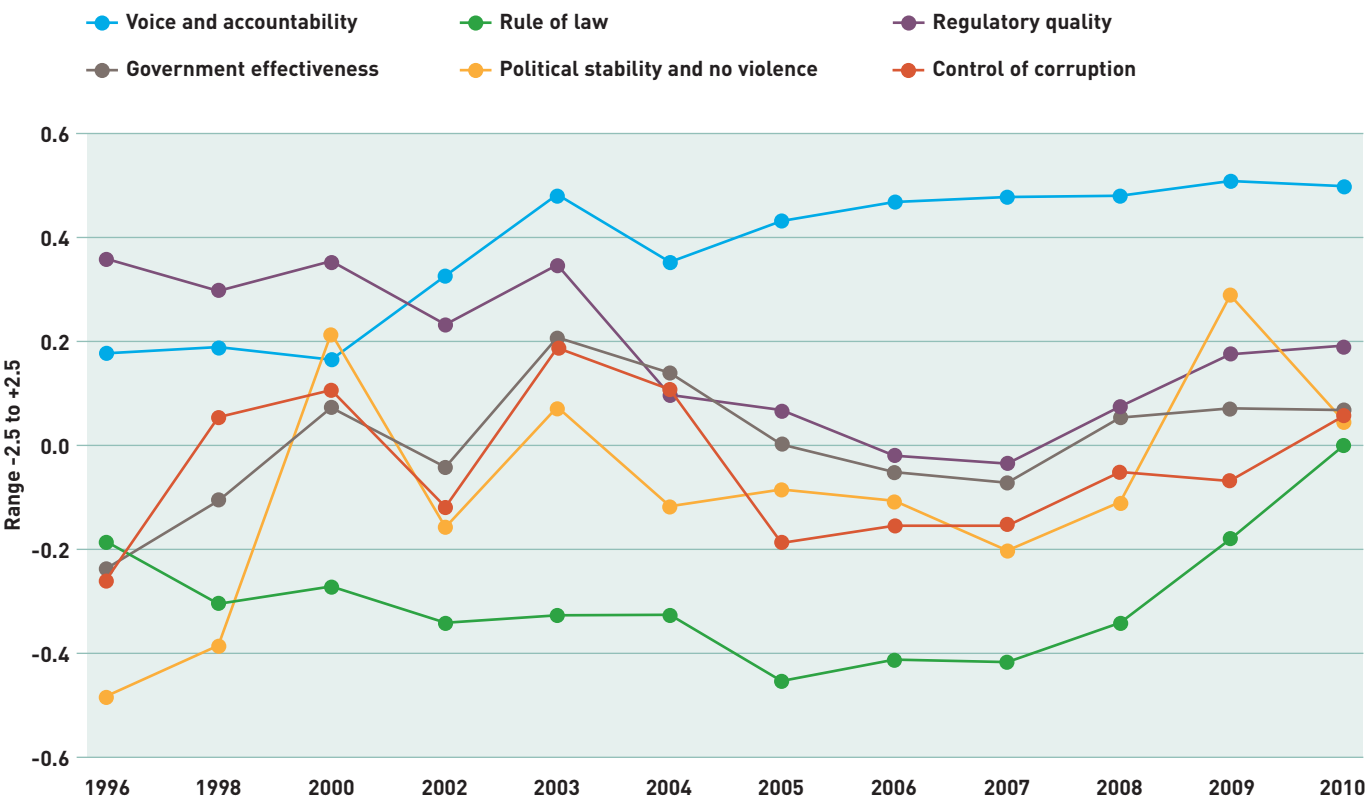
Source: *Doing Business* database.

E.2 World Bank's WGIs for Brazil

The picture gleaned above can be elaborated further by examining the WGIs. These indicators (available since 1996) combine a variety of different data sources to monitor the perceptions of citizens, businesspeople, NGOs and others. The WGI trends for Brazil between 1996 and 2010 are shown in Figure E.3, for the following six indicators:

- "Voice and Accountability" measures the perceptions held by a country's citizens regarding their ability to actively participate in the government's selection process, as well as freedom of expression, freedom of association and a free media. The indicator provides a good indicator of the political openness of a country.
- "Political Stability" aims to capture the perceptions of the likelihood that a government will become destabilized or overthrown via unconstitutional or violent means.
- "Control of Corruption" captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the "capture" of the state by elites and private interests.
- "Rule of Law" captures the perceptions of the extent to which agents have confidence in and abide by the rules of society and, in particular, the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.
- "Regulatory Quality" captures perceptions of the ability of the government to formulate and implement sound policies and regulations that enable private sector development.
- "Government Effectiveness" captures the perceptions regarding the quality of public services, the quality of the civil service and the degree of its independence from political pressures and the credibility of the government's commitment to the policies it formulates.

Figure E.3: Brazil's governance performance (1996–2010)



Source: World Bank.

Looking at data for Brazil over time, there are two areas in which Brazil is perceived to have experienced the greatest improvements since the end of the 1990s. First, ***Voice and Accountability*** has shown sustained improvement – the Brazilian people today feel more engaged in political decisions and change than hitherto was the case.

Second, with respect to ***Political Stability***, improvement over time has been large but somewhat uneven from period to period (and with a fall in 2010): this could be a reflection of the temporary anxieties that have accompanied the occasional elections and changes of government such as that in 2002–03.

Brazil's worst-scoring indicators in absolute terms are those that measure the strength of the institutions which govern their citizens as well as the respect that citizens have for these governing bodies. ***Control of Corruption*** improved somewhat in the election period between 2002 and 2003 that saw the arrival of Luiz Inacio Lula da Silva to power, but then fell again. In the years since 2005 this indicator has shown a gradual improvement.

The ***Rule of Law*** indicator experienced the lowest absolute score out of all the indicators and in 2005 the indicator dropped to as low as -0.45. Since 2005, there have been marked improvements in this indicator, reflecting improved perceptions regarding the Brazilian government's ability to uphold a system of property rights, rules and regulations that is fair (even if ineffective).

Finally, ***Regulatory Quality*** has experienced an absolute decline since 1996. By contrast, perceptions about ***Government Effectiveness*** have been volatile over time, albeit with a significant improvement from the initial levels of 1996.

E.3 Assessment of WGI performance relative to comparator countries

The WGI indicators are quantitative constructions and no explicit meaning can be ascribed to the absolute numbers accrued by each country. However, the indicators can provide a picture of the relative performance of this country. With this in mind, the following figures compare Brazil's performance graphically with a set of comparator countries (including previous ICMM case study countries) across the six WGI. Thus, in the following charts:

- The ***numbers in parenthesis*** in the figures specify the WGI ranking of each country in 2010.
- The ***dark bars*** show the changes in governance rankings between 1996 and 2010, indicating how many positions the country has risen or fallen in these rankings over this period.
- As there have been a number of changes in relation to how these governance indicators were first measured in 1996, we also look at changes in perceptions of governance in the more recent past. The ***light bars*** show the more recent changes in governance rankings between 2005 and 2010.

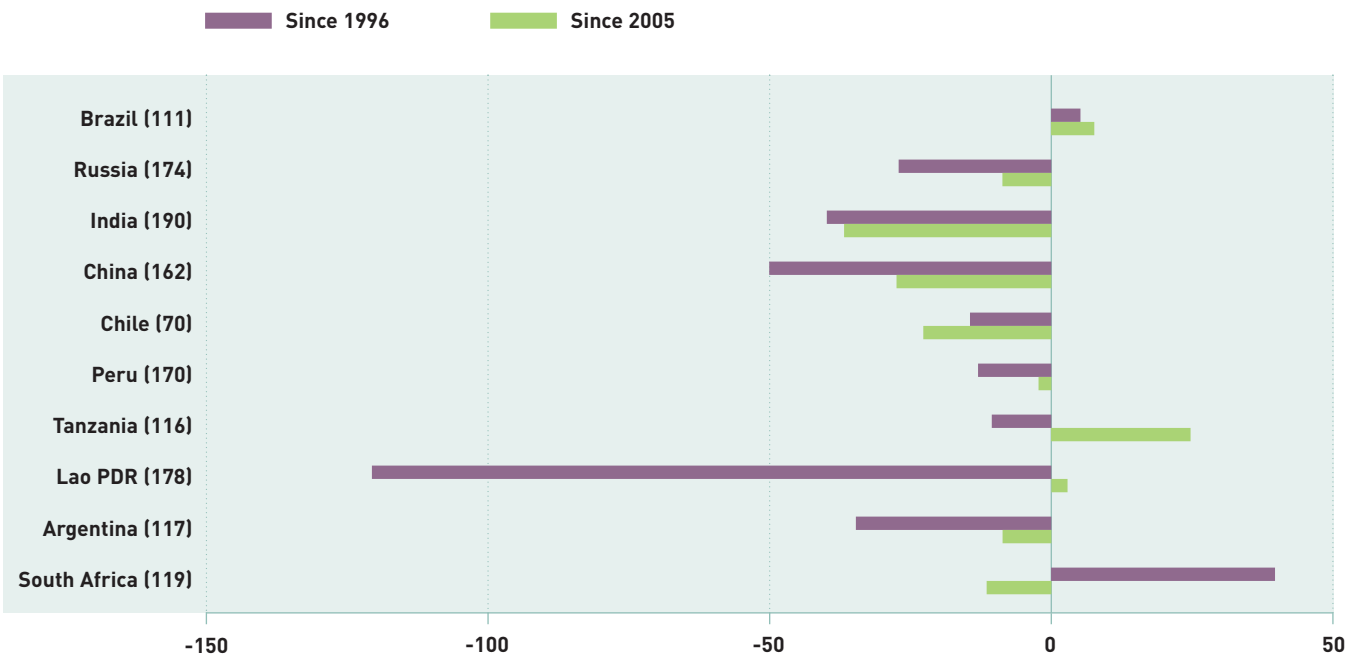
Focusing on changes in rankings over the last five years may be somewhat more reliable, as it helps to avoid biases from adding/subtracting sources.[50]

First, Figure E.4 indicates the slight improvements in the ***Political Stability*** rankings of Brazil relative to comparator countries since 1996, though most of these improvements have been made since 2005 under the Lula administration. These improvements in Political Stability resonate with the improving overall economic indicators during this period. Brazil is ranked in the middle of the sample (rank 111), with only one comparator country (Chile) ranked higher. Significantly, other BRICS countries have displayed overall declines in their rankings on this indicator, with the exception of South Africa looking at the period 1996–2010.

Second, in relation to ***Voice and Accountability***, Brazil's situation has remained fairly stable over the time periods considered (Figure E.5). The country's ranking has improved marginally since 1996, but remained largely unchanged since 2005. Brazil's ranking of 78 was the highest ranking on this indicator among BRICS countries, with the exception of South Africa, and with Russia exhibiting the greatest decline in relative rankings. Although Chile has improved its rankings significantly since 1996, the more recent trends indicate that some of these improvements have been undone over the last five years, with the country's ranking falling 15 positions since 2005.

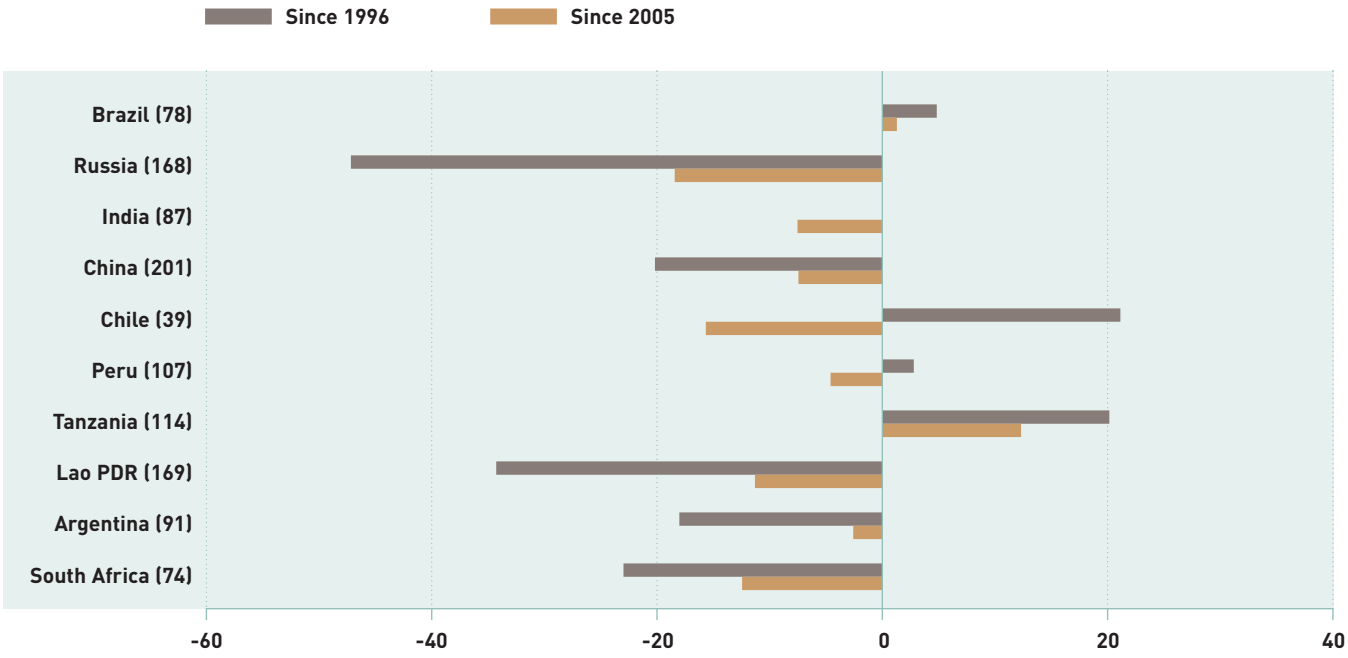
50 Further details regarding changes to source data can be found at http://info.worldbank.org/governance/wgi/pdf/c30.pdf

Figure E.4: Rankings and changes over time: Political stability



Source: World Bank. Axis represents the absolute change in governance ranking, during the two periods.

Figure E.5: Rankings and changes over time: Voice and Accountability



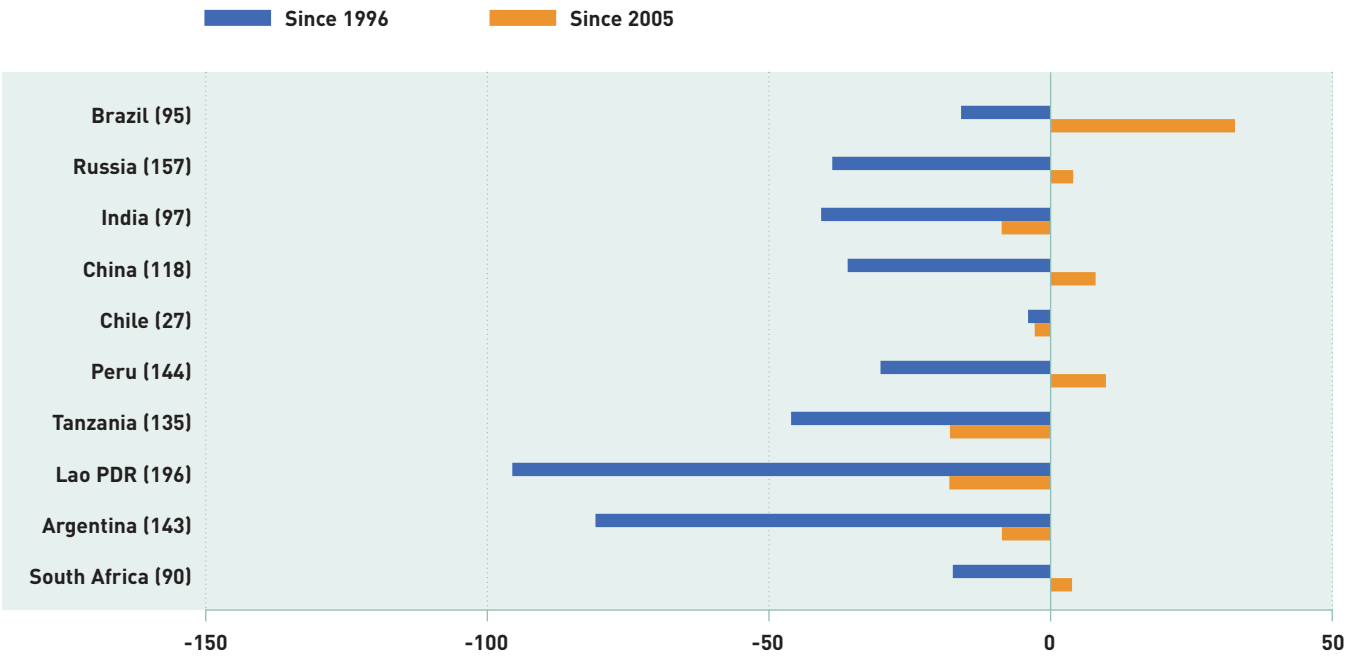
Source: World Bank. Axis represents the absolute change in governance ranking, during the two periods.

Annex E
Governance indicators – international comparisons

In relation to the ***Rule of Law*** indicator, Brazil again ranks around the middle of the countries in the sample (ranked 95 in 2010). However, this is still higher than its neighbouring countries Peru and Argentina and higher than other BRICS countries. Although Brazil has witnessed a decline in its ranking since 1996, the more recent data since 2005 indicate a rapid relative improvement with an increase of 32 positions in the rankings.

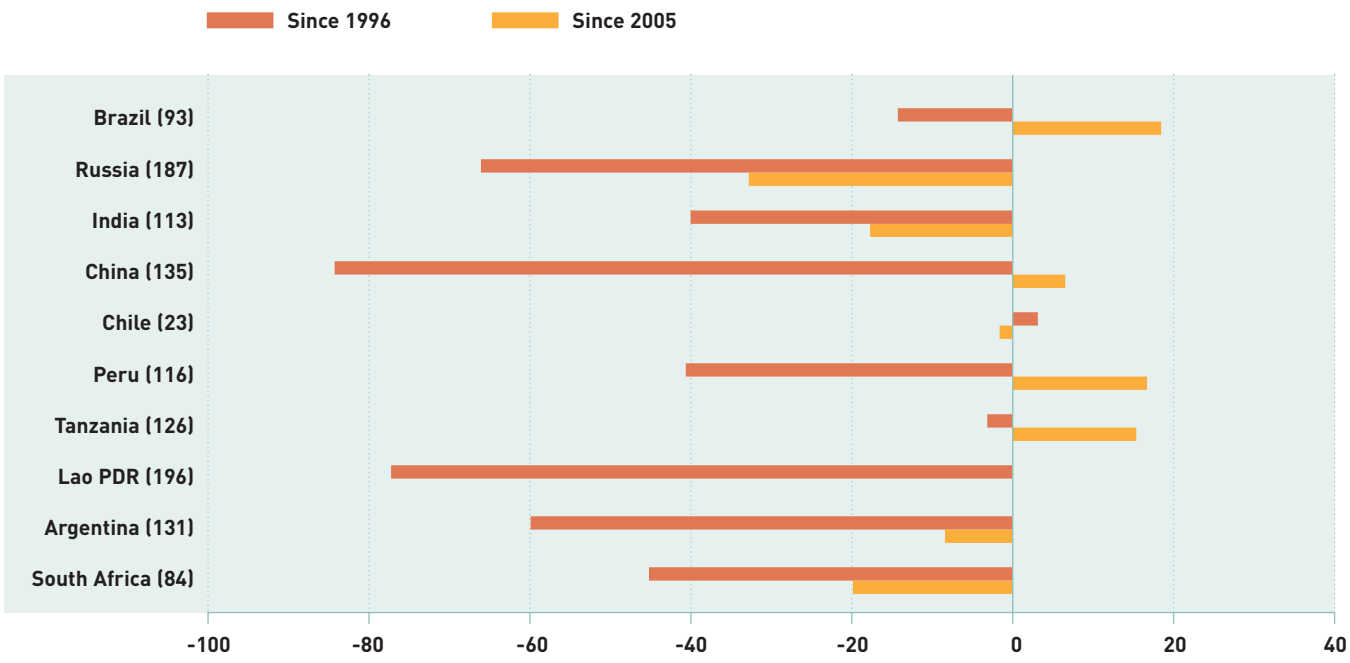
In relation to the ***Control of Corruption,*** Brazil again ranks in the top half of the global distribution and significantly outperforms other large emerging markets such as China and Russia, although South Africa ranks marginally higher. Chile is once again ranked much higher than Brazil. Over time there has been a varying degree of short-run fluctuations in Brazil's Control of Corruption ranking and also a general long-run decline to the present position of 93rd. Unlike most of its comparator countries, Brazil's relative ranking on this indicator has improved over the last five years, rising by 18 positions. Looking at the sample below, it seems the efforts to combat corruption in Brazil (as well as in Peru) appear to have been successful.

Figure E.6: Rankings and changes over time: Rule of Law



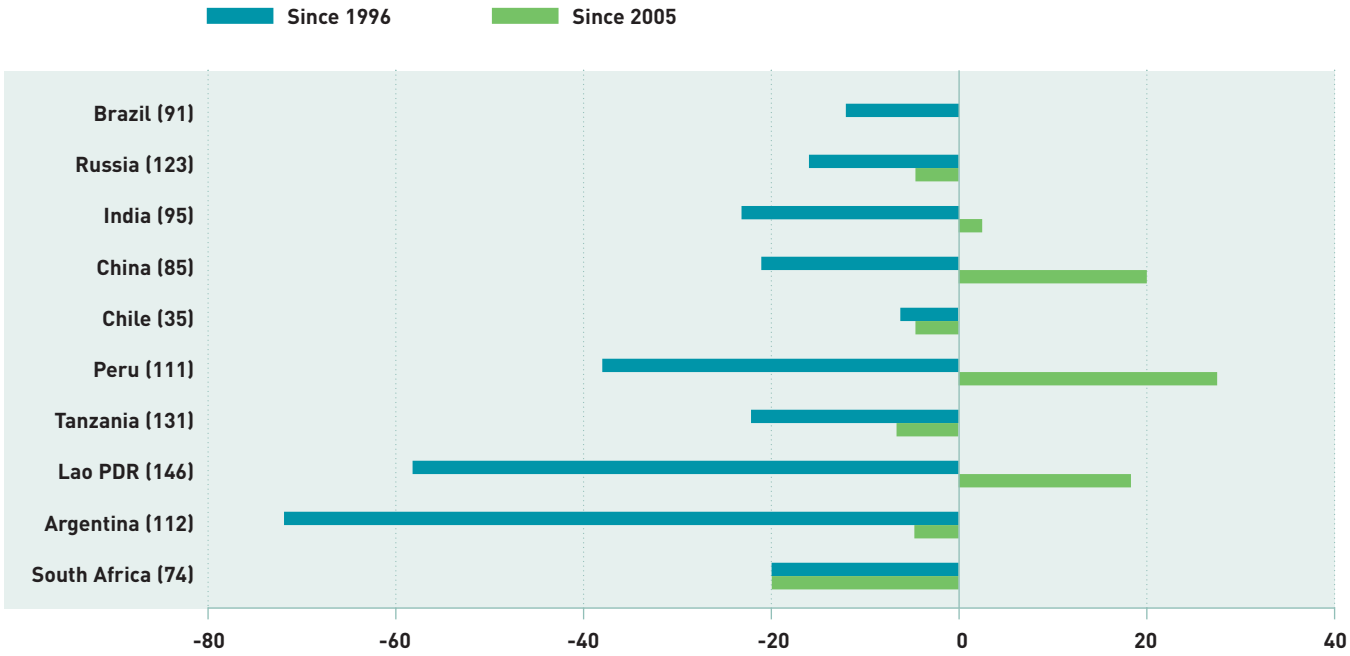
Source: World Bank. Axis represents the absolute change in governance ranking, during the two periods.

Figure E.7: Rankings and changes over time: Control of Corruption



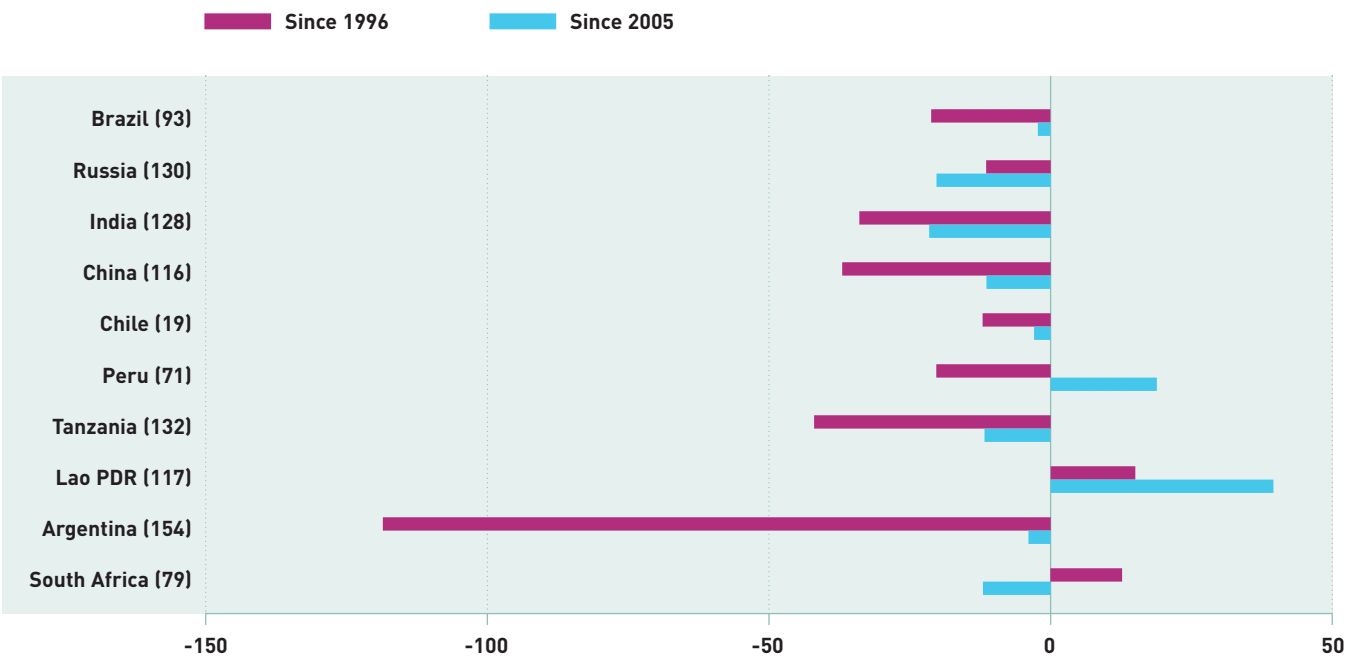
Source: World Bank. Axis represents the absolute change in governance ranking, during the two periods.

Figure E.8: Rankings and changes over time: Government Effectiveness



Source: World Bank. Axis represents the absolute change in governance ranking, during the two periods.

Figure E.9: Rankings and changes over time: Regulatory Quality



Source: World Bank. Axis represents the absolute change in governance ranking, during the two periods.

On ***Government Effectiveness*** Brazil is currently positioned in the second percentile ranking of 91 in 2010, which is slightly ahead of India but slightly behind China (see Figure E.8). These rankings are above most African countries, but well below the US and most European countries (not shown in figure). These rankings have remained unchanged for Brazil over the last five years, indicating that the Lula government's reforms have yet to translate into improved perceptions.

In terms of ***Regulatory Quality*** (see Figure E.9) Brazil ranks above the others BRICS countries, although neighbouring Peru and Chile both outperform it. As was the case above on Governance Effectiveness, there have been no major changes to Brazil's rankings since 2005. This suggests that issues around transparency and bureaucracy of government policy remain unaddressed.

E.4 Summary and discussion

The national level data on perceptions of the quality of governance for Brazil shows some ambiguity: Brazil has a burgeoning reputation as an outstanding economic power and is now the sixth largest economy in the world but when compared to OECD countries its performance on most aspects of governance remains modest. The country rankings based on the World Bank's World Governance Indicators (WGI) places Brazil in most cases squarely around the median of c.190 countries. While Brazil outperforms other "BRIC" countries (China, India and Russia) on various indicators, the country's absolute scores have not seen marked improvements since the mid-1990s. Hence, aggregate improvements in governance have not been a main driver behind the very good overall economic performance of the country, and likewise aggregate assessments of Brazil's governance performance are ill-suited to identify the critical issues at stake.

Noteworthy are the aggregate improvements with respect to perceived levels of "Voice and Accountability" and "Political Stability, as well as on the "Rule of Law and "Control of Corruption". But these improvements have been counterbalanced by the absence of positive change with respect to "Government Effectiveness" and "Regulatory Quality". While it is difficult to pin down exactly the reasons for these aggregate perceptions, they indicate ***challenges around the reliability of the political administrative system to translate national-level policy deliberations into the implementation of public policies at the municipal and state level, where they are required to fully achieve the direct and indirect benefits of mining activity***. From 2005 onwards there appears to be the onset of a trend that points to improvements across the board. Unfortunately, it is too early to confirm that this trend will be sustained throughout this decade.

Annex F
The 1988 Constitution and the fiscal regime

The Brazilian Constitution of 1988 was introduced as part of the political transition from a military dictatorship. It sets out a federal presidential constitutional republic, based on a representative democratic democracy. Not uncommon for a Constitution drafted in response a preceding autocratic regime, it is one that contains detailed stipulations around the autonomy of sub-national entities and their administrative capabilities, and this brings important implications with respect to intergovernmental financial transfers and taxation.

At the federal level, the impacts of the 1988 Constitution have been two-fold:

- It has increased the formally mandated obligations of the federal, state and municipal governments to allocate spending on certain social and other services; and
- It has obligated the federal government to share more of its tax collection with sub-national governments, and also to concede authority for formulating tax and revenue policy to sub-national government entities.

Taxation

At the state level, a major change has been fiscal decentralization in the form of allowing individual states to set the rates they levied on the country's value-added tax (ICMS – Imposto sobre a Circulação de Mercadorias e Serviços). As well as becoming the major single source of self-generated tax revenue for most states, this differentiation of rates across states has added complexity and encouraged competitive tax rate setting between states. In mineral dependent states mainly exporting their product, the zero rating of exports under the ICMS means that those states receive less revenue than would otherwise be the case. Since 1997 this has been corrected with the Kandir Law, as a result of which states now receive compensation from the federal government for their loss of ICMS revenue. In practice this "export" compensation transfer has been small relative to the foregone revenues for the ICMS and also to the transfers that the states receive under various other headings.

The states are also required to transfer a part of their ICMS revenues to municipalities. This constitutes a main form of state to municipal transfer, and in the case the mining affected areas of Southeast Pará is the main source of public revenue.

One of the responses since the last 1980s is that the federal government has developed new forms of taxation that are levied solely at the federal level and are not shared with subnational government entities. This, and the transfers from both the federal government and state governments down to municipal administrations has left the state governments with a somewhat more squeezed revenue basis and administrative reach, despite their broad and also legislative public sector responsibilities.

Intergovernmental Transfers

In contrast to the more recently introduced fiscal decentralization, intergovernmental transfers to sub-national administrative entities have a longer tradition and have been a pillar of Brazil's public finance system for more than a century. However their importance greatly increased with the 1988 Constitution. According to Ministry of Finance data, the enhancement to directly collected tax revenues affected by transfers rose from less than 10% of tax revenues before 1988 to around 24% by 2006. In 2006 federal transfers to the state governments represented around 20% of federal tax receipts. State level transfers to municipalities represented 30% of state level tax collections.

Annex F
The 1988 Constitution and the fiscal regime

Since the 1988 Constitution most transfers have been based on specific formulae. For example, states are required to share with municipalities 25% of their ICMS collections. The 1988 Constitution also increased the state and municipal shares of both the federal income tax (IR – Imposto de Renda) and the industrial products tax (IPI – Imposto sobre Produtos Industrializados) – these being managed through the two funds – the states' participation fund (FPE – Fundo de Participação dos Estados) and the municipalities' participation fund (FPM – Fundo de Participação dos Municípios. It also established three regional funds – including one for the North (FNO – Fundo de Financiamento do Norte) – to specifically support the less developed regions of the country and assigned 3% of both the IR and IPI revenues towards this objective.

At the level of the municipalities, the Constitution also increased transfers from states to municipalities. Specifically, one quarter of the state ICMS and half the revenues from the state Motor Vehicle Tax (IPVA) are transferred to municipalities. Further, the tax on financial operations in gold (IOF – Ouro – Imposto às Operações Financeiras – Ouro) is currently transferred in the proportions of 30% to the state of origin and 70% to the municipality of origin. States have also been required to transfer to municipalities one quarter of any export compensation funds received from the Federal Government.

A few years after the introduction of the new Constitution, these transfers were supplemented by subnational transfers that involve matching grants to help expenditures on "merit" goods, especially education and health. Basically, the system in place now requires states and municipalities to earmark and spend set percentages of their revenues on these two sectors. These spends are then complemented by federal transfers. In education the main medium for this since 1996 has been the FUNDEF/FUNDEB system of transfers. In the case of health the transfer system works via the comprehensive Unified Healthy System (SUS) that was created in 1986.

By 2006 inter-governmental transfers based on these constitutionally set tax revenue sharing arrangements were estimated by the Ministry of Finance to account for as much as 85% of all transfers.

In Southeast Pará, in 2006 the transfers accounted for 76% of all municipal revenues. This poses a challenge whereby any volatility in tax receipts, or indeed any tax reform arrangements, carries the potential of large feedback effects on the transfers to sub-national governments. Reform of the two elements – tax structure and system for allocation and transfers – need to be considered as joint issues, bearing in mind that the overall tax burden on the mining sector in Brazil is already perceived to be high (see Section 2.3).

Statistical detail on some aspects of these features of the current municipal revenue streams are summarized for mining-affected and other municipalities in Figure F.1 at the end of this Annex.

Changes to the situation described above during the Lula and Rousseff presidency periods from 2003 and beyond have involved the addition or strengthening of additional special socially oriented programmes and respective transfers, designed to address inequality either of living standards (notably the Bolsa Familia and the later Poverty Eradication Programme – Brasil Sem Miséria of 2011) or of infrastructure endowments (notably the Growth Acceleration – PAC programme of 2007) across the different regions of Brazil.

Table F.1: **Overview of municipal transfers in seven "AID" municipalities**

Municipality	Transfers ICMS	% of Pará	Transfers FPM	% of Pará	Transfers IPI exports	% of Pará	Transfers FUNDEB	% of Pará	Transfers LC87	% of Pará	SUB-TOTAL	% of Pará	CFEM	% of Pará	Population ('000 in 2010)	% of Pará
Canaã dos Carajás	15,308	1.80%	6,478	0.42%	640	1.80%	6,396	0.39%	313	1.80%	29,135	0.71%	0	0.00%	26.7	0.33%
Curionópolis	2,041	0.24%	6,478	0.42%	85	0.24%	3,858	0.23%	42	0.24%	12,504	0.31%	7	0.00%	18.3	0.22%
Eldorado dos Carajás	2,806	0.33%	7,558	0.50%	117	0.33%	9,826	0.59%	57	0.33%	20,364	0.50%	0	0.00%	31.8	0.39%
Marabá	49,749	5.85%	40,675	2.67%	2,080	5.85%	59,680	3.61%	1,016	5.85%	153,200	3.75%	6,119	4.02%	233.7	2.86%
Ourilândia do Norte	2,296	0.27%	6,478	0.42%	96	0.27%	5,714	0.35%	47	0.27%	14,631	0.36%	0	0.00%	27.4	0.34%
Parauapebas	76,623	9.01%	19,434	1.27%	3,204	9.01%	35,291	2.13%	1,565	9.01%	136,117	3.33%	106,498	69.99%	153.9	1.89%
Tucumã	3,487	0.41%	7,558	0.50%	146	0.41%	7,679	0.46%	71	0.41%	18,941	0.46%	0	0.00%	33.7	0.41%
TOTAL 7 AIDs	**152,310**	**17.91%**	**94,659**	**6.20%**	**6,368**	**17.91%**	**128,444**	**7.76%**	**3111**	**17.91%**	**384,892**	**9.42%**	**112,624**	**74.02%**	**525.5**	**6.44%**
TOTAL Municipalities of Pará State	850,417	100.00%	1,525,621	100.00%	35,563	100.00%	1,655,016	100.00%	17,374	100.00%	4,083,991	100.00%	152,158	100.00%	8,160.5	100.00%

Annex G
Summary Balance of Payments for Brazil (1995–2010, US$ million)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Current account	**-18384**	**-23502**	**-30452**	**-33416**	**-25335**	**-24225**	**-23215**	**-7637**	**4177**	**11679**	**13985**	**13643**	**1551**	**-28192**	**-24302**	**-47365**
Balance on goods (FOB)	-3466	-5599	-6753	-6575	-1199	-698	2650	13121	24794	33641	44703	46457	40032	24836	25290	20221
Exports	46506	47747	52994	51140	48011	55086	58223	60362	73084	96475	118308	137807	160649	197942	152995	201915
Imports	-49972	-53346	-59747	-57714	-49210	-55783	-55572	-47240	-48290	-62835	-73606	-91351	-120617	-173107	-127705	-181694
Services and Income	-18541	-20350	-25522	-28299	-25825	-25048	-27503	-23148	-23483	-25198	-34276	-37120	-42510	-57252	-52930	-70373
Current unilateral transfers	3622	2446	1823	1458	1689	1521	1638	2390	2867	3236	3558	4306	4029	4224	3338	2788
Capital and financial account	**29095**	**33968**	**25800**	**29702**	**17319**	**19326**	**27052**	**8004**	**5111**	**-7523**	**-9464**	**16299**	**89086**	**29352**	**71301**	**99662**
Capital account	352	454	393	320	338	273	-36	433	498	372	663	869	756	1055	1129	1119
Financial account	28744	33514	25408	29381	16981	19053	27088	7571	4613	-7895	-10127	15430	88330	28297	70172	98543
Direct investment	3309	11261	17877	26002	26888	30498	24715	14108	9894	8339	12550	-9380	27518	24601	36033	36919
Brazilian direct investment	-1096	469	-1116	-2854	-1690	-2282	2258	-2482	-249	-9807	-2517	-28202	-7067	-20457	10084	-11519
FDI	**4405**	**10792**	**18993**	**28856**	**28578**	**32779**	**22457**	**16590**	**10144**	**18146**	**15066**	**18822**	**34585**	**45058**	**25949**	**48438**
Equity capital	4239	9893	16817	25479	29983	30016	18765	17118	9320	18570	15045	15373	26074	30064	19906	40117
Other foreign investments (net)	18019	10989	-2846	-2893	-9223	-15213	9353	2150	-686	-8721	-22486	24104	31683	8143	14076	41301
Loans	5493	3270	5879	4031	1342	-8774	5714	1031	-1549	-10421	-26753	9851	13694	5172	4926	41158
Monetary authority	-239	-387	-234	8944	2803	-10434	6639	11363	4645	-4494	-23402	-138	-138	0	0	-4
Exceptional financing	-47	-72	-34	9329	2966	-10323	6757	11480	4769	-4363	-23271	0	0	0	0	0
Remaining sectors (long-term and short-term)	5732	3657	6113	-4914	-1461	1660	-925	-10332	-6194	-5927	-3351	9990	13832	5172	4926	41161
Long-term	-841	-3519	8278	6490	-2009	2736	951	-5321	-4751	-4743	-2291	10505	64	13321	7175	19049
Short-term (net)	6573	7176	-2165	-11404	548	-1077	-1875	-5011	-1443	-1184	-1059	-516	13768	-8148	-2249	22112
Currency and deposits (net)	4919	-4339	-9743	-9665	-3249	-33	-596	-621	625	517	567	1458	607	-1495	1092	964
Errors and omissions	**2207**	**-1800**	**-3255**	**-4256**	**194**	**2637**	**-531**	**-66**	**-793**	**-1912**	**-201**	**628**	**-3152**	**1809**	**-347**	**-3197**
Overall balance	**2919**	**8666**	**-7907**	**-7970**	**-7822**	**-2262**	**3307**	**302**	**8496**	**2244**	**4319**	**30569**	**87484**	**2969**	**46651**	**49101**
Change in reserves*	**-12919**	**-8666**	**7907**	**7970**	**7822**	**2262**	**-3307**	**-302**	**-8496**	**-2244**	**-4319**	**-30569**	**-87484**	**-2969**	**-46651**	**-49101**

* - = increase

Annex H
Government comments

48390.000518/2013-00

Ministério de Minas e Energia
Secretaria de Geologia, Mineração e Transformação Mineral
Departamento de Desenvolvimento Sustentável na Mineração
Esplanada dos Ministérios, Bloco "U", 4º andar, sala 430
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Ofício nº 004/2013-DDSM/SGM-MME

Brasilia, 19 March 2013

Dear Ms. **Kate Carmichael**
Manager, Social and Economic Development
ICMM - International Council on Mining and Metals

Subject: **IBRAM-ICMM Brazil Country Case Study**

Dear Madam,

1. We welcome the opportunity to review and comment on the IBRAM-ICMM Brazil Country Case Study. This is an important initiative for the mining industry in Brazil, with respect to matters involving Corporate Social Responsibility.

2. As the mining sector of Brazil expands, a broader evidence base concerning the actual and potential future contributions from the mining sector to sustainable and equitable development – through direct and indirect impacts – will be of critical importance in framing our future policies. At the same time, the environmental, social and labour issues will need to be carefully addressed.

3. In this context, the application of the ICMM Mining: Partnerships for Development toolkit to Brazil has been useful to us. It has provided a valuable description of the impacts of the mining sector on the Brazilian economy in general – and in particular in the rural areas of Pará in Northern Brazil, where much of the current development is taking place. Your report has also brought together a great deal of useful information about how the mining companies are working with various partner agencies in government and the private sector in trying to address the multi-facetted challenges that are involved in capturing fully the benefits of this important sector of our economy.

4. The task of ensuring that Brazil derives maximum benefits from the mining sector will require continued and effective government policy across a range of areas, as well as communication and information sharing between many different actors.

5. The engagement with government, non-government and industry stakeholders in the preparation of the study, and during the multistakeholder workshop held on 29 February 2012, makes a useful contribution in this regard.

6. There is a necessity to carry out intense work in mining regions, conducted by different decision makers, including civil society representatives, and with participation of state agencies at various levels so that there is alignment of private investment with public policies and with the participation of society. Societal welfare is reflected by the increase of efficiency, improvement of economic performance, more effective governance and poverty reduction.

Thank you for your good work.

EDSON FARIAS MELLO
Director, Ministry of Mines and Energy

Acknowledgements

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The preliminary findings of this report were developed between October 2011 and January 2012, and presented and discussed at a multi-stakeholder workshop in Brasilia on 29 February 2012. The workshop entitled "Exploring the economic and social impacts of mining in Brazil" was organised by the Instituto Brasileiro de Mineração (IBRAM) and brought together around 120 participants, from a broad selection of industry, government and non-government organisations. Our sincere thanks are due to the participants at this workshop and to the staff at IBRAM who worked tirelessly to ensure its success. In particular we are grateful to the workshop participants for openly sharing their perspectives on a range of challenges facing the mining sector, with particular thanks to Claudio Scliar and Edson Mello at the Ministry of Mines and Energy, Pablo Fonseca dos Santos at the Ministry of Finance, Luiz Pinto from supplier development association Federação das Industrias do Pará (FIEPA) and Professor Maria José Salum (Professor at Federal University of Minas Gerais) for chairing discussions during the day. The wide range of contributions made at this workshop and not least those emerging from the working group sessions have immeasurably improved our understanding of many of the key issues and possible ways of addressing them. These contributions are reflected throughout the report and in Annex B.

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The results and conclusions in this report are OPM's responsibility alone. OPM, as the consultant firm with the primary responsibility for this assessment, has no financial interest in any mining company. The present assignment has been undertaken on the basis of strict objectivity and independence.

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