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Changing Climate and Society: The Surprising Case of Brazil

Carmen Dayrell, John Urry

CASS/CEMORE Lancaster

The problem of climate

Contemporary societies are faced by a new spectre haunting the 'globe' – the changing of the world's climate. Such change is believed to be caused by increased levels of 'greenhouse gases' (GHGs) in the atmosphere which cannot be fully absorbed into the oceans and hence impact upon the earth's present and future temperatures. Such a climate forcing mainly results from systems that involve extracting, burning and distributing fossil fuel based-energy from under the ground. Some unimaginably old *and* astonishingly dirty fossil fuels made the shiny modern world contingently possible.

In burning all this fossil fuel, 2000 billion tons of CO_2 in particular have been spewed into the atmosphere and will remain there for hundreds of years (Berners-Lee and Clark, 2013: 26). CO_2 emissions in particular increased exponentially from 1850 to the present day and show no signs of slowing down, let alone of going into reverse even with some displacement of coal by gas (Berners-Lee and Clark, 2013: 12; http://www.theguardian.com/business/2014/jan/15/bp-predicts-greenhouse-emissions-rise-third; accessed 16.1.13). If temperatures continue to increase by anything between 2 to 6 degrees Celsius over this century as emissions rise, then human, animal and plant life upon the earth will be irreversibly transformed. According to Berners Lee and Clark this is *the* 'burning question' confronting the earth's present and future citizens (2013). We will see below how Brazil and a few other societies have contributed to such global warming through large programmes of deforestation. A tree is about 50 percent carbon and the net effect is large-scale carbon storage as trees take carbon into their cells through photosynthesis. When trees are burned, harvested, or otherwise die, their carbon is released back into the atmosphere. Around 12% of GHG emissions are thought to result from deforestation (http://www.cbo.gov/publication/42686; accessed 27.1.14).

Key in articulating and organising a global response to apparently changing climates is the Intergovernmental Panel on Climate Change (IPCC). This was founded in 1988, a year of record temperatures, by the United Nations Environment Programme. Every few years around 2500 scientists from different scientific disciplines examine the links between GHG emissions and climate change. The IPCC-organised actions of thousands of scientists, policy-makers and NGOs across the globe have, in the face of commercial and state interests, transformed public, media and policy debate. The IPCC is the world's largest scientific endeavour and one relatively open to industry experts, outsiders and NGOs. It mainly developed models and arguments that *all* can sign up to, even the Pentagon arguing that climate change will cost millions of lives and poses a threat to global stability far eclipsing global terrorism (Abbott, 2008; National Intelligence Council, 2012). Even by

2007 the IPCC stated that the evidence of humans changing the climate is now 'unequivocal' (http://www.ipcc.ch/; accessed 2.6.08).

Relatedly Nobel prize-winner Paul Crutzen argued that there is a new geological period of human history, the 'anthropocene' following the holocene. In this new period it is human activities that exert a major impact upon almost all aspects of the earth system, an impact equivalent to a great force of nature (http://www.anthropocene.info/en/anthropocene; accessed 18.9.12). Such view is supported by claims that such warming will only be slowed down or reduced if the seven billion 'humans' on the planet behave differently. Climate change is not a pure 'scientific' problem since human actions are central to this apparent warming. Climate change is entangled with specific imaginaries of how society is and ought to be and this is why the 'social' needs to be positioned at the heart of analysing why climates are changing and of policies seeking to develop low carbon alternatives (see climate scientist, Hulme, 2009).

However, the framing of 'humans' within climate change understanding and debate has been monopolised by the 'dismal science' of economics (most famously in Stern, 2007). This economistic framing resulted in a focus on human practices which are viewed as individualistic, market-based, and calculative. It generated responses to climate change involving individual calculation to change behaviour, new technologies seen as fixing the problem and developing markets for novel 'green products'.

However, these economic models encounter serious limitations. While economic institutions are globally significant this is often also because of their social and political consequences. Large global corporations, such as those central to 'carbon capitalism', organise the lives of workers and consumers and do not merely affect 'markets'. Many such corporations have vested interests in some version of 'business as usual' (see Urry, 2013, on carbon capital).

Moreover, economists typically regard energy as responsible for about 5% of the GDP of any economy. But fossil fuel-based energy is a unique bundle of commodities which are non-renewable and generate 'external diseconomies' on such a historical and geographical scale that they seem to change climates and future supplies of energy, water and food. Schumacher thus writes: 'There is no substitute for energy. The whole edifice of modern society is built upon it….it is not "just another commodity" but the precondition of all commodities, a basic factor equal with air, water, and earth' (quoted Kirk, 1982: 1-2). This 'basic factor' structures the social, temporal and spatial organization of societies and 'life' itself (see Tyfield, Urry, 2014).

A further problem in economic models is that most of the time people do not behave as individually rational economic consumers maximising utility from the basket of goods and services they purchase and use. People are creatures of social routine and habit. These routines stem from the multiple ways that people are locked into social practices and social institutions, including families, households, friendship groups, social classes, genders, work groups, businesses, leisure groups, schools, ethnicities, age cohorts, nations and so on. Buying and using goods and services help to constitute these institutions and their social practices and it is such practices that are the very stuff of life. Shove thus argues against the restricted model of 'economic' behavioural change based upon the dominant paradigm of

'ABC'—attitude, behaviour, and choice. She and colleagues argue for transforming or replacing these very social practices and thereby to reduce energy 'demand' (Shove, 2010; Shove, Panzar, Watson, 2012).

Modern lives totally depend upon burning fossil fuels, to heat, power, manufacture and move people and objects. In the twentieth century societal changes brought about high carbon forms of life, as well as huge population growth. Especially important were a cluster of carbon-based systems beginning in the US in the first half of the last century, including electric power and national grids; the steel-and-petroleum car system; suburban housing; technologies for networking; distant, specialized leisure sites; and aeromobility. These high carbon social socio-technical systems increased income, wealth and movement, engendered population growth, generated rapidly rising GHG emissions and used up maybe half of the world's oil (Urry, 2013). In the neo-liberal period since the later 1970s there was a further ratcheting up of such systems. The legacy of excess during the twentieth century can be seen in the limited future alternatives now possible for twenty first century societies for developing post-carbon societies. High carbon systems have thoroughly got into most aspects of social life and of the ways in which those lives are understood and represented including within the media (Urry, 2011).

In order to overcome this high carbon world it is necessary to bring about a wholesale shift to an interlocking cluster of low carbon systems. This is not just an economic issue but a broader need for a low carbon 'economy-and-society'. It is necessary to move to interlocking low carbon systems which may provide lower levels of measured income but will sustain reasonable levels of wellbeing or what Jackson terms 'flourishing' (2009). This is not at all simply a matter of policy prescription or of transformed economic incentives, but of changing the nature of life itself.

So far we have presumed that there is consensus in the science of climate change. But this is of course incorrect, as Hulme brings out (2009). This is an area that could hardly be more contested. There are three broad positions or discourses within climate change literature, in terms of the science, popular science and public opinion (for detail, see Urry 2011).

The first position is that of *gradualism*, as best represented in the reports of the IPCC (Shackley, 1997). This involves the claims that climates are changing around the world, human activities are significantly responsible for these changes, these changes are relatively slow, and economies need to be adjusted in order to reduce future temperature increases. Individuals and societies can and should be induced to transform their behaviour through appropriate incentives, as elaborated in the Stern Review (Stern, 2007). This also presupposes developing new technologies that will somehow fix the problem of climate change through dramatic new ways of generating low carbon energy. Alongside the IPCC there developed a huge climate politics within science, within the media including Nobel prize-winning movies (Al Gore), and within much policy debate involving most major global institutions signing up to the notion of 'sustainability'.

The second main position is that of *scepticism*. This involves challenging the sciences of climate change especially because of the uncertainties involved in predicting changes in temperatures over future decades. It is said that there are too many 'unknown unknowns'. Also if climates have altered in the past sceptics argue that this is the result of 'natural'

processes such as sun spot activity rather than 'anthropogenic' processes. Scepticism involves a critique of the social sciences playing any role here.

Some sceptics explain away arguments for climate change as being driven by the vested interests of research scientists and the media, something reinforced since so-called 'Climategate' (Montford, 2010). Other sceptics suggest that there will actually be benefits from changing climates (wine growing in SE England?) while some migration of populations happens anyway. A different argument is developed by political scientist Lomborg who argues that the cost involved in dealing with climate change, as compared with other equally important global challenges, makes low carbonism unjustified (2001, 2008).

The power of scepticism has recently grown especially in the US (see McCright, Dunlap, 2010). While only one climate change scepticism book appeared in 2001, eighteen were published during 2009. This scepticism is particularly significant within the internet, the blogosphere and thinktanks promoting 'business as usual'[1]. Many are 'front' organisations intended to suggest especially to the media that there is more uncertainty about climate science than there actually is amongst scientists who overwhelmingly accept some notion that climate change is generated by human activities. The significance of such climate sceptic 'merchants of doubt' is well-documented by Oreskes and Conway (2010).

Catastrophism critiques both these positions. It takes from the former a belief in the reality of climate change, and from the latter the significance of uncertainty and the limits of science. But it then locates both of these within a 'complex systems' framework which emphasises non-linearity, thresholds and abrupt and sudden change. IPCC Reports it is claimed do not factor in all the potential and uncertain feedback effects such as the rapid melting of ice in Greenland and in the two polar regions. These changes in ice are relegated to a footnote in the Fourth IPCC Report in order to achieve a 90% certainty (Yusoff, 2009). Very modest projections of sea level change, which ignore future uncertainties especially related to the melting of ice, enables sceptics to argue that such increases can be dealt through modest techniques of adaptation (see critiques of IPCC in leading US climate scientist, Hansen, 2011).

Catastrophism draws upon historical, ice core and archaeological data to maintain that positive feedbacks will take the climate system away from equilibrium through positive feedback effects (Pearce, 2007). Many scientists also argue that the earth is a single complex system and can be subject to very rapid system shifts moving abruptly across thresholds. Deploying such analysis of climate forcing, Lovelock refers to the likelihood of irreversible global 'heating' (2006). Wynne suggests that far from the IPCC exaggerating the dangers of anthropogenic climate change they probably underestimated it (2010). Some climate scientists argue for the possibility of abrupt changes and runaway feedback loops

[1] These include the American Enterprise Institute, Americans for Prosperity, Cato Institute, Competitive Enterprise Institute, Energy for America, Global Climate Coalition, Heartland Institute, Marshall Institute, the Nongovernmental International Panel on Climate Change (NIPCC), Science and Environmental Policy Project, Science and Public Policy Institute, The Heritage Foundation, and World Climate Council

that could lead to the disappearance of whole societies (http://www2.macleans.ca/2014/01/17/climate-refugees/; accessed 24.1.14; Giddens, 2009). Various UK Chief Scientific Advisers have documented and developed such a catastrophist view of climate futures (Urry, 2011).

Furthermore, Parenti examines the consequences of anthropogenic climate change and especially extreme weather events already occurring between the two Tropics (2011). There are many 'damaged societies' experiencing water and food shortages, rising sea levels, poverty, lack of access to energy, climate change refugees, extreme weather and regime failure. These compound and amplify each other through a kind of catastrophic convergence. Up to 2.7 billion people are thought likely to experience violent conflicts as climate change interacts with other system contradictions (Parenti, 2011: 7-11; Davis, 2010).

Systems thinking is crucial here. Systems form social habits and these habits are the stuff of social life and are not easily changeable. But significantly changes occasionally do occur in such systems, such as the dramatic growth of the system of mobile telephony. New low carbon systems must appear more desirable, fashionable and necessary components of a better life. Thus low carbon systems and lives will only become significant if they also become fashionable upon a global scale (Urry, 2011). And this will involve the role of old and new media in forming and sedimenting a vision of a fashionable low carbon future.

There are thus three main approaches to the issue of climate change, gradualism, scepticism and catastrophism. This paper examines Brazil in light of these global debates. Brazil is one of the five BRIC countries that have become highly significant and globally debated over the past decade or so (Russia, India, China and South Africa are the other BRICS). We examine how public opinion was transformed as Brazil became pretty well the society most 'concerned' about climate change. Also we examine elements of the media treatment of global warming/climate change. This shows how many issues debated in the Brazilian media came to be framed as involving the problem of changing climates. Brazil also developed some very significant low carbon ways of generating energy and pioneered world significant transport innovations (from biofuels to innovative public transport in Curitiba and elsewhere). We show that in Brazil much media and popular debate is organised explicitly or implicitly around the crucial issues of climate change.

And Brazil is significant here since implicit in much writing about the 'environment' is a 'modernisation' thesis, that the more modern the society the more likely it is that 'post-industrial' values especially relating to the environment become especially significant (Inglehart, 1997). The interesting case of Brazil directly challenges this modernization thesis; indeed that in some ways Brazil seems way 'ahead' of most supposedly more 'modern' societies.

Brazil: from low to high concern

Brazil's relationship with climate change has changed fundamentally in the last decade in terms of both public opinion and policymaking. As recently as 2002, only one-fifth of Brazilians expressed concern about environmental issues (PEW, 2007). But only a few

years later, the picture is entirely different. Recent surveys have shown that climate change is currently considered a high priority concern within Brazilian society and Brazilians overwhelmingly support government policies upon climate change. What is more, contrary to what one might expect, this change happened at the same time that Brazil experienced high rates of economic growth and protest movements have occurred against many other aspects of government policy (such as the forthcoming World Cup).

Like other BRICS, Brazil is a major emerging economy. In 2011, they accounted for one quarter of world GDP and this proportion will continue to rise (IEA, 2013). Not surprisingly, these countries have increasing effects upon global climate. In 2011, they accounted for two fifths of global carbon emissions from fuel combustion (IEA 2013).

However, Brazil is a distinct. Although it is the sixth-largest emitter of GHGs this mainly results from high rates of deforestation (IEA, 2013). Brazil's fossil fuel-based emissions are low by global standards, representing only 1.3% of global CO_2 emissions from fuel combustion (IEA, 2013). There is high investment in hydropower and biofuel, which make the Brazilian energy system one of the 'cleanest' in the world (IEA, 2013). Although these two types of energy generation are not free from environmental critique, they have minor impacts in generating GHGs (Held *et al* 2013:134).

Brazil adopted strict climate policies in the last decade and voluntarily put forward ambitious targets to curb carbon emissions. It is also actively engaged in discussions and negotiations at the international level related to climate change governance and policies, especially since the 1992 Rio Earth Summit. Brazil is widely regarded as a world leader in environment protection and climate policymaking.

Our purpose in this research is to examine this dramatic increase in climate change concern within Brazil over the past decade or so and examine some of the reasons that lie behind it. We will explore data, actions and attitudes that have triggered such a shift. We hope to understand the relation between the various forces involved. Who influenced whom? Can we say society influenced government's attitudes? Or was it the other way round? Would the government's efforts work if Brazilian society was not sympathetic to this issue? What is the significance of the 'mediatisation' of such issues? How are such issues framed within the media within contemporary Brazil?

Carbon emissions in the BRICs

Due to the recent economic growth, the BRICS have increasingly contributed to GHG emissions. However, their contributions vary (Figure 1 – IEA 2013). China is by far the major producer of GHGs and India second. Emissions rose sharply between 1990 and 2011 in these two societies. Although emissions also rose in Brazil and South Africa, their rates remain low by comparison with the other BRICS. Russia is the only country here that managed to reduce emissions within this time period.

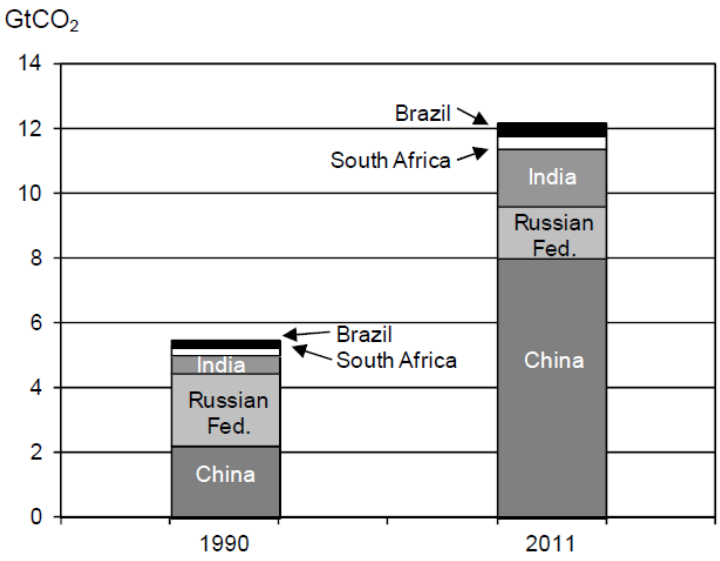

Figure 1: GHG emissions in BRICS countries (Source: IEA 2013)

CO_2 emissions in the BRICS mainly result from electricity and heat generation. In 2011, this represented 61% of GHG emissions in South Africa, 57% in Russia, 52% in India, and 50% in China (IEA, 2013). Brazil is a clear exception, with four fifths of total electricity generated by hydropower plants (Figure 2, IEA, 2013).

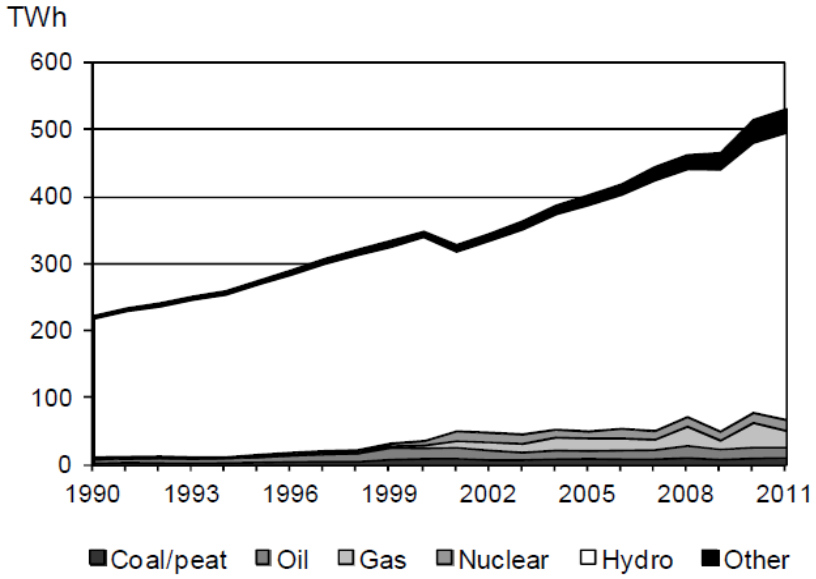

Figure 2: Brazilian electricity generation by fuel (Source: IEA 2013).

Even though the transport sector accounts for 45% of Brazil's carbon emissions related to energy use (IEA 2013), its overall fuel combustion is low by comparison with the other BRICS. This is mainly due to the widespread use of biofuels, and ethanol from sugarcane

in particular, which is said to be far more energy efficient than other bioethanol feed stocks such as corn or rapeseed (Held *et al* 2013). Biofuels represent around 20% of the energy used for road transport and about four-fifths of cars in Brazil are 'flex-fuel', which means that they run either on 100% ethanol or gasoline with 20-25% ethanol (IEA, 2013). As a result, carbon emissions per unit of fuel consumed are 20% lower in Brazil by comparison with the world average (2.3 versus 2.8 tCO_2 per toe, IEA 2013). By contrast, in 2011, the transport sector accounted for 8% and 10% of the total carbon emissions in China and India respectively.

Brazil's GHG emissions are mainly due to deforestation. Recent figures have shown that CO_2 emissions per capita nearly doubled when emissions from land use change and forestry (LUCF) are taken into account (WRI, 2010). In 2005, LUCF emissions represented an astonishing 84% of total carbon emissions in Brazil (Held *et al*, 2013).

Brazil's climate change policies

Investment in hydroelectricity started in Brazil in early 20th century assisted by its natural resources and climate. By 1910, hydropower represented 86% of all electricity generated (Held *et al*, 2013). Regulations were only passed in 1934 and from then on electricity generation gradually moved to a state-owned system. Government participation in hydropower projects increased steadily during the military regime (1964-1982) and so did investment, motivated by how other forms of power generation were especially costly in Brazil and also because of oil-price increases in the 1970s.

However, by the mid-1980s, large hydropower plants came to be heavily criticised by environmentalists and indigenous groups (Held *et al* 2013). Also Brazil entered a serious macroeconomic crisis and central government faced severe financial difficulties. As a result, major power companies were privatized during the mid-1990s and more attention was paid to fossil fuel which, in 2005, represented 23% of all energy generation capacity. However, despite a severe energy crisis in 2001 caused by extreme droughts, hydropower regained its momentum and is still the primary source of electricity generation within Brazil.

Although unsuccessful at the time, Brazil's efforts to encourage the use of ethanol as a fuel for transportation energy dates back to the 1930s, triggered by the country's heavy dependence on imported oil, rather than by a willingness to cut carbon emissions (Held *et al* 2013). The idea was revived in the 1970s, when Brazil imported 80% of the oil used, oil prices reached record levels and sugar prices collapsed (Held *et al* 2013). The ethanol programme took off and rapidly developed as a result of tax incentives and subsidies, as well as technological advances that enabled cars to run 100% on ethanol. With the major economic crisis in Brazil during the 1980s, when government had to cut down subsidies, and high prices of sugar and low prices of oil in the international market, the Brazilian ethanol industry went into decline (Held *et al* 2013). It was only revived in 2003 with the introduction of 'flex-fuel' vehicles which account for 80% of cars in Brazil.

Deforestation in the Brazilian Amazon started in the 1960s when the military government sought to control of the countries' borders and vast natural resources by developing policies to stimulate economic growth and populate the region (Held *et al* 2013). This involved

building highways through the forest and implementing schemes to attract investment into local industry and agriculture. Held *et al* add that in the late 1980s and 1990s cattle and soy bean farming became the economic driving forces of the region (2013). Legislation to control deforestation was bought in during the 1960s but, until early 2000s, the government was still unable to enforce the rules (Held *et al* 2013). This was mainly because the interests of Amazonian farmers and loggers were well represented in the National Congress, which opposed any policy to limit deforestation.

At the international level, Brazilian climate policymaking remained fairly conservative until late 1990s. In early UNFCCC negotiations, Brazil's foreign climate policies still reflected domestic politics and Brazil was reluctant to make commitments to cut carbon emissions, which would mean controlling deforestation. Brazil's position was evident in its 1997 'Brazilian proposal', which suggested that responsibility for mitigating emissions should be established on the basis of historical record, rather than present-day emissions, and also that Annex-I countries that exceeded their emissions should be fined and funds transferred to developing countries (Held *et al*, 2013; historically British people have the worst emissions record per capita stemming back over more than two centuries).

Change developed after the Rio Earth Summit in 1992. Towards the late 1990s environmental groups, scientists, politicians, and businesses concerned with environmental issues gained increasing space within national politics. As Held *et al* (2013) explains, in addition to increased public concern triggered by major deforestation crises in 1995-1996, which added extra pressure on the National Congress to revise the 1965 Forest Code, a number of government initiatives developed. An Inter-Ministerial Commission on Climate Change (CIMGC) was set up in 1999 to coordinate actions and assist the government in determining its position in the following UNFCCC. In 2000, a Brazilian Climate Change Forum (BCCF) was established to enable government officials, NGOs, academics, and enterprises to discuss climate change policies. The National Forest Programme and National Conservation Area System were also established in 2000 and contributed to increasing the share of forest land and creating and managing protected areas. Another deforestation crisis in 2004 – when deforestation rate reached 27,772 km^2 per year – favoured further reforms with more effective enforcement of forestry laws (http://www.obt.inpe.br/prodes/prodes_1988_2013.htm; accessed 24.1.14; Held *et al*, 2013).

The Action Plan for Controlling Deforestation and Protecting the Amazon (PPCDAM) launched in 2004 has reduced deforestation rates more drastically (http://siscom.ibama.gov.br/monitorabiomas/amazonia/Amazonia.htm; accessed 24.1.14).This programme was designed to manage land use in the forest areas as well as to monitor, control and promote sustainable practices. Deforestation rates impressively dropped 79% between 2004 and 2013, currently reaching 5,843 km^2 per year (http://www.obt.inpe.br/prodes/index.php; accessed 24.1.14).

Another important step in the process was the setting up of the Climate Change National Fund (CCNF). It was granted $130,000,000 for its initial operation in 2011 to be invested in mitigation and adaptation projects (Viola 2013). These projects included implementing measures to control desertification, minimize the effects of climate change, promote

sustainable technology and production chains, as well as pay for environmental services (Viola 2013).

Internationally, Brazil has played a key role in climate change discussions and negotiations over the past decade. Brazil's communication to the UNFCCC launched in 2004 was an important initiative to demonstrate the country's willingness to take appropriate action. It provided a comprehensive assessment of the state of affairs in Brazil at the time, stressed all risks and challenges the country would face if global temperatures rose, and proposed actions to be taken domestically (Held *et al*, 2013). In 2006, Brazil proposed the creation of a global fund with resources from Annex 1 countries and corporations to help controlling deforestation (Viola 2013). The 2008 initiative went further. Brazil made a voluntary commitment to curb its carbon emissions, irrespective of international actions, by reiterating its decisions to support the use of renewable energy and to reduce deforestation (Held et al, 2013). This commitment was announced in the Copenhagen summit in 2009 and signed into law in the same year. The Amazon Forum – a coalition of states in the Amazon region created in 2009 – also played an important role in increasing the pressure on the Brazilian government to curb deforestation by including the REDD+ (reducing emissions from deforestation and degradation) initiative in its Clean Development Mechanism (CDM) and any other market mechanism (Viola 2013).

Public Opinion

In 2002, only one-fifth of Brazilians regarded environmental issues as a major global threat (PEW, 2007). This figure was the lowest among the Latin America countries surveyed (with the exception of Venezuela, also one-fifth) as well as among the BRICS and some developed nations (see Figure 3 below). In 2002, China stood out as the society in this PEW Survey most concerned with environmental issues.

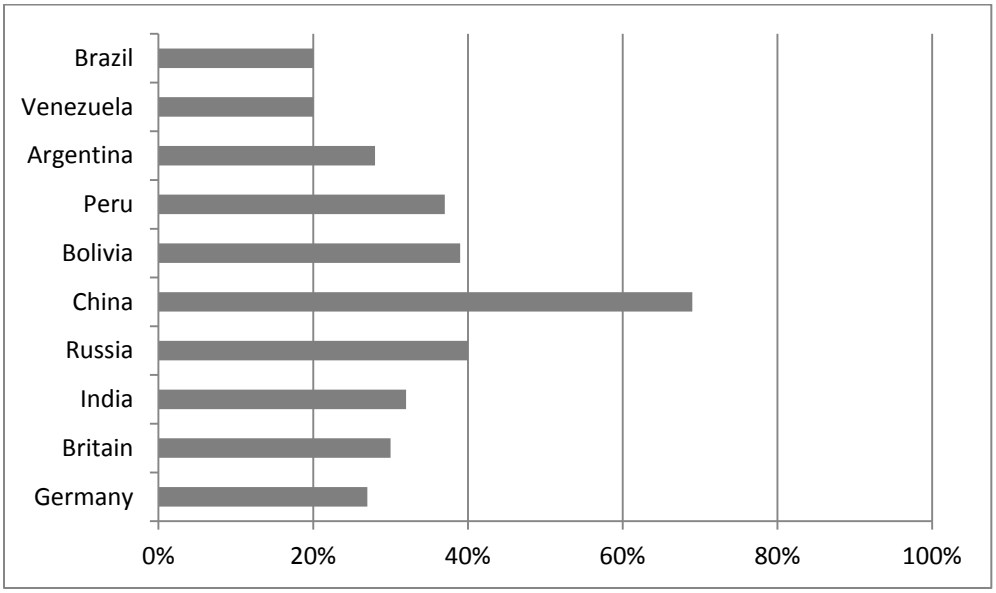

Figure 3: Percentage of people who considered environmental issues a major threat in 2002, by country.

Between 2002 and 2007, the percentage of Brazilians who regarded environmental issues as a major global threat rose sharply, reaching 49% in 2007 (PEW, 2007). Although the degree of concern increased in all 47 countries, Brazil stood out as the country with the most significant rise (29 percentage points).

In a Gallup poll conducted between 2007 and 2009, 79% of Brazilians reported that they knew something or a great deal about climate change (2009). This figure was far above those of other BRICS, except Russia, but lower than that of developed countries such as the U.S. and Britain (Figure 4). The percentage of Brazilians who either had never heard of the issue, did not know, or refused to answer was much lower than China, India, and South Africa, but at the same time much higher than the U.S. or Britain.

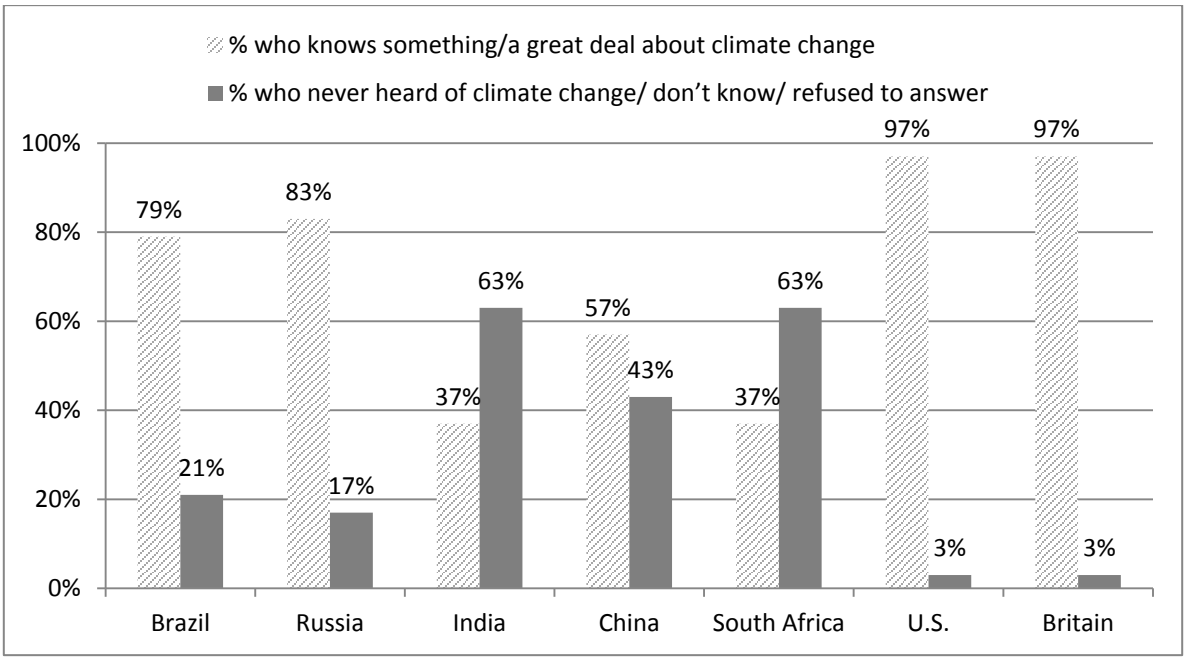

Figure 4: Awareness of climate change by country (Source: Gallup, 2009)

More importantly, the Gallup survey in 2009 also revealed that, within those aware of climate change, Brazil figures prominently as the most concerned. When asked about how serious of a threat global warming is to the interviewee or his/her family, 94% of Brazilians answered that it is *very* or *somewhat serious* and only 4% deemed it *not serious*. These figures contrast sharply with those from developed nations such as the U.S. and Britain where, although most respondents reported that they were aware of climate change, as many as a third of respondents regarded the problem as *not serious* (Figure 5).

Brazil also stood out in relation to other BRICs. The percentage of Brazilians who regard climate change as a *very* or *somewhat serious* threat was the highest. Such a degree of concern is especially clear if compared to the corresponding figures for China and Russia. Concomitantly, Brazil showed the lowest percentage of people who regard global warming

as *not serious*. The percentage of people who did not consider global warming to be a serious problem was much higher in all other BRICS, with the exception of India. It seems that climate change scepticism was almost non-existent in this period in Brazil.

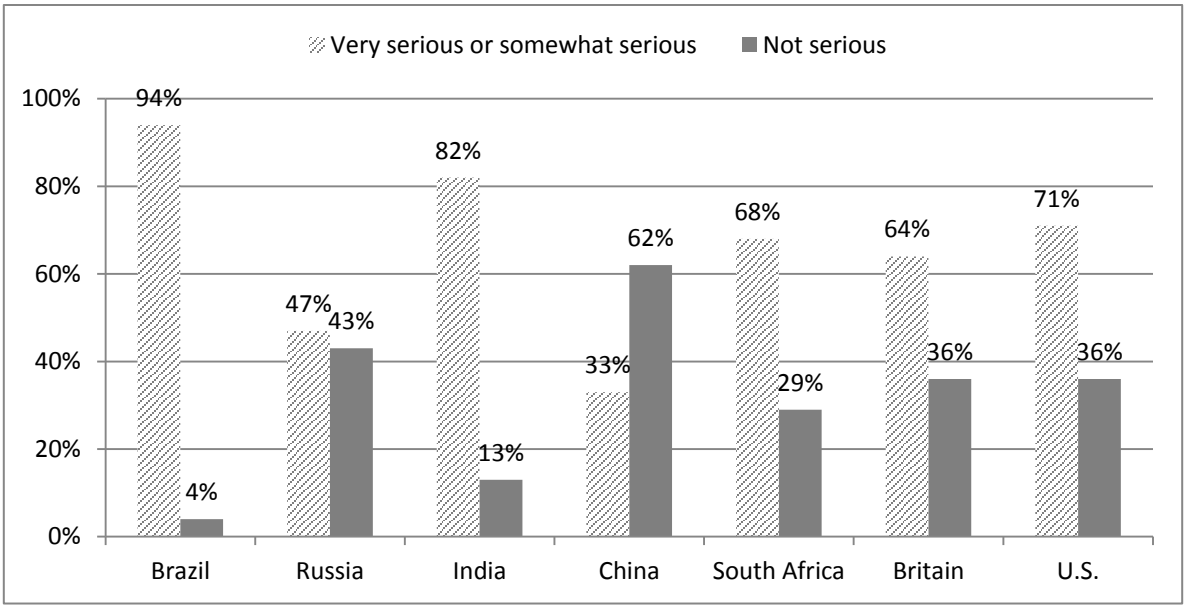

Figure 5: Degree of concern about global warming in the BRICS, Britain and the U.S. in the 2007-2008 period (Source: Gallup, 2009)

As with Gallup the PEW Global Attitudes Survey also indicated Brazilians' high degree of concern about global warming (PEW, 2007a, 2008a, 2009). Nine-in-ten Brazilians considered global warming a *very* serious problem in 2007 and figures remained the highest among all 47 countries in the following years: 92% in 2008 and 90% in 2009 (PEW, 2008a, 2009). Here again, the percentages were substantially higher than in other BRIC countries (South Africa was not reported) as well as the U.S. and Britain (

Table 1). Also, Brazil (and to a lesser extent, India) again showed the lowest percentage of people who did *not* consider global warming a serious problem. These figures were far lower than those from other BRIC countries, as well as the U.S. and Britain.

		Very serious	Somewhat serious	Not serious	Not a problem	Don't know/ Refuse to answer
Brazil	2007	88%	8%	1%	2%	2%
	2008	92%	4%	1%	1%	1%
	2009	90%	4%	2%	1%	3%
Russia	2007	40%	33%	19%	6%	3%
	2008	49%	25%	14%	7%	4%
	2009	44%	34%	14%	4%	4%

India	2007	57%	28%	4%	1%	10%
	2008	66%	22%	5%	1%	5%
	2009	67%	26%	2%	0%	5%
China	2007	42%	46%	7%	1%	4%
	2008	24%	51%	17%	1%	7%
	2009	30%	54%	12%	1%	3%
Britain	2007	45%	37%	10%	5%	3%
	2008	56%	28%	10%	5%	1%
	2009	50%	34%	10%	5%	2%
U.S.	2007	47%	28%	13%	9%	2%
	2008	42%	30%	13%	11%	3%
	2009	44%	30%	14%	11%	2%

Table 1: Degree of concern about global warming in the BRICS, Britain and the U.S. between 2007-2009 (Source: PEW, 2007, 2008, 2009)

The awareness of climate change amongst Brazilians was also evident in the following PEW surveys (PEW 2010, 2013). However rather than asking about global warming, both surveys examined climate change. PEW (2010) asked whether global climate change was a *very* serious problem, *somewhat* serious, *not too* serious, or *not a problem*. Brazilians once again were by far the most concerned, with 85% reporting that climate change is a *very* serious problem. These figures were much higher than those of other BRIC countries (South Africa was not reported) as well as the U.S. and Britain (Figure 6). Unlike Brazil, all these countries seem show very divided opinions as to whether climate change is a *very* or *somewhat* serious problem. Also with the exception of India these countries showed a higher percentage than Brazil of people who consider climate change neither a serious problem nor even a problem at all.

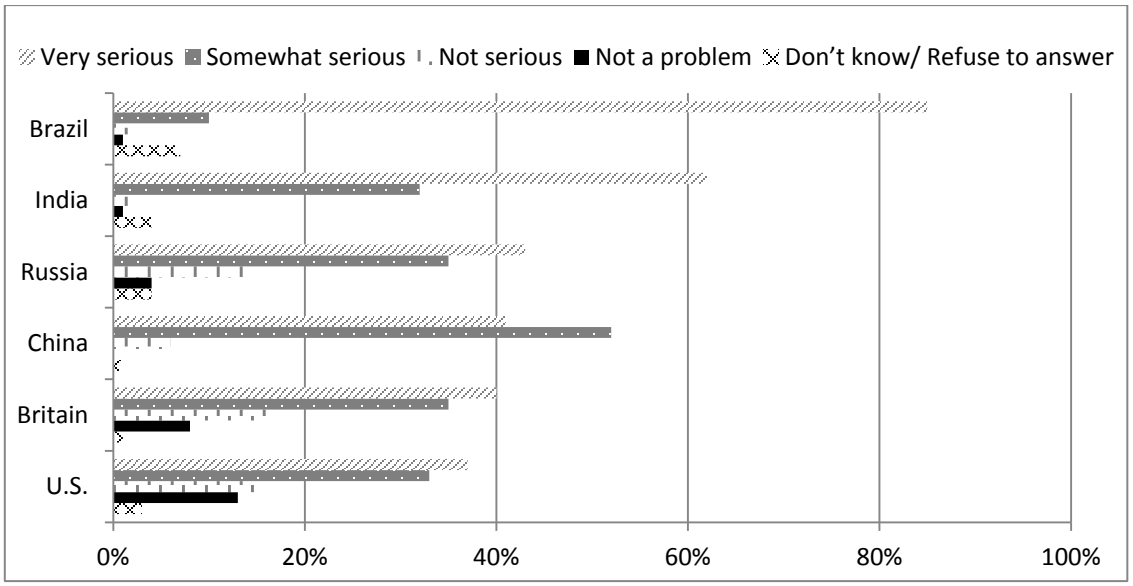

Figure 6: Degree of concern about global warming in the BRICS, Britain and the U.S. in 2010 (Source: PEW, 2010)

In PEW 2013, respondents were asked whether global climate change is a *major* threat, a *minor* threat or *not a threat* to the country surveyed. Brazil (76%) was outnumbered only by Greece (87%) and South Korea (85%) of those considering climate change a *major* threat. But, in relation to other BRICS (except India, whose results were not reported), Britain and the U.S., Brazil again stands out, showing the highest percentage (see Figure 7).

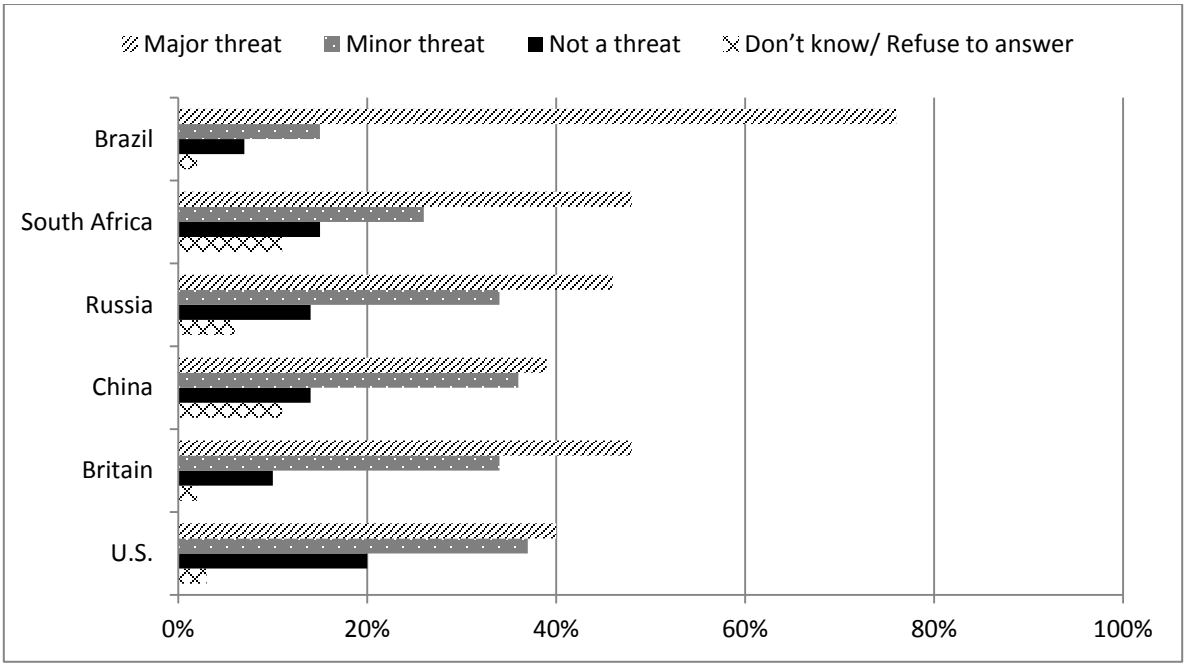

Figure 7: Degree of concern about global warming in the BRICS, Britain and the U.S. in 2013 (Source: PEW, 2013)

Brazilians' high degree of concern about global warming is also evident in surveys carried out by IBOPE in 2009, 2010 and 2012 (CNI-IBOPE 2012)[2]. Brazilians' awareness of global climate change rapidly increased after 2007. For three consecutive years (2009, 2010 and 2012), at least 90% of respondents expressed the belief that global temperatures are rising (CNI-IBOPE, 2012).

And in line with Gallup and PWE surveys, CNI-IBOPE also found that the Brazilians' concern about global warming rose steadily 2009 to 2011, as shown by the growing percentage of those who consider it a *very serious* problem (2012; see Figure 8). Although such figures are lower than those labelled it as *very serious* in the PEW surveys, they are

[2] IBOPE is the largest Brazilian Institute of Public Opinion and Statistics, with a business unit focussing on sustainable development and environment specifically. The CNI-IBOPE survey (2012) was commissioned by the Brazilian National Industry Confederation (CNI is the acronym in Portuguese) and was based on 2.002 interviews carried out in December 2011 in 141 towns (small, medium-sized, and large) across the country.

higher than the proportions indicated for other BRICS, the U.S. and Britain (cf. Table 1, Figures 6 and 7). More importantly, if we add the percentages of the categories *very serious* and *serious* together, the overall percentages of those who consider climate change serious climb to about 90% in 2009 and 2010, and 94% in 2011. These figures are consistent with those found by Gallup and PEW and reinforce the view that climate change scepticism has gained little traction within Brazil.

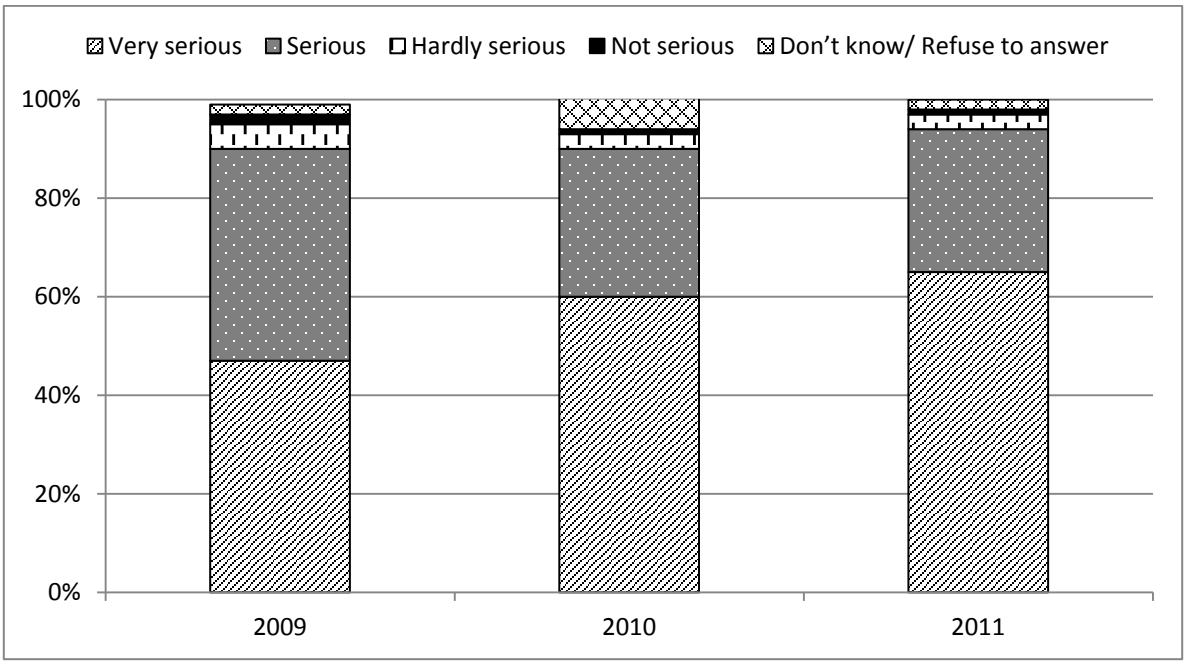

Figure 8: Degree of concern about global warming in Brazil for the 2009-2011 time period (Source: CNI-IBOPE, 2012)

Another interesting finding was that, in the 2011 survey, the vast majority of respondents (90%) stated that global warming is an immediate problem (CNI-IBOPE, 2012). Such opinion was found even though about a quarter of respondents believe it is a problem for future generations. About 22% of respondents predict that global warming will occur in the very near future and 3% believe it will happen in a distant future, but most respondents (66%) believe it is an urgent problem.

In fact, climate change interestingly seems a widespread cause for concern across Latin America. All seven countries surveyed in 2013 listed climate change as more worrying than international financial instability, U.S. power and influence, North Korea's nuclear program, Iran's nuclear program or Islamic extremist groups (PEW, 2013). More than half those interviewed reported that climate change was a *major* threat to their country. The figures were Argentina (71%), Chile (68%), Bolivia (65%), El Salvador (64%), Venezuela (53%), and Mexico (52%).

Also Latin Americans show the strongest belief that rising temperatures are the result of human activity and are not ‘natural’ (Gallup, 2009). Among the 20 countries with the highest rates of people who consider global warming to be the result of human activity, 13 out of 20 are in Latin America. And 9 out of 13 are in South America. In the specific case of Brazil (CNI-IBOPE, 2012), as many as 78% and 79% of respondents in the 2010 and 2011 surveys expressed the belief that global warming results from human activities. Only 11% in 2010 and 16% in 2011 thought global warming is due to ‘natural’ causes.

Brazilians do have divided opinions about who exactly is to blame for global warming (CNI-IBOPE, 2012). In 2010 ‘citizens’ and ‘industry’ scored the highest percentages (26% and 25% respectively), followed closely by ‘governments’ (17%). Around one-quarter of respondents thought ‘everyone’ was to blame. According to CNI-IBOPE in 2011 about two-fifths of Brazilians (38%) placed responsibility on ‘industry’ (2012). The percentages of those who blamed ‘citizens’ and 'everyone' for causing global warming came slightly down to 22% and 16% respectively. The percentage of those who blamed ‘government’ remained nearly the same in 2011 (18%).

The 2007 and 2008 PEW surveys aimed to identify the country ‘hurting the environment most’. Respondents were asked to pick one country India, Germany, China, Brazil, Japan, U.S., and Russia. As in most places, Brazilians views the U.S. as the country ‘hurting the environment most’ (PEW, 2007, 2008). What is interesting is that China came either first or second as the country to blame but not in Brazil. For 16% of Brazilians in 2007 and 14% in 2008, Brazil itself was the biggest polluter and fewer Brazilians ranked China first. Rather than naming countries, the CNI-IBOPE survey (CNI-IBOPE, 2012) asked whether rich or poor countries should be blamed. For most Brazilians (53%), wealthy countries are responsible for global warming and only 7% placed the responsibility on poor countries (CNI-IBOPE, 2012). However, a third of respondents (34%) put the blame on both. What is more interesting to note here is that, when asked whether rich or poor nations should take actions to fight global warming (CNI-IBOPE, 2012), most Brazilians (55%) answered both equally. Another 28% said that both should work together towards reducing global warming but wealthy countries should do more. Only 11% of Brazilians considered that solutions should be rest only on the shoulders of rich countries.

Another relevant point is that the vast majority of Brazilians believes that protecting the environment should be given priority over economic growth. Both PEW (2010) and Gallup (2012) results reflect such a viewpoint (Figure 9). This is an interesting finding especially because the data was collected in 2010 when the Brazilian economy was growing strongly (GDP growth rate in 2010 was 7.5%: http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG; accessed 24.1.14). Such ratios are much higher than those reported for Britain, the U.S. and Russia.

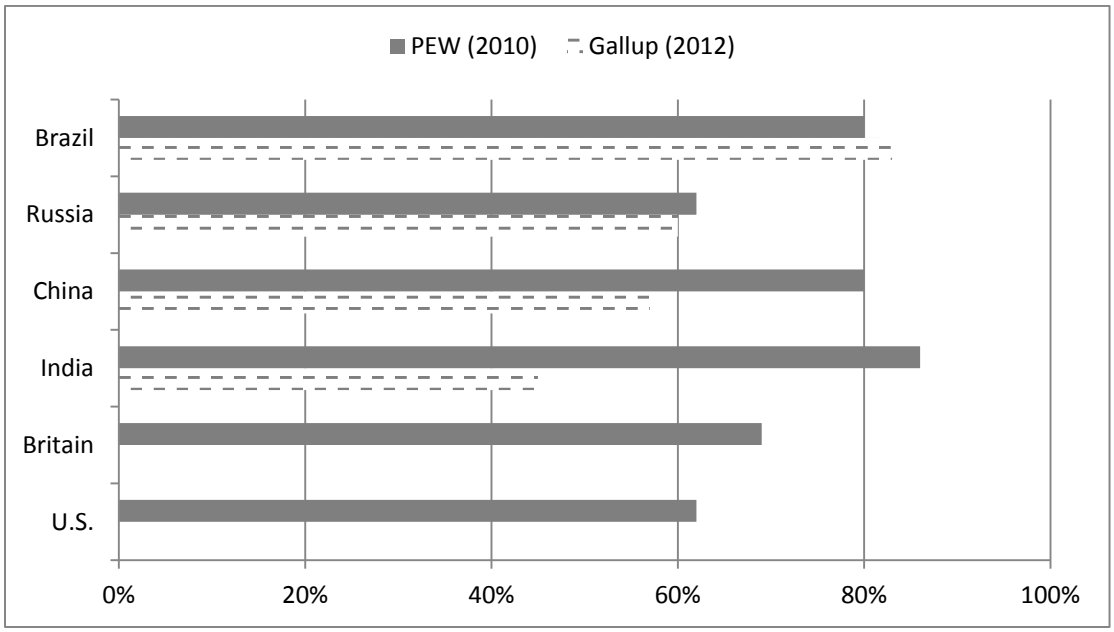

Figure 9: Percentages of people who agree that protecting the environment should be given priority over economic growth. Gallup (2012) did not report results for Britain and the U.S.

The 2012 CNI-IBOPE survey reinforces Brazilians' concern for environment protection. In both 2010 and 2011 surveys (Figure 10), very few respondents considered that priority should be given to economic growth: 11% and 8% respectively. The percentage of Brazilians who thought environment protection should be given priority rose from 30% in 2010 to 44% in 2011. A significant proportion of respondents – 47% in 2010 and 40% in 2011 – stated that economic growth and environment protection should be considered equal goals.

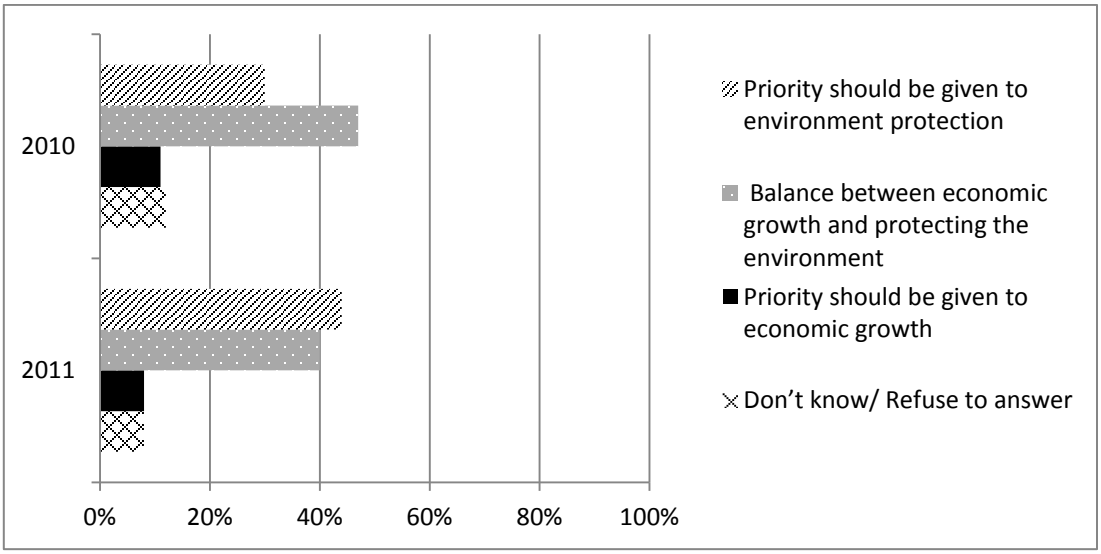

Figure 10: Brazilians' opinion about whether priority should be given to environment protection or economic growth (Source: CNI-IBOPE, 2012)

As regards paying for the costs of curbing emissions, Brazil follows the general pattern in these PEW surveys (2009 and 2010). There is little agreement as to whether people should pay the bill to address climate change and society seems divided between those who agree and those who disagree with paying the costs for taking relevant action. These surveys do not examine what these 'actions' might be.

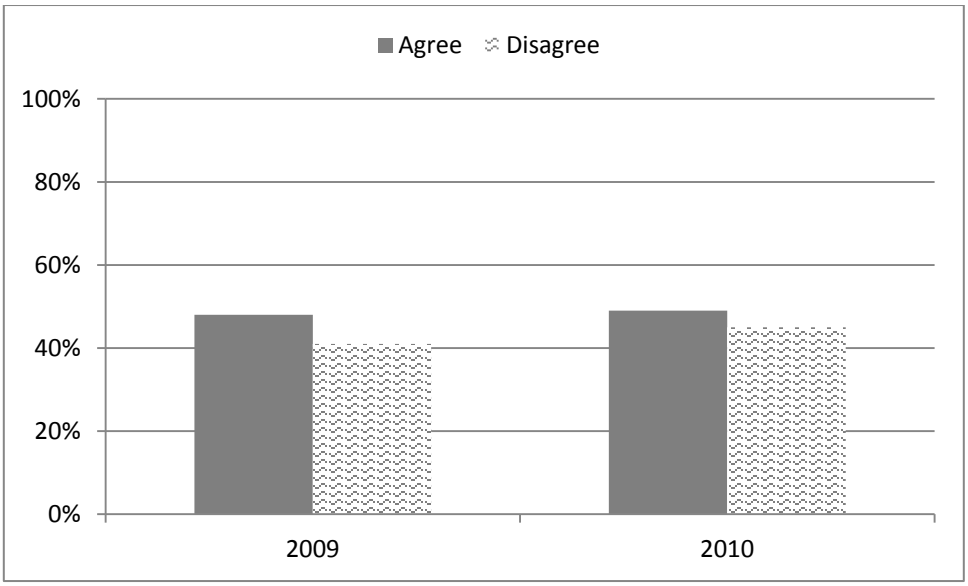

Figure 11: Percentages of Brazilians who either agree or disagree they should pay the bill for curbing emissions (Sources PEW 2009, 2010)

According to CNI-IBOPE (2012), only 6% of Brazilians agrees that citizens should pay higher taxes to cover the costs of implementing measures to curb GHG emissions. Also, although 38% of Brazilians blamed industry for causing global warming, a lower percentage (25%) thinks it should pay the bill to overcome the problem. Most Brazilians (46%) believe that governments should cover such costs through reducing taxes on industry and only 11% think that such costs should be paid by all parties.

For around two-fifths of Brazilians, the best way to ensure environment protection is to implement strict legislation and enforce laws effectively (CNI-IBOPE, 2012; see Figure 12). About a third of respondents considered that educational measures would be the best way to promote environment protection and around a quarter suggested addressing the problem by adopting compensatory measures.

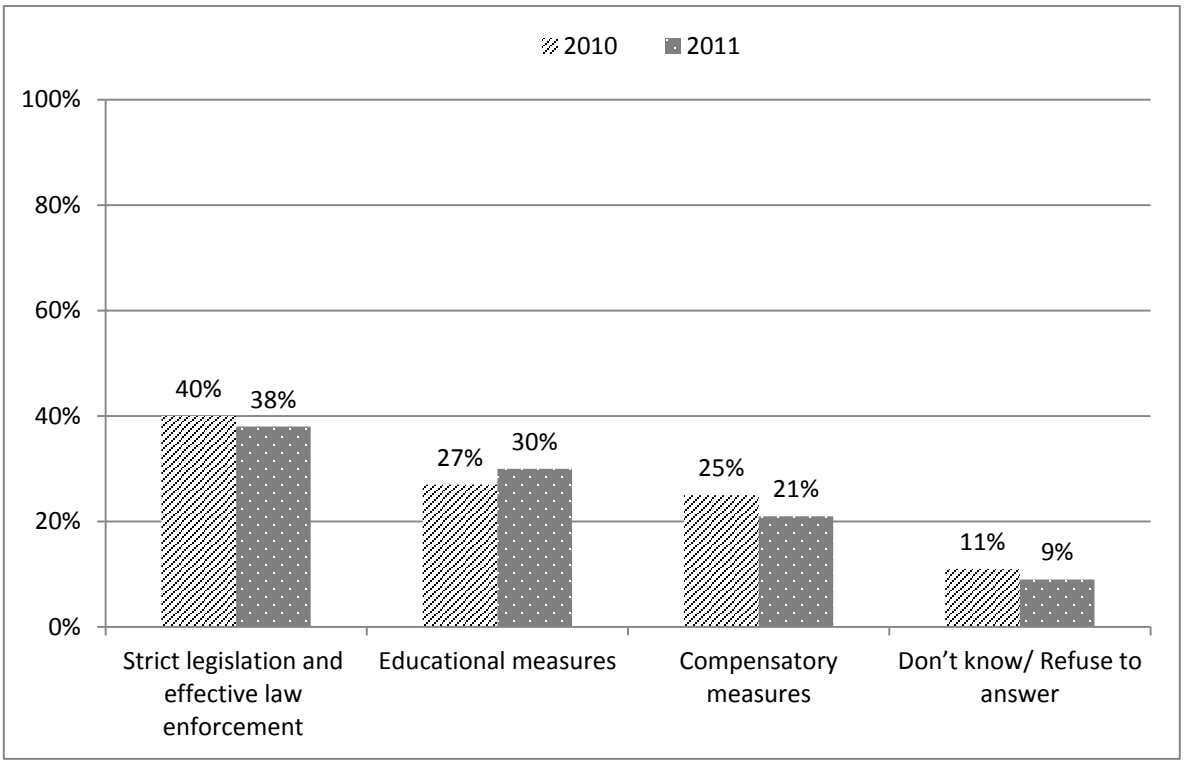

Figure 12: Brazilians' opinion on the best way to promote environment protection (Source: CNI-IBOPE 2012)

Another interesting finding was that deforestation emerged spontaneously as the environmental issue that is of greatest concern amongst Brazilians. About half of the respondents – 50% in 2009, 44% in 2010, and 53% in 2011 - mentioned it as one of their main environmental concerns (CNI-IBOPE, 2012). This is relevant given that, as mentioned earlier, GHG emissions in Brazil are closely linked to high deforestation rates. Not surprisingly, Brazilians also place deforestation as a top priority for the government's environmental policies and actions (CNI-IBOPE, 2012)

The Brazilian Shift: potential reasons

The fundamental shift in Brazil for effective climate governance is believed to be closely related to widespread public support for stricter climate policies. As Held *et al* (2013) explain, by the mid-2000s, Brazilian politicians were obliged to respond to the increasing level of concern about climate change. This was most evident in the 2010 Presidential elections when climate change became a key issue in the political agenda after Marina Silva – renowned environmental activist and Minister of Environment from 2003 to 2008 – joined the race as the Green Party's candidate. With strong arguments about deforestation and sustainable development, Silva altered public debate by drawing considerable attention to global warming. Her opponents (Dilma Rouseff and José Serra) were forced to include environmental issues within their campaigns.

Held *et al* (2013) also mention how the presence of dedicated environmentalists – such as Marina Silva and Carlos Minc – in key government positions also contributed to such a shift occurring. These activists influenced Brazil's policymaking bodies. Their influence is even clearer when we compare the Brazilian approach with its neighbour Argentina. Although climate change is a major concern among Argentinians and, like Brazil, the country is also most likely to face disastrous consequences if global temperatures rise, Argentina is regarded as a laggard when it comes to climate change governance. Franchini and Viola argue that this is mainly because local political forces consider the issue to be peripheral (2013).

Another reason for the fundamental change in the Brazilian approach to climate governance is the increasing engagement of various enterprises from mining and agribusiness which became strong advocates for stricter climate change policies to curb emissions and to decrease deforestation rates (Held *et al*, 2013). For the business community, Held *et al* explain, the government's conservative approach towards LUCF deterred foreign investments in the Amazon region (2013). In addition to business corporations, Viola also mentions the joint efforts of various NGOs (such as Greenpeace, WWF, Friends of the Earth, and Vitoria Amazonica Foundation) and supermarket chains (such as Carrefour, Wal-Mart, and the Brazilian Pao de Açucar) which vehemently objected to the consumption of soy and beef from deforested areas (2013). With the support of the scientific community, universities, and some local governments, this initiative found fertile ground in the media (Viola 2013).

Held *et al* (2013) suggest two reasons for the sharp increase in concern about environmental issues. One is the growing number of extreme weather events such as Hurricane Katrina in 2005 and a severe drought in the Amazon region in 2005. Although this seems a plausible thesis, not all countries affected by extreme weather show similar level of concern (such as Australia). For example, the U.S. has witnessed devastating hurricanes in recent years, yet most Americans do not consider global warming a very serious threat (see Table 1, Figures 6 and 7). This suggests that in Brazil other process must be operating.

Held *et al* (2013) also suggest Brazilians became concerned with climate change because of the coverage of climate change within the media. Based on the 2009 ANDI report[3] (ANDI), the authors link such major shift in public opinion to the exponential increase in the number of news reports on climate change after the release in 2006 of the Stern Review (Stern,2007) and Al Gore's powerpoint documentary *An Inconvenient Truth* (released 2006). For Viola, in addition to media coverage, public events, scientific conferences, NGOs' initiatives, and corporate meetings also played a key role in shaping public opinion, thus adding extra pressure on the Brazilian government to take actions (2013).

Climate Change in the Brazilian News Media: The ANDI Report

[3] ANDI is the acronym in Portuguese for the Brazilian News Agency for Children's Rights (***A**gência de **N**otícias dos **D**ireitos da **I**nfância*). The study was carried out in partnership with the British Embassy in Brazil as part of its Climate Change Communication Program.

Although climate change is regarded as a major topic by the Brazilian news press, not much research has been undertaken to examine how the issue has been constructed within the Brazilian news media over the past two decades. One noteworthy exception is the ANDI Report (2009) which describes a comprehensive quantitative and qualitative evaluation of Brazilian news media's coverage of climate change. Based on the assumption that the media plays a key role in shaping public opinion, ANDI's primary goal was to determine how much attention climate change received in the news media as well as to assess the content.

The study was based on a set of 1,755 news stories (including editorials, columns, articles, interviews, and reports) randomly collected from 50 Brazilian daily broadsheet papers and published between July 2005 and December 2008. The data included at least one newspaper from each state capital and two newspapers from the Federal District, and wherever possible, financial and business dailies were also considered. Individual news stories were collected by searching the websites of all selected newspapers using a set of keywords. This keyword list was compiled by a set climate change experts and initially included 89 keywords related to climate change. It was later reduced to 19 since some keywords were found hardly ever to occur separately from the main search words of *climate change* and *greenhouse effect*.

Once retrieved, texts were grouped according to the extent the content addressed climate change, as follows (ANDI, 2009:21-22):

- Minimum: one or few lines on climate change;
- Average-minimum: one paragraph about climate change;
- Average: a sub-section about climate change; or
- High: climate change was addressed throughout the news story.

The analysis only included texts containing at least 500 characters whose content was categorised either as "average" or "high". Quantitatively, the study examined the overall number of news stories on climate change published between July/2005 and December/2008 as well as fluctuations within this time span. Qualitative aspects of the data were examined by content analysis (Mccomas and Shanahan, 1999). This method has been employed in various media survey; it 'seeks to identify possible subjectivities, intentionalities, and potentialities employed in the linguistic resources' (ANDI, 2009: 21).

The media and climate change

Brazilian newspapers published on average one news story about climate change per week. However, numbers fluctuated widely throughout the period. During the first year (Jul/2005 to Jun/2006), coverage included one news story every nine days, with a slight rise towards the end of 2005 which ANDI associates with hurricane Katrina. Figures start to rise towards the end of 2006 and a major peak was in the first half of 2007, when one story was published every 2.2 days. Despite a decline in the third quarter of the year, 2007 showed an average of one story on climate change every five days. For ANDI, the substantial rise in 2007 reflected a global trend at the time when the issue gained greater prominence as a result of the Stern Review, Al Gore's *An Inconvenient Truth*, three reports by the Intergovernmental Panel on Climate Change (IPCC), a UN High Level Meeting to evaluate

the commitments made in the Kyoto Protocol, COP-13, and the Nobel Peace Prize award to Al Gore and the IPCC. Climate change coverage declined significantly in 2008. However, the overall average for 2008 (one story every six days) was still higher than for the first 12 months of the analysis (one every nine days). ANDI explains that such apparent reduction of interest in the issue was not restricted to Brazilian media specifically but was a global trend.

Another interesting finding was that climate change coverage was concentrated within national rather than local newspapers (Table 2)[4]. However, in fact all Brazilian newspapers are state based and not national newspapers in the strict sense (relating to or common to a whole nation). Although the Report does not specify the criteria and reasons for treating such papers as national, a plausible argument is that they are published in states which are highly influential in terms of political and economic power. This leads us to assume that they reach wider audiences and most likely to go beyond state boundaries. At the same time, one could argue that there is no reason to regard as 'local' newspapers from states such as Rio Grande do Sul, Minas Gerais, Bahia, e Pernambuco which are also politically active and heavily populated.

	National Newspapers	**Local Newspapers**
2006	Every 2.2 days	Every 10 days
2007	Every day	Every 7 days
2008	Every 1.8 days	Every 9 days

Table 2: Average frequency of news stories on climate change published by Brazilian newspapers from 2006 to 2008

A further finding of the analysis was that Brazilian newspapers made hardly any distinction between carbon emissions in different regions within Brazil. In other words, the media seems to somehow place responsibility on the country as a whole rather than on specific regions. This is important because, as mentioned earlier, emissions in Brazil are mainly due to high rates of deforestation in the Amazon region, which occupies a large portion of the North of the country. It is far away from the most populated regions (Southeast and South) and from the capitals where most of the surveyed newspapers are based in. However, the Southeast and South regions have experienced serious extreme weather conditions in recent years (heavy rain and massive flooding).

ANDI's analysis was carried out in relationship to two periods[5]. The first point is that very few articles presented the concept of climate change, only about 1.3% of all articles. For

[4] ANDI regarded the following newspapers as national: two papers based in Sao Paulo (*Folha de Sao Paulo*, *O Estado de Sao Paulo*), one from Rio de Janeiro (*O Globo*), another from the federal capital Brasilia (*Correio Braziliense*), and two major financial and business dailies (*Valor Econômico* and *Gazeta Mercantil*).

[5] The first (identified as 2005/2007) comprised news stories published from Jul/2005 to Jun/2007 and the second (identified as 2007/2008) covered those stories published from Jul/ 2007 to Dec/2008. In what follows, we discuss the most relevant aspects of the

ANDI, such a low figure reflects the difficulty in defining such a complex issue. More importantly, evidence to support the existence climate change was found in around one quarter of articles in each period. ANDI interpreted this figure as indicating that most newspapers (the remaining 76%) assumed that the climate threat is real and there is no need to provide detailed evidence. Another indication that the notion of climate change is well-established within Brazil is that, according to ANDI, Brazilian news media take a consensus or gradualist view of climate change. Conflicting views were presented in only 10.2% of stories in 2005-2007 and 7.4% in 2007-2008. In addition, nearly one third of the news stories from both periods stressed that climate change is a serious issue.

Carneiro and Toniolo (2012) reached similar conclusions. The authors examined 676 news reports on global warming published by three Brazilian media outlets, all part of an influential communications group based in São Paulo, between Oct/2007 and Oct/2008: an internet portal (UOL), and the *Folha de S. Paulo* newspaper in its printed and online versions. The analysis shows that all three sources refer to global warming as a real phenomenon and there was no questioning (0% of articles) on whether or not it is happening. Also, hardly any article contradicted the 'scientific consensus' suggested by the IPCC.

A further crucial finding shows the growing recognition that human activities directly impact upon climate change. According to ANDI, this link was made in around 60% of stories from both periods. At the same time, reference to 'natural causes' fell from 42.6% in the first period to 36.1% in the second. For Carneiro and Toniolo (2012), Brazilian mass media has explicitly related global warming to human activities in recent years and seldom presented dissenting opinions on this anthropogenic view. They found that less than 1% of articles framed global warming as resulting from natural causes. Most articles refrained from discussing the causes of global warming and a large number stressed the impact of human actions on global climate (Table 3).

	UOL internet portal	*Folha* (online)	*Folha* (printed)
No reference to the causes of global warming	47.0%	71.3%	57.0%
Human activities cause global warming	51.9%	27.1%	41.2%

Table 3: References to the causes of global warming in articles published by three Brazilian media outlets (Carneiro and Toniolo, 2012)

ANDI also found relevant differences between the two periods in the categorisation of articles according to various sub-topics (see Figure 13). For the first period (2005-2007) coverage mainly focused on the greenhouse effect. Renewable energy sources and the consequences and impacts of climate change came in distant second and third places

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analysis. ANDI is a unique piece of research and this accounts for the attention it receives here although it is now a few years old.

respectively. While articles on the greenhouse effect were far less frequent in the second period and there were fewer articles addressing the consequences and impacts of climate change, the proportion of articles discussing climate change and global warming in general showed considerable increases. This suggests that the issue was discussed in more broad terms in the second period. Renewable energy sources also remained on the agenda in the second period but the percentage of articles covering this fell slightly. The Report highlights that a clear shift occurred in the 2007-2008 period, when the Brazilian media seems to have placed increasing emphasis on solutions to overcome the challenges posed by global warming. The percentage of articles discussing measures was nearly four times higher than that in the first period. Interestingly, the number of articles referring to collective international action also rose from the first period to the second, which could perhaps be seen as an attempt to claim that solutions should be discussed at the international level.

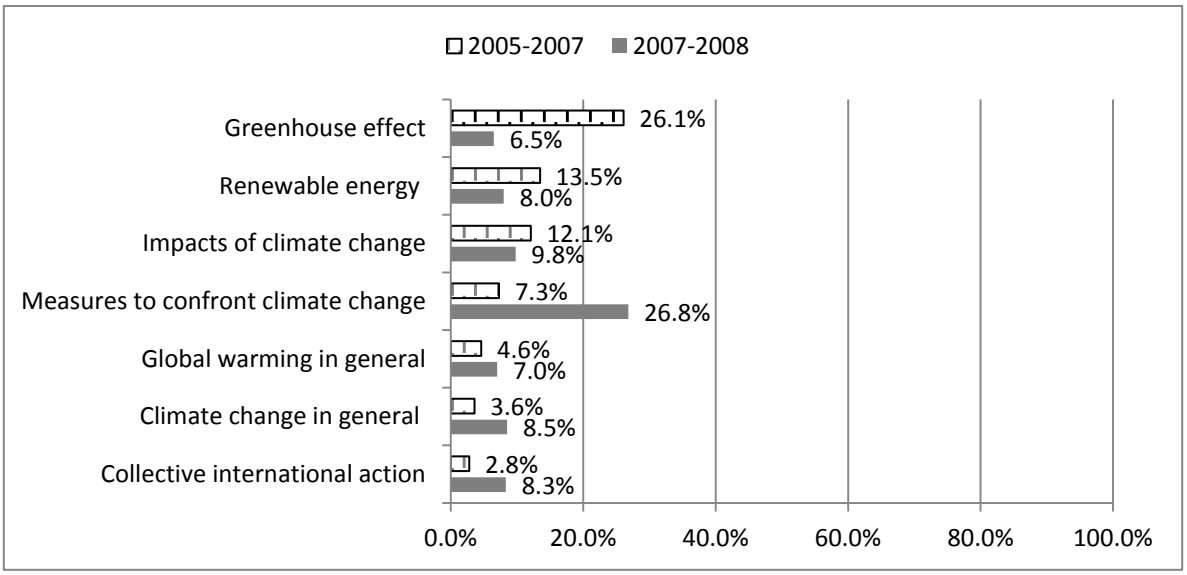

Figure 13: Percentage of articles covering various sub-topics

Based on the assumption that the plurality of sources reflects a diversity of sectors participating in the debate, the ANDI study also examined what sources the Brazilian newspapers used to collect information. A relevant finding was that the percentage of stories with no reference to the source from which information was retrieved dropped from 24.9% in the 2005-2007 period to 14% in the second period (Figure 14). This was interpreted as indicating that documenting sources gained importance between the two periods. In both, most information came from climate experts and the Brazilian government. Also, less data was collected from non-Brazilian government sources while information from international organizations and the private sector was more common in the second period. The media's attempt to diversify its sources of information was also seen in the category 'others' which showed an increase.

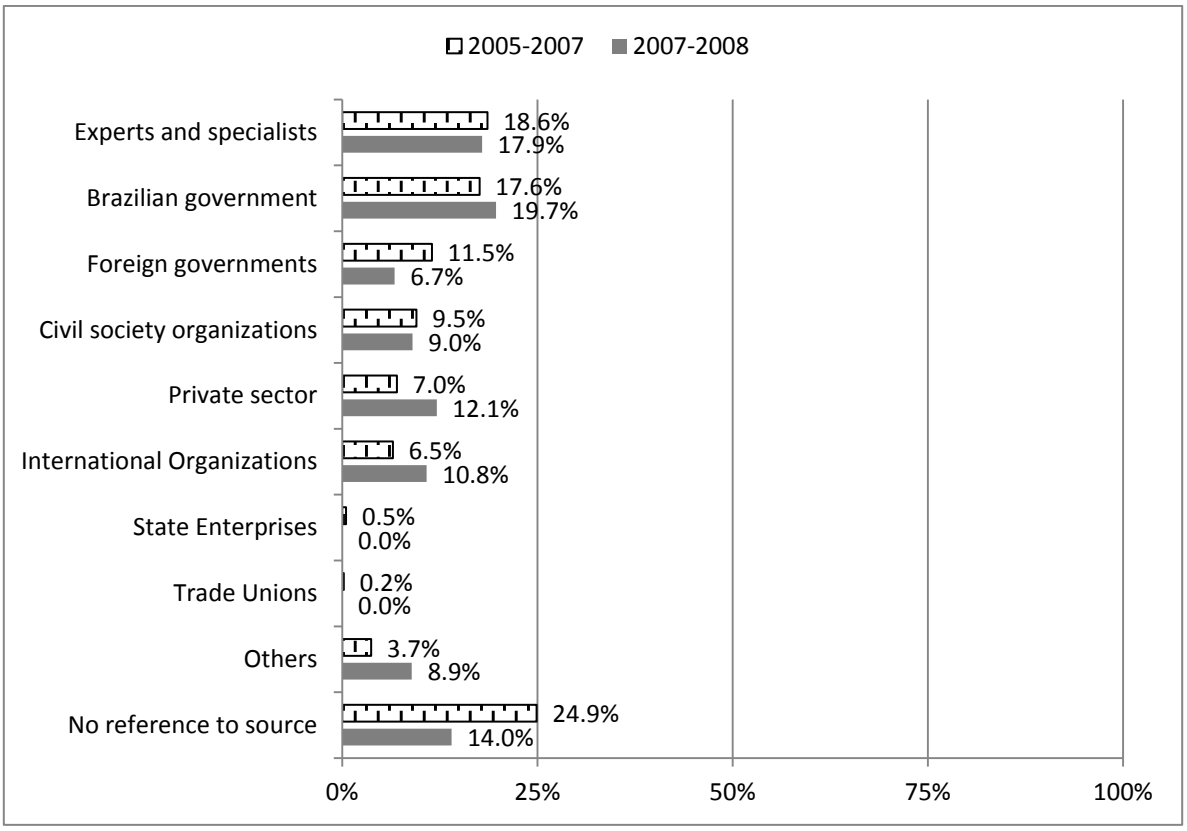

Figure 14: Sources cited in Brazilian newspapers (ANDI 2009: 41)

The analysis also revealed that about 40% of all stories mentioned climate change legislation, within which the Kyoto Protocol is by far the most cited (in about half the stories). ANDI also notes that even though Brazilian environment legislation includes a number of important instruments this was hardly referred to, appearing in only 2% of news stories published between July 2007 and December 2008.

Relatedly, Carneiro and Toniolo (2012) found that the IPCC, the Kyoto Protocol, and the UN were the most cited sources in the three outlets surveyed. The Greenpeace was also recurrently mentioned and so were public figures such as Al Gore, Ban Ki-moon and Rajendra Pachauri who take a gradualist view of climate change. For the authors, a very striking finding was that the sceptic view of climate change was almost non-existent. There was hardly any reference to institutions, agreements, or public figures (such as Bjorn Lomborg, Pat Michaels, Lord Monckton, and Sarah Palin) whose positions are drastically different from that adopted by the IPCC.

ANDI also examined the proportion of stories discussing the causes, consequences, and solutions for climate change, assuming that these three elements are essential for identifying those who should be responsible for taking action. References to the causes of global warming and possible solutions remained stable (36% and 41% respectively). However, there was far less emphasis on the consequences of the phenomenon in the second period (figures dropped from 58.5% in the first period to 34.4% of the total number of stories).

When discussing the consequences of global warming, most stories focused on the impacts of global warming upon the environment. The exception was for the financial and business dailies whose stories (40.9%) tended to adopt the economic and financial approach – the impacts of mitigation measures on a country's GDP. This latter approach came second in the national and local newspapers: 15.9% and 14.7% in the 2007-2008 period respectively. Political interests occupy the third place in all three categories of newspapers.

As a limitation of this news coverage, ANDI points out that the Brazilian news coverage did not establish an explicit link between climate change and development strategies – be they sustainable, economic, human, social, or community. Neither did it discuss the need for changing consumption patterns or the forms of 'demand'. The Report brings out how discussions as to solutions to overcome the problem were restricted to environmental issues such as deforestation, while the adverse effects of locked-in social habits were largely neglected (as they are almost everywhere!).

ANDI then examined what social actors are indicated in the media as being responsible for global warming. The analysis revealed that governments (both Brazilian and foreign) were the most blamed: over 20% of all news in both periods. However, there was an increase in the number of articles placing responsibility on the 'society at large': figures rose from 9.4% to 16.9% '. More responsibility was also given to the private sector – figures rose from 8.5% to 15.2% – and this included more emphasis on the need to develop mitigation strategies with a direct impact on large corporations.

Similarly, public authorities were expected to search for solutions to the problem. In the first period, responsibility was placed upon foreign governments (24%) and solutions were dependent on international negotiations and agreements. This figure fell to 16.2% in the second period, which saw an increasing tendency to place responsibility on the Brazilian government for solutions. References to the role of the Brazilian executive rose from 20.1% in 2005-2007 to 32.8%, 2007-2008. Interestingly, state and municipal government received far less attention (around 10% or less), which ANDI interpreted as indicating that coverage put responsibility on central government. Also interestingly references to government (Brazilian and foreign) actions included concrete proposals as well as debates about alternative responses to climate change. The analysis also revealed a higher number of assessment measures from one period to another (2.7% to 11.1%). For ANDI these figures indicated a growing interest in assessing government actions and an attempt of the media to stress the regulatory role that governments can and should play.

The greenhouse effect was discussed in a significant proportion of news stories. The analysis also showed that carbon dioxide was viewed as the most significant of the greenhouse gases causing global warming. Here again, solutions were put in the hands of the Brazilian government given that the coverage indicated degradation and deforestation in the Amazon and Savannah regions and, to a lesser extent, fossil fuel vehicles as the main cause of carbon emissions in Brazil. There was also a strong urge to reduce coal as a source of energy – mentioned in 70% and 61% of all stories in the two periods surveyed. The report adds that this also involved discussing strategies to overcome the issue such as carbon credits, clean sources of energy and enhanced efficiency in CO_2 emissions. Another aspect that indicates an attempt by the media to place stronger emphasis on the Brazilian scenario was that there was a sharp increase in the percentage of articles making reference

to places within Brazil, from 42.7% of the total news content about climate change in the first period to 72.4% in the second.

The ANDI report also suggests that the Brazilian news media has made progress in demanding effective action to reduce carbon emissions. This conclusion was based on the increase in the percentage of articles discussing emission targets – rising from 15.4% to 32.9% in. The Report also mentions a growing effort of the media to inform the general public about the position of the Brazilian government within international negotiations with respect to emission targets. The proportion of stories mentioning the Brazilian position rose from 3.7% to 11.8%.

ANDI also increasingly emphasised the need to implement policies which directly impact upon carbon emissions. Mitigation measures were cited in about half the stories. Interesting shifts were observed when mitigation measures were examined in relation to the areas they refer to (Figure 15). In the 2005-2007 period, nearly half the references to mitigation measures related to energy issues but this figure dropped considerably in the following years. Nevertheless the coverage of energy use remained substantial in the second period and, according to ANDI, revolved around the potential replacement of fossil fuels by clean energy sources and ethanol in particular. Although the percentage of stories mentioning strategies related to soil and forest management remained fairly similar it in fact emerged as the top concern in the second period, showing the highest number of mentions. It is also interesting to note the growing interest in carbon credit trading from the first to the second period, rising from zero to 9.8%. Discussions on measures to affect industrial activities and transport systems also increased throughout the surveyed period.

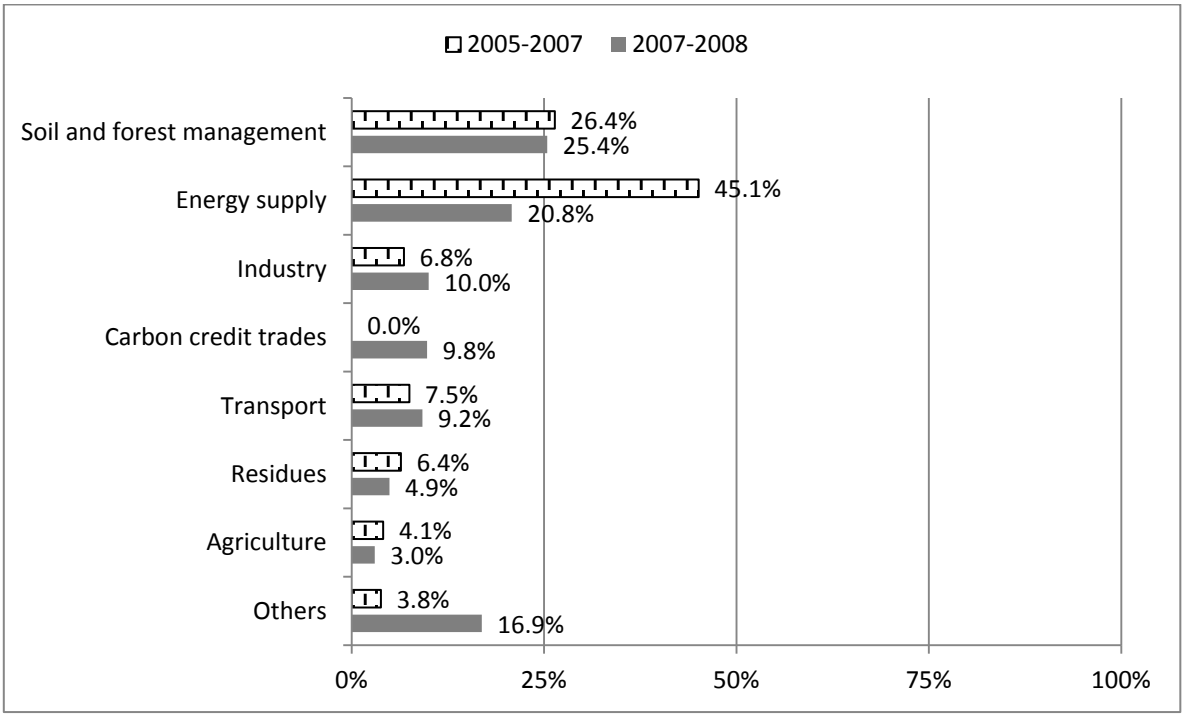

Figure 15: Mitigation strategies by impact area (source: ANDI, 2009:56)

ANDI's study also examined other related topics. Fossil fuels were discussed in about one third of all news stories: 31.6% in the 2005-2007 period and 25% in the 2007-2008 period. Nuclear power was also mentioned but at a much lower rate – fewer than 3% of the stories. Renewable sources of energy received considerable attention and were mentioned in nearly one third of all news stories from both periods. Ethanol was the most discussed source of energy, cited in about 10% of all stories.

Conclusion

In this paper we tried to establish some of the distinctive features of 'changing climates' within contemporary Brazil. This is of course a daunting task because of the country's extraordinary scale and diversity. We have shown that the BRICS are central to the future of climate policy and nowhere is this more true than Brazil. The state of the Amazon rain forest has been an iconic marker of the state of the earth given its utterly central function as one of the world's main carbon sinks. Unlike almost anywhere else it is deforestation that is central to generating GHGs. Brazil has been innovative in developing biofuel, flex fuel cars, new bus systems and hydropower. It has also played a major role in international debates on global warming ever since the Rio Earth Summit in 1992.

However, various scholars maintain that despite these achievements Brazil's status remain fragile. For example, for Held *et al* (2013), heavy investments in hydropower and biofuels may lead to damaging effects on the climate. Viola notes that once the reduction in deforestation is factored out then Brazil showed an increase in carbon intensiveness as energy emissions have increased steadily since 1994 (2013). This was mainly due to an increase in generation of electric power from fossil fuels and significant increases in oil refining, diesel and gasoline consumption, and the continuing growth of individual/private transport (Viola, 2013; Viola *et al*, 2012). Moreover, according to Viola, the 'pre-salt' oil fields found in 2007 will have adverse consequences upon future climate change policies (2013; IEA 2013). They are expected to quintuple Brazilian oil reserves and may have important impacts upon Brazilian public debate (2013). These oil reserves have raised doubts about Brazil's voluntary commitment to curb carbon emissions. For Viola *et al*, the Brazilian government seems to be drifting away from low-carbon policies (2012). Also the implementation of the Climate Law has shown little progress and in early 2012 Brazil responded to the international economic crisis by cutting taxes on oil consumption so as to stimulate car manufacturing.

In this paper we examined various ways in which different issues of climate change have come to be seen as a centrally important issue within Brazil, with the country still showing higher scores in various sample surveys than almost anywhere else. There is so far little evidence of climate change scepticism. The central debate would seem to be between gradualists and catastrophists. There seems to be a strong belief in the ontological reality of climate change. And in generating and reproducing the view that it is human activities and the GHGs released into the atmosphere that are key the Brazilian media seem to be playing a significant role. This we have examined through the ANDI Report but in future work we intend to interrogate in more detail a corpus of material over a ten year period derived from a wide variety of media. We hope this will reveal in depth how such crucial issues are framed within Brazil which may play a leading role in the global search for what

increasingly seems a lost war. We will seek to show how Brazilians understand the ‘reality’ of climate change, its possible ‘causes’ and the array of policies, programmes and innovations that might just bring about significant mitigation.

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