8

BRAZIL

Subsector Focus: gold

8.1 Overview

Hydrologically, Brazil has abundant water resources accounting for approximately 12% of the world's available freshwater resources. Average availability across the country is high although the Northeastern region has a semi-arid climate, which comprises a large part of the population. Some water stress exists here as well as in the south of the country where most of the urban population resides.

However, although Brazil is a mostly water rich country, it has traditionally had a weak water regulatory system punctuated by poorly managed and maintained supply systems. A number of water conflicts have arisen as a result of weak institutions. The main water challenges are deforestation in the Amazon basin and related water impacts, water pollution in Rio de Janeiro, Sao Paulo and several other large cities, water pollution caused by improper mining activities, wetland degradation and severe oil spills. In the face of these, Brazil is rapidly increasing its institutional capacity in water resource management. Many watershed and basin committees have been formed to manage local resources, which are enforcing national policy precepts of "users pays" and "polluter pays".

Brazil is an example where water pressures and resulting financial risks are not a consequence of chronic water shortages or prolonged droughts but unsustainable water management and pollution from agricultural or industrial processes. As Brazil continues to develop economically and mining activities increase, water-related regulatory risks will continue to rise around institutional and social issues. The country has large deposits of precious metals and iron ore (**see Figure 9 and 10**). This briefing focuses on one important sub-sector in Brazil:

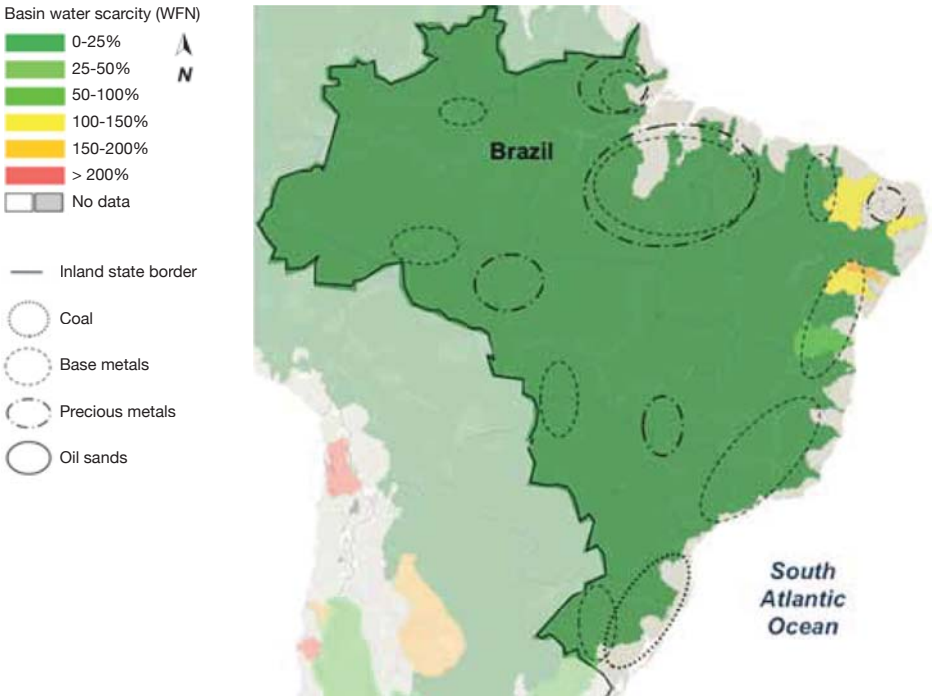
(1) **Gold.** Brazil is among the top 15 producers of gold in the world. The principal gold producing companies in Brazil are: AngloGold Ashanti, with 19% of the total; Mineração Serra Grande (Anglo and Kinross) with 13%; Rio Paracatu Mineração (Kinross) with 17%; Yamana Gold 27%; and others, including production in informal mine settlements, also known as garimpos, with 24%. Brazil's gold deposits are primarily located in the Brazilian states of Minas Gerais and Pará with some lesser mining in Goiás, Mato Grosso and Bahia. Brazil exports just under half of its gold production. In 2008, export revenues were valued at $1bn FOB (free on board).

The Amazon region has been responsible for a major share of Brazilian gold production in recent years. The region has witnessed a sizable gold rush which spawned a powerful informal mining sector. There have been environmental effects of gold mining in the region, in particular mercury pollution in the rivers. The environmental costs of the present extraction technology will be faced primarily by future generations, because of natural chemical processes and key elements of the environmental problem are as a result of the informal miner economy.[118]

Geographical distribution of mining activities in Brazil in the context of water scarcity.

Figure 9:

Average annual blue water scarcity for Brazil

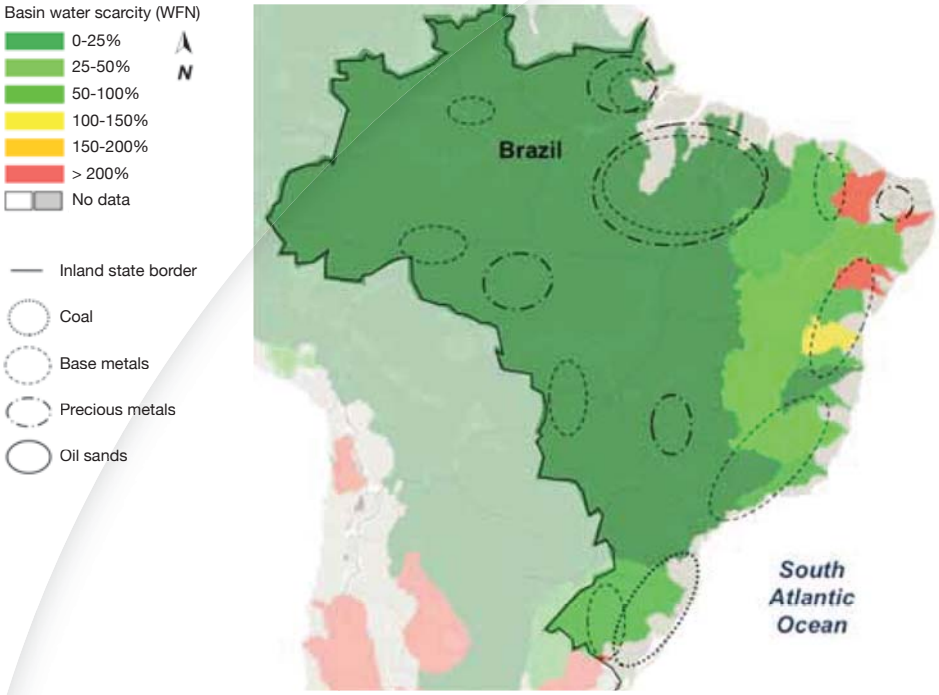


Description: Annual average of the twelve monthly blue water scarcity values per basin, equally weighted. Blue water scarcity is defined as the ratio of blue water footprint (based on consumption rather than withdrawal) to blue water availability – where the latter is taken as natural runoff minus environmental flow. Blue water resources are surface water and ground water on the basis of data from 1996-2005.

Source: Hoekstra, A.Y., Mekonnen, M.M., Chapagain, A.K., Mathews, R.E. and Richter, B.D. (2012) Global monthly water scarcity: Blue water footprints versus blue water availability, PLoS ONE 7(2)

Figure 10:

Maximum monthly blue water scarcity for Brazil



Description: Blue water scarcity in the month with the highest scarcity level - defined as the ratio of blue water footprint to blue water availability – where the latter is taken as natural runoff minus environmental flow. >100% means that consumption is higher than availability in that particular month. Blue water resources are surface water and ground water on the basis of data from 1996-2005.

Source: Hoekstra, A.Y., Mekonnen, M.M., Chapagain, A.K., Mathews, R.E. and Richter, B.D. (2012) Global monthly water scarcity: Blue water footprints versus blue water availability, PLoS ONE 7(2)

8.2 Case Study 7: Gold Mining in the Amazon

The example of gold mining in the Amazon draws an important distinction between large corporate action and small and medium-scale operations. Low regulation of small scale operators creates both physical and regulatory risk for larger operators.

Gold mining in the Amazon Basin happens in a remote region. There is little regulation over these operations and yet there are lasting environmental issues where mining run-off empties into local streams and creates severe water quality problems. The impacts on water quality are difficult to monitor given nature of small-scale operations, which are highly mobile and operators move from one site to another very quickly.

There are a number of difficulties that attend this gold mining process. Small-scale operations use basic gravimetric washing practices, which lead to missing fine particles of gold and other metal materials, which then pollute local water resources. Furthermore there are no instruments to measure usage of water so the throughput is much higher than in larger operations. A number of environmental impacts are associated with these mining practices including deforestation, land degradation, deterioration of surface water, mercury pollution, and loss of aquatic flora and fauna. These water-related impacts also adversely impact local communities. Many of these risks may be attributed to the following:

- Small farmers and artisanal miners do not handle technical and environmental information at various stages of mining activity.
- The mining activity is carried out with little environmental responsibility.
- Introduction of technology without planning and implementation without environmental responsibility.
- Absence of the competent environmental authority to control and plan the development of the mining industry.

The very large risk associated with this type of situation lies with the potential impact on larger companies who begin or who are operating in region. Most large companies have higher standards of environmental practice and traditionally work with communities and NGOs to limit water risk. However, there is a risk these companies could receive blame for deteriorating water quality that is contributed to by smaller scale operations. Such potential reputational risks can then turn into disruptions of operations. In these areas there is little institutional oversight leaving almost no protection for communities. Based on this case study, three major areas of concern emerge:

1. **Evolving regulatory structures**
2. **Water quality concerns**
3. **Limited engagement with local stakeholders**

	Asset management	Corporate finance	Project finance
Evolving regulatory structure	Profitability structure of investments change as additional regulatory costs emerge	Risk profile changes as a result of potential changes to regulatory structure	Impositions of additional regulatory costs severely impact cash flow and debt service
Water quality concerns	Share price may fall due to increased reputational and regulatory risk.	Risk profile changes when pollution coming from the company becomes increasingly transparent.	Permitting delay or failed acquisition as a result of poor behavior
Limited engagement with local stakeholders	Share price may fall due to increased reputational risk, in case water consumption is not in balance with other stakeholders	Without good local relations, especially large multinational companies can have higher risk to be blamed for local water mismanagement	Local stakeholders may increasingly be able to shut down or significantly curtail current mines or new developments