Environmental Performance Reviews

Brazil

HIGHLIGHTS

2015

OECD

BETTER POLICIES FOR BETTER LIVES

Environmental Performance Reviews

THE OECD

The Organisation for Economic Co-operation and Development (OECD) provides its 34 member countries with a unique forum to work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

WHAT ARE EPRs?

OECD *Environmental Performance Reviews* (EPRs) provide evidence-based analyses and assessments of countries' progress towards their environmental policy objectives. They promote peer learning, enhance government accountability and provide targeted recommendations to help countries improve their environmental performance. They are supported by a broad range of economic and environmental data. Each EPR cycle covers all OECD member countries and selected partner countries.

WHY AN EPR OF BRAZIL?

Brazil is one of five major emerging economies with which the OECD has established a key partnership, together with the People's Republic of China, India, Indonesia and South Africa. In the context of this mutually beneficial co-operation, the OECD conducted the first review of Brazil's environmental performance. This involved a constructive dialogue between Brazil and the countries participating in the OECD Working Party on Environmental Performance. The EPR provides an assessment of Brazil's environmental progress and policies and identifies 53 recommendations to help enhance policy coherence, effectiveness and efficiency. These *Highlights* summarise the main findings, with a special emphasis on:

- **Key environmental developments**
- **Environmental governance and management**
- **Progress towards a green economy**
- **Biodiversity conservation and sustainable use**

"Brazil needs to remain vigilant and thoroughly implement all the environmental programmes it has put in place."

Ángel Gurría, OECD Secretary-General

OECD
BETTER POLICIES FOR BETTER LIVES

Brazil

BRAZIL 2014

Population
199.5 million

GDP/capita
(purchasing power parity)
USD 15 800
(OECD average is 38 900)

Total area
8 515 770 km^2

Population density
23.4 inhabitants/km^2
(OECD average is 34.9)

Currency
Brazilian real
USD 1.00 = BRL 2.35

Overview

Brazil is the world's fifth largest country. Vibrant growth and effective social policies lifted millions of people out of poverty in the 2000s, although socio-economic development varies widely across the country. Natural resources are essential to Brazil's development: it is among the major global agricultural, minerals and oil producers, and hydropower generates most of its electricity. Protected areas extend over a large part of the country and deforestation in the Amazon has dropped remarkably, which in turn has helped curb greenhouse gas emissions.

However, economic growth and urban, agricultural and infrastructure expansion have also meant increased energy and resource use and consequent environmental pressures. Quality and coverage of environmental services need to be further improved. While Brazil's environmental laws are stringent, implementation and enforcement gaps persist.

In the current context of a contracting economy, better integrating environmental objectives into economic and sectoral policies would help Brazil move towards a greener, more sustainable development path.

OPPORTUNITIES

- **The world's most biodiverse country, with vast forest, water, mineral and fossil fuel resources.**
- **A low-carbon energy mix based on hydropower and biofuels.**
- **A comprehensive and advanced legislative framework for environmental management and sustainable use of biodiversity.**
- **A new Forest Code that promises to reconcile the objectives of biodiversity conservation and agricultural development.**
- **First-rate deforestation monitoring systems.**
- **One of the world's largest systems of protected areas.**

CHALLENGES

- **A weakening economy and wide disparities in income and access to environmental services.**
- **A decentralised governance structure, demanding close co-ordination between federal, state and municipal governments.**
- **Highly heterogeneous institutional capacity, creating gaps between announced policies and implementation.**
- **Growing cities, requiring upgraded water, waste and urban transport infrastructure.**
- **Continued clearing and degradation of large areas of tropical forests and savannah.**
- **Insufficient human resources to effectively manage protected areas.**

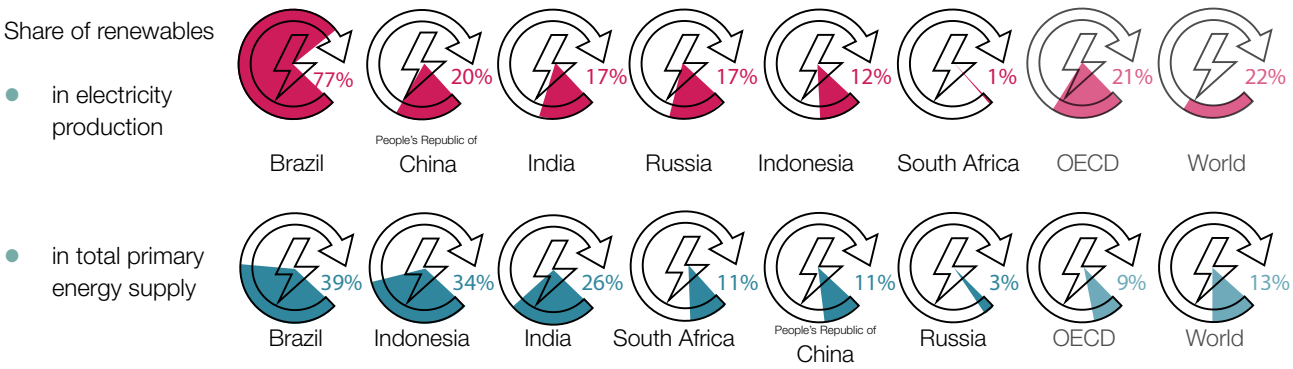
Key environmental developments

Brazil is very diverse with respect to climate, vegetation, land use, population, institutional capacity and economic activities. Brazilians are proud of their country's natural wealth and environmental awareness is increasing. Yet economic growth has been demanding on land, water, materials and energy, and has resulted in increased pollution and waste generation.

ENERGY AND CLIMATE CHANGE

- Brazil has a low-carbon energy mix, based on hydropower and biofuels: nearly 40% of its energy needs and about 80% of its electricity are generated from renewable sources. These are the highest shares among BRIICS countries (Figure 1). They help keep the carbon intensity of Brazil's economy (CO_2 emissions per unit of GDP) below the OECD average.
- Greenhouse gas (GHG) emissions have declined by more than 40%, thanks to a dramatic reduction in deforestation; in 2012 they were below the 2020 target (Figure 2). The fall in GHG emissions associated with deforestation has more than offset growing emissions from energy use and agriculture, which are now the largest emitting sectors.
- Brazil developed a comprehensive strategy for reducing GHG emissions. It launched climate change programmes in areas such as energy, iron and steel production, agriculture and deforestation control. Brazil is also developing a system to monitor the implementation and effectiveness of these programmes, as well as a climate change adaptation plan.

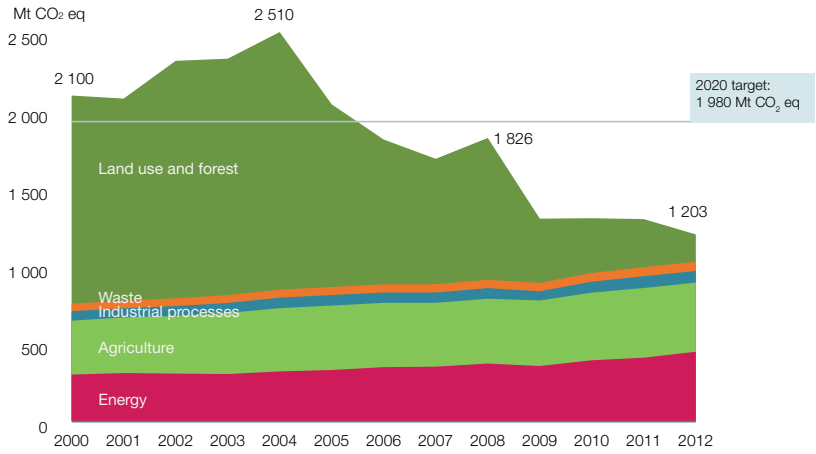
Figure 1: **Brazil has the highest share of renewables among BRIICS countries**



2013 data. Renewables include hydropower, geothermal, solar, wind, biofuels and renewable waste.
Source: IEA (2015), *IEA World Energy Statistics and Balances* (database).

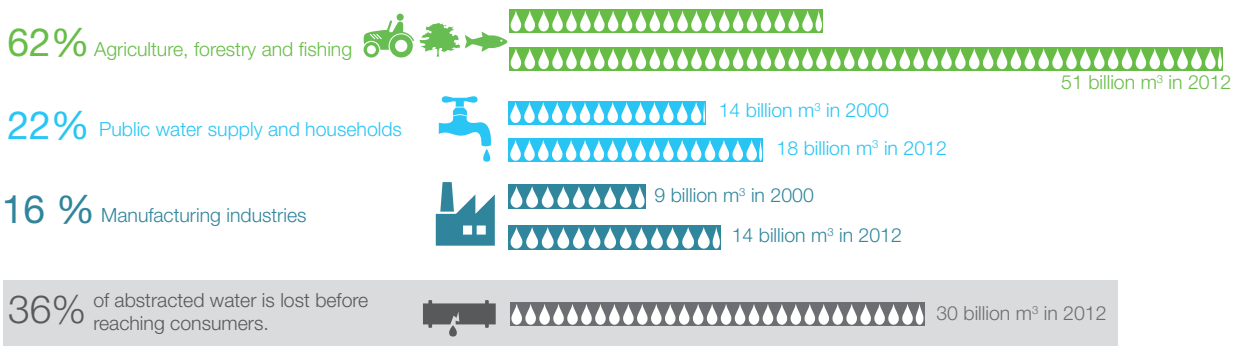
Figure 2: **GHG emissions have dropped to a level below the 2020 target**

Greenhouse gas emissions by sector, in million tonnes CO_2 equivalent



Source: MCTI (2014; 2013), *Estimativas anuais de emissões de gases de efeito estufa no Brasil*; MCTI (2010), *Second National Communication of Brazil to the UNFCCC*.

Figure 3: **Water use, especially for agriculture, has increased considerably**



Gross freshwater abstraction by sector, 2012.
Source: OECD (2015), "Freshwater abstractions", OECD Environment Statistics (database) 1 = 1 billion m³

AIR QUALITY

- Air pollution has been reduced, but peak concentrations of small particles regularly exceed national air quality standards in major metropolitan areas. This has severe health impacts.
- Less than half of the states have installed monitoring systems, and data on air pollution are often inconsistent. Brazil is revising its national air quality standards in accordance with World Health Organization guidelines.

WASTE MANAGEMENT

- More people - but still only half of the rural population - benefit from waste collection services. Most waste is still landfilled, sometimes in uncontrolled sites.
- The 2010 National Solid Waste Policy is helping implement sound management principles, including extended producer responsibility for the recovery of selected products (e.g. electronic devices and pesticides) at the end of their useful life. However, recycling infrastructure, waste data and institutional capacity at local level are insufficient to ensure effective waste management.

WATER MANAGEMENT

- Brazil is endowed with 12% of the world's freshwater resources, but their distribution is uneven across the country: about 70% are located in the Amazon basin. Water abstractions have dramatically increased since 2000, especially for agriculture, the main water user (Figure 3). Access to potable water is now almost universal in urban areas, but still lacking for 15% of the rural population.
- Low rainfall and inefficient water use have led to some critical situations. The 2014-15 water shortages in the southeast affected millions of people and damaged agriculture, industry and hydropower production. More than a third of abstracted freshwater is lost before reaching consumers, primarily due to inadequate infrastructure.
- National, state and river basin plans for integrated water resource management cover only half the territory, are generally poorly implemented and fail to guide water resource allocation.
- Only 56% of the urban population had access to sewage collection systems in 2011, with large regional variations. Water quality is good or very good in about 80% of water bodies, but low in many densely populated urban areas, mainly due to increased effluent volumes and poor wastewater treatment.

Next steps | climate, air, waste and water

- Speed up the implementation of the sectoral climate change programmes and the development of the monitoring system.
- Develop a comprehensive nationwide air quality monitoring system.
- Establish consistent water allocation criteria and wastewater discharge limits.
- Better enforce waste management and disposal regulations and strengthen the waste management information system.

Environmental governance and management

The Brazilian Constitution recognises the people's right to an ecologically balanced environment. Brazil is an economically and socially heterogeneous country, with a complex federal governance framework. This makes implementing environmental policies and programmes on the ground challenging. The stringency of environmental requirements and the level of compliance vary substantially across jurisdictions, reflecting local priorities and capacity constraints.

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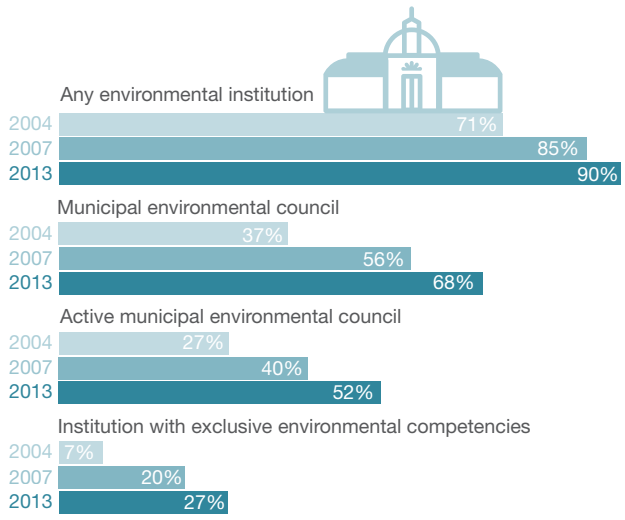
MULTILEVEL GOVERNANCE

Brazil has developed a comprehensive yet complex environmental institutional framework. The federal environmental institutions, including the environment ministry (MMA), the Brazilian Institute of Environment and Renewable Natural Resources and the Chico Mendes Institute for Biodiversity Conservation have grown remarkably in capacity and staff over the last 10 years. The National Environmental Council, a high-level advisory and deliberative committee, brings together all levels of government and relevant stakeholders. Yet effective co-ordination within and across levels of government is challenging.

Figure 4: **Many municipalities have established an environmental institution**



Source: IBGE (2013; 2009; 2004), *Perfil dos municípios brasileiros.*

All states and many large municipalities have their own environmental institutions (Figure 4), but their level of development varies considerably and their capacity is often limited. Despite progress, states and municipalities do not consistently monitor the state of the environment and the outcomes of their environmental policies.

FINANCING ENVIRONMENTAL PROGRAMMES

Public allocations for environmental management grew by 48% in 2010-14, reaching about 0.4% of the federal budget. The MMA budget is relatively small, and other ministries and agencies contribute a large part of public environmental expenditure. Recent government efforts to track this spending are a step forward to better understand whether public resources are efficiently allocated.

Environmental funds are a crucial source of finance for many environmental programmes. Major examples include the National Climate Change Fund and the Amazon Fund. Part of oil and gas revenue is used to finance environmental and climate mitigation programmes. Earmarking resources for environmental purposes may be necessary to secure reliable, sufficient financing, but can reduce the flexibility and efficiency of revenue allocation. Some funds have overlapping objectives, and they could be more closely monitored.

LEGISLATION AND ENFORCEMENT

Brazil has developed a stringent and advanced environmental legislation framework at the national level and in most states. Recent legislation has better

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AMAZON FUND

The Amazon Fund was established in 2008 to invest in deforestation prevention and forest conservation and sustainable use. It is managed by the Brazilian Development Bank in co-ordination with the MMA. Most of the funds come from international donors, mainly Norway and Germany. Between 2009 and early 2015, the fund accumulated more than USD 970 million and supported 72 projects.

At least 80% of the fund's investment is earmarked for the Brazilian Amazon region. The fund also supports an international project to expand the systematic monitoring of forest coverage to the other seven member countries of the Amazon Cooperation Treaty Organization.

defined the environmental responsibilities of the three levels of government. However, the stringency of environmental requirements varies across jurisdictions, creating risks of environmental dumping. The law is weakly enforced in many states and municipalities, partly because of an insufficient number of inspectors. Fines are rarely collected and environmental liability is sporadically applied.

Environmental licensing and impact assessment have been subject to broad criticism. Weak technical capacity, especially at subnational level, inadequate project planning and occasional interference of local interests hinder the timeliness, effectiveness and transparency of these instruments. Furthermore, they do not give sufficient consideration to potential environmental impact and to mitigation and compensation measures. There is no requirement for strategic environmental assessment of territorial plans and other development programmes.

Public participation is an eminent feature of Brazil's environmental governance. Non-government organisations participate in several multistakeholder decision-making bodies such as protected areas management committees. Public consultation is a mandatory part of environmental licensing. Citizens have a guaranteed access to environmental information and justice. However, despite some progress, information on both the state of the environment and policy implementation remains fragmented.

Next steps | governance

- Rationalise the multitude of co-ordination bodies to improve policy coherence.
- Streamline environmental funds and monitor them for transparency and efficiency.
- Strengthen implementation and enforcement capacity at subnational level.
- Develop a uniform system for collecting and managing environmental data, including on environmental law implementation and economic aspects of environmental policies.
- Require strategic environmental assessment of territorial plans and development programmes.
- Clarify the environmental licensing procedures and build administrative capacity.
- Strengthen the capacity of environmental inspectors at all levels of government and engage local communities in compliance monitoring.

Case studies

BOLSA FLORESTA

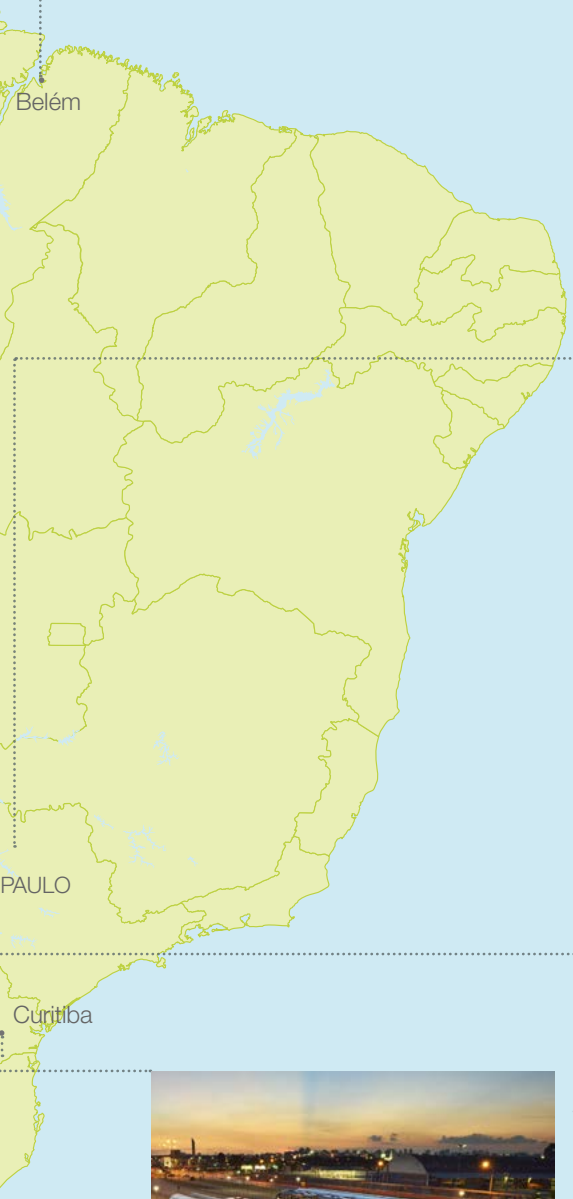
The state of Amazonas launched Bolsa Floresta in 2007. This pioneering conditional cash-transfer programme compensates traditional and rural families for their efforts in conserving the forest areas they live in. It provides income to more than 35 000 people scattered across hundreds of communities and has helped improve their health and education outcomes. Deforestation has decreased faster in areas participating in the programme than in the others. Following this example, in 2011 the federal government launched Bolsa Verde as part of its large anti-poverty programme Brasil sem Miséria.

PROMOTING NON-TIMBER PRODUCTS

Forest extraction is not limited to timber: rubber, seeds, fibres, fruits, essential oils and others generated BRL 936 million in 2011. However, the extraction of non-timber products is limited by insufficient demand and a mismatch between production and commercialisation. The 2009 National Plan to Promote the Production Chain of Socio-Biodiversity Products aims to strengthen the extraction and sale of 30 traditional non-timber products from sustainably managed forests, providing income to traditional and rural communities. It facilitates access to credit and markets, provides technical assistance and includes a minimum price policy for selected socio-biodiversity products.

THE SOYA MORATORIUM

In 2006, following pressures from NGOs and consumers, a group of large companies decided to stop buying soya grown on cleared forestland in the Brazilian Amazon. This put pressure on commodity traders to follow their lead. In all, 47 companies joined the moratorium, with support from eight civil society organisations. The rate of soya field expansion through deforestation in the Amazon biome fell from 30% in 2004 to about 1% in 2014. Land conversion into soya fields continues in the Cerrado biome, where the moratorium does not apply.



DEFORESTATION MONITORING BY SATELLITE

Watching over 5 million km^2 of Brazilian forests, with only one enforcement official for every 11 000 km^2 in the Amazon, required some innovative thinking. The National Institute for Space Research (INPE) runs sophisticated systems to monitor the Amazon forest cover, based on satellite imaging. Among them, the Real Time Detection Programme, DETER, updates information on where violations have occurred every few days. Building on this, INPE is currently developing a system for detecting deforestation and forest degradation throughout the country. It also runs a training centre on satellite rainforest monitoring in Belém.

GREENBLUE MUNICIPALITY PROGRAMME

In 2007, São Paulo state's Secretariat for the Environment launched the GreenBlue Municipality Programme to improve the effectiveness of environmental management at municipal level. Municipalities can join by signing a memorandum of common actions and goals in 10 areas, including sewage treatment, biodiversity, air quality and environmental education. They receive technical support and training. Every year, the Secretariat evaluates municipalities' performance and awards prizes. Best performers get priority access to funding.

ECOLOGICAL VALUE ADDED TAX

Part of the revenue from the state-level value added tax (called ICMS) is redistributed to municipalities in each state. In the early 1990s, the state of Paraná started to redistribute a share of this revenue on the basis of environmental parameters such as extension of protected areas and presence of municipal waste collection services. The mechanism, known as Ecological ICMS, aims to encourage municipalities to improve their environmental management. Today, most Brazilian states have the Ecological ICMS in place. This has helped increase the number and size of protected areas, although its impact on biodiversity conservation is not very clear.

BUS RAPID TRANSIT SYSTEM

The city of Curitiba is home to the world's first bus rapid transit system, with separate bus corridors, at-level boarding, electronic ticketing and high-capacity bi-articulated buses. The Green Line, launched in 2009, runs 100% biodiesel buses. This integrated, efficient system is operated by private companies without subsidies. Combined with parking policies, the system has reduced automobile trips per year and ambient air pollution.

Progress towards a green economy

In recent years, some of Brazil's economic and infrastructure development plans have started to include an environmental dimension. Nonetheless, the integration of environmental, social and economic objectives has been piecemeal. Brazil would gain from developing a coherent strategy for a green economy and sustainable development. This is all the more important now that the fast economic growth of the 2000s is over and Brazil needs to recover growth, while continuing to reduce poverty, inequality and environmental pressures.

GREEN TAXES

There is scope to extend the use of green taxes and remove harmful tax exemptions as part of a comprehensive tax reform. Revenue from environmentally related taxes is low (0.7% of GDP in 2013). Most revenue stems from taxes on vehicle ownership, but tax rates are not linked to the environmental performance of vehicles.

Fossil fuel use is taxed at lower levels than in many other countries. In 2015, the government raised the federal fuel tax (CIDE) on petrol and diesel, which had been zero since 2012. However, the CIDE rates remain unlinked to CO_2 emissions caused by fuel use. Consumption of fuels in agriculture and manufacturing remains largely untaxed, which discourages energy savings. Diesel is taxed at a lower rate than petrol despite its higher carbon content and emissions of local air pollutants (Figure 5).

Water abstraction and pollution charges are enforced only in a few states. Prices are too low to influence decisions on water allocation and use. There are no other charges on natural resource use and pollution.

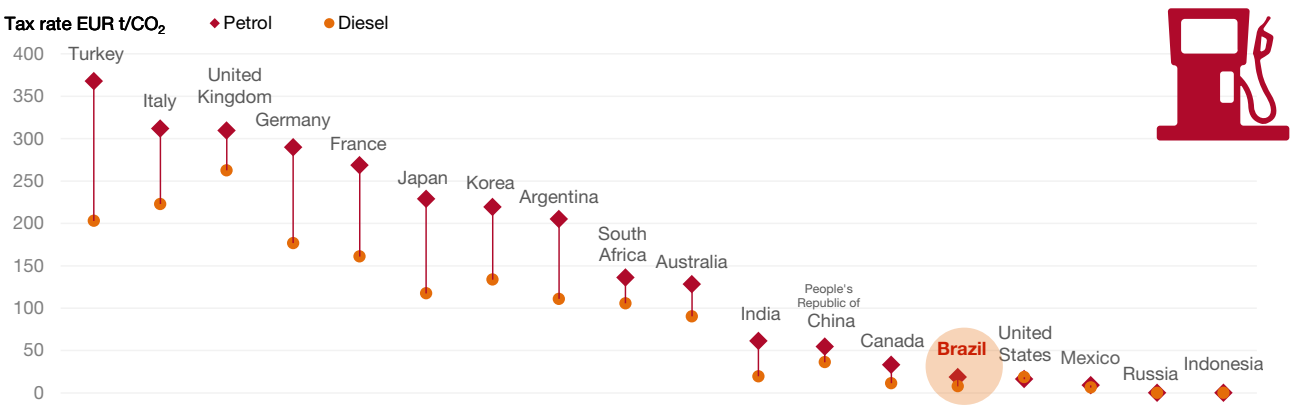
INVESTMENT IN LOW-CARBON INFRASTRUCTURE

Public infrastructure investment in environment-related sectors increased with the 2007 and 2011 Growth Acceleration Programmes. Yet coverage and quality of infrastructure need to be further expanded and improved, particularly for wastewater treatment, sanitary landfills and public transport. Inadequate pricing of water and waste services, red tape and weaknesses in project planning delay infrastructure delivery and discourage private-sector engagement.

The Brazilian Development Bank (BNDES) stepped up its environment-related activities to 15% of total lending in 2014 (Figure 6). BNDES financing for wind energy projects has been conditional on the use of locally produced materials. This has supported the emergence of a wind power industry in Brazil, although this form of industrial protection could harm the sector's competitiveness in the long run.

Brazil was the world's seventh largest investor in renewable energy in 2014, mainly in large hydropower plants and wind. It has long encouraged ethanol production to power road vehicles. The majority of passenger cars are flex-fuel (which can run on both petrol and ethanol) and 17% of road transport fuels are biofuels, by far the world's highest share. The ethanol industry has recently suffered from declining competitiveness, however, which is partly due to the low taxation and price of petrol.

Figure 5: **Taxes on CO_2 emissions from diesel and petrol use are low**
Tax rates on road fuels on a CO_2 emission basis, 2012 (2015 for Brazil), G20 countries.



Notes: Saudi Arabia not available. Figures for Canada, India and United States include only federal taxes. Tax rates converted using standard carbon emission factors from the Intergovernmental Panel on Climate Change and energy conversion factors from the IEA.
Source: adapted from OECD (2015), Taxing Energy Use 2015: OECD and Selected Partner Economies.

Brazil's large energy efficiency potential remains untapped. The International Energy Agency estimates that Brazil could have 11% off its projected energy consumption in 2035 if it puts in place measures such as building codes, energy management in industry and vehicle fuel economy standards. This equals the 2012 electricity production of the massive Itaipu hydropower plant.

ECO-INNOVATION AND GREEN MARKETS

Brazil is more specialised in green technologies than other BRIICS economies and its eco-innovation performance is improving. About 9% of all patents filed in Brazil were environment-related in 2009-11, compared to the BRIICS average of 7.8%. Brazil spends about 3% of its total research and development expenditure on environment-related innovation. It shows pockets of excellence in agro-technology, biofuels and hydro energy.

The environmental technology, goods and service sector could become a significant source of growth for Brazil (1% to 7% of GDP). However, Brazil's leading companies invest only 1% of turnover in clean technology, and small and medium-sized enterprises invest even less. Various barriers to the invention and adoption of clean technology persist, including weak science-industry linkages, skill gaps, regulatory obstacles, a complex incentive system, and high patenting costs and import duties.

REORIENTING AGRICULTURAL SUPPORT

Brazil has a highly productive and competitive agricultural sector, which accounts for 5.7% of GDP and about 15% of employment. Subsidies to farmers are low compared to OECD and other BRIICS countries, but tend to stimulate production and input use, with potential risks of increasing pressures on water, soil and forest areas.

In addition, fertilisers and pesticides benefit from some tax exemptions, which have contributed to their growing use. Organic farming accounts for less than 1% of the agricultural land area. Support schemes such as the Low-Carbon Agriculture Programme aim to encourage environmental improvement and efficient use of inputs. However, these efforts remain small.

Figure 6: **BNDES environment-related investment targets mostly renewables**
2014 investments in BRL billion

Source: BNDES.

Next steps | towards a green economy

- Reform environmental taxation, in the framework of a broad fiscal reform. This means: adjusting energy taxes to reflect fuels' carbon content and pollutant emissions; introducing taxes on pollution, waste and resource use; and aligning vehicle taxation to environmental performance.
- Facilitate infrastructure delivery through simpler administrative procedures, local capacity development and inter-municipal collaboration.
- Continue to scale up investment in rail infrastructure and urban public transport.
- Extend the use of charges for water, sanitation and waste services to improve their financial viability and encourage efficient resource use; utilise social transfers to compensate low-income households.
- Stimulate environmental technology with awareness campaigns, better access to finance and green procurement.

In-depth | biodiversity

A megadiverse country, Brazil hosts the largest rainforest in the world and one-tenth of all known species of flora and fauna. Its territory spans over six terrestrial biomes and its extensive coastline is home to various marine ecosystems. Infrastructure development, agriculture, population growth and urbanisation remain the main pressures on biodiversity. Brazil should build on its impressive progress in reducing deforestation to further improve the status of biodiversity and enhance its sustainable use. This will require sustained financial and human resources and effective inter-institutional co-ordination.

ECOSYSTEMS AND SPECIES

With the second largest forest area in the world, Brazil experiences the world's highest average annual loss in total forest cover. Annual deforestation of the Amazon massively declined, from 27 000 km^2 in 2004 to about 4 800 km^2 in 2014, thanks to a coherent set of actions (Figure 7). However, an area of forest equal to the size of Slovenia (or the Brazilian state of Sergipe) is still lost every four years. The tropical savannah (Cerrado) is also under strong pressure. Overall, total forest area has decreased by about 5% since 2000 and by 10% since 1990.

Brazil hosts rich coral reef ecosystems and the world's largest contiguous area of mangroves. Its marine waters are home to a vast range of fish, mammals and turtle species. Deforestation of riparian forests and mangroves, urban development along the coasts, oil and gas development and water pollution are among the major pressures on marine and coastal ecosystems. Several marine and freshwater fish stocks are fully exploited or overexploited as a result of overfishing.

Over 45% of plant species and nearly 10% of fauna species are threatened. In 2012, about half of threatened fauna species were protected under a conservation action plan, and federal protected areas now cover nearly 60% of threatened flora and fauna species. This has helped improve the conservation status of more than 100 species.

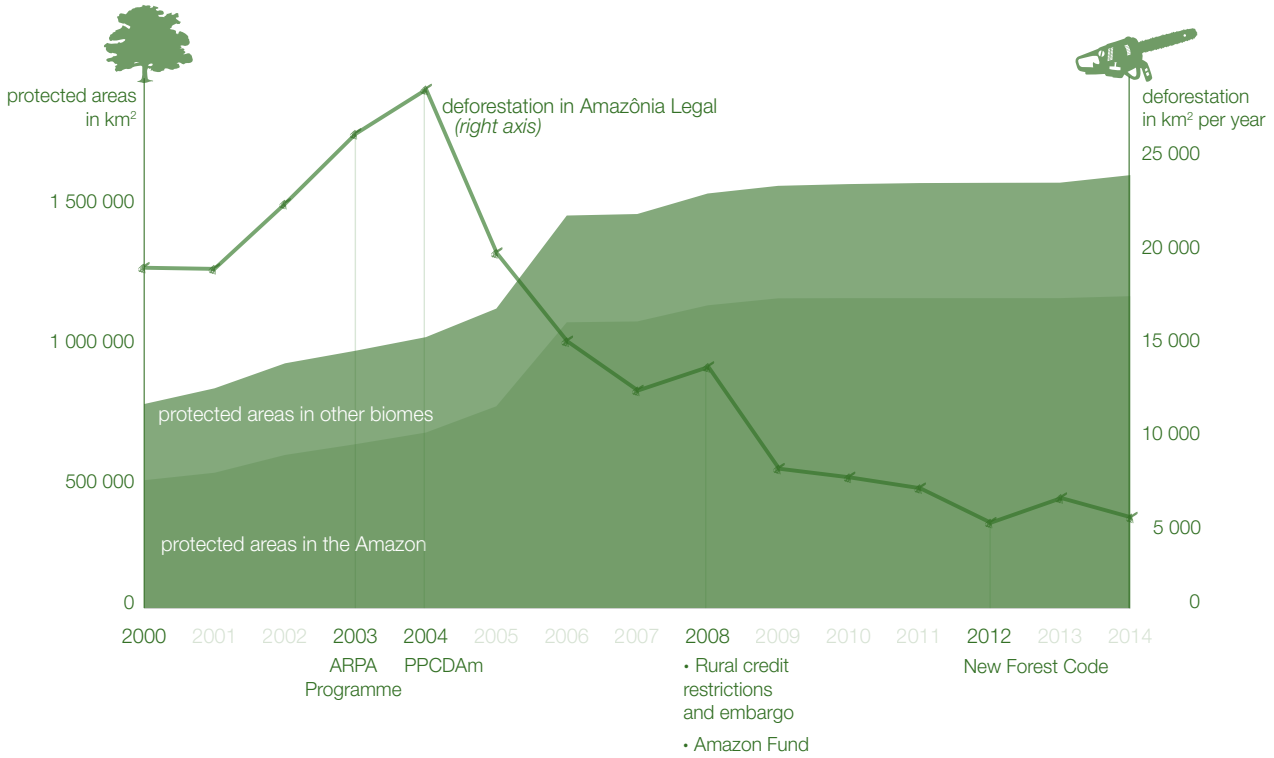
AN EFFECTIVE STRATEGY AGAINST DEFORESTATION

The Action Plan to Combat Deforestation in Amazônia Legal (PPCDAm), launched in 2004, involves 13 ministries under the co-ordination of the Executive Office of the Presidency (Casa Civil). The programme is based on three main streams of work:

- **Strengthening monitoring and enforcement** with satellite monitoring systems (page 9), targeted inspections, heavy fines and restricted access to credit for landholders in municipalities with critical deforestation levels.
- **Clarifying land tenure to fight land grabbing:** thousands of rural land holdings have been granted property titles, and hundreds of protected areas have been established under the ARPA programme (page 15).
- **Promoting sustainable logging and production chains**: actions taken include capacity building for sustainable forestry, agriculture and livestock practices, sustainable timber logging concessions and minimum guaranteed prices for Amazonian food products. Brazil needs to strengthen this pillar to make sustainable livelihood options in forest areas more attractive than illegal land clearing.

The PPCDAm is widely recognised as an effective strategy, which can serve as a model for other countries. Building on this success, the government launched a similar programme to control deforestation and forest fires in the Cerrado biome.

Figure 7: **Policy measures have effectively helped curb deforestation**
Annual deforestation in Amazônia legal, 2000-14. The Amazônia Legal encompasses the Amazonian forest (about 4.1 million km²) and transitional vegetation (1 million km²).



Source: INPE (2015), "Projeto PRODES: Monitoramento da floresta Amazônia Brasileira por satélite"; MMA (2015), Cadastro Nacional de Unidades de Conservaçao.

POLICY FRAMEWORK

The legal framework for biodiversity is comprehensive and stringent. Key laws include the 2000 law establishing the system of protected areas (page 15), the 2012 Forest Code (page 14) and the 2015 legislation on access to genetic resources and benefit sharing.

Brazil adopted 20 biodiversity targets to 2020 that are aligned with its international commitments. Some states, including São Paulo, Paraná and Rio Grande do Sul, have developed biodiversity strategies and plans, but ensuring consistency and harnessing synergies with federal biodiversity policies is challenging. Overall, there has been a proliferation of biodiversity-related plans and programmes since 2000, often with overlapping objectives, and their implementation is not systematically monitored. Sectoral policies, such as energy and agriculture, could take better account of biodiversity goals.

While a regulatory approach still prevails, Brazil is progressively using payments for ecosystem services (PES) and other conditional monetary transfers (such as Bolsa Floresta, page 8). These programmes compensate households and communities for their efforts in reducing the environmental impact of their activities. However, state PES regulations are highly heterogeneous; many such programmes are not systematically monitored and their environmental effectiveness is not clear. A federal framework law on PES would improve consistency and effectiveness.

Scientific knowledge on biodiversity has improved remarkably, but information is fragmented and not always consistent. Economic evaluation of biodiversity is rarely used to inform policy decisions. The Brazilian Natural Capital Initiative, launched in 2013, aims to fill this gap. It identifies the economic benefits of biodiversity and the costs of its loss, and promotes their consideration in policy making at all levels of governments.

Next steps | biodiversity

- Streamline the multitude of biodiversity-related plans and programmes; evaluate and revise them systematically.
- Keep the focus on fighting deforestation, including outside the Amazon; continue to develop forest monitoring technology.
- Scale up support for sustainable forestry and farming practices and speed up the use of concessions for sustainable forest management.
- Develop a framework law for PES and monitor the effectiveness of existing PES programmes.

Quick focus | the Forest Code

In 2012, Brazil approved its new Forest Code to replace the 1965 code. The key legal instrument for forest protection on private lands, the new code aims to overcome the implementation shortcomings of the previous one, which had resulted in widespread violations and large illegally deforested areas. Ultimately, the new code aspires to reconcile the objectives of biodiversity conservation and economic development, notably in agriculture.

The Forest Code requires rural landholders to set aside a share of their land for forest conservation and restoration (so-called Legal Reserve), as well as along water bodies and sensitive areas to protect water resources and prevent soil erosions (so-called Permanent Preservation Area). This share varies according to the biome: up to 80% in the Amazon, 20% to 35% in the Cerrado and 20% in the other biomes. The new code introduced two innovative instruments: the Rural Environmental Cadastre and the Environmental Reserve Quotas.

The Rural Environmental Cadastre aims to improve monitoring and compliance. It uses high-resolution satellite images to localise each rural parcel. Landholders must register their lands and set-aside areas in the cadastre by May 2016. Registration will be a condition for accessing rural credits as of October 2017. As of April 2015, 53% of the target area had been registered. States are responsible for implementation of the cadastre and ensuring compliance with the set-aside requirements, but their capacity is often limited.

Environmental Reserve Quotas are tradable forest rights. Landholders who did not meet their set-aside obligations (prior to 2008) can either restore the tree cover or purchase an equivalent quota amount. Quotas are issued for areas maintained as native forests and woodlands in excess of the Legal Reserve requirements. Offsetting is possible only within the same biome and, possibly, the same state. This system creates demand for forested lands and encourages forest conservation. As forest restoration is costly, especially for small rural holders, the quota system could be a cost-effective way to make sure that landholders comply.

The National Plan for Native Vegetation Recovery aims to promote large-scale reforestation of 125 000 km^2 within 20 years. The programme, currently under public consultation, will require significant financial resources and innovative financing instruments (for example, bonds to raise funds for restoration investments).

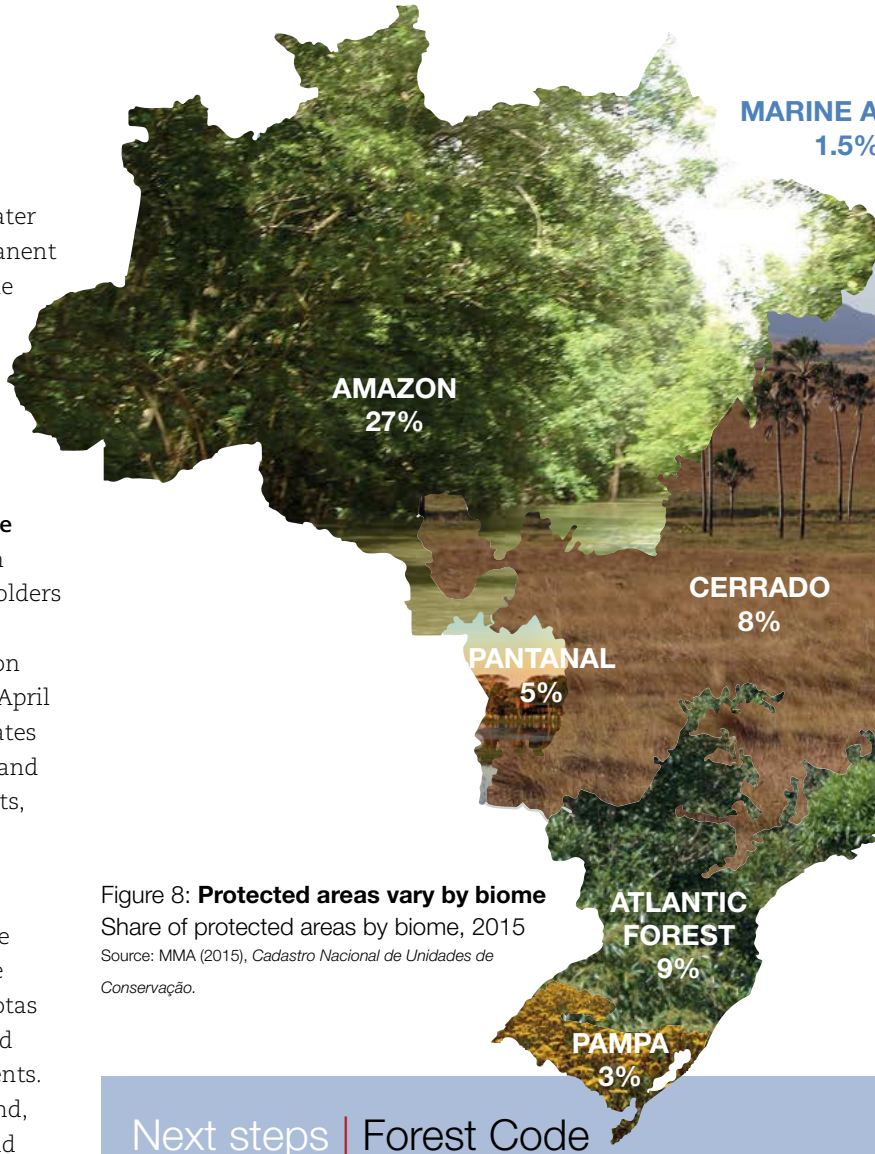


Figure 8: **Protected areas vary by biome**
Share of protected areas by biome, 2015
Source: MMA (2015), *Cadastro Nacional de Unidades de Conservação.*

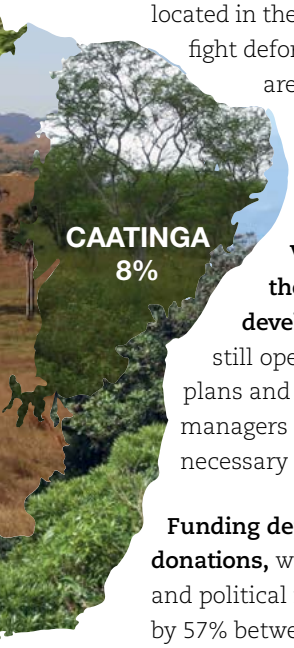
Next steps | Forest Code

- Enhance the capacity of states and municipalities to implement the Rural Environmental Cadastre.
- Provide economic incentives for land registration in the cadastre, compliance with the code, and sustainable management and restoration of set-aside areas.
- Accelerate the development of the proposed National Plan for Native Vegetation Recovery, estimate its costs and identify funding sources.

Quick focus | Protected areas

Protected areas are a cornerstone of Brazil's biodiversity policy. The number and extent of protected areas have more than doubled since 2000, when the National System of Protected Areas was established. The Chico Mendes Institute for Biodiversity Conservation (ICMBio), the national agency responsible for overseeing federal protected areas, faces obstacles to effectively manage protected areas and unleash their economic potential.

AREAS



Protected areas cover more than 17% of Brazil's terrestrial areas and inland waters but only 1.5% of coastal and marine areas. Most protected areas are located in the Amazon, reflecting government efforts to fight deforestation in this region. Additional areas are protected within indigenous lands and on private lands that comply with the Forest Code. Altogether, this makes Brazil's nature protection system one of the world's largest.

Weak management risks hampering the effective conservation and sustainable development of protected areas. Many areas still operates without the required management plans and most of them are understaffed. Park managers are highly committed but often lack the necessary training and financial resources.

Funding depends heavily on public budgets and donations, which make it vulnerable to external factors and political negotiations. The budget of ICMBio grew by 57% between 2008 and 2014. While significant, this increase is not proportional to the expansion of protected areas. Resources are largely used to cover staff and other operational costs, while investment in much needed equipment and infrastructure is modest.

Extending tourism, recreation and environmental education in protected areas would help generate environmental, social and economic benefits. The number of visits has steadily increased since the mid-2000s, but they only concentrate on a few large national parks. Less than 20% of protected areas generate revenue from access fees and tourism activities. Few protected areas have engaged in partnerships with private businesses and non-profit organisations to manage tourism and recreational services. This is mainly due to regulatory constraints and red tape, the lack of adequate management plans, and limited resources and capacity.

THE ARPA PROGRAMME

The Amazon Region Protected Areas (ARPA) programme is among the world's largest tropical forest conservation programmes. Since 2003, it has created more than 500 000 km^2 of protected areas in the Amazon, including along the so-called "deforestation arc" (comprising the eastern and southern edges of the forests in the states of Rondônia, Mato Grosso and Pará) and in areas expecting road infrastructure development.

This has greatly helped curb deforestation: only about 5% of the deforestation that took place in the Amazon in 2008-12 was within protected areas. The programme has also improved the management effectiveness of participating protected areas, with investment in basic infrastructure and staff training. Funding has largely come from international partners, but the Brazilian government is committed to gradually increasing funding from the federal and state budgets.

Next steps | protected areas

- Further expand protected areas to meet the national targets of protecting 30% of the Amazon, 17% of the other terrestrial biomes and 10% of marine areas by 2020.
- Ensure that all protected areas develop management plans and step up capacity building efforts.
- Develop a financial strategy for the protected area system and explore funding sources that would reduce the dependence on the public budget and on international finance.
- Scale up tourism, recreation and environmental education activities in protected areas with more involvement of the private sector.

MORE INFORMATION

OECD Environmental Performance Reviews: Brazil 2015
The report and all data are available online
www.oecd.org/environment/country-reviews
or
http://doi.org/10/8bn

Environmental Performance Review programme
www.oecd.org/environment/country-reviews

CONTACTS

Head of the Environmental Performance and Information division
Nathalie Girouard
Nathalie.Girouard@oecd.org

EPR of Brazil co-ordinator
Ivana Capozza
Ivana.Capozza@oecd.org

Communications
Clara Tomasini
Clara.Tomasini@oecd.org

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