

## Watching Brazil but Missing the Story: An Amazonian Inferno

by PATRICIA F. PINHO | University of São Paulo | patricia.pinho@iag.usp.br

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As I write this essay, hundreds of millions worldwide have their TVs tuned to the Olympics’ opening while immense forested areas of the Brazilian Amazon are laid bare. August 2016 might be remembered by the Amazonian people as foreboding events that are now unfolding; an unprecedented dry season has begun: “It’s the driest we’ve observed in the last 15 years at the onset of the dry season” (Grossman 2016).

Global circulation models have predicted an increasing drying of the Amazon region that could be severe enough to compromise forest structure, resulting in dieback (Cox et al. 2004; Lapola and Norby 2014). Climate change in Amazonia will increase tree mortality, a biomass loss that leads to carbon emissions. Regardless of the uncertainties associated with these projections, Amazonia is expected to experience rainfall reduction, an increase of 4 to 6 degrees Celsius in temperature, and an altering hydrological regime with extreme droughts expected to occur more often, increasing human suffering and economic losses. Very little is discussed both in the media and scholarly literature about the socioeconomic impact of a possible Amazon dieback (Vergara and Scholz 2010). This lack of attention may be a result of the fact that climate change impacts in the Amazon are poorly explored, despite extreme drought (and floods) affecting the region, economy, and population in recent years.

Climate change in Amazonia must consider global circulation models; land use change, its forest impact, and responses to it; local, regional, and global CO<sub>2</sub> balance and emissions debates; and their importance for overall global climate stability. In that list a very important component is missing: humans and their institutions, economy, infrastructure, and livelihood, which over the past decade have been severely

impacted by extreme variability in the region.

The insistence on dehumanizing Amazonia has been reproduced over centuries by science and political elites both nationally and internationally. The accounts presented in this essay set the stage to claim that inasmuch as socioenvironmental justice movements have had a long story of struggle in Amazonia, climate anomalies are bringing another formidable challenge to its population.

The concept of justice shows the disconnection between causes and impacts associated with climate change. The traditional peoples of the Amazon, the overall majority, are among those who contribute the least to global warming yet suffer significantly from climate anomalies. Squeezed between large development impacts, the implementation of different categories of protected areas (which in some cases exclude some groups over others and impose strategies that might act against local cultural ideas), and, more recently, climate adversities, those living in Amazonia experience constant struggles and confrontations. In fact, they are among the poorest and most remote in Brazilian society (Pinho et al. 2014, Pinho, Marengo, and Smith 2015).

In this essay I present some evidence as to whether there is a real increase in the potential for an Amazonia dieback because of climate change, investigating what scientists are saying on the topic. I provide evidence of socioeconomic impact using the extreme droughts of 2005, 2010, and 2016 as proxy for climate anomalies. This evidence will show the closely linked phenomena of climate change and socioenvironmental justice as the population’s ability to cope with these events in the near future is severely

compromised. It can be seen, not only in the North and the global South but in developed versus developing nations and within national domains, that impacts of climate anomalies are unevenly distributed, and disadvantaged communities bear (or fail to bear) the costs of massive global, national, and local environmental transformation. I show how scientific studies, regardless of their tremendous importance, have contributed to the idea that Amazonia is only a forested area and important in the climate change context for its ability to provide carbon sink for global benefit. The policy domain has also ignored the social experience that exists in Amazonia, thus limiting action responses from government to support local needs in times of climate adversities.

### **Amazon Forest: From Green to Brown by 2100?**

A synthesis of the literature shows a level of uncertainty about the Amazon's future in the context of climate change. Results of global circulation models have predicted an increased precipitation level for the Amazon, while other studies suggest a drying scenario (Marengo et al. 2010). Among the most accepted results are models suggesting that rainfall reduction in Amazonia might be so severe that forest structure and dynamics are compromised. In that model, a forest dieback scenario takes place. The uncertainties are associated with land use changes such as deforestation, biomass burning, and forest fragmentation, which affect local and regional climates. These may compound the effects of global climate change on the stability of the Amazonian rain forest, accelerating dieback as it provides feedback for higher temperatures and lower humidity (Nobre, Sellers, and Shukla 1991). Recent global circulation

models suggest that the area affected by mild and severe drought will nearly triple by 2100, and the continued emissions of greenhouse gases will increase extreme events and degrade Amazonian forests (Duff et al. 2015). In fact, it is difficult to define what constitutes a catastrophic change in drought frequency and intensity for the stability of Amazonian forests, as well as in the socioeconomic effects on the population.

In any case, climatic feedback associated with an Amazon dieback suggests that the widely understood role of the Amazonia forest as the "world's lungs" would be compromised. During the extreme droughts of 2005, 2010, and 2016, both international and national media sources broadcast numerous reports about the droughts' effects on Amazonia in terms of the forest's planetary role and its carbon release into the atmosphere. As a prominent scientist stated: "Without this 'carbon sink' the world's ability to lock up carbon will be reduced, compounding the effects of global warming."<sup>1</sup> The social impact of these droughts are only mentioned in the context of accelerated land use change, specifically, the incidence of fire outbreaks promoted by local farmers' need to clear the land for crop plantation. "Almost all fires in the Amazon are started by landowners clearing fields and forests for cultivation and livestock" (Tollefson 2016). These views portray social factors as responsible for impacts on the forest, but still the forest is largely described as "free" from human pressure: "While the Amazon is bisected in parts by navigable waterways and roads, and is increasingly encroached by settlements and industrial agriculture much of the Amazon is still free of human pressures" (Venter et al. 2016).

If Amazonian forest is severely impacted by climate change, the implication is

that carbon sequestration is threatened, resulting in impacts beyond national borders. "The loss of biodiversity in the world's largest rainforest justifies serious concern. But even more is at stake, as the Amazon holds a staggering stockpile of carbon sequestered in tree trunks and soil" (Grossman 2016). The views are deceptive in that they portray Amazonia as an intact system, passively susceptible to accelerated pressures from land use change and recent policy changes. In fact, from a climate change perspective, it suggests a lack of human agency in Amazonia. I argue that these representations of Amazonia are limited, and when they acquire a grand narrative status within discourse, as Isabelle Stengers suggests, they can have dire results for human understanding (Davis and Turpin 2013). In the next section I show how society has been impacted by climate change on a daily basis.

### **Social Reverberations: Impact of Extreme Droughts in 2005, 2010, and 2016**

During the years of extreme drought, scholarly and media coverage both portray Amazonia's social domain as only a destructive force. However, evidence shows that deforested areas are dominated by larger properties (greater than 500 hectares) with only a small percentage from smallholder's properties, which represent a greater proportion of people (Godar et al. 2014). Of around 30 million people living in the region, 29 percent of the population is indigenous, but there is also a rich diversity of other ethnic groups, including Afro-Brazilian communities, traditional inhabitants, and migrants from other regions of the country. Income-based poverty in Amazonia affects up to 42 percent of the population, whereas for the entire country it is 28 percent. The livelihoods of the poor residing in these

areas are highly dependent on and sensitive to changes in the provision of resources by the prevailing ecosystem, closely tuned to the hydrological cycle. The flow of the river dictates ecological patterns, human settlements, land tenure, productive systems (economy), and social organization in Amazonia, and it is central for food access and production.

Some of the severe impacts suffered by most of Amazonia's population during extreme droughts can be summarized as both environmental disruptions and disruptions in the provisions of services and infrastructure. As part of the negative feedback loop associated with extreme droughts, with river transportation interrupted, local communities could not get access to market products that otherwise would support their needs in times of adversity. Additionally, the market prices for staple crops such as manioc severely increased and were not affordable by most of the riverine population even when they could be reached. There was an increase in mortality of fish due to the low water (and dissolved oxygen) levels, and increased competition among fishermen as they anticipated a collapse given the low water; thus collective action to safeguard endangered fish species was compromised (Pinho and Orlove 2010). As an effect, fisheries' productivity will be compromised in the next dry season of the hydrological year. An impact on health is associated with an increase in fire incidents, namely respiratory diseases, especially in small children and the elderly, and incidences of diarrhea as a result of contaminated water (Smith et al. 2013). Small-scale agriculture is severely compromised, as it is difficult and or impossible to cultivate staple foods. Resource extraction (forestry, National Forest Programme or NFP, and others) also suffers a decline in productivity and impediments to transportation of the

products with low water levels. Energy availability is interrupted given the lack of fuel that is delivered by the river to most of the municipalities. It is true that the acclaimed social program for poverty reduction in Brazil, which has the largest direct cash transfer scheme in Latin America, has certainly contributed to local livelihoods in Amazonia; but it does not act as a buffer given the reasons pointed out, such as lack of physical access to markets. These facts support the idea that strategies designed for the northeast that acted as a buffer, reducing climate impacts on vulnerable populations (Eakin, Lemos, and Nelson 2014), do not translate well to Amazonia under climate adversities and risks.

No official estimates exist of the costs associated with these droughts for most of the Amazon region. In 2005, Acre registered smoke pollution that affected more than 400,000 people, and fire damaged more than 300,000 hectares of forest, with direct costs of more than US\$50 million (Brown et al. 2006). In 2010, there was slightly more data available, with 40 out of 62 municipalities of the state of Amazonas declaring a state of emergency; the government released US\$12 million for relief to support impacted communities. The majority of the people impacted by the 2010 drought that were interviewed revealed that they had no knowledge of support from the government (see Pinho, Marengo, and Smith 2015). The year 2016 will be also remembered as another dramatic drought: "In Manaus, more than 40% of the food supply depends exclusively on the river transportation. Food that would be delivered in four days is taking twice the amount of time given the low water levels—as a result, it is getting more expensive" (*Folha de S. Paulo* 2016). In the capital of Acre, Rio Branco, due to the low water level, the

government has implemented rationing of water. Throughout the basin, passenger boat trips were canceled, leading to physical isolation. Authorities anticipate a shortage in fuel delivered to major urban centers in the states of Amazonas, Acre, and Rondônia. Community leaders of the state of Amazonas say the population hasn't seen a drought like this in 30 years, and many are "praying" that government does not forget about them again, as food and water insecurity are scaling up (Souza 2016). In the context of a historical absence of governance in the region, local responses during severe droughts has increased migration to urban areas, as migrants hope municipalities will be safer in terms of climate anomalies. However, migrants' vulnerability actually tends to increase in cities, as access to food, jobs, markets, education, and health are still precarious. Additionally, migrants occupy urban margins, as in the case of Manaus, where human problems such as lack of clean drinking water, contamination, waste accumulation, crimes, and violence are on the rise.

On the topic of climate change governance for Amazonia, policy responses are still very limited in preparing society for these impacts. Civil defense is charged with giving technical and financial support, evaluating and reducing risks, and being ready for actions to reduce human suffering. The reality is a lack of individual and municipal capacity and of coordination among higher levels, delaying actions during extreme droughts. The relief support delivered in times of adversity in most cases doesn't get to the impacted communities (given interrupted access). In other instances, relief is used as currency for political campaigns during elections. Moreover, governmental bodies tend to dismiss the critical abnormal drought, attributing the need for more robust

measures of the hydrological regime for action.<sup>2</sup> At the same time, civil defense executive directors are “worried about communities’ well-being given the shortage and interrupted access to food supply” (Souza 2016). In Acre, regarding the low visibility of the impact of the extreme droughts on populations and the absence of authorities’ responses, sources claim, “People are deaf when we talk about rivers in Amazonia. Our kids will go thirsty if no action is taken” (*AcreNews* 2016).

### Connecting the Dots: Seeing the Amazon but Missing the Story

Given this evidence, I argue that the narratives of Amazonia as a pristine environment relatively free from human pressure have acted against a more robust strategy to improve socioeconomic conditions in the region. In times of climate adversity, the dieback hypothesis has been shown to reverberate, impacting both forest and the socioeconomic domain given the consecutive extreme droughts.

However, as long as these narratives fail to conceive of Amazonia as a social landscape, they will fail to capture daily struggles and the detrimental importance of the population to forest stewardship. Such conspicuous disparities between the tremendous natural capital and widespread social hardship has already been described a long time ago, “so striking was the mixture of natural riches and human poverty.”<sup>3</sup> As with environmental justice movements elsewhere, environmentalism in Latin America takes shape in the arenas most directly salient to people’s lives and livelihoods. Environmental resistance weaves into existing struggles for social justice because people face environmental threats in every corner of their daily lives. Climate change has already been more

salient in other regions of Latin America, such as glacier retreat in the Andes (Gagné, Rasmussen, and Orlove 2014). Perceiving the Amazonian region as suffering from climate change is relatively new, to the point that hydrological anomalies are still not completely linked to climate change by the prestigious national science community. “With three events in a hundred years it is difficult to do statistics” (Paulo Artaxo, interview for *Folha de S. Paulo*, 2016). In contrast to the novelty of the climate change concept for the Amazon and of attempts to prove the dieback hypothesis, it seems that social struggles in the area have persisted throughout the years.

### What Would a Projected Increase of 4–6 Degrees Celsius Mean for the Amazon?

Future projections and scenarios for the Amazonian dieback confirm that it is likely that extreme drought events will be more frequent and severe (IPCC 2014). Socioecological systems will have to adapt. But what does adaptation mean for the human population in Amazonia? It means to continue to strive for better living conditions at the murky intersection of development, ecosystem protection agendas, and climate change, where residents are still perceived as outsiders. Thus, ethical issues and challenges connected to climate change come to the fore. Justice includes broad considerations of human well-being, not limited to health, safety, access to material resources, satisfactory social and kin relationships, aspirations and opportunity, fairness, and sense of purpose in life. All these are absent in the region, growing as preexisting vulnerabilities outside climate change. Consecutive years of social hardship as a consequence of extreme droughts have shown the limits of cultural practices among the Amazonian population (Pinho,

Marengo, and Smith 2015). The extent to which these people can resist future climate adversities will depend on the strategies designed to support them in facing climate risks. Certainly it could be achieved with the active engagement of the scientific community, policy makers, and communities at different scales of governance. Nonetheless, it seems important now to step back and conceive of Amazonia as a social domain, regardless of our tendency to dehumanize it.

### Notes

- <sup>1</sup> T. Patterson, quoted in “Amazon: Lungs of the Planet,” BBC Future, November 18, 2014.
- <sup>2</sup> “There is nothing abnormal about this drought. We are in the onset of the water level reduction, and we cannot confirm which phenomena are taking place, we need to continue to follow the daily measurements” (chief of Hydrological Service of Manaus, in Souza 2016).
- <sup>3</sup> Bates and Wallace, naturalist (1848), in Slater 2003, 116.

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