

Biological Megadiversity as a Tool of Soft Power and Development for Brazil

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In this article, I provide a brief overview of the importance of biodiversity and its value for Brazil and for the world. This theme will be on the Brazilian and global agendas over the coming decades. In the case of Brazil, vast biological diversity is a clear resource for global influence and a valuable tool of soft power that, along with other resources, constitutes a hugely important asset for the country's economic and social progress. I also briefly examine favorable conditions for the country (other aspects of soft power) and challenges that must be confronted, in particular accentuated by the current national political context.

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Introduction: megadiversity as a distinguishing factor in Brazil

Brazil's international influence depends on the country's ability to accumulate resources for the exercise of soft power. In the 21st century, with the spread of biotechnologies, biological diversity is one of Brazil's most valuable assets, alongside others associated with the institutionalization of the science and technology system and the construction of a global environmental agenda. Economic and social development based on an advanced bioindustry, in a positive and sustainable relationship with the protection of biodiversity, could stimulate the creation of techno-industrial hubs associated with the country's most biodiverse biomes, such as the Amazon, Cerrado and Atlantic Forest. This development depends to a large extent on quality education, science and technological capacity, as well as adequately addressing challenges of environmental management and effective governance. In this context, and considering resources of soft power and challenges, this article offers an overview of the theme of biodiversity within the global environmental agenda and its growing future relevance, examining the importance of this agenda for Brazil's development.

Brazil is the country with the greatest biological diversity in the world. It is one of seventeen countries regarded as megadiverse. Megadiverse countries have at least 5000 indigenous botanical species and a marine ecosystem on their coasts. According to Conservation International, 70% of the world's flora and fauna are found in these seventeen countries, which occupy only around 10% of the earth's surface. Brazil is the most megadiverse of the seventeen. It has the greatest land biological diversity (flora and fauna), while Indonesia has the greatest marine biological diversity. Recent estimates are that the animal and plant species currently known in the country (there is an incalculable number of species not yet discovered, mainly in the Amazon – on average, 700 new species are discovered every year) represent 15% to 20% of global biological diversity. Other natural resources contributing to Brazil's megadiversity include: 20% of the world's drinking water; the largest continuous area of mangroves (1.3 million hectares); and the only coral environment in the South Atlantic, stretching for 3000 km along the country's northeastern coast.

The country contains two of the world's 34 biodiversity 'hotspots': the Atlantic rainforest and the Cerrado. A hotspot of biological diversity is a biogeographic region with a great diversity of flora and fauna that is at risk of extinction. These 34 areas previously covered around 16% of the Earth's surface and 86% of its habitats have already been destroyed. Today they cover only 2% of the earth's surface, but 50% of vascular plants and 42% of existing vertebrates are indigenous to these hotspots.

Brazil is also a country of great social and cultural diversity, with almost 55% of the population being of African descent, large European and Japanese populations, both Brazil born and immigrants, and more than 200 indigenous peoples, speaking 170 languages. The indigenous and riverside communities of the Amazon have vast knowledge of species of fauna and flora and their functions. They are part of the knowledge capital that would allow Brazil to promote the preservation of biodiversity and sustainable use of genetic and biological resources. These resources will be fundamental to providing Brazil with the capacity to enter the fourth industrial age competitively, as a major pole of biotechnology and bioindustry. Biodiversity is a highly valuable resource, because of the environmental services it provides, the opportunities it presents for sustainable use, and as the basis for another model of progress, that is more compatible with the needs of the 21st century.

Brazilian soft power

Brazil has never had sufficient military and economic power to use as a resource in the international arena. But it has always had influence in world diplomacy. This is explained by the resources of soft power that the country has been able to develop and exploit. The first was the creation of a professional diplomatic corps, which began to be built during the Empire and expanded under the Republic. Even during the military regime, Itamaraty was preserved and retained an elite of ambassadors and advisers that allowed the country to continue exercising influence in multilateral institutions. Under the Bolsonaro government, professional diplomacy has been discredited and demoralized.

Another resource of soft power that achieved sufficient scale to leverage global influence was the development of a scientific community of excellence, based

mainly in public universities and institutions such as National Institute for Space Research (INPE), the Brazilian Center for Physics Research (CBPF), Institute of Pure and Applied Mathematics (IMPA), the National Observatory, and the Brazilian Agricultural Research Company (EMBRAPA), among others. A network of scientific and technological knowledge based in agencies such as Capes and CNPq and in contributions from FNDCT. More recently, since the 1990s, non-governmental science think-tanks have been formed, mainly dedicated to the study of biodiversity and the climate, in the interest of developing public policies for the conservation of nature and mitigation of climate change. The scientific community has reached new heights since the 1990s, in both qualitative and quantitative terms. The union between diplomacy and science in Brazil was extremely significant for projecting the country's global influence, especially in multilateral forums that deal with science and technology-related issues, such as climate change (the country has significant participation in the Intergovernmental Panel on Climate Change, IPCC), biological diversity, health (WTO), human rights and food (FAO).

Destruction of biodiversity and climate change as limits to development

During the final decade of the twentieth century, environmental issues, particularly linked to the destruction of biodiversity and climate – especially global warming caused by human activity –, became increasingly central to global politics. These themes were initially addressed by the Club of Rome, which created the first transdisciplinary network of scientists dedicated to the study of their evolution, impacts and implications for public policies. The study 'Limits to Growth' (Meadows, Meadows, Randers and Behrens III, 1972), a seminal work led by Donella and Dennis Meadows, both from the system dynamics group coordinated by Jay Forrester at MIT, used system dynamics in an innovative way, as a method, logical structure and language. The software used to produce the simulations was an experimental version of a program designed by Jay Forrester that conducted simultaneous equations, organized systematically. Integrating demographic, economic and geological data, among others, it sought to assess the viability of maintaining the same pattern of economic growth over the subsequent 30 years. The results of 'Limits to Growth' alerted the world to the possibility that development could reach a point of exhaustion. The Club of Rome report

had great repercussions and received additional impetus with the first oil crisis in late 1973. Its expansion, with a much larger number of equations and variety of data sources, resulted in a second report, *Mankind at the Turning Point*, by Mihajlo Mesarovic and Eduard Pestel (MESAROVIC and PESTEL, 1974). This report identified that the factors that would exhaust the possibilities for continued development on post-War lines were subject to human control and could be altered via public policies. The debate that followed initially prompted initiatives by governments and companies, before eventually reaching the multilateral arena and being incorporated into international relations.

In 1983, the UN General Assembly created the World Commission on Environment and Development. The then Secretary-General, Javier Pérez de Cuéllar, invited the young former Prime Minister of Norway, Gro Harlem Brundtland, to establish and chair the Commission. The Commission's early activities were heavily influenced by the Meadows' seminal work. In 1987, its report, called 'Our Common Future', which became known as the Brundtland Report, introduced the notions of sustainability and sustainable development into the technical-scientific vocabulary, referring to the ability to meet our present needs without compromising the capacity of future generations to meet theirs. The Brundtland report had enormous impact worldwide and led to the UN convening a world summit on environmental and climate issues, the United Nations Conference on Environment and Development. Known as the 'Earth Summit', it became referred to as 'Eco 92' and, later, 'Rio 92', in the global media. It was a milestone in global policy on sustainability, climate change and biological conservation. From then on, Brazil added a new resource to its stock of soft power that would continually appreciate along with growing concerns about 'sustainability': The Amazon rainforest and the biological diversity found in its various biomes. This, along with professional diplomacy, scientific excellence and biological wealth led to a significant increase in Brazil's global influence.

Brazil in the global policy of biological diversity and climate

It was no coincidence that Brazil hosted the first and most important global summit on biological diversity and climate. We had the advantage of being a middle-income country with a professional diplomatic corps with a strong reputation, a

foreign policy based on conciliation and non-intervention in the internal affairs of other countries, and a rich biological endowment. The conference took place at one of the most delicate moments of Brazilian domestic politics following the ratification of 1988 Constitution. The country was in the midst of a crisis that would lead to the impeachment of President Fernando Collor de Mello. He soberly chaired the sessions of heads of state and the political negotiations were led by elite professional diplomats, in particular Rubens Ricupero and Marcos Azambuja. The Brazilian Foreign Secretary was the political scientist and jurist Celso Lafer, who placed great value on both diplomacy and the scientific community, and was able to clearly translate the top priority given by the president to the summit. The Minister of the Environment was the physicist José Goldemberg, who reinforced the relationship between diplomacy and science, which would be of strategic importance over the following years.

Rio 92 marked several important beginnings. As it envisaged the participation of civil society, several environmental NGOs were created, in Brazil and around the world, in order to participate at the Summit. Several of them would go on to become important global and national scientific think tanks. It also marked the entry of parts of the Brazilian scientific community to the center of global debates on biodiversity and climate change. Two fundamental conventions emerged from Rio 92, the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity. Brazil would play a prominent role in both. Some mechanisms were also created that would be used later in the Kyoto Protocol, a treaty that was part of the Climate Convention, adopted in December 1998 and only surpassed with the 2015 Paris Agreement. One of the Protocol's instruments, the Clean Development Mechanism (CDM), was the result of negotiations based on two similar proposals by Brazilian and American scientists. It introduced the idea of carbon credits, which allowed countries to develop projects to reduce carbon emissions and, with them, obtain certificates that could be used towards their emission reduction targets. Brazilian diplomacy and scientists who contributed to the development of this mechanism also played a decisive role in negotiations for it to be officially adopted. In 2012, Rio was host to Rio+20, the summit that proposed the Sustainable Development Goals (SDGs). The SDGs were complex, they comprised 17 Sustainable Development Goals, and 169

targets, envisaged to be completed by 2030. They were to be evaluated with indicators designed to determine their effectiveness. Due to their complexity, they were only approved at the United Nations Summit on Sustainable Development in September 2015, at the UN headquarters in New York, after several rounds of negotiations. They are now part of the public policy agenda of most nations in the world, with varying degrees of success.

I closely followed, through systematic observation, negotiations for a broader and more comprehensive climate agreement than the Kyoto Protocol (ABRANCHES, 2010a, 2010b), and for the Sustainable Development Goals, at Rio+20. COP15, held in Copenhagen in December 2009, was regarded as a major frustration. However, it was a politically decisive moment, in which the three key players responsible for the impasses that prevented a satisfactory global climate agreement, China, the United States and Brazil, shifted their positions. The three had imposed impediments and demands that, in practice, prevented the negotiations from moving forward. In Copenhagen, partly under the pressure of huge social mobilization on a global scale, they began to cooperate to discuss the terms of a viable agreement. The rivalry between China and the United States was at the center of the problems at COP-15. With President Barack Obama still at an early stage of his first term, he was very cautious. Negotiations stalled, leading governments into a cul-de-sac. This was only resolved in the final hours of the summit, in a meeting between the heads of government of the BASIC countries, a negotiating group composed of Brazil, South Africa, China and India. Obama took the initiative to enter the room where BASIC was meeting to negotiate a compromise with Wen Jiabao, the Chinese Prime Minister. He had the help of the Brazilian President, Lula da Silva, an experienced union negotiator prior to his political career, and the Prime Minister of India, Manmohan Singh, who had previously worked at the UNCTAD and had experience of complex multilateral negotiations. In a rare moment in the history of international relations, the heads of government sat, shirted around the table, to discuss the agreement that would be signed, sentence by sentence. Obama, Jiabao, Lula, Singh and South African President Jacob Zuma, reached a text after hours of tense negotiation, which would not, however, be made official at the last plenary session of the Copenhagen convention. But the 'Copenhagen Accord', with new contributions resulting from another intense round of conversations, was

incorporated into the 'Cancún Accords' at COP 16 in Mexico the following year. In 2011, in Durban, South Africa, another decisive session of the Climate Convention took place and, again, Brazilian diplomacy played a key role in the search for a compromise solution that would pave the way for a firmer agreement with the accession of United States and China. An ingenious diplomatic solution, with the active participation of the experienced Brazilian diplomatic negotiator, led to the replacement of a top-down approach, which was accepted neither by the USA nor by China, and also concerned Brazil, for a bottom-up agreement, that was accepted by all. The path to a compromise had been paved. These three critical moments, in Copenhagen, Cancún and Durban, opened the path that would lead to Paris and the historic 'Paris Agreement', at COP 21, in December 2015. This alternative formula, devised by professional diplomats, led by the famously competent French diplomatic corps, allowed for the incorporation of the Paris Agreement into the legal framework of the Climate Convention, while avoiding stating explicitly that it was a legally binding decision. By being incorporated as an amendment into the main text of the original agreement of the Convention, the Paris Agreement did not require ratification and became part of the body of international law on climate change.

Social and political aspects of climate change and destruction of biodiversity

Sociological and political topics associated with climate change and the destruction of biodiversity are broad, varied and relatively little explored. Political science has devoted relatively little to studying the interactions between the dynamics of domestic interests, the clash of economic interests linked to the fossil-fuel economy and the destruction of biodiversity, and multilateral negotiations on climate change and biological diversity. Such interactions are increasingly central to the conflict of domestic and global interests and are decisive for the trajectory of democracy. (VIOLA and FRANCHINI, 2017). In Brazil, these relationships are crucial. Firstly, because they are associated with the country's crucial ability to generate and reproduce competitive soft power. Secondly, because they are obstacles on the country's critical path to achieving progress and overcoming its primary challenges. Studying conflicts of interest associated, on the one hand, with the conservation of biodiversity and, on the other,

with activities that have highly negative impacts on the natural environment, such as mining, prospecting, livestock rearing and logging, for the more diverse uses, has revealed networks that include regulators and police, producers and deputies, often with ramifications for crimes of land grabbing, armed violence, deforestation, timber smuggling and for corruption, especially in the Amazon.

These networks of influence have emerged more clearly in research carried out by NGOs dedicated to environmental protection and have contributed to important negotiations that seek to dissociate large companies, especially those involved in the export activities, from ties to criminality. This occurred in the case of negotiations around the soy moratorium, which involved NGOs armed with concrete data, demonstrating these dangerous links, business associations like Abiove, from the soy oil industry, large export trading companies, large importers of meat and soy, such as McDonald's, and the prosecutor's office. The global relevance of the biodiversity agenda was made clear by restrictions on Brazilian exports of soy and meat that were unable to prove that there were no products in their shipments that had originated in deforested areas.

Studies carried out by Imazon, a think-tank dedicated to researching and developing public policy proposals, showed that, in the Amazon, environmentally destructive activities, including the construction of large hydroelectric dams, give rise to cycles of boom and bust, in which there is an increase in the region's human development index, followed by collapse of social conditions, when investment dries up, either because construction ends or due to the exhaustion of natural resources or soil fertility (CELENTANO and VERÍSSIMO, 2007; SCHNEIDER et al., 2002). Climate and biodiversity have connections with a number of pressing contemporary challenges in Brazil. The relationship between destruction of biological diversity and poverty is one of them. The other crucial relationship is governance and the ability to resolve conflicts related to the environment, not only in the countryside, but also in urban environments, in the regulation of air quality and greenhouse gas emissions. Predatory elites who illegally occupy public land, invade indigenous territories, maintain slavery-like working conditions, and deforest the Amazon use poverty as an alibi and shield. They use it as an alibi, because they present land invasions and deforestation as necessary for the survival of deprived, informal

and unemployed populations. They use poverty as a shield by using a frontline of land-grabbers and deforesters formed by poor squatters, as a fence around their irregular properties, to avoid eviction by the police. This is a billionaire business. Deforestation of large areas requires significant capital in the form of tractors, trucks and winches. Large-scale deforestation is associated with a network of economic interests that range from the use of armed groups to intimidate and kill, to smuggling, to the irregular production of soy and cattle, to export agriculture, the industrialization and export of soy, both for food and animal feed. The prevention, for example, of the contamination of legal soy by illegally sourced soy, produced as a result of deforestation and other criminal activities, is only possible thanks to the aforementioned soy moratorium, which blocked purchases by large customers of products originating from deforested land. A similar process took place, on the initiative of the environmental public prosecutor's office (*Ministério Público – MP*), with the 'Carne Legal' (Legal Meat) program, which brought together large meatpackers, NGOs and the MP in a meat-tracking agreement, that would prevent the slaughter of cattle and purchase of meat from deforested areas. Today, traceability is part of the protocol for foreign purchases of meat in almost all European Union countries, and is occasionally used as a mechanism of protectionism or economic pressure, with the blocking of purchases of Brazilian meat not traced from origin by Europe, Russia and the United States.

The weakening of environmental and climate regulation

From a scientific point of view, there does not seem to be much room for backtracking in the processes of climate change mitigation, which also presuppose greater protection of biological diversity. There is also no room for socio-economic development based on the dominant 20th century model of high carbon emissions, extensive consumption of fossil fuels, and intensive exploitation of natural resources. The limits to progress have narrowed in the 48 years since the seminal research conducted by the Club of Rome. It would hardly be necessary to dwell on the effects to democracy and human rights of a radical deterioration in living conditions on the planet due to the destruction of biodiversity and global warming above 4°C, an increasingly likely scenario according to climate scientists, whose data are compiled by the IPCC. There are clear episodes in history

of the violent way societies adapt to material scarcity and how 'social Darwinism' easily translates into social and political violence, the destruction of collective and individual rights, and even the disappearance of entire peoples and civilizations.

Industries exert enormous pressure on the precarious apparatus regulating air quality and greenhouse gas emissions, both at the federal level, where this competence lies with the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) and the National Environment Council (CONAMA), and state and municipal levels. This system of pressures, including actors from industrial corporations, lobby groups and parliamentarians financed by them, is an important dimension of domestic politics that influences foreign policy. It also occurs in rural areas in relation to deforestation. In Brazil, deforestation is also one of the main sources of greenhouse gas emissions. But none of this is exclusive to Brazil. This system is very strong in the United States and, under the Donald Trump administration, has managed to promote significant reductions to the emission standards approved during the Obama administration, especially through intervention in the Environmental Protection Agency (EPA), which has a strong mandate bestowed by the 1963 Clean Air Act. Trump also stepped in to weaken the role of organizations involved with climate science under NASA's institutional umbrella, notably the National Oceanic and Atmospheric Administration (NOAA).

In Brazil, a similar attack by the federal government is currently being carried out against organizations linked to environmental and climate regulation, science, and indigenous peoples. Fundação Nacional do Índio (FUNAI), which is in charge of indigenous policy, has been disempowered and denied specialized personnel, and the Bolsonaro government has completely paralyzed the process of demarcating indigenous lands. This process began to slow down under Dilma Rousseff's government, stopped under Michel Temer's government and is currently under review pending the possible interruption and reversal of past demarcations under the Bolsonaro government. Jair Bolsonaro is preparing a bill on the regularization of indigenous lands, based on the idea that already demarcated indigenous lands are oversized and should revert to 'ideal size' and that non-indigenous activities, such as mining, prospecting, livestock rearing and

canalizing of rivers must be authorized on those lands. The process of demarcating indigenous lands first gained impetus under the Collor de Mello government, which demarcated 112 territories. The Fernando Henrique Cardoso government demarcated 145, Lula da Silva, 79, and Dilma Rousseff demarcated only 21 indigenous territories during her entire period in office, up until 2016. Under Michel Temer, there were no new demarcations and under Bolsonaro the system is being reformulated against indigenous interests. The authoritarian impulses of the Bolsonaro government are very evident in the areas of environmental regulation, which has strangled FUNAI and extinguished all councils containing civil society representation, which predominated in the areas of environmental and indigenous rights. Where he was forced to retain such organizations, because the Supreme Court ruled they were mandated by the constitution, he changed their structures to drastically water down or eliminate civil society representation, and reduce the participation of academic and scientific organizations. CONAMA, for example, suffered a sharp reduction in representation, playing an even weaker role than it had when it was created under the military regime. The Amazonas Fund, set up to receive transfers of resources from European Union countries, such as Norway and Germany, to compensate for reductions in deforestation and which financed sustainable development projects in the region, was dismantled by the Environment Minister. Countries committed to the Fund ceased payments, due to the increase in deforestation, which under Bolsonaro's management rose from 7,300 km² in 2018 to 10,300 km² in 2019 and, according to estimates based on INPE's real-time deforestation alerts, could reach 15,000 km² this year. None of this has happened by accident. The correlation of forces that elected and sustains the Bolsonaro government is ultra-conservative, with strong representation from ruralists and the most backward industrial sectors. It closely resembles Donald Trump's base in the USA. Democracies have performed much more effectively in protecting biodiversity, mitigating and adapting to climate change, and respecting and guaranteeing the rights of the original populations for the obvious reason that they are more plural, representative and open to popular pressure.

A key point is that biodiversity as a resource of soft power can, when associated with other soft power resources such as science and technology, create

the basis for the constitution of hard power, in the form of economic power in areas of the global economy such as food, pharmaceuticals and new materials. Part of a country's accumulation of soft power is related to its legitimacy on the international stage. The quality of diplomacy and the observance of international agreements are necessary, but not sufficient conditions. The well-being of the population and the quality of democracy are also important assets for legitimation. In order for Brazil to realize the soft power potential of its biological diversity, good environmental governance is needed to achieve zero deforestation and establish the minimum level of legal-political protection and social stability, which are essential for the sustainable development of biodiversity. It also necessarily involves reducing inequalities and poverty, in order to reduce pressure on the rainforest frontier. Wide and equal access to quality education will allow for the development of the human component of biodiversity and the formation of a qualified workforce at all levels of the science-technology-production chain. With this base of biodiversity protected and a society able to take advantage, our comparative and competitive advantages to develop a low carbon economy will increase exponentially (BALAT and BALAT, 2009).

In addition to biological diversity, which can also play an important role in the local production of sustainable biomass energy, our wind and solar potential is unparalleled. We have the resources to competitively develop the hydrogen economy, the most plausible candidate to replace the current oil-based economy. Studies carried out by geographer Bertha Becker and climatologist Carlos Nobre, with the institutional support of the Brazilian Academy of Sciences, developed the proposal for an Amazon 4.0 – a bioindustrial pole, which would require an expansion of quality education from elementary to university level in the region, including technical education in areas supporting biotechnological research and development and bioindustry. This alternative path of sustainable development requires multidisciplinary studies to develop, including from political science, particularly in the area of public policy, as well as sociology and anthropology. It is not just a matter of biology and chemistry, or economics.

The pandemic as an effect of poor environmental management

The SARS-COV-2 pandemic confirmed the predictions of environmental and epidemiological research that pointed to the probability of the migration of viruses from the wild fauna to the human organism, due to an unhealthy relationship between humans and the natural world. In addition to being invisible, the virus causes a disease that has a long incubation period, between 07 and 14 days, without symptoms or with symptoms so mild that they may go unnoticed. Hence the severe threat it represents. Infected people transmit the virus without being aware of it, on a geometric scale. Because of these characteristics, it quickly became a global pandemic. The disease spread rapidly through a globalized world. It emerged, most likely, in China, in Wuhan, the capital of Hubei province. At a seafood market fish mingled with illegally procured meat and live wild animals. The coronavirus is present in common bats or pangolins (*manis javanica*), which are illegally imported into Guangdong province. Upon entering the human body, it undergoes adaptive mutation (natural selection) that transforms it into a highly infectious and quite lethal virus. The specific origin is still a mystery. We know almost nothing about this new type of coronavirus, which has been named SARS-COV-2, and even less about the disease it causes, a severe and acute respiratory syndrome (SARS), known as COVID-19. People react to it in such varied ways that we are not yet able to detect patterns. We lack sufficient data and adequate research. Knowledge that we will only have after the pandemic has subsided completely and become another 'influenza' that reappears annually in outbreaks of varying severity. It is not a mystery, however, what it was allowed it to migrate to the human organism. It was the inadequate management of nature, the reckless invasion of the natural environment by the human environment. The economic impact was almost immediate. When the disease began to spread through Wuhan, the government closed down the entire province. Hubei is one of the most important regions in the world for the production of electronics. The world economy depends on globalized supply chains and several of them are highly concentrated in hubs in China, which supply parts and components, and where final products are assembled. The total halt to production in the province of Hubei brought a sudden interruption to various sectors of the world economy, including in the United States and Germany, two other key drivers of the globalized economy.

The use of masks was recommended after a certain point, but they quickly became scarce even for health personnel, among whom rates of infection and death have been very high. There was also a lack of ventilators worldwide for patients who required mechanical assistance to breathe during the most severe phase of COVID-19. The health consequences are devastating. The severity of the pandemic is associated with the quality of governance. Poor governance is associated with higher severity of the COVID-19 crisis. Several non-epidemiological factors affect the natural dynamics of the disease and quality of governance appears to be one of them. Political science has consistently demonstrated that good democratic governance makes a difference to the stability of democracy and also to the effectiveness of public policies. Upon entering the human body, the virus undergoes adaptive mutation (natural selection) that turns it into a highly infectious and lethal agent. The health and human consequences of the pandemic are devastating, as are its side effects on the economy, social life and politics.

The pandemic and quality of governance

Pandemics like this show how the quality of democratic governance and the robustness of public health care facilities and social protection networks are negatively correlated with the severity of contagion and mortality rates. Germany, which has a universal health protection system and a strong scientific and technological system, was not only one of the first countries to invent a test to identify SARS-COV-2 and COVID-19, but it has done quite well compared to other European countries in containing the pandemic. Portugal, too, with a clear majority government and a public health system that managed to survive austerity before the progressive coalition came to power, has managed to contain the pandemic much more successfully than Italy and Spain, where governments enjoy only small majorities. United States and Brazil, meanwhile, have authoritarian and conservative governments and display dysfunctional governance. The former lacks a public health system entirely. Brazil has a very well designed system, the SUS, but it has been depleted by successive cuts to budgets, equipment and personnel under the fiscal austerity programs imposed by several governments, while also being hit by corruption schemes that filled the country with buildings of hospitals and health centers that were either unfinished or lacked the necessary equipment and

personnel to function. For these reasons, the performance of these two countries in controlling the pandemic has been disastrous. The United States, mainly due to the efforts of state governments, which enjoy far greater technical and financial autonomy than their Brazilian counterparts, seems to have finally managed to reduce the contagion and death curves. The Brazilian case remains out of control, despite the efforts of state governments, which won control of local health decisions thanks to a decision by the Supreme Court. The federal government failed to act and the Ministry of Health has been neutralized, with the dismissal of two qualified ministers and the militarization of ministerial and departmental staff, on an interim basis, which has rendered it passive and directionless, unable to offer strategic coordination of the response to the pandemic or generate essential resources for state and municipal health services. Brazil has failed to test the population to accurately measure the spread of the contagion, the number of cases and the number of deaths resulting from COVID-19. The country is proceeding through the pandemic without a compass, without knowing exactly the scale of the problem it is facing. The failure of Brazilian governance during the pandemic also revealed absolute contempt by the federal government for science and for the country's excellent medical research system, which could have been a valuable asset in facing this challenge.

Conclusion

I consider these issues part of the transition into the 21st century, given the environmental and climatic limits as well as the new structural and technological possibilities it presents, which pose new dilemmas for collective action and global governance. Historical evidence suggests that humanity is able to take precautions for risks and traumas that have recent and very serious precedents, but fail to take precautions with unknown, unprecedented risks, even when they are predicted by science, regardless of the degree of potential danger involved. This is an important issue that requires detailed theoretical reflection, moral philosophy and more empirical, historical and contemporary research, because this is the type of risk that is being predicted with significant degrees of probability, for the coming decades, primarily driven by environmental or climate-related factors. Among the dangers identified by science, there are also

unpredictable, unprecedented and unknown ones (as SARS-COV-02 was, and, to a large extent, still is). Beyond these, there are those that are unpredictable and unknown, but about which we can estimate probabilities based on changes in the physical and human environment and collective behavior in producing, reacting to and adapting to these changes. These are questions at the frontiers of scientific knowledge, not only in the natural sciences, but also the social and behavioral sciences. The lack of studies exploring these new areas leaves humanity less equipped to deal with the transition that will unfold over the next century. The world will, inexorably, enter new patterns of technical organization, production, energy use and territorial occupation. Having timely knowledge at different moments of this transition, in all spheres of human knowledge, is an essential task for collective global well-being and for the future of democracy in the world

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