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Brazil's Role in Environmental Governance

Analysis of Possibilities for Increased Brazil-Norway Cooperation

Anna Helene Valberg

Report for the Norwegian Ministry of the Environment

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Abstract

This report examines the role played by Brazil in connection with certain international negotiations, such as the climate negotiations and the CBD. It identifies the driving factors that have influenced environmental politics and standards in Brazil, and take note of conflicts that must be discussed when Norway is seeking expanded cooperation with Brazil. In line with the mandate, FNI identifies areas of particular interest for further collaboration between the two countries, and recommend directions for supplementary Norwegian policy-making in light of a broadened scope for Norway-Brazil interaction.

In recent years, the Norwegian government has initiated an extensive process aimed at reducing emissions from deforestation and forest degradation (REDD). This is the most obvious shared environmental scope between Norway and Brazil. However, given the large body of literature that already exists on this field, this report will concentrate instead on issues more on the outskirts of the REDD discourse, such as biodiversity conservation, biofuel efficiency and challenges concerning hydropower, all of which threaten to impact negatively on the Amazonian areas.

In our recommendations, we cite tangible examples to illustrate issues where we believe lessons learnt in Norway may have applicability to Brazil.

Key Words

Brazil, Norway, Environmental Politics, Environmental Cooperation

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List of acronyms

ABS	Access and benefit sharing
ANA	(*Agência Nacional de Aguas*) National Water Agency (Brazil)
ANP	(*Agência Nacional do Petróleo, Gás Natural e Biocombustíveis*) National Petroleum Agency (Brazil)
BAT	Best Available Technology
BNDES	(*Banco Nacional de Desenvolvimento Econômico e Social*) Brazilian Development Bank
CBD	Convention on Biological Diversity
CGEN	*(Conselho de Gestão do Patrimônio Genético)* Genetic Heritage Management Council (Brazil)
CI	Conservation International
CNI	(*Confederação Nacional da Indústria*) National Confederation of Industry (Brazil)
CONAMA	(*Conselho Nacional do Meio Ambiente*) National Environmental Council (Brazil)
CSR	Corporate Social Responsibility
EC	European Commission
Embrapa	(*Empresa Brasileira de Pesquisa Agropecuária*) Brazilian Agricultural Research Corporation
FIVAS	Foreningen for internasjonale vannstudier
ForUM	Forum for Utvikling og Miljø
FPIC	Free, prior, and informed consent
FUNAI	(*Fundação Nacional do Índio*) National Indian Foundation (Brazil)
GHG	Green House Gas
IBAMA	(*Instituto Brasileiro do Meio Ambiente E Dos Recursos Naturais Renováveis*) Brazilian Institute of Environment and Renewable Natural Resources
IBGE	(*Instituto Brasileiro de Geografia e Estatística*) Brazilian Institute for Geography and Statistics
IGC	Intergovernmental Committee on Genetic Resources, Traditional Knowledge and Folklore
IIASTD	International Assessment of Agricultural Knowledge, Science and Technology for Development
INPE	(*Instituto Nacional de Pesquisas Espaciais*) National Institute of Space Research (Brazil)
IPHAN	(*Instituto do Patrimônio Histórico e Artístico Nacional*) National Historical and Artistic Heritage Institute (Brazil)
IPR	Intellectual Property Rights
IUCN	International Union for Conservation of Nature

KOS	Climate and forest project *(Klima- og skogprosjektet)* of the Norwegian government
LUC	Land-use change and forestry
MAB	(*Movimento dos Atingidos por Barragens*) Movement of Dam Affected Peoples (Brazil)
MAPA	(*Ministério da Agricultura, Pecuária e Abastecimento*) Ministry of Agriculture, Livestock and Food Supply (Brazil)
MEA	Millennium Ecosystem Assessment
MMA	(*Ministério do Meio Ambiente*) Ministry of the Environment (Brazil)
MRV	Monitoring, Reporting and Verification
NGO	Nongovernmental Organization
NHO	(*Næringslivets Hovedorganisasjon*) Confederation of Norwegian Enterprise
OAG	Office of the Auditor-General
PES	Payment for ecosystem services
PNMA	National Environmental Policy (Brazil)
PNMC	(*Política Nacional sobre Mudança do Clima*) National Climate Change Plan (Brazil)
POPs	Persistent Organic Pollutants
PPA	(*Plano Plurianual*) General National Plan 2008-2011 (Brazil)
PPCDAM	(*Programa de Avaliação do Desflorestamento na Amazônia Legal*) Action Plan to Prevent and Control Deforestation in the Legal Amazon (Brazil)
REDD	Reducing emissions from deforestation and forest degradation
SINITOX	(*Sistema Nacional de Informações Tóxico-Farmacológicas*) National Poisoning Information System (Brazil)
SISNAMA	(*Sistema Nacional do Meio Ambiente*) National System of the Environment (Brazil)
TCU	(*Tribunal de Contas da União)* Office of the Auditor-General (Brazil)
TEEB	Economics of Ecosystems and Biodiversity
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WCD	World Commission on Dams
WHO	World Health Organization
WIPO	World Intellectual Property Right Organization

1 Introduction, mandate and methodology

Mandate and methodology

The Ministry of the Environment, Norway, has requested the FNI to examine the role played by Brazil in connection with certain international negotiations, such as the climate negotiations and the CBD. The FNI was asked to identify the driving factors that have influenced environmental politics and standards in Brazil, and take note of conflicts that must be discussed when Norway is seeking expanded cooperation with Brazil. In line with the mandate, FNI identifies areas of particular interest for further collaboration between the two countries, and recommend directions for supplementary Norwegian policy-making in light of a broadened scope for Norway–Brazil interaction.[1]

In recent years, the Norwegian government has initiated an extensive process aimed at reducing emissions from deforestation and forest degradation (REDD). This is the most obvious shared environmental scope between Norway and Brazil. However, given the large body of literature that already exists on this field, this report will concentrate instead on issues more on the outskirts of the REDD discourse, such as biodiversity conservation, biofuel efficiency and challenges concerning hydropower, all of which threaten to impact negatively on the Amazonian areas.

In our recommendations, we cite tangible examples to illustrate issues where we believe lessons learnt in Norway may have applicability to Brazil.

In terms of methodology, this has mainly been a desk study, where most of the material has been collected from scientific publications. In addition, we have been in contact with key informants from Norway and Brazil, by email correspondence, phone and face-to-face interviews.

Norway and Brazil: At opposite ends?

Brazil and Norway are at first glance rather opposite countries. State organization is very different: whereas Brazil is a large federation consisting of 26 states and a federal district, Norway is a unitary democracy, a constitutional monarchy. While Brazil has almost 200 million people with great ethnical mixture, Norway is home to almost five million people of considerable ethno-cultural homogeneity.

Brazil, with its enormous agricultural export industry, its large informal sector, its past record of military dictatorship and unstable economy with high inflation, has traditionally been ruled by elites. It is only during the past decade that the country has become an emergent world power in many dimensions. Today, Brazil is one of the most attractive trade

[1] The report has been researched and written by Anne Helene Valberg in collaboration with and assistance from Kristin Rosendal, Peter Johan Schei and Morten Walløe Tvedt, all FNI.

partners internationally, benefiting from its stable growth and steadily increasing political confidence. Its rich natural resources make Brazil the most prominent mega-diverse country globally, a feature that led Brazil to take a strong position in the CBD negotiations, where it has headed the G77 group of developing countries.

Despite the many differences between Norway and Brazil, the two countries share visions for the future on surprisingly many topics. Both countries are considered important in the ongoing climate negotiations, where they have taken on heavy commitments for reducing their own greenhouse gas (GHG) emissions. With their shared and pioneering initiative to protect rainforests, they have managed to change the REDD discourse internationally. Another area where Brazil and Norway have been unified and profiled actors is in the CBD negotiations, where Norway has been working side by side with the developing countries. In addition to being engaged in environmental issues such as biodiversity and access and benefit sharing (ABS), both two countries are home to indigenous populations, and share concerns on how to take their needs into account.

Both Brazil and Norway have unique domestic energy matrixes heavily focused on hydropower. Traditionally fish, shipping and marine industries have been common ground in trade and commerce, but with the major new discoveries of oil and gas, the petroleum sector has attracted many Norwegian operators to the offshore activities of Brazil. When Brazil constituted its national petroleum agency (ANP) in 1997, it was with the corresponding Norwegian agency (Oljedirektoratet) as a model (interview, Martinsen, 2011).

Concerning state organization, Brazil's former president Luiz Inácio Lula da Silva (2003–2010) considered the 'Scandinavian model' as exemplary in both social dialogue as well as in the organization of Norway's sovereign wealth fund (Government Pension Fund — Global). Over the past eight years, there are clear traces of an ideological affinity here. With a new president, Dilma Rousseff, intending to follow up the legacy of Lula, the way should be open for increased cooperation between Brazil and Norway.

2 Brazil: The domestic arena – brief overview of current political, environmental and economic trends

In the framework of the current political system in Brazil, it is difficult to put together a stable parliamentary majority. This creates problems in effectively exercising legislative and executive powers. Brazil is, as noted, a federal republic made up of 26 states and one federal district. The country has 5,560 municipalities, and is a multi-party representative democracy where the president is both head of state and head of the federal government. The federal legislative body is the National Congress, consisting of the Federal Senate and the House of Representatives *(Camera dos deputados)*. Each state has a state legislature and a directly elected governor, who heads the state executive and appoints its members. Every state and municipality in Brazil is fully responsible for planning, executing and monitoring its expenditures.

It is worth noting that the conservative powers hardly ever front a candidate for the presidency. Their approach is rather to engage in hard campaigns to get governors to rule on the state level. Hence, federal politics are often blocked on state level. The links between the three levels of governance are relatively fragile. This makes it difficult to define and implement policies and reforms nationwide, to promote national integration and encourage a balanced development of the various regions and issues.

Democracy is deficient in many emerging countries. Brazil's record on this point has enhanced its international legitimacy and attractiveness. Though diluted by social inequality, this has become a key ingredient in the 'soft power' of Brazil today.

Multi-level governance

Federalism allows for considerable variation in sub-national environmental policies. After the centralized power of the military regime, redistribution of power came with the 1988 democratization in Brazil. With new federal arrangements, many responsibilities and resources were shifted from the federal level to state and municipal levels. In environmental matters the three levels share responsibilities (Farias, 1999), albeit with vague mandates. An increased number of actors can veto policies as well as the degree of political conflict over the policies (Souza, 1997: 10–11).

Public policy-making in Brazil is highly politicized, and there is rarely such a thing as the 'last word' (Hochstetler Hochstetler and Keck, 2007:3). Hence, strong environmental legislation as such is no guarantee for strong political action. In Brazil, the self-reinforcing mechanism is the 'non-resolution' and the 'non-decisions' of key questions, and the provisional nature of policy legislation, whose implementation requires separate mobilization of commitment (Hochstetler and Keck, 2007:17).

Regional inequalities are pronounced in Brazil, and most towns and some states lag behind federal standards when it comes to environmental regulations (Farias, 1999).

2.1 Regulations and implementation of environmental policy

2.1.1 Institutional challenges: with REDD as an example

A 2009 report from the *Tribunal de Contas da União* (TCU) – Brazil's Office of the Auditor-General (OAG) – identifies several important institutional challenges concerning environmental governance. The TCU has completed a comprehensive review of the Brazilian administration's efforts to reach national climate goals in the Amazon region, comprising nine out of 26 states. When the military dictatorship was overthrown and superseded by democracy in 1985, the military and economic elites preserved their political powers and interests, partly through strengthening the Amazon region by means of giving them a greater say in Congress. Today Brazil faces a range of challenges concerning implementation and compliance with its strict environmental laws. The difficulties are linked to the fragmented distribution of responsibilities, as well as weak instruments for monitoring, reporting and verification (MRV) and conflicting ends. There are considerable difficulties concerning interaction between departments – vertically, between levels (federal, state, municipal); and horizontally, between sectors (different ministries) (TCU, 2009).[2]

There are various inter-ministerial conflicts in terms of interests, and several ministries are not primarily interested in the issue of forest protection. Action plan follow-up has been weak and there are competing incentives. States lack clear procedures for reporting to the federal level, and the structural conditions for the implementation of protection plans appear incomplete. Conflicting goals as to, *inter alia*, agricultural policy, transport policy and land reform policies can influence and even prevent the implementation of environmental protection plans. Brazil lacks a clear distribution of responsibilities for following up the plans established in its 2008 National Climate Change Plan, PNMC. While the plans of the Ministry of Agriculture often collide with the goals of environmental protection, there is a need for technical assistance, technology and training in nature preservation. There is a frequent lack of resources to initiate and implement government policies (TCU, 2009).

Concerning forests, the TCU notes diverging objectives between REDD work and forest-based industrial activities, which may be an impediment to REDD. There are also problems related to monitoring forests. Brazil is considered to have a satisfactory system for monitoring, but the TCU points out that the authorities do not distinguish between legal and illegal logging (TCU, 2009), which that might slow down the process of reducing deforestation, as legal logging is far easier to stop. The weaknesses TCU detects in the Brazilian system can be linked to overall

[2] Any references to materials written in Portuguese have been translated by the FNI team.

challenges in the international debate on REDD, where several criteria are seen as crucial to make REDD work in the long run.

There is no clear definition of what should be accepted as 'ecosystem services' (TCU, 2009). This can indicate that the Brazilian authorities cannot have a full overview over opportunities for reducing deforestation, in turn making it difficult to determine whether goals are actually reached. In addition, most monitoring of rainforests is done manually, relying on optical satellite monitoring which does not work in darkness or through cloud cover.

The audit report shows that there are challenges related to national ownership of environmental initiatives. Such ownership is generally linked to the public administrative capacity, and if this is lacking, it can result in opposing forces against the project, corruption and a low degree of compliance with legislation. However, the TCU report does not cite cases where this has happened in Brazil.

The Norwegian Office of the Auditor-General (OAG/*Riksrevisjonen)* supports the development of national strategies and capacity building where it is needed, but has indicated that this is no longer relevant for Brazil, as the country already has progressed past the point where it is necessary. Rainforest Foundation Norway (Leira, 2011), as well as the NGO International Rivers (interview, Millikan, 2011), argues that the Brazilian National Strategy on Climate Change lacks a holistic perspective that takes sufficient consideration of environmental protection and social rights. The plan focuses mostly on climate issues, ignoring the needs connected to biodiversity as a whole. Rather than capacity building, Brazil needs to resolve liability areas between state levels.

Whether the scale of REDD should be national or project based, is here closely associated with the lack of responsible state actors. Brazil has chosen a national approach to REDD activities, but has not clearly divided the mandates between the different levels of government. The TCU report (2009) points to the Ministry of Agriculture, Livestock and Food Supply (MAPA) as an actor that is not contributing in actions to reduce carbon emissions. The report stresses that agriculture and deforestation are not considered in a broader context. Only seven percent of the funds needed to implement plans for sustainable development of agricultural industry in the Amazon are available (TCU, 2009). Although MAPA has the opportunity to seek funding from other sources, including the Amazon Fund and World Bank, to strengthen the implementation of the sustainability plan, it is assumed that the plan will be underfinanced during initial years (TCU, 2009). This could mean that the country will not achieve optimal efficiency in its efforts to reduce deforestation, which represents the by far largest source of GHG emissions in Brazil. Additionally, measures to protect biodiversity and livelihoods seem unlikely to be a priority, as PAC II (see below), focusing on infrastructure construction, is the main concern of President Rousseff.

Internationally, it is a complicating factor that different sector interests stress different components of the REDD scheme. In international

negotiations, Brazil has been a leader in both climate talks and in the CBD, but the criterion of permanence is still threatened by the priority of climate over environmental protection. With the problems concerning sector integration, the central REDD principle of permanence is challenged. The principle implies that a forest saved today will not be destroyed next year; an assurance that is impossible to guarantee. MMA is commonly known to have less influence than other ministries, such as MAPA and Itamaraty[3], ministries that traditionally emphasize growth, not conservation.

Another key issue is the introduction of standards for reporting on activities and results in the wake of implementation of climate plans. Today, many activities taking place on the state level are not necessarily reported back to the federal government (TCU, 2009). The Ministry of the Environment (MMA) receives inadequate information from the states, which are the ones cognizant of actual forest uses. The various federal states lack the necessary institutional instruments to approve forest utilization, and that makes it more difficult to achieve a clear distinction in measuring legal and illegal logging. The TCU report calls for a management model for measuring the achievement of targets in the climate plan, and proposes a system analogous to that found within the Brazilian Plan for Accelerated Growth (PAC) (TCU, 2009). Brazil's national plan for climate change (PNMC) from 2008 contains no deadlines, responsibilities or performance goals (TCU, 2009). The absence of such criteria may make it even harder to achieve the ambitious goals (TCU, 2009). There is an evident lack of sector integration, horizontally and vertically: this represents weighty challenge in building institutional capacity for solving the environmental, climatic and social tasks lying ahead.

The weaknesses TCU detects in the Brazilian system can be linked to overall challenges in the international debate on REDD, where several criteria are seen as crucial to make REDD work in the long run. Albeit Norway advocates a REDD mechanism that entails promotion of sustainable forest management, contribute to the protection of biodiversity, promote sustainable development and poverty reduction, securing rights, involvement and livelihood of local communities and indigenous peoples (Norway, Ministry of Environment, 2009), the bilateral agreement between Norway and Brazil only measures the reductions of deforestation. Whether or not reduction in emissions have been achieved determines the disbursement of REDD money from Norway to Brazil.

REDD is based around a simple idea of paying those that reduce forest degradation and deforestation (Angelsen, 2008). It is seen as one of the cheapest, most significant and quick measures available, and has several potential co-benefits (ibid.). REDD has the potential to reduce poverty, protect human rights, conserve biodiversity and provide ecosystem services, as well as reduce GHG emissions (ibid.). Including these co-benefits as criteria in a potential international REDD regime takes REDD to REDD plus.

[3] The Ministry of Foreign Affairs (Brazil)

The concerns expressed in the TCU report are similarly reflected in the Norwegian Climate and forest project (KOS initiative) and in the overall international debate on REDD. The monitoring done by the National Brazilian Institute for Space Research (INPE) has concerned only deforestation and forest degradation, more recently to some extent emissions from hydropower plants. However, there is no monitoring or measuring of factors not connected to GHG emissions and climate effects. It is internationally acknowledged that measuring other aspects, such as preservation of biodiversity and protection of livelihoods, is equally important as measuring specific CO_2 emissions. A model that takes into account these dimensions is needed in order to establish a robust framework for an international REDD regime for the future.

2.1.2 Legal framework: Environmental licensing in Brazil

The fundamental grounds of environmental licensing are in Brazil constitutionally mandated. The 1988 Constitution ensures the protection and preservation of an ecologically balanced environment. The public authorities are required to conduct and publish environmental impact studies on any activities that can cause degradation to the environment. The Constitution also provides that every person has the right to an ecologically well-balanced environment (Lima and Magrinia, 2010).

Jurisdiction is shared by the three levels of governance: federal, state and municipal authorities. The common competence involves parallel actions, although the proper functioning of the National System of the Environment *(*Sisnama*)* is intended to prevent duplication of activities (Lima et al., 2010). As a general rule, the federal law prevails over other levels. State and municipal regulations may establish restrictions where nothing is stated in federal law. Thus, a state law, as long as it is considered constitutionally valid, can ban a particular activity authorized by federal legislation (Lima and Magrinia, 2010:109). Environmental protection is constitutionally regarded as a general principle of all economic activity. This includes differential treatment depending on the environmental impact of different products and services.

The main environmental law, Law 6938 of 1981, which established the National Environmental Policy (PNMA) precedes the 1988 Constitution. The law requires prior licensing for the operation of enterprises involving the use of environmental resources that may cause environmental degradation or pollution in any way. It is this fundamental law that sets the framework for official environmental policy, determines the instruments available to Sisnama, organizes the principles and guidelines of Sisnama, and specifies the responsibilities and liabilities of the ministries, states and municipalities.

The assessment of environmental impacts is regulated by Resolution 001/1986 of the National Environmental Council *(Conama).* The main regulations of environmental licensing are provided by Conama Resolution 237/1997. According to this resolution, licensing must be done by the federal environmental agency, the Brazilian Institute of Environmental and Renewable Natural Resources *(Ibama)* for a wide range of activities (Lima and Magrinia, 2010: 109).

Federal responsibilities include any undertakings located or developed jointly in Brazil and a neighbouring country, in the territorial waters, on indigenous lands or conservation units. The federal authorities also regulate the licensing of activities located or developed in two or more states, on military bases, and any enterprise dealing with radioactive materials or nuclear energy.

State agencies have jurisdiction connected to any activities located or developed in more than one municipality (local administrative unit), or whose direct environmental impacts spill over the boundaries of one or more municipalities. They also have jurisdiction over forests or vegetated areas subject to permanent preservation (under Article 2 of Law 4771/1965), or in preservation units of the state's area.

Municipal jurisdiction involves local environmental licensing of businesses and activities and those delegated from state level.

Under the Conama Resolution 001/1986, the environmental impact study required in the licensing process must an analysis describing the potential for physical, biological and socio-economic aspects of the area of influence of the enterprise in question; the distribution of social benefits and disadvantages; and mitigation measures of any negative impacts.

Various actors are involved in the licensing process, which indicates the complexity of federal environmental licensing in Brazil. The Environmental Ministry, state and municipal councils and agencies, Iphan, Funai, federal prosecutor's office as well as the National Water Agency (ANA) are among the bodies involved.

Controversies concerning environmental licensing

In Brazil, environmental licensing has been subject to intense controversy, involving top federal authorities (Lima and Magrinia, 2010: 110). Important infrastructure constructions, including energy projects, are slowed down by the licensing process. On the other hand, complaints are voiced when licenses pushed through, due to economic and political pressure, despite the environmental challenges involved (ibid.). Enforcement of environmental legislation is often seen as a barrier to economic development. Contradictory statements from government authorities have several times made the headlines, revealing the different points of view concerning licensing processes. The major controversies have involved the construction of hydroelectric plants and transport infrastructure, two areas that accounted for 40 per cent of the licenses issued by Ibama in 2007 (ibid.). Bessa (2008) notes the excessive priority that has been accorded to economic issues, to the detriment of social and environmental ones, leading to a lack of social legitimacy of the licensing process.

However, the former president Lula da Silva did much to put Brazil on the map as a global green power. During his presidency, the MMA was granted substantially more resources (interview, Kasa, 2011), and Lula appointed strong environmentalists to key positions – such as former activist Marina Silva, as minister of the environment. In the CBD and the

FCCC negotiations, Lula led Brazil to prominence. Moreover, according to the Global Biodiversity Outlook 3 (UNEP, 2010), nearly 75 per cent of the 700,000 square kilometres of protected areas created around the world during the years of Lula's presidency are located in Brazil. As he stepped down and helped in the campaign leading his preferred successor, Dilma Rousseff, to a safe victory in the president elections of 2010, Brazil now has a new, strong leader determined to continue the policies of Lula da Silva.

2.1.3 Expected changes with the new government: From Lula to Dilma

Following in the footsteps of his predecessor Fernando Henrique Cardoso, President Lula da Silva managed to lift Brazil to an international position thought impossible, or at least far from reach, only a few years earlier. With his exceptional charisma, coming from a land where personal relations mean a lot, he has placed Brazil on the map in many ways. Lifting more than 20 million people out of poverty, reinforce state control of oil and gas, stabilizing the economy and securing stable growth, as well as being a very active participant on the international arena, he made Brazil an extremely attractive partner in trade, finance, industry and foreign affairs. Leading the G77 in international negotiations, Brazil has taken on more climate change commitments than most other non-Annex 1 countries, even making these commitments federal law. With Dilma Rousseff as his chief of staff, Lula managed to calm an economy historically marked by inflation. In the capital markets, Rousseff will have to make sure the booming growth in economy does not lead to a new wave of inflation. That is why she is seeking to cut public spending by USD30 billion, and thus refusing to increase minimum wages more than a few dollars, to a monthly income of USD305 *(The Economist,* 2011b). At the same time, however, oil industry employees are getting higher wages than most Norwegians *(Dagens Næringsliv,* 2011).

When Dilma Rousseff was first promoted as Lula's preferred successor, she was dismissed as a bureaucrat robot with no mind of her own. In her inauguration speech on January 1th, she showed that the frog had indeed become a princess: she spoke eloquently of women's rights, and the need to consolidate Lula's successful politics and stabilize economic development (LAB, 2011). Dilma lacks the exceptional charisma of Lula *(Economist,* 2011a). But as an experienced economist and administrator, she has CEO advantages that Lula did not have (Vaz, 2011). Dilma is seen as more quiet than Lula, but also more in line with Brazilian tradition. With her deep understanding of politics and her people, she can be an efficient leader. During the election campaign, both she and her opponent Serra were called 'competent leaders with little sense of humour' (Vaz, 2011). To indicate a comparison with Norway: she can be seen as a Gro Harlem Brundtland-kind of leader. As Lula's chief of staff, her tough managerial style earned her the nickname 'the Iron Lady'.

As a former energy minister, a known 'developmentalist' and the architect behind the Brazilian PACs (Programs to Accelerate Growth), she is expected to give precedence to growth over preservation. Still, in her inauguration speech, she made some encouraging references to the

environment, saying that she would show the world that sustainable growth is possible. Interestingly, the new undersecretary of energy is an environmentalist, and Dilma emphasized that even though the newly discovered 'Pre-Salt oil fields are the ticket to the future' for Brazil, there will also be considerable investment in renewable energy. Still, environmental politics is seen as questionable in the hands of the new president. Dilma has been a prominent advocate of the construction of the Belo Monte Dam on the Xingu River, which will be the world's third biggest hydropower plant. The project has been strongly condemned by environmentalists, scientists, locals and indigenous groups (see 2.2.1).

The first stage of PAC promoted improvements in sanitation, housing, transport, energy and water resources, and was coordinated by President Dilma herself when she was Lula da Silva's chief of staff. The second stage of the Program to Accelerate Growth (PAC 2) is an attempt to tackle severe infrastructure problems (Sotero, 2011; Brazil, Federal Government, 2010a).

In the new ten-party government, about half of the 37 ministers have been retained from the previous government. Dilma's choices for key governmental posts are considered as wise by experts. She has assembled an inner cabinet of moderate, competent and respected advisors, with the heavyweight administrator Antonio Palocci as chief of staff. She also pleased anxious foreign investors by putting together a well-regarded team of economics. Her choice of the Chicago-trained economist Alexandre Tombini as Central Bank Governor calmed the markets, as did her pledge of full autonomy for the country's central bank. From the Lula da Silva government she has retained a handful of minsters, among them the Finance Minister Guido Mantega, who is expected to front an expansionary fiscal policy. At the same time Tombini is seen as a symbol of responsible monetary management. Rousseff's economic team has surprised investors by promising deep budget cuts. Mantega expressed to Reuters that Rousseff had requested a heavy hand in budget spending and would implement a USD 12 billion cut.

In her inaugural speech, the new president vowed to focus on tax reform and other steps to help eradicate extreme poverty in the next decade, but will continue the same economic policies to ensure continued economic growth. Among the many ministers Dilma retained from the previous government is the environment minister, Izabella Teixeira, who had assumed the post in April 2010, when Carlos Minc stepped down. Dilma's goal was to have women in one third of the ministerial posts. What she managed was 9 out of 37 – still, that is a Brazilian record. Chief of Staff Antonio Palocci was Lula's first finance minister, but stepped down in the wake of a corruption scandal in 2006.

With Rousseff, foreign policy will be less ideological, more pragmatic. She is expected to be less aggressive than Lula, and has voiced a stronger position on human rights in countries like Iran. Dilma is also expected to be stricter than Lula when it comes to foreign investment and foreign companies operating in Brazil, especially in the oil and gas sector. She might try to put Petrobras under even more state control, and will continue the struggle for federal control of state royalties.

All in all, the new government seems to focus on social inclusion and market-friendliness. Environmental matters are not a priority.

2.2 Driving forces: Economic sector interests at stake in climate, biodiversity and chemicals policies

2.2.1 Key environmental issues

Key environmental issues in Brazil are connected to unsustainable use of natural resources, particularly in the Amazon regions, leading to deforestation. In addition come problems concerning the preservation of the remaining Atlantic forest, water quality and availability, and the growing demands for energy that put pressure on the country's clean energy matrix (BNDES, 2009). The environmental management system is based on a good policy framework, but implementation varies from region to region and by sector impact, especially regarding non-point-source impacts (BNDES, 2009).

Amazon deforestation

Amazon deforestation has proceeded at an average rate of 19,000 km^2 over the past 30 years, due to a combination of economic forces, poor agricultural practices, weak property rights and scant enforcement of regulations (BNDES, 2009). The destruction of the forests means soil erosion, climate and social impacts and loss of biodiversity. Some 70 per cent of Brazil's CO_2 emissions stem from deforestation and land-use change. Moreover, less than seven per cent is left of the original Atlantic Forest, a global biodiversity 'hot spot'. Soil degradation is becoming an increasingly serious problem. The area has an extraordinarily high level of endemism (World Bank, 2008).With few (riparian) forests and little vegetation left around water springs, this has also affected the availability of water to 70 per cent of the population living in areas formerly covered by the Atlantic Forest (Salati et al., 2007).

Water access and quality

Brazil has more freshwater per capita than any other upper-middle income country, with the Amazon Basin accounting for 20 per cent of the world's freshwater. However, distribution is extremely uneven, and there are critical areas where shortages are more than a potential threat (Brazil, Ministry of Environment, 2010). About 70 per cent of the country's freshwater is concentrated in the Amazon Basin, whereas the semi-arid northeast region, with 28 per cent of the population, has only five per cent of the water resources (BNDES, 2009). Surface waters near urban centres are generally polluted due to point-sources of domestic and industrial run-off or various types of pollution from agricultural activities. In some regions, water shortage is becoming critical due to the increase in water consumption for industrial and irrigation activities (Salati et al., 2007:109).

Scarcity, pollution and weak management and lack of water rights contribute to the striking problems concerning water in Brazil. Environmental costs associated with water contamination in seven of the

largest urban areas have been estimated to USD 300 million yearly. The lack of reliable information and proper assessments of water quality is a main problem here. (Brazil, Ministry of Environment, 2010)

The 1997 Water Act established Brazil's National Water Resources Policy and the National Water Resource Management System. The law stipulates that water is a public good that cannot be privatized. Water management is to be decentralized and based on multiple use: Energy, irrigation, industry, public supply. Further, the law establishes that in times of shortage, priority is to be given to human and animal consumption (ibid.)

As regards underground water, Brazil's estimated total reserves are estimated at 112,000 km^3, most of which is located in the Guaraní Aquifer. The Brazilian Institute of Geography and Statistics (IBGE) calculates that 16 per cent of the country's municipalities depend exclusively on underground freshwater. Risks to underground water include overexploitation and contamination (ibid.).

The access to water resources is also closely linked to deforestation and agricultural activities. As the Amazon Basin ensures the precipitation and water-recycling system in all of the southern Brazil, deforestation influences the access to water in large parts of the country (Salati and Vose, 1984). Reduced precipitation in the Amazon could affect the climate and the present agriculture in south-central Brazil.

Environmental sanitation

The large concentrations of people living in metropolitan areas result in water pollution, lack of sanitation and improper collection and disposal of solid wastes (BNDES, 2009). 57 percent of Brazilian households are connected to a sewerage system, and 24 percent have septic systems, but distribution is even more uneven than for water supply (BNDES, 2009). Little of the collected wastewater is treated. A large part of the disadvantaged population who do not benefit from sanitation services live in slums, peri-urban areas, and smaller towns with poor financial and managerial capacity. The situation of solid waste management has in fact become critical. Most collected waste ends up in improperly managed open dumps rather than in sanitary landfills designed to isolate leakage and capture methane emissions (BNDES, 2009).

Solid waste

Brazil has a daily production of about 160,000 tons of urban solid waste (Brazil, Ministry of Environment, 2010). The government aspires to find better solutions to final waste treatment and disposal, to develop mechanisms for increased recycling, and to reduce the total amount of waste (ibid, 2010). Although the government is satisfied with its coverage as regards urban wastes (97 per cent), disposal is inadequate. Only 59 per cent of Brazilian municipalities dispose of their wastes in landfills (ibid.). The National Solid Waste Policy is intended to provide for collection, final disposal and treatment of urban, hazardous and industrial waste, in accordance with the Basic National Sanitation Act and the Public

Consortia Act (ibid.). The National Solid Waste Policy provides for Reverse Logistics – a set of actions, means and procedures aimed at facilitating the collection and return of solid wastes to the original producers, for treatment and re-use in new products (ibid.). This is known as the principle of shared responsibility in product lifecycles and is intended to give producers economic incentive for recycling.

Energy matrix

Some 80 per cent of the electric energy generated in Brazil is produced by hydropower (BNDES, 2009). Only 30 per cent of overall energy use is based on traditional fuels, and commercial energy consumption per capita is relatively low. With its accelerated growth, however, Brazil is now facing increasing demands for energy. Expected electricity consumption by 2015 has been estimated at an average of 600 million MWh, which will require additional production of 3000 MW per year. Over the past years, growth has been met by oil-based thermo-electric plants (ibid.).

These prospects imply a continuation of an expansive energy development, and can act as a barrier to energy efficiency measures. In light of the strong interests represented in the energy business, Norway might want to discuss with Brazil what kind of energy matrix that is desirable in the future. With strong environmental regulations, implementation of policies and compliance with commitments must be ensured.

2.2.2 Conflicting land-use policies

Biofuels production versus biodiversity conservation

The environmental benefits deriving from biofuels are not to be taken for granted. They must be evaluated on a case-by-case basis, because the benefits depend on the GHG emissions associated with the cultivation of feedstock, production process and transport to markets (World Bank, 2008: 60). Changes in land-use, such as deforestation and draining, can cancel the emissions savings. Land-use changes due to the need to replace land for food crops now used for biofuel production can eradicate GHG savings as well as irreversibly damaging wildlife and wild lands (ibid.). Land-use change and biofuel production in Brazil has eco-systemic and eco-social consequences, where the Amazon and the Cerrado savannah biome southeast of the Amazon are areas of particular vulnerability. Intensified and more sustainable land-use might help mitigate climate change impacts in such areas (Sawyer, 2008).

The development of the Amazon and the Cerrado are intertwined, but for the Cerrado the future is highly uncertain. Despite the new action plan, experts do not agree whether the policies will outweigh the strong driving forces of the market mechanisms and technical progress. The importance of the Cerrado and the threats facing it have long been neglected (Scariot et al., 2005). In the short run, agro-energy production will almost certainly lead to increased deforestation in the pressure areas. Biofuels also produce negative social impacts.

Agribusiness development

Facilitated by investments in infrastructure and green revolution technology, the frontiers of rice, cattle and soya expanded from central and northeastern Brazil to the north and west from the 1960s onwards (Margulis, 2004). From 1990, there was a boom in soya production; since 2000, beef production has expanded, mainly for the global market.

Amazon deforestation became an issue of global interest. Various international initiatives, supported by the G7 among others, started in the 1990s. The Action Plan to Prevent and Control Deforestation in the Legal Amazon (PPCDAM) was launched in 2004. The National Biodiversity Policy came in 2002 (Decree 4339/2002), indicating that loss of biodiversity had become an internalized issue in Brazil. Later, the volume of carbon emissions from deforestation in the Amazon has become a global concern. This has led to the idea of valuing ecosystem services, so that maintaining natural resources can be more beneficial than exploitation (Sawyer, 2008).

Agro-energy in the near future

Biofuel (ethanol or bio-diesel) is widely considered the best alternative to fossil fuels (Farrell et al., 2006). Biofuel provides Brazil with a new role as a global producer of agro-energy. Different governments and companies support various solutions, but internationally, there has to be a certain focus on the cost-benefit matrix of biofuel production. The production and distribution of biofuels entails the possibility of a net loss in terms of CO_2 emissions. When one takes into account the whole lifecycle, however, the associated energy needs include extensive amounts of fossil fuels for fertilizer production, transportation and labour inputs, manufacture and operation of farm machinery, as well as the processing of raw material and transport to markets (UN 2007). Without a corresponding and considerable increase in productivity, biofuel production may in fact bring few if any climatic net benefits to (Sawyer, 2008).

Lapola et al. (2010) argue that direct land-use changes will not necessarily have a large impact on carbon emissions because most biofuel plantations would replace rangeland areas. However, as they note, indirect land-use changes, especially those that push the rangeland frontier into the Amazonian forests, could totally offset any carbon savings from biofuels. Lapola et al. suggest that closer collaboration or a strengthened institutional link between the biofuel and cattle-ranching sectors in the coming years is crucial for effective carbon savings from biofuels in Brazil.

Ecosystemic effects

The direct and indirect negative impacts of biofuels can be ecosystemic, causing impacts on biodiversity, water and carbon; or social, including economic and political dimensions, in various ecosystems (Sawyer, 2008).

Depending on the crop, location, previous land-use and technology, the direct ecosystemic effects of expansion of soya and cane monoculture may include, according to various sources cited by Rodrigues & Ortiz (2006) and Honty and Gudynas (2007), damage to biodiversity, soils, water resources and the atmosphere. Destruction of biodiversity occurs when forest or savannah land or land undergoing regeneration is cleared. Not so obviously, biodiversity is also reduced when mixed farming systems are replaced by monoculture landscapes. Owing to the effects of wind and water, soil erosion occurs when natural vegetation is removed, unless minimum tillage or integrated crop–livestock systems are used. Soil fertility is also reduced due to contamination, compaction and loss of organic matter (Honty and Gudynas, 2007).

Cane production and processing consume huge quantities of water, as much as 4: l per litre of ethanol (Gabeira, 2007). Water is polluted with pesticides, and with nitrogen and phosphorus from fertilizers. Clearing woodland generates massive emissions of CO_2 into the atmosphere. There are also greenhouse gas emissions of N_2O from fertilizer use. Smoke and ashes from the widespread practice of burning sugarcane fields before manual cutting cause local atmospheric pollution. There is also pollution due to pesticides sprayed from the air (Sawyer, 2008).

Socio-systemic effects

Various negative social, economic and political impacts of biofuel production within the socio-economic context of Brazil have also been identified. First of all, concentration of land tenure continues or is worsened, since monoculture of cane and soya beans requires large areas for mechanization and, especially in the case of sugarcane processing, for sufficient scale (Sawyer, 2008). There is also a concentration of income: producers and processors make large profits, while workers are displaced or earn low wages.

While soya bean cultivation may eliminate employment, sugarcane involves temporary semi-proletarianization. Although mechanization is underway, 80 per cent of the sugarcane harvested in Brazil is cut manually by approximately 1 million seasonal workers (Lima, 2007). Conditions are unhealthy, shortening working life and even causing death from exhaustion, as manual cutting of sugarcane involving tens of thousands cutting strokes per day (ibid.). Displacement and seasonal labour involve the physical and cultural destruction of multifunctional family farms and traditional communities (ISA, 2006).

Also, although cane and soya in Brazil are different from maize in the USA, food prices are rising due to competition for land and capital in the expanding markets for grain and beef *(Economist,* 2010a). This benefits farmers, and could even help them adopt more sustainable practices – but it stimulates frontier expansion and does not benefit the poor.

Inter-regional connections

In addition to the direct and indirect effects of expansion of soya and cane monoculture, extensive cattle-raising is being displaced to frontier areas,

where it is generating pressures for large-scale deforestation. Livestock farmers who sell their land to planters of soya or cane can purchase areas ten times as large on the frontier, owing to the big differential in land prices. The average price of land in the North region is seven times less than in the South, and the differential is increasing (Sawyer, 2008). Property value in rural areas also tends to fluctuate dynamically with national and international commodity prices, often responding quickly to changes in monetary and regulatory prices (Lourival et al., 2008).

Although there are restrictions regarding clearing and planting soya and cane in the Amazon, there are no specific national or international policies or actions to limit the expansion of cattle-raising. The remarkable soya moratorium negotiated by Greenpeace in 2006 was restricted to traders agreeing not to purchase soya from newly cleared areas in the Amazon in the next two years (Sawyer, 2008). There is still no monitoring of deforestation outside the Amazon.

Possible collapse in biofuel markets

Sawyer (2008) predicts a possible collapse in biofuel production. By the middle of the next decade, according to various predictions, it will be economically feasible to produce biofuel from cellulose, i.e. generic biomass, rather than carbohydrates or plant oils. With technical progress enabling production of ethanol produced cellulosic, the worst impacts of biofuels may come in the next decade, due to regional re-concentration (ibid.). The apparent bio-diesel and alcohol boom in Brazil could collapse into an empty frontier, with devastating consequences, Sawyer argues. The result could be degraded land subject to fire, abandoned infrastructure, bankrupt farmers and unemployed seasonal workers. The Cerrado and the Amazon, no longer needed for production of carbohydrates or plant oils, could become vast degraded pastures (Sawyer, 2008).

Policy implications

Already there are 25 million hectares of soy monocultures; by 2020 the area could grow to 70 million hectares. Sugarcane cultivation is to be expanded from six to 30 million hectares (Umweltsinstitut München, 2011). The expansion of agro-energy production in Brazil is inevitable in the short run, due *inter alia* to the building of infrastructure (Sawyer, 2008). An approach to mitigating the possibly catastrophic impacts of biofuels would be to strengthen alternatives for family and community livelihoods in sustainable landscapes, providing greater social justice – as proposed in the IAASTD report (2009). Agrarian reform can be carried out incorporating agro-ecology and agro-forestry. Small farmers can make sustainable use of biodiversity, such as native fruits and nuts, handicrafts, honey and medicinal plants, as is done in the *Programa de Pequenos Projetos Ecossociais* (PPP-ECOS), supported by GEF-SGP.

The future of biodiversity is intimately linked to agricultural development (UNEP, 2010). Sawyer (2008) proposes that a bias in favour of the forests, ignoring or even sacrificing biomes with few trees, and the

current international fixation on the Amazon, as if other biomes were unimportant, should be overcome. In addition to financial and technical cooperation, there is need for advice on public policy, a change that depends on scientific inputs and public perceptions (Sawyer, 2008).

Hydropower and dams: environmental challenges

Energy generation in Brazil is based principally upon hydroelectric plants, which account for approximately 80 per cent of its total energy supply, 95 per cent of the national electricity production (ANEEL, 2005). Loose regulations have led to the unplanned construction of hydroelectric dam reservoirs over the last 30 years, bringing in its wake severe social and environmental challenges. Of the Brazilian hydropower potential of 260GW, 23 per cent has been developed; Brazil has about 450 hydropower dams (ibid). Many new plants are yet to be constructed. Problems with hydroelectric energy involve loss of land, displacement of human populations, livelihoods and biodiversity and wildlife habitats as backed-up rivers flood terrestrial ecosystems and radically altering aquatic ones (International Rivers, 2011). In addition, hydropower plants bring a problematic climate challenge (Lima et al., 2008; Ramos et al., 2009; Fearnside, 2007).

Biodiversity and environmental issues

Dams and other water infrastructure significantly impact freshwater ecosystems by changing the quantity, quality and timing of waterflows, creating barriers to the movement of wildlife, sediment and nutrients, and inundating specific habitats (World Commission on Dams /WCD, 2000). The expansion of hydropower dams creates conflicts with international agreements focusing on loss of biodiversity, as well as national regulations (Pittock, 2010). The impact of water infrastructure on freshwater ecosystems continues to grow in severity despite the recommendations of the WCD for dealing with problems concerning existing and planned dams. For example, hydroelectric plants bring changes to hydrological systems, modifications in water quality due to the increase in bacteria and algae and the reduction in oxygen levels, silting, and emissions of greenhouse gases from organic decomposition in reservoirs. The Millennium Ecosystem Assessment (MEA, 2005) notes the extensive losses of wetlands (including rivers) globally and describes freshwater ecosystems as being over-used and under-represented in protected areas, and with the highest portion of species threatened with extinction. Large dams alter the natural flow of rivers, and causing problems to migrating fish stocks. Other fish that spawn only in moving water find little waterflow in areas impounded by dams, and large fish are killed when turbines are running.

The dirty downside of hydropower

The impact of climate change has often been a central argument of government policies in favour of hydropower, an energy source that is generally seen as clean, at least from the perspective of global warming. However, hydroelectric reservoirs are also known to have severe social and environmental impacts – an unfortunate climate downside.

Hydroelectric dams produce significant amounts of carbon dioxide, as well as nitrous oxide and methane (Fearnside, 2005; 2007). This is because large amounts of carbon tied up in trees and other plants are released when the reservoir is initially flooded and the plants rot. After this first pulse of decay, plant matter settling on the reservoir bottom decomposes without oxygen, resulting in a build-up of dissolved methane.[4] This is released into the atmosphere when water passes through the dam's turbines. Emissions of methane from turbines and spillways is the main reason why Fearnside's estimates of GHG emissions from Brazilian hydroelectric dams are more than ten times higher than the official estimates Brazil submitted to the Climate Convention in its national inventory (Brazil, MCT, 2004, p.154; 2006).

Greenhouse gas emissions represent a significant additional impact of many dams, especially in the tropics. Carbon emissions vary from dam to dam; but, in some cases, dams can even produce more GHGs than power plants running on fossil fuels. In 1990, Brazil's Tucuruí Dam emitted more greenhouse gases than the entire city of São Paulo (Fearnside, 2002).With the 2006 IPCC guidelines for National Greenhouse Gas Inventories, tropical countries that rely heavily on hydroelectricity, such as Brazil, could see their national GHG emissions inventories increased by as much as 7 per cent. And yet, despite a decade of research documenting the emissions from hydroelectric reservoirs, hydropower still has a reputation for mitigating global warming.

Social issues: The Belo Monte dam

Social problems are particularly linked to river populations affected by plant construction. The growing demand for energy is driving an expansion of infrastructure projects, like the controversial Belo Monte dam project on the Xingu River (cost: 11 to 18 billion USD) in the Brazilian Amazon. The dam will be the third largest hydropower plant globally when it is finished, producing electricity for an estimated 23 million people in Brazil's major cities, like São Paulo, Rio de Janeiro and Belo Horizonte. In preparation for dam construction, the Brazilian authorities have approved flooding of roughly 500 km^2 of farms and rainforest in the Xingu River basin (Regnskogfondet, 2011a).

Among other effects, this will prevent migration of the fish that are a major food source for many indigenous communities (New Scientist, 2010). The rights of indigenous peoples potentially affected by extractive industry and infrastructure projects are covered by national law as well as the new international ABS regulations, where local people and indigenous groups have the right to free, prior, and informed consent (FPIC) (Amazon Watch, 2010). However, persistent opposition by environmental and indigenous groups has failed to stop the project. Indigenous communities estimate the dam will devastate their lands, forcing about 12,000 people from their homes. Rainforest Foundation

[4] The standard estimate is that the effect of methane on global warming is 25 times stronger than that of CO_2 (UN IPCC, 2007), but new NASA studies assess that methane is 33 times more potent than CO_2 (*The Times*, 2009).

Norway confirms this figure, adding that 40,000 will lose access to important resources. The dam will reduce river levels, destroying the traditional fishing industry. Cities above the dam, like Altamira, face the opposite problem: about a third of Altamira will end up under water, and thousands of residents will have to be relocated.

Fisheries and Aquaculture

Fisheries have always been a central component of Norwegian business and industry. Norway controls some of the richest fishing grounds in the world, and is one of the largest producers and exporters of farmed fish on a global basis (Fisheries.no, 2010). Norway is by far the largest aquaculture producer in Europe. Because of natural limitations in wild fish stocks, the main growth in the seafood business will be in the aquaculture sector (Norway, Ministry of Fisheries and Coastal Affairs, 2007). As Brazil and Norway are establishing their collaboration on aquaculture in the Amazon, the industry's requirements for competitive conditions must be combined with a sustainable development, protection of fish stocks and the environment in general. Alongside the growth of Norwegian aquaculture operations, concerns have been raised about the environmental effects of escapees and pollution, fish welfare, and consumer health as well as the use of marine resources for producing fish feed (Olesen et al., 2010). Minimizing risks to the marine environment and biological diversity is a prerequisite for long-term growth and development.

Reducing the numbers of escaped fish to an absolute minimum is an important goal, pointing to an aim including that aquaculture shall not result in permanent changes in the genetic characteristics of wild fish stocks. Initiatives in this area include the establishment of an Aquaculture Escape Commission, whose remit is to investigate the causes of fish escapes, gain experience and propose regulatory improvements. Furthermore, better management tools and operational and technical requirements made of the industry are equally important (Fisheries.no, 2010). The strengthening of inspection and control activities also constitutes an important element.

Norwegian aquaculture is in a leading position internationally, and due to Norway's extensive experience, it is also likely to search solutions that can match the need for a sustainable management of aquaculture. Hence, a co-operation with Brazil could benefit both, and Norway no doubt has extensive experiences to share with Brazil.

Considering the problems following Norwegian aquaculture investments and operations in Chile (where the entire salmon farming sector is currently suffering from widespread outbreaks of infectious salmon anemia disease), it is expected that stricter regulations regarding biological and environmental risks will become necessary (Marine Harvest, 2011). New regulations will require investment in new technology.

Both Norway and Brazil need to adapt to sustainability challenges in aquaculture. With both countries being central leaders in the future

international aquaculture industry, a continuous focus on environmental sustainability, ethics and food safety is of vital importance. With different aquaculture species, waters and landscapes, challenges concerning escapes, diseases and vaccination, exotic or local species' influence on wild life many remain similar. Aquaculture hence is an area where Norway and Brazil might find scope for cooperation.

Fishways and hydropower

During all stages of their lifecycle, many important species of freshwater fish in Brazil migrate in the rivers among essential habitats. However, their wanderings are severely blocked by the hundreds of hydroelectric dams and reservoirs, and will be obstructed even more by the many hydropower plants that are under planning (Godinho and Kynard, 2009).

Construction of fishways is an important effort to protect endangered fish species. A fishway is a structure on or around artificial barriers (such as dams) to facilitate the natural migration of diadromous species. Norway has a very long tradition here, and has been a pioneer in fishway construction in the Scandinavian countries (Norwegian Directorate for Nature Management, 2002). Most of the 500-odd Norwegian facilities are of the pool and weir type, intended mainly for salmon. There are only a few for brown trout, grayling and coregonids (ibid.).

Fishway building is booming in Brazil, but poor understanding of the migrations of Brazilian fish has led legislators, scientists, and the public to several misconceptions about the role of fishways in fisheries conservation (Godinho and Kynard, 2009). A big problem is the belief that only upstream spawning migrations must be facilitated. In addition to providing passage for pre-spawning migrants, upstream fishways also serve to provide passage for other fish migrations (ibid.).

There is a need for protection of downstream migrant fish as well. Studies are needed to determine turbine-related mortality during downstream migration of Brazilian fish. Many Brazilian fish regularly migrate downstream and are entrained into turbine intakes as they pass downstream of the dam. Fish mortality during downstream migration at Brazilian dams is inadequately understood, and there are hardly any data on the subject (Godinho and Kynard, 2009).Norway has very different species and landscapes, but might possibly have knowledge applicable to Brazilian circumstances in this regard.

Brazilian federal policies on power-sector regulations

Lula's government administration altered the power-sector regulations, in order to increase the attractiveness of, and opportunities for, private investment in hydropower generation. The new regulations mean that hydropower projects cannot be presented to the public tender until after the governmental energy planning agency has granted an environmental license. The aim is to reduce environmental risks to investors, and stimulate hydropower investments. When some of the country's major private construction and civil engineering companies showed uncertainty concerning the financial risks earlier this year, the government raised its

investment stake, and is now financing more than three-quarters of the Belo Monte project.

In January 2011, the license for the Belo Monte project was approved by Brazil's environmental agency (IBAMA) despite evidence that the dam-building consortium Norte Energia had failed to comply with many of the social and environmental conditions required for an installation license. In the face of such disregard for human rights and environmental legislation, as well as the protests of civil society and condemnations by Federal Public Prosecutor's Office (MPF), construction is expected to start very soon. The President of IBAMA, Abelardo Azevedo, resigned after facing heavy pressure to grant a full installation license for Belo Monte, which would violate several IBAMA regulations (Regnskogfondet, 2011b).

2.2.3 Agriculture versus biodiversity conservation

Policy reform is an important driver of changes in agricultural land-use. As the demands on agricultural lands to produce food and fuels continue to expand, effective strategies are urgently needed to balance biodiversity conservation and agricultural production. Brazil's biomes are increasingly important to the world. International cooperation needs to progress beyond establishing protected areas, which has been aimed at saving species but has not always been effective in promoting an ecosystem or landscape approach. With its comprehensive National Plan on Climate Change (PNMC), Brazil is poised to implement measures intended not only to mitigate GHG emissions, but also to protect biodiversity and natural resources. A main effort in this regard has been the remarkable reduction of deforestation in the Amazon over the past five years. At the same time, however, the Cerrado savannah biome has been utilized to increase national production. In these areas, protection has not been given priority as in the Amazon, and the biodiversity value of the Cerrado has not been appreciated until recently. Because domestic and international protection has focused on the Amazon region, we will here direct our attention to the Cerrado biome. It has indeed come under serious threat – a particularly grave circumstance, as it is increasingly seen as a rescuing global breadbasket.

The unrecognized importance of the Cerrado

Brazil's Cerrado region is the wooded grassland that once covered an area half the size of Europe, making up 24 per cent of Brazil. It represents five per cent of the total global biodiversity, and is one of the most endangered biomes in Brazil. It is considered one of the world's richest savannahs, and is home to 70 per cent of the country's hydrographic basins. Due to conversion for agriculture and cattle pasture, the Cerrado has become Brazil's largest single source of carbon emissions. (Brazil, Federal Government, 2010d.)

Over the past fifty years, the Cerrado biome has become Brazil's largest source of soybean and pastureland, and a significant producer of rice, corn, sugarcane and cotton. In contrast to the small farms that can be found in other parts of Brazil, the Cerrado is dominated by a very

different kind of agriculture: capital-intensive, large-scale, mechanized monoculture.

The Cerrado is fast being transformed into cropland to meet the rising demand for soybeans, sugarcane and beef. A study by Conservation International indicates that the Brazilian Cerrado may disappear by 2030: indeed, some 57 per cent of the 204 million hectares of original vegetation cover have already been completely destroyed (Conservation International, 2004).

In September 2010, the Federal Government released its Action Plan for protection of the Cerrado (PPCerrado), with a goal of reducing deforestation in the Cerrado biome by 40 per cent by 2020. The plan outlines 151 actions to significantly reduce the loss of vegetation cover

and promote the protection and sustainable use of natural resources in the biome (Brazil, Ministry of Environment, 2010). These actions include promoting the pig-iron industry's use of charcoal from planted forests, and increasing the resources spent on recovery of degraded areas. Nearly USD 200 million will be spent in 2011 to foster sustainable production activities, monitoring and control, and the creation of 2.5 million hectares of new protected areas. Priority is to be given to the 20 most deforested municipalities in the region (Brazil, Federal Government, 2010b). International Rivers claims, however, that the PPCerrado is under financed, and will not have the resources to halt the destruction of the savannah (Millikan, 2011). At the same time, powerful economic and agricultural forces have interests diverging from the plan, and abundant

resources to back their interests. Lobbying to reduce the size of protected areas has become more frequent (Lourival et al., 2008).

The rate of deforestation in the Cerrado region is alarming, reaching 2.2 million hectares or about 1.1 per cent of the remaining Cerrado each year. The main pressures on the Cerrado are the expansion of the agricultural frontier, fires, and the unplanned development of urban areas. With 204 million hectares of vegetation cover already destroyed, half of the remaining areas are severely impacted and may not be appropriate for biodiversity conservation, CI reports. This is where the main challenge to the government of Brazil lies, in addition to halting the perverse incentive whereby the Amazon region has been 'leaking' land-use change to the Cerrado.

There is now two or three times as much annual deforestation in the Cerrado as in the Amazon: $22,000–30,000\,km^2$ yearly in the Cerrado, as compared with $13,100\,km^2$ in 2005–2006 and 9600 in the Amazon in 2006–2007. Accumulated deforestation in the Cerrado is between $800,000\,km^2$ and $1,600,000\,km^2$ (estimates vary), as compared with $700,000\,km^2$ in the Amazon, which is nearly twice as large (Machado, 2004).

The woodland and savannah matrix of the Cerrado is especially vulnerable because it has less protection and is widely considered to have low value, even offering an alternative to deforestation in the Amazon (ISA, 2006). The Brazilian government intends to exclude sugarcane from the Amazon and the Pantanal wetlands, as if there were no problems in the Cerrado (Brazil, Federal Government, 2010b). The Brazilian Ambassador to Norway, Mr. Moreira Lima, also embraces the notion of the Cerrado feeding the world (Moreira Lima, 2011a).

As the Cerrado is heralded for its agricultural miracle *(Economist,* 2010c), with the transformation of an alleged wasteland into an important global food source *(Aftenposten,* 2010), there has been little mention of the ecological costs involved, including the conversion of the rich biodiversity of the savannah and the associated loss of ecological services. According to the PPCerrado, INPE will start monitoring the Cerrado biome in connection to the action plan (Brazil, Federal Government, 2010d).

Both Mrs. Rousseff and former minister of Environment Mr. Minc have state that Brazil is one of few countries that can produce more and emit less, and that sustainable growth is a desired goal (Huffingtonpost.com, 2011; Brazil, Ministry of Environment, 2009). With reduced deforestation on a national scale, and a rationalization of cattle industry where the first goal is to double effectiveness of the industry's area usage, this seems to be a vision within reach. Land use changes are deemed to come and hence it is imperative that biodiversity protection is ensured. Concurrently, measurement of biodiversity loss should have high priority.

Livestock grazing's environmental impact

Brazil is the world's second largest beef producer, with exports increasing rapidly during the past decade, and the world's top exporter of beef (Cederberg et al., 2011). The Brazilian Ministry of Agriculture expects almost a doubling in exports in the coming decade (Morin, 2008). In 2006, nearly 25 per cent of Brazil's beef production came from the nine states of the Amazon states[5] where continuous grazing all year around is the predominant feeding strategy (ibid.).

The strong growth in beef production since the mid-1990s has been achieved by intensification and pasture expansion in the Amazon states, but mainly by intensification of production in the rest of Brazil (ibid). Cederberg et al. (2011) indicate that the impact from cattle raising is much bigger than the current international estimates suggest. This is because indirect effects on land are not included when determining a product's carbon footprint. They conclude that Brazilian beef is a heavy producer of carbon dioxide. By 2050, global meat consumption is expected to have increased by almost 80 per cent, which will require more grazing land and increased soy cultivation. Added to this is increased demand for land to produce bioenergy (Cederberg et al., 2011).

2.2.4 Norwegian investments in Brazil: Scope for Corporate Social Responsibility (CSR)

CSR leading to lack of accountability among local governments

In areas where big industrial companies establish large facilities, it has often happened that the local authorities have abandoned their legal responsibility for providing public services to the local community. Instead, the companies, armed with CSR projects, have started offering these services. Both local government and civil society accept the practices established by companies, which in turn leads to a situation of paternalistic dependence, whereby companies are expected to take on responsibilities that legally belong to the local authorities. A recent Columbia University (Cornejo et al., 2010) study reveals these patterns, and also finds a complex and intricate web of relations, further complicated by political, historical and cultural factors. This is an issue that should be taken seriously by Norwegian actors operating in Brazil. Some are even mentioned in the Cornejo report.

The study shows that companies continue to use authoritarian corporate responsibility models from the 1970s that serve to reinforce a cycle of dependency, making local communities unorganized, voiceless and weak. The only local organizations with a voice are the labour unions, which have settled on merely performing social and financial activities that attack the *symptoms*, not the *causes*, of social ills. Favouring the promotion of economic growth through private investments, local and

[5] The Legal Amazon region (LAR, an administrative unit which includes the nine states of Acre, Amapá, Amazonas, Pará, Rondônia, Roraima,Tocantins, Mato Grosso and most of Maranhão state)

state government has generally failed to enforce regulations, leaving implementation of public services to the companies. Licensing and monitoring responsibility is not explicitly distinguished among different levels of government, leading to confusion and lack of accountability. This is a point also emphasized by the Confederation of Norwegian Enterprise (NHO), currently in a dialogue with its sister organization CNI, communicating options to simplify environmental licensing processes.

Environmental industrial standards in Brazil

According to Cornejo et al. (2010), efforts to reduce environmental risks in the mining industries have been implemented more slowly than efforts concerning labour and social challenges. Large Brazilian companies have very high industrial standards (interview, Malme, 2010). They are on par with, or better than, the standards followed in Europe. New plants are built using the best available technology (BAT), which also should specify ideal resource use and emissions. On the other hand, Brazil has a slightly different way of regulating activities compared with Norway regulations. Norwegian emission limits are regulated by law, in line with the EU IPPC Directive, where the BAT standard to be followed is specifically defined. In Brazil, such emission permits are regulated differently.

The company first gets a basic permit, but must also apply for a range of partial permits related to various issues, in addition to following the country's general regulations. Permits are granted for only a short period, and must be renewed each year, which leads to copious bureaucracy and paperwork, high uncertainty and low predictability (interview, Malme, 2010). Implementation and monitoring of environmental standards are related to the experience and expertise among those involved. Today, Norwegian actors (including NHO) are working together with the Brazilian authorities and stakeholders (including the NHO sister organization CNI) to compile a simplification of regulations in Brazil's environmental licensing. The Brazilian concession regime was introduced by the Petroleum Law (no. 9.487) in 1997. Before this time, Petrobras was a wholly state-owned company with a monopoly on petroleum exploration and production in Brazil. The Petroleum Law also created the National Council of Energy Policy (or CNPE) and the National Petroleum Agency (the ANP). The latter is charged with coordinating regular bidding rounds and awarding licenses on the basis of policies formulated by the CNPE (CMS Cameron McKenna, 2009). When Brazil established its petroleum agency, ANP, it was with the Norwegian Petroleum Directorate (Oljedirektoratet) as a model (interview, Martinsen, 2011). There have been 10 licensing rounds since 1999, and the Brazilian licensing model has been rightly praised for its openness and transparency (CMS Cameron McKenna, 2009). The Brazilian Energy Commission is also looking to create a new state-owned company inspired by the Norwegian model of Petoro (ANP, 2010).

President Lula made it clear that he saw the Scandinavian approach to bureaucracy and the organization of state production as a model (interview, Martinsen, 2011). Whether Dilma Rousseff will continue along this

line seems questionable, but there is a certain possibility she will ensure that oil and gas are nationalized to a wider degree than earlier expected. With Brazil taking environmental issues more seriously, a licensing system with clear divisions of liability will doubtless benefit companies, but possibly also the environment itself. With understandable, stabile processes and greater transparency, corporate ownership of high environmental standards might increase (interview, Martinsen, 2011). This is an area where Norwegian backing might be welcome, despite Brazil's already high industrial standards.

CSR standards and social dialogue

Cornejo et al. (2010) notes a lack of effective social dialogue among local stakeholders. The study recommends a broadened scope and fresh resources for civil society organizations as essential to provide representation to voiceless communities, communicating with companies and advancing the recommendations for social dialogue, to ensure that civil society concerns are taken into consideration and reflected in regulations and decisions at company and government level. The study also recommends that companies include socio-economic impacts in their decision-making processes, by moving beyond a philanthropic CSR model to engage in important and sustainable relations within their direct and indirect spheres of influence.

Interestingly, Norwegian companies like Hydro agree, and report that they in recent years have started a reform of their CSR projects, in the direction of capacity building, multi-stakeholder engagement and social dialogue in the local societies surrounding their plants (interview, Malme, 2011). They also agree that greater accountability on the part of the elected authorities is essential to ensure effective protection of the rights of local communities.

2.2.5 Valuing natural resources through different ecosystem services

Among the internal goals of biodiversity conservation established by the Brazilian government is the protection of at least 30 per cent of the Amazon biome, and 10 per cent of the remaining biomes and coastal and marine areas under the National System of Conservation Units. The government also hopes to have the welfare of all species officially recognized as endangered in the country addressed by Action Plans and active Advisory Groups. All relevant public policies for traditional knowledge should be implemented, in compliance with the provisions of Article 8j of the CBD.

Access and Benefit Sharing: Brazil in ABS negotiations

The objectives of the CBD constitute a package deal between conservation of biodiversity, access to genetic resources and related technology, and equitable sharing of benefits arising from the use of genetic resources. This is based on the acknowledgement that without benefit sharing, poor countries, where the major bulk of the world's terrestrial species diversity is found, would have less incentive to conserve biodiversity. The Nagoya Protocol on ABS was adopted in

October 2010 during COP 10 to the CBD. The Protocol has been coined a 'masterpiece of ambiguity' and leaves a high level of flexibility to countries for the implementation of the treaty.

Brazil is an area of high diversity and similarly high activity and stake in regulation of Access to and Benefit Sharing (ABS) from utilization of genetic resources. It was part of the negotiating bloc that in 2002 united in the group of Like-Minded Megadiverse Countries (LMMC). These 17 developing countries were frustrated with the slow pace of progress at the CBD on biodiversity issues of concern to them, and pushed for the negotiation of a protocol to the CBD on ABS issues.

In addition to be a country of megadiverse biological diversity spanning over large areas, Brazil is an important user country of genetic resources. This is particularly so for the agricultural sector which has huge economic value for Brazil. But also for bio- and gene technology in non-agricultural branches Brazil is a user country of genetic resources. These dual positions can be compared to those of Norway. Norway is also both a provider and a user of genetic resources (although on much smaller scale).

Since 1994, there have been various initiatives to regulate access to Brazil's genetic resources, but still no law has been permanently approved. Various proposals are being evaluated by commissions under the Congress. . Brazil has passed a number of 'decretos' and 'resolutions' relevant for genetic resources. The states of Amapa and Acre have passed their own laws regulating access to genetic resources.

Access to biodiversity resources and associated traditional knowledge and the benefits resulting from its use is regulated in accordance with CBD clauses. In 2001, Brazil established the Genetic Heritage Management Council (CGEN), tasked with implementing national policies on access to genetic resources and traditional knowledge, and developing technical and administrative activities for providing or denying access. Access to the genetic heritage requires prior authorization from CGEN. Depending where the resources are expected to be collected (indigenous territory, protected area, private land, land essential to national security, or jurisdictional waters, continental shelf or exclusive economic zone), different agents are called to take part in the authorization granting or denying prior informed consent (indigenous communities, competent authority within the protected area, landowner or the Brazilian maritime authority, respectively) (Garforth et al., 2005). Expeditions for accessing genetic resources must be coordinated by a national institution: foreign institutions or persons are not allowed to develop such activities by themselves. The CGEN includes training and awareness programmes directed towards indigenous communities.

According to Chapter 8 of the Provisional Measure, non-compliance with the regulation may be punished with various types of penalties. The penalties range from fines, confiscation of samples and products, suspension of the sale of products, to the closure of establishments, suspension or cancellation of the registry, patent, license or authorization,

prohibition of contracting with the public administration, and restriction of tax incentives (Garforth et al., 2005).

Brazil is one of the countries that have implemented a disclosure requirement in its patent system, which might be used as a monitoring mechanism. Article 31 of the Provisional Measure requires that the origin of the genetic material and the associated traditional knowledge be specified when applying for IPRs for a process or product obtained using samples of components of the genetic heritage. Thus, Brazil has taken one important step as a user country in direction of establishing a system for enforcing the sovereign rights of other countries over their genetic resources.In 2002, Brazil ratified the 1989 ILO Convention concerning Indigenous and Tribal People, in which the parties pledge to protect traditional knowledge.

Many studies (see Madeira, 2008; Ostrom, 2000) suggest that in a process of protecting new areas, it is wise to include locals and indigenous populations. Inclusion of these groups leads to better conservation results, as they are traditionally used to harvesting their local nature in a sustainable way. Also, inclusion leads to a stronger ownership to ecosystem services projects, a goal that was supported by the MEA (2005).

2.2.6 Pollution and chemicals issues

Mercury uses in Brazil

In 2003 the Governing Council of the United Nations Environment Programme (UNEP) concluded that there was sufficient evidence of global damaging impacts related to releases of mercury. According to UNEP, these impacts include problems to human health and to the environment. In the period 2002 to 2008, global mercury emissions were reduced substantially, decreasing from 23.3 tonnes yearly to about 7.4 tonnes, a 68 per cent decrease over those seven years (World Chlorine Council, 2010).

A globally binding instrument on mercury is expected be one of the last of the big new international environmental agreements. A treaty is expected to be ready by 2013 (Andresen et al., forthcoming). Cadmium and lead do not get transported as easily as mercury, but it was originally a target to include both these substances in the mercury agreement – an ambition that has now been abandoned.

Dominant sectors for mercury uses and emissions in Brazil are the chlor-alkali plants and the gold mining industry, and areas like the savannah suffer from mercury pollution caused by gold mining (Hochstetler et al., 2007:14). Brazil has unilaterally tried to prohibit the use of mercury, but it has been difficult to control implementation of the regulation. Gold miners often operate in small groups, and it is difficult to quantify and regulate their activities. The gold mining sector is a complex challenge, involving health, social and environmental impacts on many small actors. There are two institutional programmes focusing on gold mining in Brazil, one run by the Federal Government, and one by UNIDO.

It was expected that Brazil would have reservations concerning the mercury agreement. But as former minister of the environment and presidential candidate Marina Silva suffers from mercury poisoning (Hildebrandt, 2001), Brazil proved to be a more willing part in the negotiations than originally predicted (Andresen et al., forthcoming). Brazil has been positive towards a principle of differentiated responsibilities in the international agreement on mercury. Brazil is unlikely to be categorized among the big emitters, parties that will get heavy duties (ibid.). As to alternatives to the use of mercury in Brazil, cyanide is utilized. Another option would be to reduce the use of mercury (Andresen et al., forthcoming). Norway should consider collaborating with Brazil on mercury issues, issues that will be discussed at Rio+20.

Pesticides uses in Brazil: Environmental and health impacts

Brazil's extensive agribusiness sector requires massive amounts of artificial fertilizers and pesticides to produce vast harvests in poor soil while protecting the crops from pests. Pesticide poisonings, some resulting in death, have become a serious public health problem. It is estimated that average exposure to pesticides in Brazil is around 3 kg per worker per year, but in some places, as in the rural areas of Rio de Janeiro State, this increases to 56 kg per worker per year (Peres et al., 2006). Brazil is among the biggest users of pesticides internationally (Caldasa, 2011).

According to the National Poisoning Information System (SINITOX), pesticides are the second highest cause of exogenous poisoning in Brazil, accounting for approximately 10 per cent of the over 80,000 reported cases each year (Caldasa, 2011).The Brazilian Ministry of Health estimates that for each case reported, at least 50 others go unreported: that increases the annual pesticide poisoning rates to 400,000 cases per year, with 2,000 deaths. Most of the available information regarding the necessity and the correct use of pesticides for crop protection is incomprehensible to rural workers, due to the highly technical content of the material, beyond the educational levels of the group (Peres et al., 2006).

With a USD seven billion market, Brazil is the largest market for pesticides worldwide, and continues to use a range of dangerous pesticides banned in other countries (MercoPress, 2009). In spite of a 2 per cent reduction in planted areas, consumption has increased in Brazil. Expenses and consumption per hectare is still low compared to other countries, but this could be a sign of low utilization of farming areas. The increased use of pesticides can partly be explained with the emergence of new pests like soy rust *(ferrugem da soja)*. The growing use of technologies is also responsible for some of the increase. The more advanced the system of production, the higher the consumption of pesticide. There is a development concerning not only combating pests, but also finding different ways of using pesticides. In Brazil, coating the seeds instead of spraying crops is becoming more common, as spraying causes more harm to agricultural workers and the environment.

Concerning international regulations on pesticides, Brazil has difficulties in controlling the market; there is lack of human resources and laboratories, while consumption increases (Meirelles /Anvisa). With new kinds of pests, new pesticides are continually reaching the market. Currently, there are about 450 assets used in producing pesticides registered at the Brazilian National Health Vigilance Agency (*Agência Nacional de Vigilância Sanitária, Anvisa*, ANVISA) and applications for the granting of more licenses keep coming in. Brazill lacks sound and unified pesticide poisoning data and the available figures are known to be grossly underestimated (Caldasa, 2011). Pesticides banned in some countries, such as acephate and endosulfan, continue to be used in Brazil (MercoPress, 2009).

In Brazil today, it is estimated that 5,000 workers die per year, victims of pesticide poisoning. Most of these deaths could be avoided with effective use of simple protective equipment for farmers (Guivant, 2003). Some 15 percent of the fruit and vegetable samples investigated by Brazil's health agency exceeded the allowed limits. Loose safety standards and low frequency of controls enable companies to use several banned pesticides. Workers, locals and consumers are affected; rivers are contaminated, destroying aquatic life and poisoning the drinking water. The river Xingu Basin, home to several indigenous peoples and diverse biodiversity, is under pressure. Runoff from rain and flooding wash agrochemicals off the fields and into the rivers, killing fish and other life. The practices often have cumulative effects and are irreversible (Rainforest Action Network, 2011).

Strategies for rural workers

A 2006 public health study (Peres et al., 2006) recommends that policies and educational strategies be implemented for risk-communication approaches based on the cultural background of the rural workers. It is essential to incorporate risk-perception approaches into these initiatives, recognizing the crucial importance of well-informed, knowledgeable rural workers.

Social cost of pesticide use in Brazil

The intensive use of pesticides in Brazil has ignored structural and institutional gaps, such as the lack of workforce training, difficulties in implementing technologies, and the institutional vulnerability of the environmental protection, health, and safety sectors. As a result, the ‘invisible’ or social, environmental and health costs end up with the farmer.

A recent study (Soaresa and Porto, 2009) has estimated the social costs associated with acute poisoning by pesticides in the state of Paraná. The results indicate that, for maize, the costs of acute poisoning could represent 64% of the benefits of using herbicides and insecticides, but when some risk factors are eliminated, they may reach 8% of the benefits of the use of these products. In ten years, the costs of acute poisoning could swallow up some 85% of the benefits gained from using

insecticides and herbicides for maize. If, however, preventive measures are taken, the gains would be considerable, about 6.5 times greater.

Soaresa and Porto (2009) recommend that an assessment of the real benefits involved in pesticide use in Brazil be carried out, primarily in regard to smallholdings, where farmers need more training in the use – if not elimination – of these hazardous substances. There are sustainable technological options available which are economically efficient, especially in views of the social, environmental and health costs involved.

Hazardous pesticides in biofuel production

Schiesari and Grillitsch (2010) show that the global interest in biofuels is driving a continuous expansion of agro-industrial production in Brazil, bringing a substantial share of the biodiversity into contact with hundreds of potentially hazardous pesticides. Hazards are also imposed on biodiversity by hundreds of pesticides registered for use in biofuel production. Compounds not allowed by international conventions are used, as well as over 80 compounds included in lists of priority concern for exhibiting environmental persistence and having the potential to cause harming effects in humans and wildlife (ibid.). These chemicals will be used increasingly across large areas of agro-industrially converted pastures and native, untouched habitat in the Cerrado and Amazonian rainforest biomes.

Schiesari and Grillitsch (2010) recommend that if safeguarding human and environmental health is to be balanced with productivity to achieve sustainable agriculture, bolder initiatives on pesticide restriction and control must be implemented in Brazil.

3 Domestic policies affecting global environmental negotiations: Scope for synergies between Brazil and Norway

3.1 Brazil's role in the climate change (UNFCCC) negotiations

In 1996 the World Resources Institute published a study showing that many developing countries were already taking steps to reduce their GHG emissions, even in the absence of formalized obligations to do so. Brazil, in particular, has for years run activities and policies to reduce sources of GHG emissions, such as the Pro-Alcohol programme, energy conservation projects, and attempts to reduce deforestation rates through stronger legislation and enforcement (Reid and Goldemberg, 1997). The image of Brazil as a country which is already doing more than the developed world to balance its development needs with concern for the environment is actively promoted by Brazilian media.

Brazil has been a key player in the global warming negotiations from the beginning, when it hosted the Earth Summit in Rio de Janeiro in 1992. As the third largest developing country in population (after China and India) it has been an influent leader for the G77. Brazil has high stakes in the climate-change issue because some of its national economic, social, and security interests depend on continued growth in its energy sector and the development of the Amazon region. As a result, Brazil has taken a proactive role in the climate negotiations and has made several important contributions to the ongoing negotiations on global warming. In the development of Brazil's role in the climate change negotiations, three issues have been of particular concern (Johnson, 2001)

1) Historical responsibility: Common but differentiated responsibility

Brazil was among the first parties to take up the question of emissions responsibilities. Even though all signatories committed themselves to cooperate in reducing GHG emissions, the principle of 'common but differentiated responsibilities' was fronted by Brazil (Johnson, 2001). The Brazilian proposal to base emissions-reduction responsibilities on historical emissions and the impact on global temperature change strengthened the basic premise of the 1992 UN Framework Convention on Climate Change (UNFCCC). The principle maintains that developed countries must take the lead in reducing GHG gases and assuming most of the cost of abatement measures. In this sense, Brazil provided important leadership for developing countries in the negotiating process (Johnson, 2001).

2) Benefits for the developing countries

Three mechanisms allowing industrialized countries some flexibility in how they meet their emissions targets have been developed as part of the climate regime. These are Joint Implementation (Article 6), Emissions Trading (Article 17) and the Clean Development Mechanism (CDM; Article 12). The first two give the developed countries the opportunity to interact with each other, achieving credit for reducing emissions in

another country. The third mechanism, CDM, is designed to benefit the developing countries as well. The CDM is the result of a Brazilian initiative and was the first protocol mechanism to become operational (Johnson, 2001; Viola, 2009).

3) Land-use change as a determinant in Brazilian positions

Thirdly, increasingly more prominent in climate negotiations, the role of land-use change and forestry (LUC) in climate-change negotiations is of particular importance to Brazil (Johnson, 2001). Deforestation is a major source of GHG emissions in the developing world, especially in Brazil, where the deforestation of large territories of the Amazon is by far the greatest source of GHG emissions, representing more than 70 per cent of Brazilian emissions (ibid.).

Because of the huge size of the Amazon and its growing importance in national development plans, Brazil has a major stake in how changes in forests are figured in emissions calculations. Article 3.3 of the Kyoto Protocol states that changes in GHG emissions that result from changes in land-use and forestry activities can be used to meet emissions-reduction commitments. But, due to lack of consensus on the adequacy of scientific measurement techniques and data, land-use changes have only recently been included in emissions measurements. Because of the size and importance of the Amazon, Brazil has a considerable interest in how forest CO_2 sinks and deforestation emissions are treated in the calculation of emissions.

3.2 Brazil and REDD

Brazil keeping REDD off the agenda

Until 2005, Brazil was strongly opposed to including land-use change and forestry (LUC) in the climate regime, and still it is opposed to the notion of offering offsets to developed countries for REDD services. In contrast to many nations with extensive forests, Brazil's position on LUC was fixed, and Brazil here deviated from its likely alliance with China and the G77. The long-term inability of the Brazilian government to effectively control deforestation of the vast Amazon region was a major cause of its negotiating position in regard to several issues in the climate negotiations, especially the role of the CDM and of land-use change and forestry in reducing GHG emissions.

The Brazilian delegation preferred to delay consideration of the impact of land-use changes on global warming, and repeatedly highlighted the need for international cooperation in combating illegal logging and other economic causes of deforestation. This approach enabled Brazil to keep the focus on the responsibility of the Northern countries. During the years, different approaches in the Brazilian position development have been emphasized, but two particular aspects of the land-use and forestry issue have crystallized: (a) using forests in the calculation of sinks and (b) using forest-preservation projects in the calculation of emissions reductions. On one hand, Brazil has wanted a net emission calculation, as it sees the Amazon forest as a major carbon sink, absorbing and

sequencing more CO_2 than the emissions from deforestation. Second, Brazil has held that forest-prevention projects must not be included in the CDM or any other credit-generating mechanism. One of the arguments has been that, owing to enforcement difficulties, such projects could not ensure that deforestation would not occur.

Surprisingly, Brazil was attempting to water down REDD plus safeguards in COP16 in Cancun (Reeve cited in Climate Change Media Partnership, 2011). Brazil rejected any language about the safeguards as it related to their national sovereignty (ibid.). Brazil has long been driven by a geo-political conception of external threats to its territory and national sovereignty, particularly in association with the Amazon region (Fearnside, 2009; Barbosa 1996). A more supportive attitude towards environmental safeguards and integrity provisions is a prerequisite of realizing the REDD plus potential.

REDD obstacles in Brazil

The main arguments of Brazil in connection with enforcement difficulties were connected to the obstacles in effectively controlling deforestation: (a) the size of the Amazon – combined with the lack of infrastructure – which made any monitoring and enforcement efforts difficult and costly; (b) the government's conflicting development priorities regarding the Amazon as a resource to be used to achieve economic and social goals; (c) lack of enforcement cooperation by state governors, who encourage logging and settlement rather than environmental protection; (d) weak federal legislation to control Amazonian development due to intense lobbying by economic interests in Brazil's fragmented legislature; (e) inadequate federal coordination among the multiple federal agencies charged with protecting the forest and its inhabitants; (f) limited international financial contributions for forest preservation projects; and (g) OECD countries refusing to become parties to the international timber certification system, thus making it difficult to catch and prosecute illegal logging by foreign firms. These obstacles have contributed to erratic and often contradictory policies in the Amazon (Johnson, 2001; Viola, 2009).

Brazil's Greenhouse Gas Emissions

Brazil's negotiating positions are shaped in part by the nature and quantity of its emissions. Emissions come from two basic sources: energy consumption and land-use changes (mainly deforestation). Unlike other rapidly developing countries, Brazil is unique in having rather low current and projected emissions of GHGs from energy use.

Brazil's energy emissions are comparatively low. Its per capita consumption of energy is also quite low, only 16 per cent of US emissions per capita (Johnson, 2001). Brazil's relatively healthy emissions position is due to an energy matrix that relies heavily on renewable resources.

Brazil has one of the cleanest energy matrices in the industrialized world, with 46 per cent of all power generated from renewable sources (Brazil, Federal Government, 2010c).

About 38 per cent of the country's energy comes from fossil fuel sources, 33 per cent from hydropower, and 23 per cent from biomass (sugarcane-/ethanol production and charcoal). In the 1970s, in response to the oil crisis, Brazil initiated a national ethanol-gasoline programme Pro-Alcohol. About 70 per cent of the biomass energy is renewable, and 100 per cent of the hydropower is renewable (Johnson, 2001). As more than ninety per cent of Brazil's electricity is generated by hydropower, Brazil has clear advantages in the climate change negotiations.

Deforestation of the Amazon rain forest, two-thirds of which lie within Brazil's borders, is the major contributor to the country's greenhouse gas emissions. About 15 per cent (about 500,000 km^2) of the Legal Amazon has been deforested (the Amazon Fund, 2008).

Causes of deforestation in the Amazon

The direct and indirect causes of deforestation in the Amazon have been extensively documented. Direct causes include clearing of trees by slash-and-burn techniques for farming and cattle grazing; logging; flooding caused by hydropower development; and infrastructure and industrial development (e.g., road building and mining). In addition, there are several other indirect factors that affect the rate of deforestation. These include weather variations (longer dry seasons mean more fires, whereas longer wet seasons mean more flooding); economic fluctuations (currency devaluation increases the demand for timber exports and consequently logging, whereas recession or inflation can lead to more migration to the Amazon and to greater land clearance); and socio-economic pressures, with the Amazon acting as a safety valve for impoverished Brazilians who migrate to the region in search of land, gold, jobs or other economic opportunities.

In terms of CO_2 emissions, forest fires do the most damage. Forest fires in the Amazon not only directly increase the amount of CO_2 in the atmosphere but also reduce the area of forest that acts as a carbon sink to absorb CO_2.

The Brazilian National Plan on Climate Change (PNMC)

The Brazilian government released its National Plan on Climate Change (PNMC) in 2008. One of the key proposals aims at reducing the unsustainable use of the natural resources that lead to deforestation. The plan is to reduce deforestation by 72 per cent by 2017 (with a 2005 baseline) – an achievement that can save carbon emissions from Brazilian deforestation amounting to a cumulative reduction of 4.8 Gt CO_2.

The PNMC was the result of the work initiated in 2007 by working groups that developed analyses on topics such as energy and forestry, identified as Brazil's two main sources of climate gas emissions. Behind the plan were 16 ministries (*Comitê Interministerial sobre Mudança do Clima, CIM*) and the Brazilian Forum on Climate Change (*Fórum Brasileiro de Mudanças Climáticas, FBMC*). The plan contains four main pillars: reduction of climate gas emissions; adaptation to the con-

sequences of climate change; research and development; and dissemination and training.

Among the many topics covered by the plan are clean and renewable energy and energy efficiency. In addition to increasing the share of renewable and clean energy in the Brazilian energy matrix, PNMC plans to give incentives to reduce consumption, reduce GHG emissions from the oil and transport sectors, and make improvements in waste management, among others.

Concerning energy efficiency, the goal is to replace ten million outdated refrigerators for new models by 2019. According to former environment minister Carlos Minc, this measure could reduce GHG emissions by seven million tons by *not* generating electricity, and *not* emitting five million tons CFCs, harmful to the ozone layer.

3.3 Brazil's role in the Convention on Biodiversity (CBD) negotiations

Brazil was one of the first mega-diverse countries to enact national legislation on Access and Benefit Sharing (ABS) (Provisional Measure n^{o} 2186-16/2001) to implement the CBD on the national level (Santilli, 2009). Today, there is consensus among stakeholders that the legislation must be reviewed to overcome shortcomings (Santilli, 2009; interview 2011). This is because the regulations are ambiguous and lack the flexibility to deal with different kinds of situations (Santilli, 2009). Brazil has to a larger extent emphasized its interest in assuring a strict bilateral access and benefit-sharing regime, due to its position as a mega-diverse country, its rich biodiversity and expectations concerning the potential economic benefits from bioprospecting and biodiversity markets – expectations that are unlikely to be met (interview, Santilli, 2011). Issues relating to valuation of ecosystem services and land-use are not likely to have influenced the development of Brazilian positions in the CBD negotiations (ibid.).

Brazil has supported all the treaties related to the global environment signed during the 1990s. In the development of all these treaties Brazil's participation has been middle to low profile, except for in negotiating the CBD (Viola, 2010). During the negotiations of the CBD (1990–1992**),** Brazil had a leading role, deriving from its position as the largest country in the world in biodiversity.

Also in the negotiations in the Intergovernmental Committee on Genetic Resources, Traditional Knowledge and Folklore (IGC) under the World Intellectual Property Right Organization (WIPO) Brazil has played an important role. Here the topic on the agenda is the intellectual property aspects of genetic resources and traditional knowledge. How future rules on these matters are made, will influence the situation of Brazil both as a country providing genetic resources and a user country of genetic resources.

A major issue at stake during the negotiation of the CBD related to the connections between biodiversity and biotechnology. The USA (with 2/3

of the global biotech industry) strongly defended the principle of Intellectual Property Rights according to the conventional definition. On the opposite side, a coalition of countries rich in biodiversity, led by Brazil, defended the right to benefits for countries where biodiversity is located, when biotech products are manufactured from biodiversity. The CBD, approved in May 1992, implied a partial victory for the coalition of countries led by Brazil, since the Convention did not recognize the full principle of Intellectual Property Rights, defining it in a broad sense giving rights to indigenous people.

The Nagoya 2010 Protocol on ABS represents a step forward in inter national agreement on transaction with genetic resources. One important challenge both in the implementation of the Nagoya Protocol and for the implementation into national legislation is to ensure a link back to the conservation and sustainable use of biological diversity.

4 Recommendations and scope for action – some potential examples

4.1 Expanding the on-going forest initiative between Brazil and Norway

In its agreement with Brazil, the Norwegian KOS initiative underlines the equal weight of the three overall goals of the project: the climate component of reducing CO_2 emissions is one; safeguards such as protection of biodiversity and livelihoods are the two others. According to a recent UNEP assessment report (2009), boosting investments in conservation, restoration and management of natural ecosystems will provide the best and most effective way to slow down climate change, accelerate sustainable development and achieve the poverty-related Millennium Development Goals. Similarly, UNEP and IUCN (2007) concluded that REDD has the potential to link carbon and biodiversity payment for ecosystem services (PES), *if and only if* a more targeted approach to REDD is adopted – one that encourages investment only in high-biodiversity forests.

Despite the growing agreement and awareness of the importance of including biodiversity conservation and concern for local and indigenous people in REDD projects, moving from REDD to REDD plus, however, an inherent challenge remains: Monitoring is currently restricted to the capture of carbon emissions. Project monitoring, reporting and verification (MRV) focus only on carbon levels. This has implications for the types of stakeholders that can benefit from REDD projects. It will be difficult to achieve REDD plus unless criteria and principles can be developed for evaluating the conservation and livelihood aspects of projects. So far, the will seems to be greater than the ability to implement acknowledged lessons about biodiversity and climate synergies. Norway and Brazil might find common ground in spearheading efforts to develop MRV for biodiversity, by:

- Co-operation on the development and identification of MRV for local communities and biodiversity as REDD plus safeguards.
- Co-operation on integrating these REDD plus measures into the on-going discussions under UNFCCC.

4.2 Collaboration on compliance mechanisms for the ABS Protocol

Agreeing to the Nagoya Protocol is only one step on the way to establishing a practical, functional and enforceable system for access and sharing of the benefits from utilization of genetic resources. First the Protocol must enter into force after a sufficiently high number of countries having ratified it. Then it has to be implemented into national systems. Norway as well as Brazil has shown early action in the process of working on the implementation of user country measure, which represents a common ground for collaboration. In the work of the IGC under the WIPO Norway and Brazil also share interests on folklore and traditional knowledge on use of biodiversity. This should be an area for

further collaboration. Other suggestions for enhanced co-operation between Norway and Brazil are:

- A very relevant issue area for both Brazil and Norway is how to identify an effective compliance mechanism at the international and national level
- Co-operation on how to develop and implement a global multilateral mechanism for benefit sharing
- Co-operation on how to build and secure effective capacity building initiatives in association with the ABS protocol in developing countries

4.3 Domestic environmental integration (vertical and horizontal)

Chapter 2.2.2 illustrated how hydropower represents the major energy source in Brazil while also engendering social and biological challenges. Brazil is hardly looking for external advice regarding this issue; still, in light of the long experience in Norway with hydropower – as well as quite comprehensive regulations in the area (*Verneplan for vassdrag*) this could be pointed to as an interesting topic for cooperation and exchange of views and experiences.

On a similar line we could also point out the emerging interest in aquaculture in Brazil and discuss whether this could be an area to further exchange of research and development (R&D).

- Developing management plans and sharing experiences on mitigating efforts in association with hydropower development, off shore activities and marine pollution.
- Collaboration and exchange of experiences on the development of environmental regulations and compliance concerning hydropower, preservation of waters and wetlands and fishways in association with hydropower plants.
- Exchange of views and experiences for the petroleum sector. With the Norwegian ecosystem based management plans for marine areas as a basis for collaboration and scientific exchange
- Improved regulation of aquaculture and fisheries
- How to develop vertical and horizontal domestic integration on social rights, biodiversity and other environmental issues including local levels.

4.4 Special areas of co-operation during preparations to Rio+20.Co-operation on operationalizing the TEEB report recommendations

Reports from the European Commission and UNEP (EC, 2008; TEEB, 2010) conclude that investing in the restoration and maintenance of the Earth's multi-trillion-dollar ecosystems – from forests and mangroves to wetlands and river basins – can have a key role in countering climate

change. The reports recognize that enhancing the resilience of ecosystems and maintaining biodiversity are key elements of the mitigation and adaptation agendas.

There are several areas of global environmental governance that is currently in need of domestic legislation – as recently adopted as well as emerging multilateral environmental agreements depend on national legal enactment for their implementation. Brazil and Norway may have a common interest in pursuing some of these topics at the international level as well as cooperating at the national legislative level:

- Investing in and co-operating on the construction of a Green Economy that is not only greening the existing economic system, but is built on a sustainable development platform
- Collaborating in the proceeding progress of global governance in environmental issues, such as chemicals (POPs, pesticides) and pollution (marine pollution, waste management etc.)
- Co-operating on development of new specific issues for environmental governance and environmental agreements (such as mercury)as well as enhancing the synergy effects of the existing ones

4.5 Knowledge-based management

- Development of bilateral programmes for scientific and technical exchange, as well as supporting Brazil in their effort to bring the south-south perspective into technical capacity building processes
- Exchanging experiences on the safeguarding of required research funding of environmental research in business enterprises. Supporting the development of BAT and sustainable technical development
- Cross-cutting areas co-operation concerning R&D; academic and engineering collaboration

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Lectures and seminars

Brazil in a Changing Global Order: An emerging power of the 21st Century. 18 January 2011, Litteraturhuset, Oslo. Seminar arranged by the Norwegian Ministry of Foreign Affairs in association with NOREF.

- Alcides Costa Vaz, professor of international relations at the University of Brasilia
- Paulo Sotero, Director, Brazil Institute, Woodrow Wilson International Center for Scholars, Washington DC

Damming the Amazon: Indigenous peoples, hydropower and the risks for Norwegian investors 21 February 2011. Seminar arranged by Rainforest Foundation Norway, FIVAS and ForUM at Litteraturhuset, Oslo.

- Sergio E. Moreira Lima, the Brazilian Ambassador to Norway (2011a)
- Brent Millikan, International Rivers
- Torkjell Leira, Rainforest Foundation Norway

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Interviews, talks and e-mail correspondence

- Marte Nordseth, Brazil coordinator in the Government of Norway´s International Climate and Forest Initiative
- Juliana Santilli, Brazilian lawyer and public prosecutor. Co-founder of the Brazilian public interest organization Instituto Socioambiental (ISA).
- Bernt Malme, Director, Environment, Hydro Aluminium
- Harald Martinsen, Confederation of Norwegian Enterprise (NHO)
- Sergio E. Moreira Lima, Brazilian Ambassador to Norway (2011b)

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