



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

DOTTORATO DI RICERCA IN

Beni Culturali e Ambientali

Ciclo 36°

Settore Concorsuale: 11/A5 – Scienze demoetnoantropologiche

Settore Scientifico Disciplinare: M-DEA/01 – Discipline demoetnoantropologiche

TITOLO TESI

The Financialization of Pandemic Risk

A Case Study of the World Bank's Pandemic Emergency Financing Facility during
the COVID-19 Pandemic

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Esame finale anno 2024

Abstract

The Financialization of Pandemic Risk: A Case Study of the World Bank's Pandemic Emergency Financing Facility during the COVID-19 Pandemic

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Based on rising international concern with pandemic prevention, preparedness, and response, this dissertation considers the financialization of pandemic risk and the relationships and knowledge which are generated in the process. By considering the case study of the World Bank's Pandemic Emergency Financing Facility (PEF) as it was used to address the COVID-19 pandemic response, I investigate the role of private financial capital in addressing infectious disease outbreaks in developing country contexts. Based on multi-sited ethnographic fieldwork through participant observation, interviews, and document analysis at the World Bank headquarters in Washington, D.C., USA; Dakar, Senegal; and community-based research in the Kédougou and Kolda regions of Senegal, this dissertation considers the ways in which different approaches to health may inform the future of innovative finance to generate holistic, preventive approaches to infectious disease outbreaks. While major global health and financial institutions emphasize the importance of using economic tools for pandemic prevention and response investments, this research examines the ways that economic knowledge is valued across the spectrum of actors involved in World Bank projects, i.e. the World Bank, investors, partner organizations, local governments, health care workers, and communities. Best practices at the World Bank headquarters differ across global practices as well as departments in terms of priority issues and analytical approach. In Senegal, the World Bank's operational practices for pandemic risk are impacted by government priorities, national and international policy, geography, and cultural realities. As a result, knowledge of pandemic risk is entangled with multispecies bodies and geopolitical histories as international development agencies seek to address pandemic risk in Senegalese bodies.

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Acknowledgements

I extend my deepest gratitude to my advisors, Dr. Marc Brightman, Dr. Vanessa Grotti, and Dr. Marlee Tichenor, whose support and insightful guidance propelled me through the challenging journey of doctoral research. Their expertise, patience, and encouragement were instrumental in shaping the direction of this thesis. Thank you to Professor Brightman for your incredible imagination in creating the Impact Hau research group. Thank you both to Dr. Brightman and Dr. Grotti for supporting the fluctuations in my fieldwork plans in the midst of the COVID-19 pandemic. Thank you to Professor Tichenor for our long conversations and your meticulous edits along the way - always giving me the most insightful feedback and building me up to reach higher potential.

I am indebted to the members of my doctoral committee Dr. Susan Erikson and Dr. Felix Stein for their valuable feedback and constructive criticism. Each member brought a unique perspective that enriched the depth and quality of this work.

Heartfelt thanks to my colleagues and fellow researchers at the University of Bologna on the Impact Hau research team, whose collaborative spirit fostered a stimulating academic environment. The exchange of ideas and intellectual discussions significantly influenced the development of this thesis.

Special appreciation goes to the dedicated staff at the Department of Cultural Heritage, whose administrative support and assistance were crucial in overcoming various challenges with fieldwork and writing my thesis in multiple different countries.

I would like to express my gratitude to my family for their unwavering love and encouragement. Their constant support provided the emotional strength needed to navigate the highs and lows of the doctoral journey. Thank you for supporting me at the

beginning of the COVID-19 pandemic as I was evacuated from my Peace Corps post in Senegal and suddenly found myself living in Madison, Wisconsin. To my mom, my sister, Ashley, Tim, Greg, Judy, Alex, Hadley and Hudson, (and more), thank you for all of the puzzles, the cuddles, and the laughs that we shared as I got ready to embark on this PhD journey. Thank you for the fresh cold brew that got me through that first interview at 4am. And thank you for the Peloton competitions and the protein smoothie recipes that kept me sane.

A sincere thank you to my friends, who provided a welcome distraction and moral support during times of stress. Their camaraderie made the pursuit of this PhD a more enjoyable and memorable experience. From my fieldwork in Washington, D.C., thank you to everyone to the Pacers running group, the RPCV Senegambia group and the countless trips to the farmers markets, picnics, hikes, and east-coast fall adventures. From Senegal, thank you especially to my friends Amber and Mady (and Célène) for your hospitality, friendship, and support during my fieldwork.

In Bologna, thank you to my rock Giacomo for supporting me throughout my fieldwork in Senegal, and challenging me to stay strong through the many twists and turns over the course of my project, and thanks for distracting me with epic trail races, climbing, cycling adventures, and not so lucky ski adventures. Thank you to my friends for dinners and laughs, to my second family in Bologna for welcoming me in with unwavering kindness. I am incredibly grateful for all of the support and love that have gotten me through!

Lastly, I acknowledge the financial support provided by the European Research Council Grant, which made it possible for me to focus on my research without undue financial strain.

Keywords

Economic anthropology; medical anthropology; global health; finance; development studies; social studies of finance; multispecies ethnography; COVID-19; One Health; Prevention, Preparedness, Response; World Bank Group.

Abbreviations and Acronyms

ASEAN	Association of South East Asian Nations
CARTA	Consortium for Advanced Research Training in Africa
Cat DDO	World Bank development policy loan with a deferred drawdown option for catastrophe risk
CDC	U.S. Centers for Disease Control and Prevention
CDRFTAP	Caribbean Disaster Risk Financing Technical Assistance Program
COVID-19	2019 novel coronavirus
FAO	Food and Agricultural Organization of the United Nations
FDA	U.S. Food and Drug Administration
FIF	Financial Intermediary Fund
FMCBG	Finance Ministers and Central Bank Governors
G7	Group of Seven (Canada, France, Germany, Italy, Japan, the United Kingdom, the United States, and the European Union)
G20	Group of 20 (Argentina, Australia, Brazil, Canada, China, Germany, France, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom and the United States, and the European Union)
GAFFSP	Global Agriculture and Food Security Program
GFDRR	Global Facility for Disaster Reduction and Recovery
GFF	Global Financing Facility
H1N1	influenza virus, also cause of the 2009 influenza pandemic
H5N1	a highly pathogenic avian influenza type
HLIP	High- Level Independent Panel
HNP	Health, Nutrition, and Population World Bank Global Practice
HSAP	Health Security Assessment Program
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IDRC	International Development Research Center (Canada)
IFC	International Financial Corporation
IFI	International Financial Institution
IHR	International Health Regulations
IMF	International Monetary Fund
MDB	Multilateral Development Bank
MERS	Middle East Respiratory Syndrome
OECD	Organization for Economic Co-Operation and Development

OH	One Health
OHCEA	One Health Central and Eastern Africa
OIE	World Organization for Animal Health (OIE kept its historical acronym from Office International de Epizooties, established in 1924)
PEF	Pandemic Emergency Financing Facility
PPR	Prevention, Preparedness, and Response
PVS	Performance of Veterinary Services assessment methodology
SACIDS	Southern African Centre for Infectious Disease Surveillance
SARS	Severe Acute Respiratory Syndrome
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SDGs	Sustainable Development Goals
TASW	Toward a Safer World initiative (on pandemic preparedness)
THRiVE	Training of Health Researchers into Vocational Excellence
UHC	Universal Health Coverage
UN	United Nations
UNICEF	United Nations Children’s Fund
UNSIC	United Nations System Influenza Coordination
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WBG	World Bank Group
WHO	World Health Organization
WMA	World Medical Association
WVA	World Veterinary Association

Chapter 1: Introduction

Over the last two centuries, biologists and public health officials have identified an increasing number of infectious diseases, posing significant concerns at various scales (Chala and Hamde, 2021). Since 1970, new infectious diseases have been discovered at an average rate of 1 every 8 months (Institute of Medicine (US) Forum on Microbial Threats, 2009). In the past two decades, 60% of emerging infectious human diseases had their source in animals (WHO, 2023c). Ongoing epidemics and pandemics, such as HIV/AIDS, malaria, and tuberculosis pose constant challenges for global health experts (Madhav et al., 2017a). Additionally, neglected tropical diseases such as schistosomiasis, rabies, and leprosy take millions of lives annually (Mitra and Mawson, 2017; WHO, 2024). More recently, there has been a significant increase in the emergence of infectious agents and the risk of new pandemics as exemplified by the spread of highly pathogenic H5N1 influenza since 2003, the pandemic H1N1 influenza in 2009, influenza H7N9 in 2013, Severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), Ebola, Chikungunya and Dengue, and most recently severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in 2020 (Morens and Fouchi, 2020; Burrell et al., 2016). The ongoing COVID-19 pandemic which began in January 2020 exemplifies the public health threat of infectious disease outbreaks at the human-animal-environmental interface (Schmiege et al., 2020). SARS-CoV-2 is the third recorded transition of an animal coronavirus to humans in the last two decades (Coronaviridae Study Group of the International Committee on Taxonomy of Viruses, 2020).

The emergence of the novel SARS-CoV-2 responsible for coronavirus disease 19 (COVID-19) forced policymakers, scientists, economists, and the public to become acutely aware of the potential threat of pandemics caused by the spreading of infectious diseases. The urgency of response to such an outbreak is clear from the rapid global spread of COVID-19 following the first reported case in Wuhan, Hubei Province, China to the World Health Organization (WHO) Country Office on 31 December 2019 (Contini et al, 2020, WHO, 2020a).

The uncontrollable global rise in COVID-19 cases and related deaths caused widespread lockdowns and restriction of movement besides essential activities (ILO, 2024). The resulting loss of economic productivity, skyrocketing unemployment rates, and stress on international health systems reveals the economic vulnerabilities caused by infectious disease pandemics, and demands attention from global health economists, intergovernmental bodies, and policymakers alike (OECD, 2020).

In recent years, international development banks have become more involved in shaping global health security strategies and interventions through public-private financial mechanisms. The Ebola outbreak (2014-2016) exposed multiple challenges in the global infectious disease response, especially the gap between countries' commitments for outbreak preparedness, detection, and response, as required under the 2005 International Health Regulations (Heymann et al., 2015; Moon et al., 2015). To address these gaps, the World Bank launched specialized pandemic bonds in late June 2017 aimed at providing financial support to the Pandemic Emergency Financing Facility (PEF), whose purpose is to channel surge funding to developing countries facing the risk of a pandemic outbreak (World Bank and WHO, 2017). The Steering

Body of PEF announced on April 20, 2020 its plans for the allocation of USD 195.84 million to 64 of the world's poorest countries with reported cases of COVID-19 giving particular attention to areas with the most vulnerable populations (World Bank, 2020a).

Briefly, I would like to offer an alternative title to this thesis by acknowledging the “double-duty” of this work. The initial title of the work, *The Financialization of Pandemic Risk: A Case Study of the World Bank's Pandemic Emergency Financing Facility during the COVID-19 Pandemic*, which focused explicitly on PEF. Upon further reflection and consulting with thesis reviewers, I propose an alternative title, *The Financialization of Pandemic Risk: Valuing Profit Over People*. The purpose for this change is to increase the cohesion of the piece and to acknowledge that during my fieldwork in Senegal, the impact of PEF payout was only a small part of the World Bank response in comparison to the wide range of other Bank efforts – a topic which is discussed in further detail later in this dissertation.

This dissertation discusses the World Bank's PEF in relation to the COVID-19 pandemic in order to consider normative positions on the more effective approach to addressing pandemic risk from multiple standpoints including World Bank officials, policy-makers, medical professionals, and community members on a global scale and in Senegal. Analysis will examine three overarching questions: What are the normative positions on its effectiveness and shortcomings of PEF at addressing pandemic risk in the context of the COVID-19 pandemic, and from the perspectives of World Bank officials, policy-makers, medical professionals, and community members in Washington, D.C. and in Senegal? What are the key context-specific institutional arrangements for pandemic preparedness, prevention, and response? How do these arrangements align

with or diverge from the design and implementation of PEF, and what lessons can be learned for enhancing its efficacy? How do the normative positions on pandemic risk governance, based on contextual factors, impact decision-making among stakeholders such as World Bank officials, policy-makers, public health professionals, and community members in the US and within Senegal? What are the implications of these diverse perspectives for shaping more inclusive, adaptive, and sustainable approaches to addressing pandemic risk at the policy level and within the community setting of Senegal?

These questions are asked in the context of contemporary neoliberal governance and capitalist structures which are increasingly experimenting with the use of “innovative finance” to address global health problems. By attending to global governance and global health security as well as using historical methodology, this study incorporates a literature review of the history of PEF, an analysis of pandemic risk finance, multi-sited ethnographic fieldwork through participant observation, interviews, and financial analysis at the World Bank headquarters in Washington, D.C., USA; Dakar, Senegal; and community-based research in the Kédougou and Kolda regions of Senegal.

This study considers the specific case study of the World Bank’s innovative financial technologies which provide relevant insight into pandemic risk reduction, prevention, and response. Research will consider the ways in which different approaches to health may inform the future of innovative finance for generating holistic, preventive approaches to infectious disease outbreaks.

While major global health and financial institutions stress the significance of employing economic strategies for pandemic prevention and response investments, this study delves into the valuation of economic knowledge across a spectrum of stakeholders engaged in World Bank initiatives. This includes various actors within the World Bank, investors, partner organizations, local governments, healthcare professionals, and communities. Notably, practices at the World Bank headquarters vary in alignment with global norms and departmental priorities, influencing the emphasis on specific issues and analytical approaches. In Senegal, the operational approaches of the Bank regarding pandemic risk are influenced by governmental agendas, national and international policies, geographic factors, and cultural contexts. Consequently, knowledge intertwines with multispecies bodies and geopolitical histories as international development agencies strive to address pandemic risk within the Senegalese context. The findings of this research endeavor will be organized into four chapters, each outlined below.

The first chapter considers PEF as an object which both emerges from past knowledge and generates knowledge futures for pandemic risk. It explores what knowledge PEF generates and by what means; what connections are generated as a result; and what knowledge is produced or reproduced and what knowledge is ignored or left out. Much of the current literature analyzes the impact of using private finance to generate solutions for climate change and global health (Calvet et al., 2022; Berg et al., 2021; Dietz et al., 2021; Chang et al., 2019). I will build on this literature in the first results chapter by analyzing the knowledge generated by the World Bank and its financial partners in creating and supporting PEF and by exploring the implications of

replicating the financial models employed to address catastrophic risk to predict pandemic catastrophe futures. Catastrophic risk models are increasingly being used to solve global crises with the use of private finance (OECD, 2021). Exploring the knowledge produced and reproduced by catastrophic models such as that of the World Bank's PEF provides the opportunity to consider the current state of humanitarian financing and the future trajectories for which we are on track as a global society.

The second results chapter explores the financialization of pandemic risk at the World Bank through the approach of PEF to address the COVID-19 pandemic. Having generated the first pandemic bond based on pandemic insurance, PEF is a unique example of pandemic risk finance as it combines a multitude of financial structures to become an intricate organism within the global health financial ecosystem. The chapter will consider how PEF embodies the economic transitions in international development towards the use of private finance which, if successful, aims to both generate solutions for pandemic risk while generating a profit for investors and financiers. Analysis will explore what financial solutions PEF generates and by what means; what relationships and tensions were generated as a result; how the financialization of pandemic risk through PEF provides insight into the ethical and economic incentives for pandemic risk management; what obligations it creates, and which it demolishes; what insight PEF provides about the future of global health finance more broadly, and who gets to decide.

I will build on literature that explores the impact of the financialization of global health (Erikson, 2015; Stein and Sridar, 2018a; Cordilha, 2022; Chatham House, 2022) by analyzing the role of PEF in the financialization of pandemic risk and the implications of using a variety of private financial mechanisms to predict pandemic futures. In doing

so, I will explore how the World Bank has influenced the ways that the “public” and the “private” are conceived in pandemic response. I will question the extent to which PEF embraced a selective approach to health interventions. Lastly, I will discuss the types of influences the World Bank exerted through the catastrophic bond infrastructure of PEF.

The third results chapter will build upon the previous chapters by examining the way in which financial approaches to pandemic risk, such as through PEF, may create privately funded projects which deprioritize effective pandemic prevention, preparedness, and response (PPR) approaches in relation to financial gain. I question the ways in which PEF’s focus on pandemic response ignores much needed projects to address PPR at the human-animal-environmental interface. The chapter will explore the distinction between human-centered approaches to health including Universal Health Coverage (UHC), strengthening health care systems, population-centered approaches to health (public health), and emerging human-animal-environment-centered approaches to health (One Health). The chapter will also consider these distinctions by exploring the nature of PPR and One Health efforts at the World Bank as well as the way that the World Bank’s focus on response efforts through PEF shape the organization’s approach to health. Finally, analysis will consider the nuances among different frameworks for health including public health, nationalized healthcare, and One Health. I will question how public, private, and One Health approaches fit into these frameworks based on the ways that interlocutors use these terms in conversation. What is the intended meaning of “a public health system” when referred to by various interlocutors? Do they mean nationalized health care or a broader approach to human population health?

Much of the current literature analyzes how the One Health approach can improve health security in the current landscape of prevention, surveillance, and response measures in outbreak situations of emerging and re-emerging zoonotic infectious diseases with epidemic potential (Ajuwon et al., 2021; Leifels et al., 2022; Kelly et al., 2020; Prata et al., 2022). I will build on this literature by analyzing the role of the World Bank in One Health and presenting an in-depth analysis of the implications of the pandemic response approach of PEF to generate solutions for pandemic risk futures. Exploring the divergent motivations by various stakeholders involved in PEF provides the opportunity to consider the current state of pandemic risk finance and its impact on pandemic PPR efforts.

The final results chapter will seek to contextualize pandemic risk finance through a case study on community perspectives of the impact of the COVID-19 pandemic response efforts in Senegal. The chapter will explore the realities of the pandemic in the capital city of Dakar as well as in rural areas in the southeastern regions of Kolda and Kédougou near the Guinean border through interviews with government officials, World Bank officials, health workers, and community members.

Much of the current literature analyzes the impact of government responses to the COVID-19 pandemic to understand access to essential medicines and vaccines in Senegal (Bouderhem, 2022; Ba et al., 2022; Saied, 2022). This research builds on this literature by taking a critical examination of the Senegalese government and the World Bank's responses to the COVID-19 pandemic, unraveling their implications on local communities. By scrutinizing these interventions, this study aims to provide insights that not only contribute to the existing literature but also elucidate the broader significance of

the World Bank's role in shaping effective country-level strategies for navigating pandemic risks in the future.

Chapter 2: Background

2.1 COVID-19 and Infectious Disease Management

The emergence of the novel coronavirus associated acute respiratory syndrome coronavirus 2 (SARS- CoV-2) responsible for coronavirus disease 19 (COVID-19) forced policymakers, scientists, economists, and the general public to become acutely aware of the potential threat of pandemics caused by infectious disease. The urgency of response to such an outbreak is clear from the rapid spread of COVID-19 globally following the first reported case in Wuhan, Hubei Province, China to the WHO Country Office on 31 December 2019 (Contini et al, 2020, WHO, 2020a).

Increasing numbers of infectious diseases have arisen throughout the last two centuries, posing challenges at varying scales (Baker et al., 2022). As all pandemic viruses that emerged during the last century had their origin in the animal world, and ongoing changes in the human-animal-environmental interface have led to an increase in major predisposing factors that allow the emergence of zoonotic viruses as novel human pathogens (Sikkema and Koopans, 2021). The COVID-19 pandemic crisis exemplified the shortcomings of pandemic preparedness at national and international levels (Timmis and Brüssow, 2020; Williams et al., 2023).

COVID-19 is the third recorded transition of an animal coronavirus to humans in two decades (Coronaviridae Study Group of the International Committee on Taxonomy of Viruses, 2020). There has been a significant increase in the emergence of infectious agents and the risk of new pandemics as exemplified by the spread of highly pathogenic H5N1 influenza since 2003, the pandemic H1N1 influenza in 2009, influenza H7N9 in

2013, SARS, MERS, Ebola, Chikungunya and Dengue, and now SARS-CoV-2 in 2020 (Morens and Fouci, 2020; Burrell et al., 2016).

As compared with other recent infectious disease outbreaks such as Ebola virus and H1N1, the COVID-19 pandemic uniquely impacted a majority of the global population (Stoop et al., 2021; Lorente et al., 2021). The contemporary global economy drastically increased the rate of transmission of influenza virus (Taubenberger and Morens, 2010). The 1918-1920 H1N1 influenza pandemic resulted in acute illness in 25%–30% of the world population, with over 50 million deaths, whereas COVID-19 has infected nearly 55 million to date, with 1.3 million deaths (Liang, 2021).

Research suggests that the COVID-19 pandemic exemplified the importance of public health interventions as a means to prevent diseases and support population health security (Heymann and Shindo, 2020). Studies have shown that public health interventions can aid in mortality prevention, generate population health benefits, and reduce the cost of health care (Mays and Smith, 2011a; Monneret et al., 2020; Masters et al., 2017a). However, the lack of funding for public health interventions is commonly cited as a reason for the relatively low investment in public health (Wise and Nutbeam, 2007).

The lockdown measures drastically impacted health services worldwide (Losurdo et al., 2020). A study conducted in Uganda concluded that maternal and reproductive health, child health, and patients with chronic conditions were unable to access health facilities to carry out their routine particularly due to the suspension of public transport (Musoke et al., 2023). One study modelling disruption in breastfeeding practices predicted the reduction in breastfeeding prevalence due to limitations in the provision

and use of health services and disruptions to the enabling environment (Busch-Hallen et al., 2020). Additional research on the impact of the COVID-19 pandemic on access to maternal and child health services in Mozambique demonstrated negative collateral effects of government restrictions (Henrique das Neves Martins Pires et al., 2021). Diets in Senegalese households because of the pandemic experienced negative changes in the number of meals (59.8%), the quantity of calories in meals (69.7%) and the quality of meals (75.7%) (Diouf et al., 2022).

2.2 The World Bank and Structural Adjustment Programs

Founded in 1944, the World Bank Group (WBG) took a primary role in the post-World War II reconstruction efforts (World Bank, 2024a). The Bank quickly became the world's largest development institution focusing on foreign aid and has worked in over 100 developing countries by offering loans, knowledge, and advice across various industries (Morris, 2023). The Bank holds a reputation in the media, as well as amongst academic researchers and development workers as a neoliberal institution due to its approach to financing development efforts (Keck and Sikkink, 2014).

The World Bank is regarded as a powerful actor in the sphere of global health finance and is thought to have a unique ability to leverage its lending power to determine country financing allocations (Sridhar and Batniji, 2008a). In order to do so, the World Bank leverages its historical ties with ministries of finance, provides technical support to countries as a knowledge expert, and collaborates with private financing institutions to generate financing mechanisms (Tichenor et al., 2021; Vujcic et al., 2012). Given the major role that private finance has on global health finance, monetary

power continues to be a strong driver in health policy (Krech et al., 2018; Clinton and Sridhar, 2017).

The significance of Janelle Winters' research on the Bank's initial health intervention targeting onchocerciasis, characterized by its multispecies approach, offers a critical lens through which to examine the World Bank's historical engagement in global health (Winters, 2020). Winters' work sheds light on early efforts of the Bank to address neglected tropical diseases, yet it also underscores the limitations and challenges inherent in top-down, technocratic approaches to health intervention. Similarly, Fernandes and Sridhar's (2017) exploration of the Bank's past involvement in nutrition initiatives and its promotion of public-private partnerships reveals underlying tensions between profit-driven motives and public health objectives within the Bank's agenda.

Winters' critique of World Bank financing in health, while lauded for its emphasis on health investment, also invites scrutiny regarding the Bank's prioritization of market-oriented solutions over more equitable and community-centered approaches to health development (Sridhar et al., 2017a). Furthermore, the conceptualization of Disability-Adjusted Life Years (DALYs) and the exploration of “trustfundification”, as elucidated by Winters, highlight the World Bank's role in shaping global health metrics and financing mechanisms (Winters, 2020). However, these methodologies have been subject to critique for their reductionist approach to complex health outcomes and their potential to exacerbate health inequities (Arnansen and Nord, 1999; Anand and Hanson, 1997).

Moreover, the Bank's transition towards a Human Capital Index, while ostensibly aimed at measuring development outcomes, raises concerns about the commodification

of human life and the instrumentalization of health for economic gains (Hunter and Shaffer, 2021). This shift reflects broader critiques of the World Bank's neoliberal agenda, which prioritizes market-based solutions while neglecting structural determinants of health and perpetuating inequalities.

Anthropologists suggest that the World Bank maintains decision-making and incentivization power over developing countries which has a major impact on the evolution of the Bank's projects (Tichenor et al., 2021). The Bank has also historically exerted voting power to maintain western influence over development projects while making it appear as though it is giving power to developing countries (Vestergaard and Wade, 2013). Stating that the Bank can monitor progress, economists consider the ways in which the financial monitoring capacities of the Bank enable, translate and regulate certain behaviors (Mosley et al., 1995; Mackay, 2010). Critics argue that the World Bank maintains the power to restructure the projects on the ground which promotes its continuing influence (Neu et al., 2006a). Moon's theory of economic power leverages material resources to affect another's actions (Moon, 2019a).

Today, the financial transactions made by the World Bank are intertwined in the international capital market, which introduces questions of value, risk, and power across multiple actors including the World Bank, development partners, clients, and stakeholders. The International Bank for Reconstruction and Development (IBRD) of the World Bank lends to governments of middle-income and "creditworthy" low-income countries and the International Development Association (IDA) provides financing on highly concessional terms to governments of the poorest countries (World Bank, 2024e). Trust funds are the most common modes of funding partnerships between

these entities, which are organized through Umbrella 2.0 Programs (World Bank, 2023d). Trust Funds generated by the World Bank involve a financing arrangement with contributions from one or more donors which may or may not include the World Bank itself (World Bank, 2023d).

Structural Adjustment Programs (SAPs) are some of the most widely critiqued examples of neoliberal power which were generated by the International Monetary Fund (IMF) and the World Bank in the 1970s. Through the SAPs, the World Bank provided loans to developing countries or those under crisis with the condition that recipient countries reform various macroeconomic and fiscal policies coherent to economic stabilization, trade and financial liberalization, deregulation, and privatization (Summers and Pritchett, 1993a; Thomson et al., 2017). The SAPs required client countries to implement major macroeconomic reforms aimed at privatization and economic liberalization (Dhonte and Kapur, 1997).

In order to prevent sovereign defaults by governments following the global oil crisis in 1982, the debt crisis in developing countries, the IMF and the World Bank issued loans and grants with strict conditionalities: privatization of state assets, tax reforms to attract foreign investment, public debt and deficit reduction and rapid trade liberalization (Labonté and Stuckler, 2016). Scholars argue that the movement toward the use of innovative financing mechanisms in global health calls to question whether the new market value truly aligns with improved health outcomes (Erikson, 2015). Researchers assert that the privatization of pandemic risk leads to the production of health policies based on two principles: the reduction of state intervention and public responsibility, and the promotion of diversity and competition through privatization (Laurell et al., 1996).

The SAPs loans have been a central means of spreading neoliberal thought and policy internationally, as they have required and given intellectual cachet to policies promoting private management and individual entrepreneurialism as the most efficient and effective means of governing (Harvey, 2005; Craig and Porter, 2006). Economists and sociologists alike have strongly criticized the SAPs for undermining social services and leading to increased poverty—especially through monetary reforms and major cuts in public employment (Sparr et al, 1994; Abouharb and Cingranelli, 2007; Stiglitz, 2002; Keck and Sikkink, 2014). But beyond economic policy, neoliberal capitalism has promoted the extension of economic, business, and market rationalities into ever broader realms, including management of the self—where supposedly rational individuals are made responsible for managing their own health and well-being rather than being able to benefit from systems of social promotion and solidarity (Weigartz, 2010; Rose and Miller, 1992; Foucault, 2004[1978-9]).

In the 1980s, SAPs fostered neoliberal principles including stabilization, liberalization, deregulation, and privatization within the market. One study suggests that SAPs in effect reduce access to quality and affordable healthcare and negatively impact social determinants of health including income and food availability (Thompson et al., 2017). After receiving criticism for this approach, the World Bank and the IMF incorporated development policy lending (DPL) into SAPs to support sustainable reductions in poverty (World Bank, 2024c). More recently, SAPs are no longer a part of the World Bank official policy, being replaced by Poverty Reduction Strategy Papers (PRSPs) which member countries of the World Bank and IMF prepare describing the

country's macroeconomic, structural and social policies and programs over a three year or more period to promote broad-based growth and reduce poverty (IMF, 2016).

Between 2012-2013, trust funds made up approximately 50% of the World Bank's total funding for health and social services (Winters and Sridhar, 2017). While trust funds for health provide increased flexibility for health projects and investment in innovative financing mechanisms, this approach risks the potential for misalignment and decreased transparency.

Major critiques of SAPs include government spending cuts resulting from the adjustment programs typically exacerbated existing inequalities and leave the poor at a disproportionate economic loss; adjustment lending puts too much focus on short-term domestic and external macroeconomic growth alongside recession and increased import competition resulting in devaluation of domestic economies; and adjustment loans perpetuate the use of misguided policies by failing to hold governments accountable for conducting policy reform (Corbo and Fischer, 1995; Summers and Pritchett, 1993b, 388). Critiques from Summers and Pritchett (1993c, 388) go as far to say that the *"policies and governments would have been better in the long run if the crisis would have been allowed to run its course"*. While this argument acknowledges the inefficiencies of the adjustment programs for long term policy reforms, it is possible that in the case of a severe climate crisis it may leave a country unable to recover in the global economy alone.

An important lens on the effects of SAPs in Senegal is Fatoumata Seck's interpretation of Alphonse Mendy's character called Goorgoorlou, which is a comic depicting neoliberalism in postcolonial Senegal (Seck, 2017). The comic describes the

character Goorgoorlou, who lost his job after the first SAP was implemented in Senegal in 1984 (Robert, 2002). Goorgoorlou subsequently turned to the informal economy to make a living (Seck, 2017). In Wolof, the word *goorgoorlou* means learning how to become a man. The comic was later made into a television show in which in each of the episodes Goorgoolou manages to find enough informal work to give his wife money at the end of the day to household shopping and remains joyful despite the daily challenges that emerge. In one notable episode, Goorgoolou is informed that the CFA franc will be devalued by the international community, and he takes a shovel while telling his wife that *“We’ve already had the structural adjustments and the austerity program. Now it’s devaluation time. I might as well bury myself alive”* (Warner, 2022). The Goorgoorlou comic represents a political and social movement against international financial power which has created an all too familiar financial struggle amongst informal workers.

While there is widespread debate regarding SAPs, research suggests there are some successes of the programs. For instance, countries which have had at least two SA loans or three sectoral adjustment loans between 1986 and 1990 experienced more rapid economic growth, higher export and saving shares, and lower fiscal deficits in the late 1980s in comparison to other countries and their previous performance (Summers and Pritchett, 1993d). However, it is necessary to consider that these data may be misleading in certain cases.

Since countries typically apply for SA loans in response to a crisis, it can be reasonably expected that a given country will experience some form of economic growth as it recovers from a crisis with or without SA loans. Investors in SAPs typically

did not largely benefit from any returns (Summers and Pritchett, 1993e). In 1999, developing countries spent USD 13 on debt repayment for every USD 1 it received in grants (Shah, 2007).

Health officials globally employ a variety of data metrics to set public health priorities, one of the most well-known of which are Disability-Adjusted Life Years (DALYs) which represent the sum of the years of life lost to due to premature mortality (YLLs) and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population (Bokaie et al., 2023). DALYs are used by the European Centre for Disease Prevention and Control (ECDC) and the Burden of Communicable Diseases in Europe (BCoDE)-project to generate evidence-based policies for burden of disease (BoD) estimates in European Member States (MS) (Cassini et al., 2018; Mangen et al., 2013; Plass et al., 2013; McDonald et al., 2020).

A major prerequisite of DALY calculations is 'true' incidence data but since data are often obtained from (inter)national-level routine surveillance datasets that are frequently incomplete, data must be adjusted before serving as input for computing disease burden (Gibbons et al., 2014). However, many diseases are underreported due to under-ascertainment, misdiagnosis, inadequate public health and disease surveillance infrastructure, or failure to comply with disease reporting requirements (Meadows et al., 2022).

The term global health governance began to be used in the 1990's in reference to rising impacts of globalization on the determinants of health (Lee and Kamradt-Scott, 2014). While global health governance remains a high interest topic for theoretical analysis and empirical review, conclusions vary as to the objective and definition of the

term. The United Nations Commission on Global Governance defines governance as “the sum of the many ways individuals and institutions, public and private, manage their common affairs (Weiss, 2000, 795-814). It is a continuing process through which conflicting or diverse interests may be accommodated and cooperative action may be taken. It includes formal institutions and regimes empowered to enforce compliance, as well as informal arrangements that people and institutions either have agreed to or perceive to be in their interest” (Weiss, 2000, 795-796). The WHO Commission on the Social Determinants of Health holds that protecting health required “tackling the inequitable distribution of power, money and resources” (Marmot et al., 2008).

The World Bank’s approach to global health finance is based on the practice of “good governance” and is involved in assisting developing countries build these incentives and develop such capacity. In the 1992 World Bank report entitled “Governance and Development”, the World Bank defines good governance as “the manner in which power is exercised in the management of a country’s economic and social resources for development” (vii) (IMF, 2017). As a major actor in the provision of public goods, the World Bank utilizes the term “good governance” to assess a government’s ability to provide “systems of accountability, adequate and reliable information, and efficiency in resource management and the delivery of public services” (Gupta and Panzardi, 1992).

In order to do so, the Bank assesses a country’s score based on four areas of governance that are consistent with the Bank's mandate: public sector management, accountability, the legal framework for development, and information and transparency. In the document, the World Bank claims that “the programs and projects it helps finance

may be technically sound but fail to deliver anticipated results for reasons connected to the quality of government action” (World Bank, 1992).

Since the 1940s, the World Bank has undergone multiple shifts in its primary goals and approach to infectious disease management. When the World Bank began operations in 1946 to finance European reconstruction after World War II, it had almost no involvement in global health or international development as it would have been known at the time (Ruger, 2005). By contrast, today the HNP sector of the Bank is the world’s largest financial contributor to health-related projects (Ng and Ruger, 2011). The adaptability of the smallpox eradication program began with mass vaccination campaigns and ended with case containment and control based on community response. By contrast, the global malaria eradication program focused primarily on vector control mechanisms including DDT (Closser et al., 2022).

2.3 Disaster Risk Finance at the World Bank

Disaster risk is defined as “the potential loss of life, injury, or destroyed or damaged assets that could occur to a system, a society, or a community in a specific period of time. The loss is determined probabilistically as a function of hazard, expectation, vulnerability, and capacity” (UNDRR, 2009).

Without the presence of adequate funds in the case of a disaster, financial decision makers face trade-offs in allocating limited resources with competing recovery priorities among government ministries (OECD, 2015). I note that the scarcity of funds is relative to LMICs since the World Bank advocates minimally for tax increases and improvements. Governments also face the potential for halted development efforts when forced to reallocate funds away from development priorities to disaster

management efforts, which can lead countries to become increasingly reliant on foreign assistance (IMF, 2019).

According to World Bank strategies, there are three stages in which a government requires funds in the aftermath of a disaster, namely (1) Relief, (2) Response, and (3) Recovery. The relief activities are those needed immediately between a few hours to a few days after the disaster occurs and require the least amount of funds. Examples of relief efforts include money for first aid rescue, food, water, and shelter. Response funds are needed right after the relief stage, which include temporary shelters, clearing debris, and resuming public services such as schools. The reconstruction phase is the longest and may last between months or years after a disaster and requires the most amount of funds. Examples of reconstruction efforts include the rebuilding of infrastructure and buildings in a more resilient manner without creating new risk (Cubas et al., 2020). In the example of the DRF Pacific Catastrophic Risk insurance (2012), the mechanism brings parametric catastrophe risk insurance to the global reinsurance market as a single portfolio, and each country selects their own coverage/premium level. The insurance is triggered in the event of a qualifying catastrophic natural disaster to generate a quick injection of cash to be used as deemed necessary.

The WBG maintains the necessity to develop mechanisms for risk layering because no single financial instrument is suitable to respond to every disaster (Cummins and Mahul 2009). The Bank suggests that governments combine a variety of instruments to protect against events of differing frequency and severity (Holliday et al., 2021). In this way, ideally the cheaper sources of money will be used first and the most

expensive instruments used only in exceptional circumstances. The Bank recommends governments to set up dedicated contingency funds to retain the lowest layer of risk (Holliday et al., 2021).

The World Bank defines catastrophe bonds as “an insurance-linked security in which payment of interest or principal or both is suspended or cancelled in the event of a specified catastrophe such as an earthquake” (World Bank, 2024b). Since the first catastrophe (cat) bonds were issued in 1977, they have become increasingly important as risk transfer mechanisms in capital markets. The catastrophe bonds revolutionized the insurance market by offering insurers access to broader financial markets while also providing institutional investors, such as hedge funds, pension funds, and mutual funds, the option to obtain a high return on investment which was uniquely uncorrelated with the returns of other financial market instruments (Polacek, 2018). Prior to a trigger event or maturity of the bond, investors are compensated for bearing the natural disaster risk through regular coupons that consist of a floating interest rate in addition to the cat bond spread (Braun, 2016).

Cat bonds are an instrument that allows natural disaster risk to be traded as a commodity in the stock market (Drobetz et al., 2020). Cat bonds are issued through a special purpose vehicle (SPV) which holds the principal paid by investors in the form of highly rated collateral (Braun et al., 2013). The sponsoring company of the cat bond generates a reinsurance contract, also known as a cat swap, with the SPV. In the event that a catastrophic event occurs which meets the trigger requirements, the cat swap is reimbursed with the proceeds of the collateral while investors lose all or a portion of their principal depending on the parameters of the event. To determine whether a

payment under the embedded reinsurance contract is due, cat bond structures can feature a variety of different trigger mechanisms (OECD, 2024). Despite the potential benefits, the cat bond market is dominated by money managers and specialized investment funds. In the case of pandemics, the market value is further complicated, which raises questions regarding the institutional demand for cat bonds (Braun et al., 2013).

International development actors including the WBG took an active role in generating new protocol, investments, and financial instruments focused on improving the efficiency and effectiveness of emergency responses to infectious disease outbreaks. Besides PEF which uses parametric insurance and cash windows, the World Bank developed additional mechanisms for pandemic risk in West Africa including a Contingent Emergency Response Component (CERC) which seeks to provide rapid financing through existing projects financed by the Bank and the Catastrophe Deferred Drawdown Option (Cat DDO) which provides access to a contingency fund through IDA. While finance initiatives for strengthening preventative mechanisms have lagged behind those for emergency response, the World Bank also generated a regional disease surveillance and response program in West Africa: World Bank Regional Disease Surveillance Systems Enhancement (REDISSE) Program (World Bank, 2016c).

2.4 The Pandemic Emergency Financing Facility

This section of the background chapter provides background on the conceptual and operational dimensions of PEF, serving as the foundation for understanding its role in addressing the unprecedented challenges posed by the COVID-19 pandemic. In the summer of 2017, the World Bank launched specialized bonds aimed at providing

financial support to PEF, to channel surge funding to developing countries at risk for a pandemic outbreak (World Bank and WHO, 2017). PEF was generated under the notion that “pandemics pose a threat not only to global health security, but also to economic security and to our ability to end extreme poverty and achieve the Sustainable Development Goals” (Hansen, 2016a).

The primary objectives of PEF were to: “(i) make available essential surge financing to key responders, including, inter alia, governments, multilateral agencies and civil society organizations, to respond to an outbreak with pandemic potential and to minimize its health and economic consequences;...(ii) help catalyze the creation of a global market for pandemic insurance instruments by drawing on resources from insurance, bonds and/or other private sector financial instruments” (World Bank, 2019b).

PEF was established following approval of the Executive Directors of the World Bank on May 3, 2016 as a Trust Fund in the form of a financial intermediary fund (FIF) administered by the IBRD and its trustee. An official PEF document outlining the proposed financing from IDA acknowledges that “funds made available quickly in this timeframe are essential to preventing a severe outbreak from becoming a pandemic” (World Bank, 2017). PEF also aimed to “help encourage and strengthen ongoing efforts toward better country preparedness to help build strong and resilient health systems and accelerate the achievement of universal health coverage” (World Bank, 2017). PEF is a part of the WBG’s Global Crisis Management Platform which brings together a range of crisis support instruments to IDA-eligible countries including the IDA Crisis Response Window (CRW), Contingency Emergency Response Components (CERCs)

and the Catastrophe Deferred Drawdown Option (Cat DDO) operations (World Bank, 2018b).

The bonds for the mechanism were issued under the IBRD's Global Debt Issuance Facility, under the Capital at Risk Notes supplement which was created in 2014 in part to transfer catastrophic risk to the capital markets (World Bank, 2021c). Countries which qualified for credits from IDA 17 were eligible to access PEF funds without entering into a formal agreement with PEF management. PEF monies were also available to international organizations and NGOs supporting pandemic response efforts once they became accredited as PEF responding agencies (World Bank, 2018b).

PEF is composed of two parts: an "insurance window" and a "cash window". This study focuses primarily on the insurance window which is also referred to as the "pandemic bond" throughout the text. The cash window is used to provide financial assistance for diseases not covered in the insurance window and is able to be used before the insurance window is triggered (Zhu, 2020). There are two types of bonds in the insurance window – Class A (USD 225 million) and Class B (USD 95 million) leading to a total value of USD 320 million (World Bank, 2020e).

The pandemic bonds provided high interest rates and premiums, making them particularly enticing for investors. The bond coupons provided interest rates of 6.5% for Class A and 11.1% for Class B. USD 72.5 million were paid as premiums to investors from the USD 320 million total (Zhu, 2020).

The diseases covered under PEF Insurance Window in the case of high-severity events include (i) Flu (New or novel influenza A virus, or an influenza A virus whose

haemagglutinin gene is antigenically distinct, due to an antigenic shift, from other influenza A viruses), (ii) Coronavirus (virus belonging to the phylogenetic family Coronaviridae), (iii) Filovirus (virus belonging to phylogenetic family Filoviridae), (iv) Lassa Fever virus, (v) Rift Valley Fever virus, and (vi) Crimean Congo Hemorrhagic Fever virus (including Ebola) (World Bank and WHO, 2017). Only IDA Eligible Countries are offered PEF coverage with the reason being that “while every country in the world is susceptible to such disease outbreaks, low-income countries with relatively weaker health systems tend to be more vulnerable and less capable of mobilizing the financial resources to effectively respond to large-scale outbreaks” (World Bank, 2019b).

The insurance window activation criteria determine the activation of payments of pandemic bond/insurance payout amount to the Treasury Manager under the pandemic bond. The pandemic bond/insurance coverage uses pre-agreed parametric triggers to determine when the activation criteria thresholds are triggered “based on the epidemiological characteristics of the diseases and the associated outbreaks.” In the case of flu viruses, three triggers must be met: (a) “there must be at least 5,000 confirmed cases (counted from all countries worldwide) within a 42-day window” with the virus meeting particular conditions”, (b) There must be a positive growth rate after the first 42 days, and (c) “When (a) and (b) are met, the influenza pandemic is confirmed and 100% of the maximum US\$275 million coverage is released” (World Bank, 2018b).

Despite its intentions, PEF has faced criticism for its design and implementation. Critics argue that the facility's triggers and criteria are overly complex and restrictive, hindering timely and effective response efforts. For example, the loss cap for the Class

A bond was 16.7%, which results in a total de facto maximum payout of USD 195.8 million for the pandemic bonds (Zhu, 2020). Additionally, the reliance on financial market instruments, such as catastrophe bonds, introduces volatility and uncertainty into the funding mechanism, potentially exacerbating the challenges faced by affected countries.

Furthermore, PEF's eligibility criteria and disbursement mechanisms have been questioned for their adequacy in meeting the needs of the most vulnerable countries (Zhu, 2020; Zheng and Mamon, 2023; Xu et al., 2023). The facility's focus on providing financial assistance to wealthy countries through insurance mechanisms has been criticized for neglecting the needs of low-income countries with limited resources to combat pandemics. This inequitable distribution of funds underscores broader issues of global health governance and the prioritization of financial interests over public health outcomes. In synthesizing these aspects, it becomes apparent that PEF's design and operationalization reflect broader systemic challenges within global health financing and pandemic preparedness. The facility's emphasis on financialization and market-based solutions highlights the tension between profit motives and public health imperatives. Moreover, the complex interplay between epidemiological indicators, financial triggers, and eligibility criteria underscores the need for a more and equitable approach to pandemic response.

Drawing on insights from scholars like Sarah Hughes-McLure (2022), who advocate for a critical examination of global health governance structures, including financial mechanisms like PEF, further highlights the importance of addressing underlying power dynamics and structural inequalities. By interrogating the underlying

assumptions and priorities driving initiatives like PEF, it becomes possible to envision alternative models of pandemic preparedness and response that prioritize equity, solidarity, and collective well-being.

The pre-agreed parametric triggers, particularly in the context of influenza viruses such as that for the COVID-19 pandemic, delineate the conditions under which PEF would be activated to release funds. PEF criteria, ranging from the number of confirmed cases worldwide within a specified timeframe to the unique genetic characteristics and sustained human-to-human transmission of the virus, underscore the specificity and stringency of the activation process.

In order to generate surge funding, the pandemic bonds are based on contingent credit, which seeks to provide governments with immediate access to funds following disaster events and enables a more rapid and efficient response. Contingent credit lines are ex-ante instruments which allow “borrowers to prepare for a natural disaster by securing access to financing before a disaster strikes” (Cubas et al., 2020). The maximum total payout from PEF to IDA eligible countries for any of the specified infectious disease outbreaks is USD 195.84 million, which is minimal in comparison to the funds required to address pandemic catastrophe and amounts to 12 US cents per capita in IDA eligible countries (IMF, 2021; Westfall, 2020).

Despite this, the bonds received overwhelming support from investors who oversubscribed by 200%, which allowed the World Bank to price the transaction far below the market price (Eggleton and Gürses, 2023). The sitting president of the WBG Jim Yong Kim spoke with hopefulness and excitement about PEF saying that

“pandemics pose some of the biggest threats in the world to people’s lives and to economies, and for the first time we will have a system that can move funding and teams of experts to the sites of outbreaks before they spin out of control”. The facility held the slogan “Protecting people, protecting economies” from the risk of six viruses that the WHO deemed as most likely to cause a pandemic.

Jim Yong Kim's advocacy for the World Bank's PEF reflected a commitment to innovative financing mechanisms to address global health challenges. Despite facing internal skepticism and opposition within the World Bank, Kim championed the establishment of PEF as a proactive response to the growing threat of pandemics (Erikson, 2020). His push for PEF highlighted a shift towards market-based solutions and private sector involvement in pandemic preparedness and response efforts.

Susan Erikson's forthcoming book on PEF provides valuable insights into Kim's role in the development and implementation of the facility. Erikson's analysis sheds light on the internal dynamics and debates surrounding PEF, including Kim's leadership style and decision-making process which offers a nuanced understanding of the political, economic, and institutional factors shaping PEF's trajectory (Erikson, 2020).

Kim's advocacy for PEF can be situated within the broader context of his tenure as President of the World Bank, during which he emphasized the importance of leveraging financial innovation and private sector partnerships to achieve development goals. His background as a physician and public health expert informed his approach to global health financing, emphasizing the need for novel approaches to address complex challenges like pandemics.

While Kim's efforts to establish PEF were driven by a desire to enhance pandemic preparedness and response capabilities, his approach faced criticism. Skeptics within the World Bank raised concerns about the feasibility and effectiveness of PEF, highlighting potential pitfalls such as moral hazard and the prioritization of financial interests over public health outcomes (Erikson, 2025). In analyzing Kim's advocacy for PEF, it becomes evident that his leadership style and vision for global health governance played a significant role in shaping the facility's design and implementation (Erikson, 2025).

2.5 Understanding PEF Trigger Requirements

The trigger requirements for pay-outs in the case of a coronavirus outbreak include specific death parameters. Firstly, there must be a set number of deaths in at least two IBRD/IDA eligible countries for regular pay-ins and in at least eight countries for higher pay-ins from the bonds. There is a confirmation ratio determined by each eligible event, which is calculated by the Reporting Window End Date, “ d ”, with respect to an Eligible Event Period Day, “ t ” and the Covered Area, meaning the ratio that is calculated and determined based on the following formula:

Equation 1: Confirmation ratio formula used to calculate the payouts in the case of a triggering epidemic or pandemic event for the Pandemic Emergency Financing Facility (Zheng and Mamon, 2023)

$$CR_{\tau} = \frac{RCC_{\tau}}{\min(RTC_{\tau}, 750)}$$

The pay-in amount for each eligible pandemic would be divided amongst all countries which are eligible, and which applied for the funds, including a maximum of the 76 IDA countries designated with this status from pre-designated World Bank standards. One significant challenge of this payout calculation method is that low- and

middle-income countries have the lowest capacity to detect and report pandemic cases and deaths. Nonetheless, the World Bank maintains the authoritative power to use this analysis for their pandemic financing commitments.

All requests for PEF allocations are initiated through a Request for Funds Application. The full documents are provided in the annex.

Table B.1: Excerpt from PEF Cash Window Application Form of the Request for Funds Application for the Request for Funds Application (World Bank, 2018b)

Outbreak size (as of submission date)	Number of laboratory-confirmed cases: _____
	Number of clinically suspected cases: _____
	Number of confirmed deaths (if any): _____
Record of laboratory-confirmed and clinically suspected weekly case numbers for a minimum of 4 weeks prior to the date of application (attach and specify a link (url) to publicly-available source of this information):	
Evidence for human-to-human transmission, if available (attach and if relevant specify link(s) (url) to source(s) of this information):	

Table B.2: Excerpt from PEF Insurance Window Application Form of the Request for Funds Application for the Request for Funds Application (World Bank, 2018b)

3. Details of the disease outbreak		
Filovirus:	Ebola ___	Marburg ___ Other (specify): ___
Coronavirus:	MERS ___	SARS ___ Other (specify): ___
Lassa Fever ___	Rift Valley Fever ___	Crimean Congo Hemorrhagic Fever ___
Outbreak start date:		
Outbreak size (as of submission date)	Number of laboratory-confirmed cases: _____	
	Number of confirmed deaths: _____	
Outbreak growth (please attach or provide link(s) (url) to record of daily/weekly cases):		

Various application types exist based on whether the application was filled out by an IDA country itself or if it was prepared or endorsed by the WHO. In each case, the application requires a detailed list of information including the relevant infectious

disease outbreak, including the name of the virus family; outbreak start date; outbreak size (number of cases); outbreak growth (record of weekly cases); and number of deaths, if any (World Bank, 2018b). In the event of a pandemic outbreak, one must recall the discussion in the previous chapter of the problem of obtaining reliable data both on the national and international levels as well as the various incentives for either over or under-reporting deaths and cases (Beck et al., 2009; Berman et al., 2010; Jamison et al., 2006). As a result, the detailed field requirements of the request for funds applications poses an additional challenge to low- and middle-income countries eligible for PEF payout. These challenges complicate the ability of a national government and the WHO alike. The additional step to sufficiently fill out the application forms for PEF funding poses a challenge for PEF to pay out to eligible countries in a timely manner.

The maximum payout for the pandemic bonds amounts to US\$196 million, which would amount only to 12 US cents per capita in IDA countries (Westfall, 2020). The actual outputs to each recipient of PEF funds during the COVID-19 pandemic are indicated in the table below:

Table B.3: PEF Allocations Table (World Bank, 2021d)

Country	PEF Funds (US\$)	Fund Recipient
Afghanistan	8,869,070.67	UNICEF; WHO
Bangladesh	14,872,047.79	UNFPA; WFP
Benin	1,000,000.00	Government
Bhutan	1,000,000.00	Government
Bolivia*	1,500,000.00	UNICEF; WFP; WHO
Burkina Faso	4,715,073.93	UNICEF
Burundi	1,632,612.21	UNICEF
Cabo Verde	1,000,000.00	Government
Cambodia	1,213,332.35	Government

Cameroon	7,392,057.22	UNFPA; UNICEF; WFP; WHO
Central African Republic	1,000,000.00	IFRC
Chad	2,322,283.54	UNFPA; UNICEF
Congo, Dem Rep of	13,181,549.40	UNFPA; UNICEF; WHO
Congo, Rep of	1,286,905.17	UNFPA; UNICEF; WHO
Cote d'Ivoire	2,818,731.45	IFRC; WHO
Djibouti	1,000,000.00	Government
Dominica	1,000,000.00	WHO
Ethiopia	7,236,953.41	UNICEF
Fiji	1,000,000.00	Government
Gambia, The	1,000,000.00	Government
Ghana	3,287,552.45	FAO; IFRC; UNFPA; UNICEF; WFP; WHO
Grenada	1,000,000.00	Government
Guinea	1,700,796.38	WHO
Guinea-Bissau	1,000,000.00	Government
Guyana	1,000,000.00	WHO
Haiti	1,775,022.46	UNICEF
Honduras	1,264,937.69	WHO
Kenya	3,720,494.41	Government
Kosovo	2,231,507.98	Government
Kyrgyz Republic	1,000,000.00	UNICEF
Lao	1,000,000.00	UNICEF; WHO
Liberia	1,000,000.00	UNICEF; WHO
Madagascar	1,861,843.59	Government
Malawi	1,200,913.39	UNICEF
Maldives	1,000,000.00	Government
Mali	3,566,451.53	Government
Mauritania	1,000,000.00	WHO
Moldova	3,666,157.78	Government
Mongolia	1,000,000.00	Government
Mozambique	1,965,017.90	UNFPA; UNICEF; WHO
Myanmar	8,068,249.01	Government
Nepal	1,877,536.40	UNICEF
Nicaragua	1,000,000.00	UNICEF
Niger	5,347,241.39	UNICEF; WHO
Nigeria	15,000,000.00	Government
Pakistan	15,000,000.00	UNICEF
Papua New Guinea	1,252,504.28	Government
Rwanda	1,000,000.00	Government

Sao Tome and Principe	1,000,000.00	Government
Senegal	1,564,968.47	UNICEF; WHO
Sierra Leone	1,000,000.00	UNICEF
Somalia	3,076,207.76	UNICEF; WHO
South Sudan	1,581,306.85	WHO
Sri Lanka*	1,809,695.98	Government
St. Vincent and the Grenadines	1,000,000.00	WHO
Tanzania	3,986,804.71	Government
Timor-Leste	1,000,000.00	Government
Togo	1,000,000.00	WHO
Uganda	2,845,574.63	Government
Uzbekistan	4,294,607.48	Government
Vietnam*	6,549,215.23	Government
Yemen	4,075,242.12	WHO
Zambia	1,217,199.54	UNICEF
64	195,827,666.55	

**As indicated in PEF Framework, a PEF-eligible country is any IDA member country that is an IDA eligible country which must be under the IDA seventeenth replenishment (IDA17) and/or at the time of submission of a request for funds. While Bolivia, Sri Lanka and Vietnam are no longer IDA countries under the updated IDA eligibility requirements they were IDA countries under IDA17, therefore they remain PEF-eligible countries.*

The payout of the pandemic bonds for the COVID-19 pandemic as of February 2021 approached the maximum payout of US\$196 million. Yet, since each of the eligible countries received funding, the resulting amount was very small. Notably, the four countries which received a disproportionately high allotment include Bangladesh (7.15%), Congo (6.73%), Nigeria (7.66%), and Pakistan (7.66%). They each received an average of 7% of the overall funding which collectively amounts to nearly 30% of the total payout (World Bank, 2021d). There is no expressed explanation for these particularly high allocations.

2.6 Reactions to PEF by International Development Actors

Development leaders and investors involved in the creation of the pandemic bonds including Joachim Wenning, Chairman of the Board of Management of Munich

Re-one of the primary investors in the bond, raved about the potential of PEF to “strengthen the resilience of companies and societies alike” and to use “close collaboration between the public sector and insurers [to] help limit the negative effects of catastrophes in developing countries”. However, as this facility came to a close, critics argued that the bond was too expensive and ineffective, in part due to its lack of focus on preventative measures. A recent study suggests that coordinated net pandemic prevention costs range from \$18 to \$27 billion per year as opposed to the immense potential cost of a pandemic, such as the estimated \$5 trillion in GDP in 2020 due to COVID-19 (Dobson et al., 2020). Others suggested that the pandemic bonds served private sector interests over global health security (Brim and Wenham, 2019) and largely put investor risk ahead of addressing preventative measures for the health risks that it claimed to address (Stein and Sridhar, 2017).

In order to support PEF to address the COVID-19 pandemic, the World Bank delivered USD 204 billion in financial support to public and private sector clients in the first two years of the crisis (CY20-21), of which USD 135 billion is from IBRD/IDA, USD 60 billion from IFC and USD 9 billion from MIGA (World Bank, 2023e). In spring 2020, the World Bank generated the COVID-19 Fast-Track Facility with USD 1.9 billion and assisting 25 countries (World Bank, 2020f). In October 2020, USD 12 billion was approved for developing countries to finance the purchase and distribution of COVID-19 vaccines, tests, and treatments followed by additional vaccine financing to USD 20 billion the following summer (World Bank, 2020d).

2.7 One Health

Various attempts to institutionalize international development approaches to global health alongside climate change have taken form in recent years. The concept of One Health is one such example, which has been most recently defined by the One Health Commission as “a collaborative, multisectoral, and trans-disciplinary approach - working at local, regional, national, and global levels - to achieve optimal health and well-being outcomes recognizing the interconnections between people, animals, plants and their shared environment” (One Health Commission, 2021). The United Nations first attempted to institutionalize One Health through the protection of human and animal rights in 1978 which emphasized primary care and community and foregrounded health as a right, based on the state development of basic infrastructure and goods (Mackenzie and Jeggo, 2019). Nonetheless, critics of the One Health movement point to its maintained and disproportionate focus on human health, and its representation of nature as a “reservoir of pathogens”, which reinforces the extractionist and siloed approaches which separate attention to human health from that of the planet (Antoine-Moussiaux et al., 2019; Kamenschchikova et al., 2019; David et al., 2021).

One notable critique of the One Health approach is the potential for power imbalances and unequal representation among stakeholders involved in One Health initiatives. Van Woerden (2023) highlights how power dynamics, both within and between institutions, can influence decision-making processes and resource allocation within One Health frameworks. There is also concern that specific approaches such as the One Health approach may prioritize biomedical and technological solutions over addressing underlying social, economic, and political determinants of health (Waltner-

Toews et al., 2008, 109). This critique underscores the importance of adopting a holistic and inclusive approach that acknowledges the social, cultural, and economic contexts in which health issues arise. Additionally, there is a need for greater transparency and accountability in One Health governance structures to ensure that the voices of marginalized communities and vulnerable populations are heard and their interests safeguarded.

Today, One Health is being increasingly incorporated into the action plans of numerous major international organizations including the World Medical Association (WMA), the World Veterinary Association (WVA), the WHO, the Food and Agricultural Organization of the United Nations (FAO), the World Organization for Animal Health (OIE), the U.S. Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA), and U.S. Department of Agriculture (USDA), Chatham House and the Interaction Council.

The “Manhattan Principles” developed during the 2004 Wildlife Conservation Society emphasized the need to recognize the link between humans and animals (domestic and wild) regarding disease threats, food security, and economic growth (WCS, 2005). The American Medical Association later passed the “One Health” resolution in 2006 to increase communication and collaboration between the veterinary and medical community, and the AVMA subsequently established a One Health task force (Gibbs, 2014). In 2008, One Health was articulated in the inter-agency document entitled ‘One World, One Health: A Strategic framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface’, which was jointly composed by the Food and Agricultural Organization (FAO), the WHO, the World Organization of

Animal Health (OIE), which has recently been renamed as the World Organization for Animal Health (WOAH), the United Nations Children's Fund (UNICEF), the UN System Influenza Coordination (UNSIC) and the World Bank (FAO et al., 2008).

The WBG recognized and published documentary evidence in 2010 supporting benefits of the One Health approach in disease prevention, public health and global health security. In 2018, the World Bank published a new Operational Framework for Strengthening Human, Animal and Environmental Public Health Systems at their Interface (“One Health Operational Framework”) aimed at supporting countries in optimizing their One Health efforts and outcomes. The Framework sets out goals for the World Bank to develop starting points for One Health and communicating it as a key priority for the organization (IBRD, 2018).

The tragedy of the commons, as conceptualized by Garrett Hardin, describes a situation where individuals, acting in their own self-interest, deplete or degrade a shared resource (Hardin, 1968). Hardin argues that because the benefits of exploiting the resource accrue to individuals, while the costs are shared among all users, there is a tendency for overuse or exploitation, ultimately leading to the collapse of the resource. The term "tragedy" reflects the idea that despite each individual's rational pursuit of their own interests, the collective outcome is detrimental to all.

Elinor Ostrom's 'Governing the Commons: The Evolution of Institutions for Collective Action' is a groundbreaking exploration of how communities around the world effectively manage shared resources (Ostrom, 1990). Ostrom's work challenges Hardin's concept of the 'tragedy of the commons,' demonstrating through empirical evidence and case studies that common-pool resources can be sustainably governed

by local communities (Ostrom, 1990, 8). By identifying key design principles and advocating for polycentric governance, Ostrom offers valuable insights into the complexities of resource management and the importance of context-specific institutional arrangements. Her research has profound implications for natural resource management policies and has sparked debates on the role of collective action in achieving sustainability. Moreover, Ostrom's principles resonate strongly with the One Health approach, which recognizes the interconnectedness of human, animal, and environmental health. By emphasizing the importance of local communities in managing resources sustainably, Ostrom's work aligns closely with the holistic and collaborative principles of One Health, highlighting the need for interdisciplinary and community-based approaches to address complex health and environmental challenges.

2.8 Major COVID-19 Response Activities and Partners in Senegal

Senegal is the westernmost country in West Africa which borders Mauritania in the North, Mali in the East, Guinea and Guinea Bissau in the South. Senegal is a flat land with sandy grounds with an altitude lower than 130 meters except in the southeast, near the Guinean border in the region of Kédougou where part of my fieldwork was located. Senegal has a population of 17 million people, 25% of whom live in the Dakar region which geographically encompasses approximately 0.3% of the state. Extreme poverty is concentrated in the southeastern parts of the country with four regions (Tambacounda, Kaffrine, Kolda, Kédougou, and Sedhiou) where it exceeds 15 percent (World Bank, 2024a). Senegal consistent 6% growth in GDP between 2014 and 2018 was followed by a 4.4% growth in 2019 (Ndiaye, 2023). This reduction in economic growth aligned with the February 2019 presidential elections. In response to economic

losses during the COVID-19 pandemic, the Senegalese government implemented a series of fiscal policies of over USD 2 billion (West Africa CFA 1,000 billion) to boost the overall economy (Ndiaye, 2021). The Central Bank of West African States also introduced major monetary policies to lower inflation, increase cash flow, and reduce interest rates (Ndiaye, 2021). More recently, political tensions, inflation, and delays in hydrocarbon production have significantly slowed economic growth to 3.7% in 2023 (World Bank, 2024f).

The Senegalese national health policy adopted in 1989 recognizes the universal right to health to be implemented by the Ministry of Health (Paul et al., 2020). The Government of Senegal is currently committed to achieving universal health coverage (UHC) as a primary goal for improve health outcomes throughout the country. The health agenda of the Senegalese president Macky Sall focuses primarily on extending financial access to healthcare through the Universal Health Insurance Policy (referred to as Couverture maladie universelle – CMU). However less than half of the population was covered through social protection schemes by mid 2019 (Wood, 2023; Agence de la Couverture Maladie Universelle, 2021).

Senegal was the second country in Sub-Saharan Africa to register the first case of COVID-19. Between 3 January 2020 and 29 April 2022, there have been 85,994 confirmed cases of COVID-19 and 1,967 related deaths in Senegal. A total of 2,469,499 vaccines had been administered in the country as of 26 April 2022 (Diarra et al., 2022; Johns Hopkins, 2023).

Senegal is an ideal case study for reviewing PEF because represents a very common way that the Bank allocated money for PEF. The objective of the World Bank

partnership with the Senegalese government for the COVID-19 response efforts focused on strengthening disease surveillance systems, capacity to rapidly detect and respond to the pandemic through diagnostic supply procurement, personal protective equipment (PPE), and essential laboratory and health facility equipment. The WBG was also involved in the establishment of an epidemiological treatment center to provide care to COVID-19 patients.

Senegal faces multiple challenges in addressing the pandemic, including periodic waves of cases, overwhelmed the health system, insufficient hospital capacity, unpredictable global vaccine supplies, and vaccine hesitancy. In response, the WBG provided additional financing to the Senegalese government response operations in June 2021. This additional funding targeted acquisition of equipment, supplies, and access to COVID-19 vaccines throughout the country.

While the World Bank status report of the COVID-19 pandemic in Senegal published in August 2021 does not mention PEF specifically, the article outlines the other mechanisms that were used for the COVID-19 response efforts in the country. IDA provided USD 154 million total to the World Bank's Senegal COVID-19 Response Project. The World Bank provided support for essential health and nutrition services through the Global Financing Facility (GFF). REDISSE and the COVID-19 Response Plan were important contributors to the Institut Pasteur, a WHO-accredited COVID-19 testing center in Senegal where training sessions were held for Senegalese staff from 30 laboratories in Africa, showing that Senegal was a primary hub for West Africa in the COVID-19 response.

The World Bank's Senegal COVID-19 Response Project was implemented in close coordination with Agence Française de Développement (French Development Agency), Enabel (the Belgium Development Agency), the Clinton Health Access Initiative, the European Union Emergency Trust Fund for Africa, the Japan International Cooperation Agency, the Korean International Cooperation Agency, the Luxembourg Agency for Development Cooperation, PATH (a global health organization), the United Nations Children's Fund (UNICEF), the United Nations Population Fund, the United States Agency for International Development (USAID), the United States Centers for Disease Control and Prevention (CDC), and the WHO.

The infectious disease management mechanisms developed by the World Bank in West Africa include a Contingent Emergency Response Component (CERC) which seeks to provide rapid financing through existing projects financed by the Bank; the Catastrophe Deferred Drawdown Option (Cat DDO) which provides access to a contingency fund through the IDA; and PEF which uses parametric insurance and cash windows. Other major actors in West Africa include the WHO, African Union (AU), the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) which generated alternative rapid response instruments. These include WHO Contingency Fund for Emergencies (CFE); Africa Risk Capacity (ARC), an insurance-based financing scheme; and a modified Central Emergency Response Fund (CERF) for health emergencies for the respective organizations. While finance initiatives for strengthening preventative mechanisms have lagged behind those for emergency response, the World Bank also generated a regional disease surveillance and response program in West

Africa: World Bank Regional Disease Surveillance Systems Enhancement (REDISSE) Program.

2.9 Conclusion

This background chapter lays the groundwork for the anthropological exploration of the World Bank's PEF within the intricate context of the COVID-19 pandemic in developing countries. The interplay of the World Bank's SAPs, the concept of One Health, and the major COVID-19 response activities in Senegal collectively informs the understanding of the multifaceted challenges posed by the global health crisis.

Chapter 3: Literature Review

3.1 Introduction

In recent years, “innovative finance” has increasingly been used as a means to address diverse problems in global development including climate change, economic development, and health. In a 2018 report, the World Bank defined innovative finance as ‘a set of financial solutions and mechanisms that create scalable and effective ways of channeling both private money from the global financial markets and public resources towards solving pressing global problems’ (Elmer et al., 2018). While global health is a major field of study in anthropology, global health finance has only recently become a focus in the field. Current research typically takes a siloed approach to studying global health finance. Some examples include the impact of the financial market on global health outcomes and the meaning of value in global health (Riles 2011; Zaloom 2006; Povinelli 2011; Dumit 2012; Maurer 2005; Rajan 2003; Erikson, 2015). Erikson (2015) explores the emergence of new forms of exclusion in global health finance and argues that market value does not always link up with improved health outcomes.

The literature review will explore the following questions: What is the relationship between finance and pandemics? What is the meaning of financialization in the context of pandemic risk management? What are the nuances among different frameworks for health between human-centered approaches to health including Universal Health Coverage (UHC), health care systems strengthening, population-centered approaches to health (public health), versus more than human approaches to health including emerging human-animal-environment-centered approaches (One Health)? This chapter will begin by discussing the anthropology of zoonotic disease and pandemics followed

by a discussion of the anthropology of data, and the anthropology of finance, debt and risk in order to provide an overview of the various approaches to this study. I will then combine these studies to consider theories of the financialization of pandemic risk with particular focus on the World Bank approach to health and development. I will seek to ground the theories by making references throughout the literature review to relevant literature from Senegal.

3.2 Pandemic Risk

In recent years, particularly since the emergence of the global HIV/AIDS epidemic, anthropologists have focused their attention on animal-to-human infections (Keck and Lynteris 2018). Anthropological interest in zoonosis mirrors the paradigm shift in biological spheres toward fear for the risk of “emerging infectious disease” through which diseases from non-human animal spill-over into the human species causes widespread destruction (King 2004; Quammen 2020).

Anthropological studies of zoonotic diseases have taken multiple forms such as through the engagement with epistemological frameworks of zoonosis and disease emergence as these are developed in scientific communities or analyzing the existential risk of zoonosis as it is used to generate or direct global health policy (Kelly et al. 2019). The anthropology of pandemics seeks to understand the social impact of the processes and events leading to infectious disease outbreaks. The term ‘pandemic’ – which came into use in the 19th century to refer to diseases spreading across the globe – is relatively new given that infectious diseases have plagued humankind for centuries (Piret and Boivin, 2020). Anthropological studies of infectious disease outbreaks have revealed dynamic realities of pandemic risk which span across economic, social,

geopolitical, and biological landscapes. Disease outbreaks have been a common thread in human history, accompanying imperial expansion, and aiding policies for segregation, resettlement, quarantine, and population surveillance (Arnold, 1993; Hoppe, 2018).

Indigenous groups have been negatively impacted by disease outbreaks that accompanied this imperial expansion (Lynteris, 2016; Poleykett, 2018; Vaughan, 1991). In recent years, ethnographic studies of traditional healing through local practices have challenged the efficacy of Western medicine (Anderson, 2006; Feierman and Janzen, 1992; Tilley, 2011). Lévy-Bruhl's writing in *Primitive Mentality* (1923) asserts that the success of infectious disease interventions is dependent on the local conceptions of the disease. However, this perspective has been widely critiqued in contemporary anthropology and global health.

Contemporary scholarship emphasizes the diversity and complexity of local understandings of disease, highlighting the importance of cultural context, social relations, and historical factors (Kleinman et al., 1978). Rather than viewing non-Western conceptions of disease as inferior or primitive, there is recognition of their validity and relevance within specific cultural frameworks.

Research underscores the dynamic interactions between local and biomedical understandings of disease. Many communities engage in "medical pluralism," where traditional and biomedical practices coexist (Bodeker et al., 2005). This phenomenon reflects the nuanced ways individuals navigate healthcare options based on factors such as accessibility, affordability, and cultural preferences.

Interdisciplinary collaboration has become integral to understanding local conceptions of disease, involving anthropologists, public health experts, medical

professionals, and community members. This approach facilitates a holistic understanding of health beliefs and practices and informs the development of culturally sensitive interventions (Gupta et al., 2017).

There are many difficulties that anthropologists face in studying infectious disease outbreaks. Anthropologists begin their studies as outsiders of a community, which creates a temporal frame for careful research that is at odds with the temporal frame of a disease outbreak itself, depending on the means and speed by which it spreads. Epidemiologists argue that the urgency of infectious disease outbreaks – and especially with those of high risk with epidemic and pandemic potential – requires immediate action by health experts (Rosenburg, 1992; McCloskey et al., 2014). The social realities of containment measures in developing countries are a common topic of study for anthropologists. Some examples include the inefficient response of the international community to the Ebola epidemic in West Africa, uptake of emergency public health interventions by indigenous communities, and traditional medical practices (Farmer 2020; Hewlett and Hewlett 2008; Leroy et al., 2009; Nichter and Nichter 1996; Janzen 2011).

Recent epidemic and pandemic events such as the 2009 H1N1 influenza virus, Zika virus, and Ebola virus to name a few have exposed confusion about the definition of the word “pandemic” and how to recognize pandemics when they occur (Morens et al., 2009). Any assumption that the term pandemic had an agreed-upon meaning was quickly undermined by debates and discussions about the term in the popular media and in scientific publications. Arguments on the definition of pandemics ranged from a focus simply on explosive transmissibility while others assert the importance of the

severity of infection (Girard et al., 2010; Altman, 2009). One must also consider the scientific advancements in understanding viral, genetic, and immune factors while noting the added complication of evolving lifestyles and underlying diseases in modern societies which impact the severity and transmission of potential outbreaks (Short et al. 2018).

The contrast of western and indigenous practices in medicine propagates a duality of labels associated with traditional medicine. Modern global health security and preparedness programs have retained colonial approaches to medicine from 20th century tropical medicine and more recently to development programs from the 20th and 21st centuries (Lakoff, 2010; Leach and Scoones 2013; Pigg 2013; Yeh et al., 2016). Studies of the social realities of such interventions suggest that international containment strategies can result in discrimination, stigma, and panic (He et al., 2020; Brower and Chalk, 2003; Lindenbaum 2001; Herdt, 2009). The HIV/AIDS epidemic expanded anthropological studies on epidemics to incorporate larger intricacies of history and politics in health. Studies revealed the impact of structural inequalities, international biopolitics, and political activism on access to therapeutics (Farmer, 2004; Fassin, 2007; Lock and Nguyen, 2018; Robins, 2006). Others have analyzed the way in which fear led to social exclusion and discrimination (Briggs, 2005; Parker et al., 2003; Schoepf, 2001).

The eradication of smallpox laid the foundation for the frameworks of biosecurity and human-centered approaches to containment, since samples of the disease were then held in labs at high security and became protected as 'military' objects (Rose, 2008; Lakoff and Collier, 2008, 89-120). The HIV/AIDS pandemic also increased

concern for biosecurity, eliciting a culture of fear and panic in association with infectious disease outbreaks (Andiman, 2018; Collier et al., 2006). The United Nations Security Council declared the HIV/AIDS epidemic a threat to international security in Africa in 2000 as a means to generate international attention to the crisis and prepare international health systems (McInnes and Rushton et al., 2010). Mirroring François Ewald's alternative theorization of risk as a 'neologism of insurance', later anthropologists argue that the HIV/AIDS epidemic mirrors similar risk categories of 'security risks' to improve the health rather than wealth of the target population (Elbe, 2008). The subsequent 9/11 terrorist attacks in New York City introduced a new era of geopolitical concern and increased government intervention in biosecurity issues. In this way, the threat posed by epidemics increased governmental power across all forms of life and manner of living (Caduff, 2014).

Wilkinson et al. (2017) argue that public health institutions should reorient their conceptualization of 'community' to incorporate the cultural context as well as complex networks of social and political relationships. Rather than understanding the cultural context from which COVID-19 emerged in Wuhan, China, much of the existing research focuses on the dissociation of the disease "outside of culture" (Manderson and Levine, 2020). However, community reactions and "success" of containment strategies such as quarantine, lockdown measures, border controls, and hygiene practices are largely dependent on access to infrastructure and resources (Wu et al. 2021). Structural violence and vulnerability in the global south shaped COVID-19 containment efforts, and particular obstacles to controlling disease included co-sleeping in small quarters, poor ventilation, lack of sanitation, and lack of access to hygiene supplies (Farmer

2004; Vahedi et al. 2023). Furthermore, poor infrastructure in refugee camps and large distances in between rural villages posed larger societal barriers to controlling disease at a community level pointing to structural violence and vulnerabilities (Manderson and Levine, 2020).

Scholars suggest that the perceived trustworthiness of information sources including the government and international bodies, is a significant determining factor for the level of perceived risk and control over an outbreak (Smith, 2006). Echenberg (2003) discusses the Bubonic Plague and the politics of public health in colonial Senegal. In his analysis, Echenberg notes the ways in which inequality in social, economic, and political processes were exasperated by the plague as European lives and livelihoods were prioritized over those of the Senegalese. Kalala Ngalamulume analyzed the impact of cholera epidemics, smallpox, and yellow fever on the dimensions of inequality in Saint-Louis, Senegal (Ngalamulume, 2021, 260). Ngalamulume concluded the majority of victims of the epidemics were the working class and urban poor residents who did not have access to fresh water. The structural inequality linked to the infectious disease outbreaks in post-colonial spaces creates a system of distrust between communities and policymakers for disease containment measures.

Recent ontological shifts in the anthropology of zoonosis have challenged and expanded traditional understandings in evolutionary biology which focus solely on the unilateral movement of pathogens within bounded ecosystems of humans, animals, and microbes. For example, Lainé (2018) studied the 'reverse' zoonotic transmission of tuberculosis from humans to elephants in Southeast Asia during the rise of ecological

tourism. The transmission of MERS-CoV between camels and humans in the Arab Peninsula as a result of international camel racing (Cabalion et al. 2018), expanded understandings of zoonosis towards a web of multispecies entanglement on the international level.

Prior to the COVID-19 pandemic, recent zoonotic outbreaks such as MERS, SARS, and Ebola as well as cinematic depictions of contamination of human bodies from a range of animal diseases brought zoonotic threat into public eye (Ostherr 2005). Lakoff's (2017) *Unprepared* builds on this literature by arguing that the increased attention to potential (global) zoonotic pandemics was also a political project. As more intellectual attention was given to zoonotic diseases, more global governance structures were generated to control them. As a result, there was increased public perception of zoonotic diseases as a global existential threat, leading to increased political importance of preparedness.

Anthropologists argue that certain human lives are protected and helped to flourish while others, both human and animal, are forgotten if not sacrificed (Agamben, 1998). More-than-human care ethics comes from research by Puig de la Bellacasa (2017). Puig de la Bellacasa argues that “an ethical reorganization of human–nonhuman relations is vital, but what this means in terms of caring obligations that could enact nonexploitative forms of togetherness cannot be imagined once for all” (Puig de la Bellacasa, 2017, 24). Research suggests that more-than-human approaches to health may involve anti-colonial humility, confronting debts owed to lab animal frontline workers, and rethinking economic systems (Lunstrum et al., 2021).

Along with the rise of interest in multispecies ethnography in relation to infectious disease came increased collaboration amongst anthropologists, social scientists, veterinarians, ecologists, and epidemiologists, to better understand the interactions which lead to pathogenic spread (Braun, 2008; Haraway 2008; Kirksey and Helmreich, 2010). Along with this movement came the term 'One Health'. One Health is a collaborative, multisectoral, and transdisciplinary approach to achieving optimal health outcomes by recognizing the interconnection between people, animals, plants, and their shared environment (CDC, 2022). The term references "a shrinking world, compressed in terms of time and space" where a disease outbreak is felt on a local and global level almost instantaneously (Craddock and Hinchliffe, 2015, 2). One example of this is Porter's *Viral Economies* (2019), which considers bird flu in Vietnam, describes markets as the "meeting grounds for people, poultry, and pathogens" (Porter, 2019, 10).

Anthropologists argue that public health experts primarily adopt human-centered approaches to disease management such as investing in vaccines, while agricultural experts tend to focus on wider environmental risks (Destoumieux-Garzón et al., 2018). Others incorporate the theory of time into the study of outbreak control by arguing that vaccine management as a preparedness indicator occurs further ahead in time than the agricultural perspective considering the root of the risk such as with land use and food systems (DeSerpa, 1971; Pertwee et al., 2022). One Health advocates argue that investments to improve animal productivity and markets have been shown to enhance nutrition and incomes (Enahoro et al., 2019; Ndumu et al., 2018).

One theory that provides us with a helpful lens on One Health is Kate Raworth's "Doughnut Economics". Raworth proposes this economic framework as a means to

ensure that all humans have access to essential life needs without encroaching on the Earth's systems on which all life depends. The theory which is represented in the shape of a doughnut calls for humans to live more sustainably by assuring that everyone's needs are met without consuming beyond the Earth's limits. Raworth discussed her theory at the World Economic Forum as a guiding means to address the post-COVID-19 future (Charlton, 2020; Raworth, 2017a)

The environmental ceiling depicted in the model is composed of nine planetary boundaries set out by Rockström et al. (2009). The theory guiding the doughnut maintains that those living in the hole of the doughnut (those below the poverty line) do not have access to the essential basic needs of life which is an unsustainable way of living. Those outside the outer ring (those living with extreme wealth and high consumption) live in an unsustainable way outside of the Earth's ecological boundaries. The doughnut shape in-between the inner and outer circle is the ideal balance where each living species maintains a sufficient social foundation while living within the Earth's resources.

Supporters of the concept of Doughnut Economics suggest Raworth (2017b) emphasizes the interconnectedness of economic, social, and environmental factors, advocating for a more inclusive approach to economic analysis. Critics argue that the concept is oversimplified and overly general. For example, Drees et al. (2021) critique Raworth's framework for oversimplifying complex economic dynamics and failing to account for the diverse realities of different regions and societies. Furthermore, fully addressing the social and environmental limits outlines in Doughnut Economics may

require a deeper engagement with human-nature interlinkages (Wahlund and Hansen, 2022).

While anthropological literature has considered many aspects of the concept of risk, there are many gaps which need to be addressed. There's a need for greater collaboration between anthropology and other disciplines such as sociology, psychology, economics, and public health to provide comprehensive analyses of risk phenomena. This thesis will take an interdisciplinary approach between social sciences, public health, and economics to provide insight into the wider dimensions of pandemic risk management. Furthermore, much of the anthropological literature on risk has centered on Western and industrialized societies. There's a need for more research that explores risk perceptions, experiences, and responses in non-Western and marginalized communities. By considering pandemic risk across the spectrum from the World Bank to communities in Senegal, this thesis seeks to bring attention to cultural variations in risk perception and local knowledge systems.

This section has outlined multiple approaches to pandemic risk management by various scholars. The goal of this outline was to provide a foundational framework of discussions on pandemic risk. The following section will briefly explore the anthropology of data to understand the relationships which are created in modern development spheres which are increasingly using data to generate solutions to global problems.

3.3 Anthropology of Data

The relationship between knowledge and values is central to understanding the dynamics of risk, finance, insurance, and data. Knowledge production, often grounded in scientific, economic, or technological frameworks, serves as a cornerstone for

identifying, assessing, and managing risks inherent in financial transactions, insurance contracts, and data-driven processes (Beck, 1992, 136). The construction and dissemination of knowledge are also intertwined with underlying values, including cultural norms, societal beliefs, and political ideologies (Douglas and Wildavsky, 1982). These values shape the perception and prioritization of risks, influencing which hazards are deemed worthy of attention and resources, and which are marginalized or ignored (Klinke and Renn, 2002). The social study of risk, finance, insurance, and data thus demands an exploration of the intricate interplay between knowledge production, values, and power dynamics within society.

The study of data has grown in recent years as public and private sector actors have increasingly sought to unlock the potential of 'big' data to solve the world's modern problems. Anthropologists have been cautious about using data as an object of study though scholars argue that it is "ethnography specific" and "theoretically ambitious" (Douglas-Jones et al., 2021). For the purposes of this study, the anthropology of data is important in contextualizing the use of data by the World Bank to generate solutions to address pandemic risk.

The World Bank has positioned itself as the "Knowledge Bank" in the international community in which it seeks to be a leader in development expertise and knowledge transfers in the international development space (Kramarz and Momani, 2013). Generating knowledge on pandemic risk requires the transformation of data points into a tangible object which exists in both time and space (Cubides et al., 2022). Rather than modeling every individual transaction, raindrop, or hospital visit, metadata models are typically generated through empirical data and behavioral trends which fill in

the gaps of available data, inherently leaving space for error and parametric uncertainty (Edwards 2010, 342). Some suggest that the neglect of social and political features may be amplified in health data collecting instruments which privilege universalized templates and result in inadequate assessments of the impact of individual societal histories on public health responses (Mahajan, 2019).

Data from extreme weather events are sometimes used as concrete examples to inform regional forecast models. However, the original sensor data from daily forecast cycles is not always stored, and forecasters typically work only with “processed data” - that which has already been analyzed (Edwards, 2010, 236). The manipulation of processed data by forecasters creates a collage generated by assembling, appropriating, superimposing, juxtaposing, and blurring of information for forecasting operations (Daipha, 2015).

Data visualization has become a primary aspect of understanding public health (Park et al., 2021; Ola and Sedig, 2016; Abernethy and Carroll, 2016). An aesthetic approach to data may assist in approaching the emerging social phenomenon of data visualization. Here, the word aesthetics is understood a ‘persuasiveness of form’ in any cultural or social context (Walford, 2020, 226). Furthermore, data and datafication can shape organizational life—specifically, the aesthetic, emotional, and discursive aspects of our everyday encounters with it (Saifer and Dacin, 2021).

In some contexts, data collectors may engage in data fabrication ranging from active to passive acts, to subvert, resist and readdress tensions stemming from employment inequalities and challenging socio-economic conditions (Kingori and Gerrets, 2016). Scholars suggest that data is always produced rather than simply given

(Gitelman, 2013, 4). Approaches to data collection by field scientists may be shaped by the dynamic interaction between the researcher's position at the frontline of face-to-face interactions with participants alongside their own personal ethical values and motivations (Kingori, 2013). Nonetheless, Biruk suggests that data inconsistencies are not necessarily the result of deliberate alterations. She questions the colonial assumption that fieldworkers are merely "instrumental and interchangeable" with any other data collector. This representation can cast fieldworkers as unreliable and mistake prone, leading to "dirty data". Rather, she argues that the "innovative, ad hoc, and important body of expertise they develop as they live from project to project...makes research work" (Biruk, 2018, p. 28).

Hoeyer (2023) used the term intensified data sourcing to describe the range of people wanting more data and higher quality, yet disagreeing on how the data should be used. While intensified data collection enables more accurate diagnoses and facilitates medical research, it also raises concerns about privacy, security, ownership, and control of health data. Furthermore, the statistics transform human behavior and reinforce existing relations of power (Erikson, 2012). The collection, management, and dissemination of health data, particularly in the context of global health governance and surveillance generates dynamic power relations. Health data can be used to exert control over populations, reinforce inequalities, and undermine individual privacy rights (Erikson, 2015).

Peacock et al.'s exploration of the anthropology of surveillance discusses the pervasive nature of surveillance practices. The concept of audit culture, as discussed by the authors, underscores the systematic monitoring and evaluation of individuals,

institutions, and processes, often driven by bureaucratic imperatives and managerial logics (Strathern, 2000, 93). Within this framework, surveillance operates as a mechanism of social control, shaping behavior, and decision-making through the threat of scrutiny and accountability (Lyon, 2001, 18). Peacock et al. (2023) highlight the multifaceted dimensions of surveillance, illustrating how it extends beyond traditional notions of state surveillance to encompass various forms of self-surveillance, peer surveillance, and participatory surveillance facilitated by digital technologies. Through an anthropological lens, the authors interrogate the power dynamics inherent in surveillance practices, emphasizing the ways in which it intersects with issues of privacy, consent, and social justice.

Health data instruments commonly access country-level mortality and morbidity rate data and use them to analyze global health determinants (Chaundhry et al., 2020; Wunsch and Gourbin, 2018). Life expectancy is the most commonly used parameter to analyze global health data in order to make sense of short- and long-term development improvements around the world (Mathers and Loncar, 2006). One must note the potential implications of this – the focus on the quantity of life years disregards the quality of life lived.

Measures of health are often generated through burden of disease estimates (Lopez and Mathers, 2013). Data scientists exploit these limited data sources to draw conclusions regarding global health outcomes (Li et al., 2021). Data companies such as IHME or Google take various approaches to working within the global health data ecosystem. For example, global health consultants like ICF may receive funding from

the Gates Foundation, WHO, USAID etc. to collect data that will be held by the donors rather than the “impacted” or “client” countries (Gimbel et al., 2018; Dash et al., 2019).

Understanding and predicting pandemic outbreaks is a dynamic challenge involving multiple social determinants beyond public health including gender, age, education, income, food security, housing, and the environment to name a few. Since pandemic outbreaks are, by definition, international problems, they require the presence of global data. Generating knowledge on pandemic risk therefore requires the transformation of data points into a tangible object which exists in both time and space (Cubides et al., 2022). Generating an accurate picture of global health data can be complicated, particularly when relying exclusively on the availability of historical data. The first challenge to doing so is to make sense of the variety of data collection and reporting methods. A primary challenge to sensitizing international health data is the generation of metadata in the midst of widespread variability across countries in the extent, content, and validity of existing administrative data (Fabreau et al., 2023). According to the World Meteorological Organization (WMO), metadata is the descriptive data necessary to allow us to find, process and use data, information and products (WMO, 2023). This process inevitably results in metadata friction, which is the difficulty of determining when, how, and to what extent the sources revised their accounting standards and recording practices (Edwards, 2010).

The proceeding step is to coordinate the metadata from different points in time and space by generating a data model. Computer models must be employed to fill in the gaps of missing data and to manipulate the existing data into tangible knowledge. International organizations including the Partnership in Statistics for development in the

21st Century (PARIS21), the Organization for Economic Cooperation and Development (OECD), the WHO, and the World Bank have recognized the need to close this gap by improving global statistics (Chan et al., 2010; OECD, 2022; Vries et al. 2004). Through these methods, the determination of catastrophic futures depends on the existence of catastrophic data models. In the context of developing an economic model, one can employ the data input from all individual transactions in each society, but it is not realistic to simulate every single transaction. Along a similar vein, it is unreasonable to generate a catastrophic model by simulating individual raindrops for climate disasters or individual hospital visits for disease outbreaks. Rather than modeling every individual transaction, raindrop, or hospital visit, metadata models are typically generated through empirical data and behavioral trends which fill in the gaps of available data, inherently leaving space for error and parametric uncertainty (Edwards 2010). Catastrophic data knowledge is dependent on the existence of historical data points, which cannot exist without a constant awareness of its own past, present and future.

Reliable infectious disease surveillance and notification systems are imperative for monitoring public health outcomes and disease outbreaks. These systems provide the foundation for the evidence-based decision-making processes by public health officials and financing agencies, help to generate public health policies and priorities for infectious disease prevention and management, and inform intervention plans of action and healthcare services (Keramarou and Evans, 2012; Undurraga et al., 2013).

Tracking health data metrics is of particular importance in global health and development. Cultural, social, and political factors influence the construction and interpretation of health data. The interconnection among economy, sovereignty, and the

politics of knowledge drives the use of metrics in global health (Adams, 2016, 2). In some cases, metrics used to measure health outcomes may prioritize certain diseases or conditions over others, leading to skewed perceptions of health priorities and resource allocation. Erikson expands on this topic by arguing that the proliferation of metrics in global health reflects broader neoliberal market logics and governance strategies (Erikson, 2019). These metrics, often promoted by international organizations and donors, prioritize quantifiable indicators of health outcomes, such as mortality rates or disease prevalence, over qualitative aspects of health and well-being. Erikson argues that this emphasis on metrics serves to commodify health, turning it into a measurable and tradable commodity.

In an analysis of the Guatemalan genocide, Nelson explores the complexities surrounding the counting of victims and the implications of this process for post-genocide society. In her work, Nelson interweaves concepts of counting, territory, money, and resources to explore the demand of the Maya to live “beyond adequacy” without always carrying the burden (Nelson, 2015, 227). Research on post-abortion care (PAC) in Senegal suggests that restrictive legal and social policies surrounding health care services limits access to services such as safe and legal abortion (Suh, 2021, 144). Barriers to services including stigma, legal restrictions, and inadequate healthcare infrastructure, disproportionately affect marginalized women and contribute to preventable deaths from unsafe abortions.

3.4 Anthropology of Financial Risk

Financialization is defined as the increasing importance of finance, financial markets, and financial institutions to the economy (Davis and Kim, 2015).

Financialization is the increasing role of financial motives, markets, actors, and institutions in domestic and international economies. In the context of global health financial motives, markets, actors, and institutions are becoming increasingly involved in the provision of available health services (Stein and Sridhar, 2018). The study of risk is an important aspect of economic anthropology, particularly in relation to the financialization of pandemics. Economic anthropology considers risk through its relationship with finance and debt insofar as these interactions generate different forms of risk in society. In the context of pandemics, risk takes on an additional form in relationships about disease spread between humans, and across continents and species. Addressing risk from an anthropological perspective entails the exploration of how risk is culturally identified, understood, communicated, and managed in society (Boholm, 2015, 2). The rise of international agencies acting as financial mechanisms, including the World Bank's PEF indicate an active shift in health towards financial market indicators. It is important to map out major shifts in Western economic thinking to better understand the financialization of global health.

The 18th century philosopher commonly referred to as the father of modern economics, Adam Smith, maintained that "it is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest" (Smith, 1998). This statement can be interpreted by considering that the butcher, brewer, baker, and consumer engage in various forms of exchanges and value. There are two ways of interpreting this theory. The first assumes that humanity is motivated by greed, while the other is informed by Smith's *The Theory of Moral Sentiments* which suggests that market participation is tied to sympathetic moral action

through the anticipation of the desires and actions of others. This idea led to laissez-faire economics which dominated economic activity in the centuries after Smith lived. In this interpretation, each player anticipates the needs of others in the market in order to meet their own needs.

Adam Smith conceptualizes of value in the capital market in his seminal work "The Wealth of Nations," which provides foundational insights into understanding financialization (Smith, 2018). Smith's theory of value is rooted in the labor theory of value, suggesting that the value of a commodity is determined by the amount of labor required for its production. Smith's emphasis on market competition and the invisible hand mechanism offers important insights into the functioning of financial markets. Financialization involves the expansion of financial activities, instruments, and institutions, driven by profit motives and market competition. Smith's concept of the invisible hand suggests that individual pursuit of self-interest in financial markets can lead to overall market efficiency and allocation of resources.

The General Theory of Employment, Interest, and Money published by English economist John Maynard Keynes in 1936 resulted in a major shift in economic thinking. Keynesian economics challenged the assumption that laissez-faire capitalist economies can thrive without periodic government intervention to promote aggregate demand and prevent high rates of unemployment and deflation (Keynes, 1936; Rajan and Zingales, 2001). Piketty (2014) finds that in contemporary market economies, the rate of return on investment typically outstrips overall growth. As a result, the increase in wealth of capital owners is far more rapid than that of laborers. Experts suggest that "trade openness is correlated with financial market development, especially when cross-border

capital flows are free” (Rajan and Zingales, 2001). In a later publication, Rajan and Zingales (2003) urge that some government regulation is necessary to protect the capital market from private interest.

Keynes's emphasis on the role of psychological factors in shaping market dynamics also applies to financialization. Furthermore, Keynesian economics advocates for active fiscal and monetary measures to manage aggregate demand, stabilize employment, and mitigate the adverse effects of financial instability (Tobin, 1983). In the context of financialization, Keynesian policies may involve regulatory interventions to curb excessive speculation, ensure financial market stability, and protect against systemic risks.

However, critics argue that Keynesian approaches may be insufficient in addressing the complexities of financialization, particularly in light of globalization, deregulation, and technological advancements (Zalewski and Whalen, 2010). While Keynesian policies may help mitigate short-term fluctuations and stabilize financial markets, they may not adequately address underlying structural issues such as income inequality, financialization's impact on social welfare, or the concentration of wealth and power in the hands of financial elites.

Social theorists Max Weber and Michael Foucault provide two early conceptualizations of value in the capital market in which the meaning of work is detached from the free will of laborers. Weber's theory of value stems from sociological perspectives of actions as meaning and places value in a neo-Kantian framework. Neo-Kantianism refers to the advancement of Kantian theory with modern thought. Weber argues that contemporary capitalism is a derivative – or product – of Protestantism in

his seminal work *The Protestant Ethic and the Spirit of Capitalism* (Weber, 1930, 10). Rationalization is inherently tied to value in itself as it acts as a constitutive standard for understanding thought (Wedgwood, 2017, 1). According to Weber, rationalization is influenced by three factors: individual cost-benefit analysis, bureaucratic organization, and “disenchantment of the world”. Weber utilizes Friedrich Schiller’s concept of disenchantment in order to mean the cultural rationalization and devaluation of religion in modern society (Allan, 2005, 151). In this way, Weber argues that scientific knowledge is more valued in modern society than belief. Similarly, Foucault (2004) uses the opposition between economic and moral value within a Kantian view to describe neo-liberalism. Foucault argues that true market efficiency can never be fully achieved, but rather it can be approached through politically and morally neutral economic undertaking.

In the context of financialization, Foucault’s framework suggests that value in the capital market is not solely determined by material factors such as production or consumption but is also shaped by complex networks of power and knowledge. Financial markets are considered discursive spaces where value is constantly negotiated and constructed through various mechanisms such as speculation, risk assessment, and algorithmic trading. Foucault’s notion of governmentality, which refers to the techniques and rationalities employed to govern conduct, is particularly relevant in understanding how financial actors and institutions exert influence over market dynamics (Gurkan, 2018).

Furthermore, Foucault’s analysis of biopower and biopolitics elucidates how financialization extends beyond economic realms to encompass broader social and

political domains (Nilsson and Wallenstein, 2013, 47). Financial instruments and practices often exert control over individuals and populations, shaping behaviors, aspirations, and life chances. This biopolitical dimension of financialization underscores its profound impact on social inequalities, governance structures, and subjectivities.

According to Karl Marx's theory of political economy, economic communities are generated by the exchange of goods and services within a society. Marx defines a commodity as a good or service which is bought, sold, or exchanged in a relationship of trade (Marx, 1987, 270). A commodity has both a value in social use – in that the object satisfies a human requirement, want, or need – and value in exchange – based on how the commodity can be traded for other commodities which may or may not involve money (Marx, 1987, 46). Through alienation and commodification, value is separated from the labor time and social relations that objects are embedded in. In this way, exchange value is not necessarily tied to labor value. According to Marxist theory, financialization represents a stage of capitalist development wherein the financial sector assumes a dominant role in shaping economic activity. In his chapter on finance, McNeill explores Marxist perspectives on financialization in *Fetishism and the theory of value* (McNeill, 2021, 9). McNeill uses the concept of fetishism to refer to the process through which social relations among people become mediated through commodities in capitalist societies (McNeill, 2021, 59).

While some scholars believe that impact and return are mutually exclusive concepts, others question the necessity of this binary view of value. In the context of risk in global health finance, François Ewald's alternative theorization of risk as a 'neologism of insurance', suggests that insurance is a risk-based security practice

widely used to manage the welfare of populations (Ewald, 1991, 198). Other anthropologists suggest that investors may find value in catastrophe (cat) bonds for their low correlations with conventional bonds and stocks (Schöchlin, 2002). Psychologists suggest that people may favor risk betting on themselves more often when their skill is involved over equivalent random bets, indicating a general preference for control (Beniot et al., 2019).

Hart and Ortiz (2014) argue that economic anthropologists and ethnographers often overlook historical perspectives and wider social contexts. In order to address this, social scientists suggest that anthropologists should conduct studies that 'follow the money' of monetary transactions to connect these multidimensional aspects of social life. Hart and Ortiz (2014) use the example of a mother buying a toy for her child to explain this interconnection: by "using her banked salary, they are linked to global finance and to the global circuit of goods and services in which the toy producer and the mother's employer also take part. Even street transactions outside the banking system connect people to commercial networks, state-made money, and global finance".

'Innovative finance' aims to employ the market to generate a social or environmental impact alongside financial return (Mackevicuite et al., 2020). One example is climate finance which refers to "local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change" (UNFCCC, 2023). In recent years the private sector has become increasingly involved in solving global development problems through impact investing including issues of climate change, economics, and health.

A recurring debate on impact measurement is the tension between financial return and the social-environmental mission. Some scholars argue that risk-adjusted underperformance of impact investments compared with mainstream markets exemplify the failure of impact investing to deliver non-negative returns to investors and suggests that investors must sacrifice financial returns for investing in line with their values (Bernal et al., 2021). Other research suggests that the diversification potential of listed impact investments with regard to mainstream markets slowly decreases over time, suggesting that impact investors attach only limited weight to this aspect (Bernal et al. 2021). Indeed “exclusionary incorporation” in global health financing can prevent voices of the poor from participating in the decisions on their own livelihoods (Partridge 2008; Erikson, 2015).

Anthropologists consider the investor-investee relationships and the ways in which they determine the value across the investment lifespan. Barman frames the market of impact investing as a case of market design through experimentation as a means to address investors’ “difficulty” in ascertaining the social and environmental value of investments (Barman, 2015). Some scholars argue that impact investing can be justified only if the related enterprise can provide for a higher performance than with a simple portfolio diversification (Viviani and Maurel, 2019).

Diversification is the process of investing money in different asset classes and securities in order to minimize the overall risk of the portfolio (Fidelity, 2023). Chen and Harrison (2020) propose the Transactional-Relational Spiral model as a new set of relational and transactional impact measurement practices. The authors argue that

transactional and relational practices occur in sequence and reinforce each other to generate both instrumental and intrinsic value.

It is important to make the distinction between finance and funding in international development. Funding can be thought of as “the money spent by outsiders on health [or in other development arenas] in middle- and low-income countries or domestic government spending in poor countries” (Erikson 2015). Finance on the other hand is the “management of money and includes activities such as investing, borrowing, lending, budgeting, saving, and forecasting” (Vipond, 2023). The anthropology of finance is an interdisciplinary field of study which examines the mechanisms, worldviews, networks, and socioeconomic effects of finance (Ho, 2015; Ho 2009; Picketty 2014; Appel 2014; Lin and Neely 2020; Alcazar et al., 2020; Souleles 2019). Regardless of the awareness of financiers of their daily work, the output generates the foundation of value in the market (Ortiz 2017; Guyer 2016, 94). There is a growing scholarship analyzing the way that the financial industry generates profit for pharmaceutical companies, resource extraction, and oil production, resulting in the exacerbation of international inequalities for health and the climate (Pierre, 2020; Tsing 2015, 39; Klein 2007; Brisbois et al. 2019; Frederiksen, 2024). The following section will expand upon discussions of economic anthropology theory by exploring the anthropology of debt.

3.5 Debt

Davey's (2024) examination of the anthropology of debt considers the multifaceted nature of indebtedness and its implications for social, economic, and political dynamics. Davey highlights how debt, ostensibly a mechanism for repaying

what is owed, often intersects with broader issues of inequality, oppression, and social unrest. The debate within anthropology regarding the relationship between monetary debts and reciprocity illuminates the interconnectedness between quantified obligations in impersonal markets and traditional forms of social exchange. Davey also addresses the coercive nature of debt relations, acknowledging the violence and dispossession that frequently accompany experiences of indebtedness, particularly within the context of financial exploitation and class relations.

Ortiz (2013) suggests that “investors are agents that only exist in their procedural enactment, [and] they are not liable for the same need for political responsibility that a citizen is”. He goes on to say that “this absence of a subject, as described by Foucault, is not the proof of the absence of politics and morality in the process [of investing] but, on the contrary, it is a constitutive element of the relation of forces that the process entails”. Ortiz’s argument suggests that value is a central feature of modern financial practice which becomes intertwined with the moral and political.

Economic transactions in the 17th century England can help us to understand the history of the modern economy and the role of debt within it. In 1694, King William III obtained a loan of 1.2 million pounds sterling in exchange for a royal charter to establish the Bank of England. The 8 percent interest on the loan paid by taxpayers generated enough income to allow the bank to issue interest-bearing debt (Robbins, 2018; Wennerlind 2011, 44; Di Muzio and Robbins 2016, 89). This moment resulted in the institutionalization of money creation and the financialization of national debt (Robbins, 2018, 92). According to Robbins, debt played a major role in helping establish the

modern economy by institutionalizing interest-bearing bodies which have power throughout multiple areas of society.

Émile Durkheim (1960 [1893]) examines the impact of private contracts in British markets on society by conceptualizing societal ties as the “non-contractual element” that allows the economy to grow. This representation emphasizes the role of morals and historical institutionalization of debt. Thus, monetary valuation is never simply technical, but is also moral, religious and political, signaling the symbolic position of each person in society according to various orders of ranking.

According to more recent regulatory financial theories for efficient markets, the prices allotted to goods and services represent the value of exchanged goods (De Goede, 2005; Muniesa et al., 2007; Preda, 2009, 20; MacKenzie, 2008, 51). As a result, the concept of value spans across the technical, economic, moral, and political spectrum (Ortiz, 2013). In the market, pricing an item or financial mechanism inherently assigns a quantitative value to the object, allowing it to be compared and measured in relation to other priced commodities, and places it within the wider social, political, and religious landscape (Guyer, 2004, 52; Fourcade, 2011). According to Hart (1986), modern monetary policy defines the citizenship of individuals through the dynamic relationships between states and markets which both provides a belonging within groups of economic activity while providing the freedom to generate new ties. The generation of standardized procedures within the financial industry creates moral and political implications concerning temporality and ownership (Riles, 2011, 165).

In *Debt: the first 5,000 years*, economic anthropologist David Graeber (2012) defines debt as an obligation with a numerical figure attached, which inherently ties debt

to money. Graeber challenges the “obligation” of repayment by suggesting that the cost of bad loans should be met by creditors as a discipline on their lending practices (Graeber, 2012, 13). Graeber’s discussion of debt in terms of contractual agreements for repayment relates to Rousseau’s (2008, 92) argument that the origin of debt can be found in human bondage, slavery, tribute, and organized violence as part of the invention of poverty.

Graeber also distinguishes monetary from non-monetary debts. Graeber defines monetary debts as obligations that are denominated in a specific currency and can be quantified in terms of monetary value. These debts typically involve transactions involving money or financial instruments, such as loans, mortgages, or credit card debt. In contrast, non-monetary debts refer to obligations that are not directly quantified or denominated in terms of monetary value. These debts may involve social, moral, or symbolic obligations within interpersonal relationships, communities, or cultural contexts.

The work of Marcel Mauss in his essay, *The Gift* (1925) is important in connection to Graeber in which he argues that it is inherently human to be entangled in relationships of obligation through giving, receiving, and reciprocating. This is a phenomenon which the modern market economy has disrupted by making these relationships extractive rather than reciprocal (Mauss, 1925, 5). This idea is tied to the work presented earlier in this chapter regarding debt’s role in the rise of the modern market economy as well as to what will be discussed moving forward - societal ties as a non-contractual element that allows the economy to grow.

Anthropological and sociological approaches to understanding money expand the idea of value and utility to the hierarchies of social, political, and economic environments in which we live. In his essay, Mauss references the Maori concept of *hau* – the ceremonial offering of food to an *atua* – to challenge the voluntary nature of gifts as voluntary as they must be repaid under obligation.

Anthropologists also suggest that socio-religious networks can contribute to a non-capitalist spirit of commerce. Taking an example from West Africa, the strong emphasis of Mouridism on work and giving of one's personal financial gains back to the Muslim brotherhood has actually created a non-capitalist spirit of commerce and entrepreneurialism in the informal sector in Senegal (Minard, 2009).

Kinship involves a mutuality of being in the sense that persons in the same community participate intrinsically in one another's existence in the form of sharing (Sahlins, 2011; Viveiros de Castro, 2004a). This relates to the idea of reciprocity based on dynamic exchanges of goods, labor, ideas, and sentiment which provide the foundation for social systems (Malinowski 1922; Mauss, 1923, 97). The social study of insurance can provide a framework for understanding the interplay between kinship, reciprocity, and mutuality of being within insurance practices. Kinship ties often form the foundation of informal insurance arrangements, where families and extended networks come together to provide financial support in times of need (Luhmann, 1995, 326). Reciprocity is a central aspect of insurance, with individuals contributing to a common pool with the expectation of receiving assistance when required, fostering trust and solidarity within communities (Hann, 2015).

Literature suggests that worsening economic conditions continue to erode reciprocal relationships amongst the urban poor in Mexico (de la Rocha, 2020). Some suggest that the act of exchange creates a social indebtedness in which the support provided by those more fortunate is given with the expectation of later return (Polanyi, 2001, 272; Sahlins, 1977). The reciprocity of exchange of goods for food stuffs is unique in rural areas where people do not have the ability to store certain food stuffs (Sahlins, 1977; Weissner, 1982). Anthropologists since the 1960s have studied this phenomenon in urban settings in particular where the poor use reciprocity to obtain various necessities including loans, childcare, and crisis assistance from accidents, illness and fires (Wutich and Brewis, 2014; Isbell, 2005, 12; Lobo, 1982, 15; Lomnitz, 2014, 98).

South African anthropologist Deborah James (2021) uses South Africa's Black middle class to examine the social embeddedness of debt relations. Having lived under apartheid, James relates the long-standing existence of unpaid and informal loans -that were begun under Apartheid and continue into the 'post-Apartheid' moment - as an "epidemic of indebtedness". Another important concept generated by James is the idea of "money from nothing" which she uses to critique the reliance of capitalism on generating money since private banks create money whenever they sign a new loan contract. At the same time, the same banks which create money risk insolvency if a debt is not repaid – and the risk increases in relation to the likelihood of the consumer's ability to repay with interest.

Anthropological perspectives on debt go beyond mainstream economics to question the embedded social interactions which are generated and regenerated. The

institutionalization of debt has disrupted traditional moral and political relationships by producing new forms of accountability and responsibility in transactional endeavors.

3.6 Financial Approaches to Pandemic Risk Management at the World Bank

World-systems theorists suggest that financialization may be motivated by an effort to protect American hegemony (Arrighi, 1999, 23). The financialization of the World Bank can be viewed as the diversion from its traditional role as a lender for major development projects towards becoming a broker for private investment (Jomo and Chowdhury, 2019). Current literature explores the impact of the financialization of global health (Erikson, 2015; Stein and Sridar, 2018c; Cordilha, 2022). In this way, capital markets become connected to the wider health ecosystem (Frankel et al., 2006).

We live in a time in which health risks are global, meaning that countries and individuals cannot independently guarantee their own health. As a result, international and intersectoral collaboration is critical to managing disease risks, and some scholars consider health as a 'global public good'. Global public goods have been defined by theorists as meeting two criteria. The first is that they are marked by nonrivalry in consumption and non-excludability; the second is that their benefits are essentially universal in terms of countries, people, and generations (Sandler and Arce, 2005).

Research suggests that preventive care is often deprioritized by governments because it is a public good that requires resource allocation in the present to generate solutions for the future. As a result, public health can be referred to as a "quiet" policy that does not receive urgent support by interest groups or public opinion (Jacques and Noël, 2022). Furthermore, resistance from concentrated interests and fiscal constraints

can lead political leaders to adopt incremental policy changes rather than comprehensive reforms even for serious public health problems (Oliver, 2006).

Some sociologists and anthropologists argue that the position of an individual, organization, or government on the income spectrum determines the risk that they should seek to insure (Arrow, 1974, 37; Lazzarato, 2009). Private investing in global health points to the tensions between capital interest and health care coverage for the poor (Stein and Sridhar, 2017). Studies suggest it is unlikely that the insurance industry alone will be able to provide sufficient coverage for the impacts of pandemics such as the COVID-19 crisis (Gründl et al., 2021).

Foley's (2009) *Your Pocket is What Cures You* analyzes the implementation of global health policies and the way in which they are intertwined with social and political inequalities in Senegal. Foley takes an ethnographic approach to critiquing neoliberal health policies in Senegal by navigating the struggles of men and women who are must navigate crumbling health systems and economic decline.

The Primary Health Care (PHC) movement is typically associated with the Alma Ata Declaration of 1978, which put health equity on the international political agenda for the first time. PHC became a core concept of the WHO goal of *Health for all* (Litsios, 2015). The World Bank became hesitantly involved in the PHC movement in the mid-1980s, along with UNICEF, in constituting "selective primary health care". In 1979, Walsh and Warren introduced the 'selective' model of Primary Health Care (PHC), challenging the Alma-Ata concept as perceived to be unattainable due to its associated costs and personnel requirements. The selective approach proposed focusing on healthcare initiatives aimed at preventing, controlling, eradicating, or treating a limited

number of diseases that contribute significantly to mortality and morbidity in developing countries. This model presented a pragmatic alternative to the broader Alma-Ata approach, emphasizing targeted efforts to address the most impactful health challenges in resource-constrained settings. (Warren, 1988; Beigbeder, 2001, 66-67). A more recent publication complicates the application of this top-down version of PHC (Beaudevin et al., 2023). Beaudevin and colleagues' study various national trajectories within Primary Health Care (PHC) and argue that this approach underscores common underlying concerns, including the pivotal roles of accessibility and affordability. Additionally, the authors emphasize the concentration on rural centers, the extensive training of non-medical personnel, and the intricate interplay between vertical programs and horizontal system building. The examination brings to light both shared core issues and distinctive trajectories, reflecting variations in duration, priorities, outcomes, and international recognition.

More recently, at the UN General Assembly in 2012, Universal Health Coverage (UHC) was recognized as “an investment in people that empowers them to adjust to changes in the economy and the labor market and helps support a transition to a more sustainable, inclusive and equitable economy” (UN, 2012). National and international stakeholders have been working to clarify understanding of UHC and develop methods to track countries' progress towards this goal. Anthropological studies of UHC suggest that the term “coverage” is not a neutral term, but rather it was the primary ideology that shaped the use of market-based health-care reforms by international financial institutions (Iriart et al., 2001). Supporters stress how UHC employs the WHO agendas and to strengthen alliances between dominant classes in the global North and global South

against redistribution policies that would adversely affect their interests (Navarro, 2004; Birn et al., 2016). Some scholars argue that UHC does not address public health issues and therefore remains separate from the public health agendas of international financing bodies (Wynn and Moore, 2012).

In the case of infectious disease outbreaks, the resulting surge of demand for healthcare reduces access, costs lives, and increases public health spending, so attaining UHC can become impossible (Sachs, 2012). Rather than improving public health systems and infusing them with greater resources, or tackling the social determinants of health, researchers suggest that the neoclassical-neoliberal model of UHC has neglected the right to health and access to services and transformed health into a field of privatized profits (Giovanella et al., 2018). Some researchers further argue that UHC is inherently tied to capital gain through supply and demand rather than health needs (Malvey and Fottler, 2006).

The World Bank defines UHC as “ensuring that people have access to the health care they need without suffering financial hardship” (World Bank, 2023g). However, critics suggest that the financialized structure of health-care systems under UHC reforms reconfigures the everyday dynamics around access to health care, health-seeking behavior, and provision of clinical services (Abadía-Barrero and Bugbee, 2019). Ethnographic research suggests that health “coverage” has failed to guarantee access to health care or protection from catastrophic expenses, and in some cases has exacerbated pre-existing health inequities (Molina and Palazuelos, 2014; Mulligan and Castañeda, 2018, 37; Abadia and Oviedo, 2009; Dao and Nichter, 2016).

The primary goal of the Health, Nutrition and Population Global Practice group at the World Bank is to provide “financing, state-of-the-art analysis, and policy advice to help countries expand access to quality, affordable health care” (World Bank, 2023b). Studies suggest that the public-private and expansive approach of the Bank to UHC has at once shifted the responsibility of health care onto private entities while losing the meaning of health “coverage” all together (Tichenor, 2020a).

Anthropologists exploring PHC and UHC from postcolonial and decolonial perspectives have noted colonial legacies have led to coercion and redirected health towards biomedical expectations. A study of traditional midwives in Balochistan, Pakistan notes that while hospitals are not the desired location for childbirth, the biomedical economy generated by UHC coerces mothers to deliver in the clinic rather than in the home setting by generating a sentiment of fear and risk (Towghi, 2018). In practice, a primary challenge in implementing UHC is the diverging incentives of the World Bank and the WHO. While the World Bank is committed to poverty alleviation through economic well-being, the WHO is dedicated to promoting well-being through population health. Noting this friction and the unaffordability of UHC for low- and middle-income countries Robinson and colleagues (2017) take an econometrics approach to determining the most impactful cost-effective interventions in global health.

Tichenor’s (2020b) analysis of the influence of the World Bank on defining success of UHC notes that Senegal measures UHC by the proportion of the population covered by health insurance through employment-based schemes, community-based health insurance schemes, or other recognized risk-pooling schemes. However, in 2018, the coverage rate of the *mutuelles de santé* remained at less than 20% (Wood,

2023). Critics of this approach argue that the focus on community-based health insurance has failed to provide adequate resources for community members this exacerbating existing debt loads of hospitals and other health facilities created by subsidized health care schemes and other health policies (Gollock, 2021; Wood, 2023).

Suerie Moon conceptualizes expanded typology of power in the global governance space through the analysis of physical, economic, structural, institutional, moral, discursive, expert, and network. Two of Moon's typologies of power in global governance are particularly important in relation to the analysis of health financing mechanisms as suggested by Tichenor et al. (2021): (1) economic power and (2) institutional power. Moon defines economic power as "the use of material resources (e.g. money, goods) to shape the thinking and actions of other actors" (Moon, 2019b). Actors which hold any of these forms of material resources, such as governments, companies, foundations, or individuals alike can wield this power. By emphasizing the role of material resources in influencing the beliefs and behaviors of individuals and groups, Moon's definition blurs the boundaries between economic coercion and the shaping of knowledge and ideology. This blurring highlights the interconnectedness of economic and epistemic power, as well as the ways in which they mutually reinforce each other.

3.7 Conclusion

This chapter began by discussing the anthropology of zoonotic disease, One Health, and pandemics followed by the anthropology of finance, debt and risk. The chapter proceeded to combine these concepts to consider theories of the financialization of pandemic risk with particular focus on the World Bank's development

endeavors. The following results chapters will seek to expand upon this literature by taking an anthropological approach to studying pandemic risk finance with the case study of the World Bank's pandemic bonds as they were used to respond to the novel COVID-19 pandemic.

Chapter 4: Methods

This research contributes to ethnographic accounts of global health finance, using multi-sited field research to reflect its global dimensions and symmetrically apply the same empirical criteria to investor and target communities. Rather than focusing on specific sets of stakeholders in their respective worlds (e.g. international financial institutions; central banks; development brokers; global health scientists; target beneficiaries), this project explores how global health governance produces relationships between these worlds, opening windows of insight into processes of translation in global health.

Research was conducted through symmetric ethnography informed by Brightman's work on conservation and environmental finance, which builds on Kelly's adaptation of Latour's 'symmetric anthropology' to study indigenous healthcare in Amazonia, treating different categories of research participants as ethnographic subjects on the same footing (Kelly 2011; Latour, 2016, 327). These research methods further draw on D'Avella's ecological approach to investment practices to consider the way in which financial products and transactions structure human social relations (D'Avella 2014). Research will also consider the power relationship, often related to the historical context of international development aid emerging from a colonial legacy and how post colonialism links to capitalism with a global neoliberal environment. I accordingly seek to achieve an equivalent understanding of the subjectivities and socialities of the actors in impact investing for pandemic preparedness at the WBG, including economists, government officials, health professionals, veterinarians, farmers, community members, and non-human species.

Data collection involved mixed-methods ethnographic research, combining participant observation, semi-structured interviews, document analysis, and financial analysis (Woodhouse et al. 2015). Field sites in Washington, D.C. and Senegal involved informal participation in the working lives of research participants and establishing rapport to engage in the everyday discussion of ordinary tasks relevant to the research project. This provided insight into the social worlds and cultural attitudes of participants. Participant observation supported the design of interviews and surveys which enhanced the potential for comparison across field sites, sectors and categories of actors. The different methods were applied as appropriate to different elements of the research in accordance with COVID-19 restrictions and safety protocol.

The first phase of research with WBG officials in Washington, D.C. and global health governance communities which primarily relied on interviews and document analysis, whereas a greater emphasis upon participant observation was used for the second phase of the study involving the implementation of pandemic preparedness and response projects developed by the impact bonds in Senegal. Overall, approximately sixty semi-structured interviews were conducted for this study. Qualitative data was collected and stored using standard tools, including field notes, audio-visual recordings and photography. The symmetric ethnographic method of research sought to provide the grounds to document the diverse cultural, moral and emotional perceptions of risk and uncertainty that inform the design of financial mechanisms and decisions about investment and involvement in global health projects.

Analysis was based on multi-sited in-depth ethnographic research to direct the focus on the lived experience of the subjects of the study (Van Maanen, 1988, 127).

Providing feedback in dialogue with communities throughout research sought to provide the means for interactive data collection. This method was rooted in accompaniment to create social realities together through a weaving of data in a continuous cycle of data collection, input, and feedback. Research sought to support the needs and agendas of urban and rural communities by involving people living in Dakar and rural villages in southeastern Senegal in the research process. Research also considered the power relationships, often related to the historical context of international development aid emerging from a colonial legacy and how post colonialism links to capitalism in a global neoliberal environment. Anthropological approaches to contrasting and co-laboring provided in-depth analysis of the pandemic bond to provide specific lessons for the future. Rather than seeking to translate expert knowledge into interventions in the field, this research considered lessons from the field to inform expert knowledge and encourage adaptive mechanisms to improve current finance architecture and governance for infectious disease.

Results of this data were triangulated in order to generate thick, rich data and form a deeper understanding of the realities of pandemic risk finance. The results of this data collection and analysis may be used to inform the World Bank officials of the perspectives of various interlocutors involved in pandemic risk finance. It may also be useful for government officials and policymakers to gain a deeper understanding of community perspectives of pandemic response approaches to inform the future of pandemic risk management.

This research topic is of primary international concern due to the rise in anthropogenic pressures on our planet leading to a higher risk of zoonotic disease

outbreaks. Much of the discussion has been focused on immediate responses and disaster mitigation from financial bodies and public health officials rather than holistic approaches to building adaptability and resilience for the future. Senegal was chosen as the case study site for the research project as a member of the World Bank's IDA eligible countries, Senegal's leadership in the sphere of global health governance as well as One Health. Within Senegal, the case study of Dakar allows for a country-specific analysis of pandemic risk in relation to the wider global health agenda. Kolda and Kédougou were chosen as the case study sites of research with rural communities in Senegal with borders on Mali and Guinea for a number of reasons including that the region has the highest rates of zoonotic disease in the country, has multiple local projects related to the 'One Health' approach, has some of the highest poverty rates in Senegal. These regions were also chosen as case study sites because of my longstanding relationship with individuals in these areas from previous fieldwork. The realities associated with COVID-19 cases and treatment opportunities may inform future prospects in innovative finance. This is especially important since the World Bank has since established a new Financial Intermediary Fund (FIF) for pandemic prevention, preparedness, and response which was being developed during my studies.

It is important to note that while all efforts will be made to conduct in-depth ethnographic research, this research project is being conducted amid the COVID-19 pandemic, which produces restrictions on travel and in-person interactions. In Washington, D.C. in particular, this created a blind spot since interviews were more often conducted online rather than in the World Bank office. In this way, it is difficult to

imagine the structure of the World Bank and how this impacts the collaboration across sectors on topics of One Health.

By collecting data through multiple outlets including both in person and online, I hope to offset the majority of these issues while protecting the safety of research participants and myself. It is also notable that many interviews were conducted through the method of snowballing in Washington, D.C. and in Senegal. This impacts the research in that there may be increased bias in the data since many people whom I interviewed had connections of some kind with fellow interviewees. This generated a potential blind spot in the other opinions which may have been missed from this interviewing process.

Taking the World Bank's pandemic bonds as the object of my research, I structured my fieldwork in various contexts which interacted with the bonds in order to represent the reality of the World Bank's financing agenda for pandemic risk. My positionality as a female American toubab in Washington D.C. and Senegal provided me with access to long periods spent in the US, and the ease of gaining a visa for research in Senegal as well as access to information.

My previous experience as a United States Peace Corps volunteer in Senegal may also have a notable impact on this research. My connections with communities in Kolda and Kédougou assisted in my research in order to gain trust with communities, navigate public transport systems, and to communicate in Pular during interviews and conversations across Senegal. Interviews in Dakar with community members were primarily conducted in Pular or French. This is notable since the primary language spoken in Dakar is Wolof. This also impacts the type of people that I normally spoke

with and narrows the scope of my work to Pular communities living across Senegal. In the South of Senegal, most of my time was spent with my previous host family and other connections from the Peace Corps in Kédougou.

Chapter 5: Interlude – An Instigating Event

It was an early morning in mid-March, 2020. The sun was just beginning to peak over the mango and neem tree line in Vélingara, a small town in the Kolda region of southeastern Senegal. The market had a calm, familiar chaos about it characterized by sandy narrow passageways filled with wheelbarrows of clothing, carts of dates imported from Tunisia, women selling homemade peanut butter in recycled plastic mayonnaise buckets, and liters of honey in old water bottles.

Over a year into my Peace Corps Service as a Community Health Agent, I was fairly accustomed to biking the 12 km into Vélingara each week to stock up on fresh fruit and vegetables which were not available where I lived. The small village of Némataba (a Mandinka word meaning “full of neem”), which I had learned to call home, was situated in northern Kolda just 8 kilometers from the Gambian border. Némataba is a 900-person village with a health center responsible for 42 villages in its catchment area. I had been living with the family of the village chief who gave me the *tokara* (family namesake) Dienabou Danfa.

Feeling a little hungry after cycling into town, I walked past the motorcycle mechanic shop and stopped at my favorite breakfast stand. As I swung my feet around to sit down on the bench across from a man with a gas stove and hot pan set-up, I exchanged greetings with the cook in Pullo Fuuta (A dialect of the Pular language spoken primarily in southeastern Senegal, the Gambia, and Guinea). “*A waale jam? A danike seeda? Ko honno bimbi on? Ko honno bengurre nden?*” (Did you wake up in peace? Did you sleep a bit? How is your morning? How is your family?). To each of which was the same reply: “*jam tun*” (peace only). Seeing a look of fatigue in his eyes

and his body, I added “*Ko honno gole nden?*” (How is work?). He laughed as he responded “*No muusi kai*” (It hurts).

He prepared me a breakfast sandwich with an omelet and onion made on freshly baked *tapalapa* (locally produced bread) and a paper cup filled with *café touba* (a local spiced coffee drink) without sugar, although it was beyond him how I could drink coffee without a big scoop of sugar. I handed half of my sandwich to a small boy who was a member of the *talibé* (boys attending Quranic school) and started reading the newspaper clip that wrapped my sandwich, suddenly feeling dread for the days ahead. I got up and wished him a good day before paying him 800 West African CFA.

I, along with my fellow colleagues working in Senegal, woke up to an alert text from the Peace Corps Senegal Security Director at 5:30am that morning giving notice that all Peace Corps volunteers had 48 hours to pack our belongings, say goodbye to our host families and the villages which had become our homes, and appear on the roadside to be taken to the capital for evacuation due to the novel coronavirus outbreak.

While I was used to being noticed in the crowd as a *toubab* (foreigner), the interactions were normally characterized by playful banter and an exchange of sarcastic jokes about whether I had a husband, joking that my family name meant I ate beans for dinner while their strong family had chicken every night. In the past couple of weeks, the news of the new coronavirus disease spreading on social media, radio, and news outlets had begun to change my daily interactions with strangers. On occasion, small children, teenagers, and adults would look at me in fear as they pulled pieces of fabric from their skirts or jackets over their mouths and noses to protect themselves from my presence. My host brothers joked that we couldn't eat at the same lunch bowl anymore

because they heard that the coronavirus was a “foreigner's disease” and that I could be infected and spread it to them.

Feeling somewhat removed from international news in part due to the limited cell phone service in Némataba, it came as a shock to be evacuated at such short notice. I began to feel more like an outsider as the lines between myself and the community in which I lived grew more rigid. I couldn't help feeling a mix of confusion, fear, and remorse as I prepared to leave my community behind and travel to the US to stay with my family until further notice.

I continued my shopping thinking of each moment and each vendor as a goodbye as I gathered some fruits to share with my host family over the next 36 hours. I walked back to my bike and slowly made my way around the town in the beating sun, imparting my news and saying goodbyes filled with joyful stories, tears, exchange of gifts, and of course multiple (and I mean multiple) shared goodbye meals.

A couple of hours before sunset, I made my way back down the long winding dirt road to Némataba. I handed one of my host brothers a packet of *ataya* (Senegalese green tea) and a bag of sugar and we sat by the open fire as he cooked three rounds of tea over throughout the early evening, and neighbors and friends moved in and out of the compound. Over the course of the next day and a half, I sat with my host sisters in the smoky cooking structures as we peeled onions and carrots, sifted worms out of our old peanuts before grinding them into powder or peanut butter and stayed up late under the open stary sky sharing funny moments of the last year we spent together. I said many goodbyes with left-handshakes – a custom which is disrespectful and unclean if done on a regular basis but can also be used as a way of saying goodbye with the

intent to return. The act of wrongdoing by offering a left handshake generates a social debt by which the perpetrator must pay another visit to right their wrong.

Leaving Senegal during this period left me with many questions. What will be the extent of this pandemic and how long will it last? How will the international community respond to the pandemic in the US verses in Senegal? How will the pandemic impact my family in the US verses my host family in Némataba? Who is responsible for making sure that everyone will have access to health care? How could this have been prevented?...along with many more questions.

After quarantining with my family in the US for the following months, I moved to Bologna to begin my PhD studies in November 2020. The purpose of undertaking multi-sited fieldwork was to understand the realities of the COVID-19 pandemic and response efforts within different contexts in which the World Bank works starting from the context of Washington D.C. where World Bank officials generate knowledge and policies which will inform future financial interventions and mechanisms in the midst of prolonged lockdowns and geopolitical tensions regarding quarantine mandates, unprecedented government spending, personal protective equipment (PPE) shortages, and vaccine distribution. Although I spent time when possible and safe in person, I note that many of my interviews and meetings were held remotely over zoom as the World Bank team waited for clearance to return to the office in the midst of unpredictable fluctuations in COVID-19 cases and variants.

Returning to Senegal and spending time in the capital city of Dakar and later to the southeastern regions of Kolda and Kédougou, I sought to understand the pandemic realities which impacted the Dakar community including the tensions amongst the

international influence of the European COVID-19 response, government shutdowns, failed quarantine efforts, and locked borders contrasted with the impact on rural communities living upwards of 14 hours from the capital who were cut off from both government restrictions and aid. I was lucky to be hosted by the wonderful Peace Corps community in both Washington D.C. and in Senegal. In Dakar, I was hosted by one American friend who had been a fellow volunteer with me and a Senegalese friend who had been one of my Pular language teachers. Throughout my time in Dakar, I divided time amongst academics at the West African Research Center in Dakar, World Bank officials in the World Bank country office, government officials within the Ministry of Health and Social Action and the Ministry of Economy and Finance, health professionals in Dakar, Kolda, and Kédougou, and community members in less formal settings including in homes, gathering places, and markets. In part as a result of my language skills from Peace Corps, much of my community interactions in Dakar were with the lively Guinean immigrant community with whom I spoke Pullo Fuuta.

My research in southeastern Senegal was centered around the realities of COVID-19 itself, the interventions that they received for the response efforts, and the realities within the home and hospital settings. I was grateful for the opportunity to revisit Némataba and to interact with health officials, local people, and immigrant communities in Kolda and Kédougou.

Throughout my research, I sought to learn how COVID-19 was conceived in different contexts in which the World Bank generated and triggered PEF to respond to the COVID-19 pandemic starting from the top level in Washington D.C. and moving toward the community setting in Senegal. I watched as the pandemic shook the

American government, policy-makers, and the American population into panic and fear as the country struggled to implement lockdowns, maintain available hospital beds and PPE, and support a population dealing with isolation, economic stress, political division, and grief of lost loved ones.

I sought to contextualize immediate imagined future within the international development community picturing the potential for chaos and devastating mortality in the African continent as a result of their vulnerable health systems, when finding in actuality by the time I arrived in the Spring of 2021 that COVID-19 was nearly forgotten. I sought to grapple with the infrastructures which were set up to deal with the impending disaster, finding that they were insufficient or impractical. I followed the way in which the government struggled to implement policies driven by geopolitical expectations from abroad rather than local realities, rising political tensions, forced border closures for a short time before returning to a normal feeling of COVID-19 being absent or even questioning whether it existed at all.

Chapter 6: Informing Pandemic Risk Modeling through Catastrophes

6.1 Interlude

It was a cloudy mid-October morning in Washington D.C., and the second day of the World Bank and IMF Annual Meetings. The theme of the meetings that year was *Ending the Pandemic: The Road to an Inclusive Recovery*. The perimeter of the World Bank headquarters on H Street was decorated with elaborate signs and posters advertising the topics of the presentations and discussion sessions being held inside.

On the wall of the entrance to the building, the Bank displayed an enlarged photo of businesspeople bustling in a city setting carrying purses and brief cases and hurrying to carry on their lives all the while wearing a facemask. A form of living with the pandemic which had become the new normal. This was the reality the city and the world had come to know.

The ground was covered in large waterproof stickers ranging from various public health awareness campaigns regarding COVID-19 and short fact sheets boasting of the World Bank's heroic efforts and the large sums of money it had spent to fight the ongoing global pandemic. The COVID-19 pandemic had become a weapon of political war in the United States as politicians used the disease as a pawn to promote their political status. Caught up in this fight, the Bank exemplified its alliance with science as it referenced the CDC's recommendation "stay 6 ft apart to stop the spread". It seemed a strange exertion of power to use unique American measurement standards for a display which should inform a group of international people – who would be more used to the metric system – on the exact distance to maintain between one another.

Around the corner, the Bank boasted of its past, current, and future efforts to finance the COVID-19 response. Stickers lining the ground near the perimeter of the Bank indicated that the IFC was currently deploying USD 8 billion in fast-track financing to sustain businesses, protect jobs, and support the private sector. Others announced the Bank's COVID focus on protecting poor and vulnerable people, supporting income and food supplies, employment for poor households, informal businesses, and microentrepreneurs. The words "\$8 billion" and "fast-track financing" were written in bold to catch attention. The famous PEF was nowhere to be found. While the average person walking past the headquarters was likely unfamiliar with the specific meaning of fast-track financing at the World Bank, it indicated the urgency and swiftness that that Bank was taking to address the pandemic.

The Annual Meetings illuminate reality of the decisions being made within the walls of the Bank. The presentations given and the decisions being made were open to the public only through livestream despite the Bank's presentation of the Annual Meetings as a space for the public to engage in their work. In this way, the outside world could gain knowledge from the occurrences in the meeting but were less able to contribute. What is the impact of this restricted access? What would a Bank that engages with the public it impacts look like? How is the historical knowledge produced by the World Bank being protected and brought into the future for global health financial efforts? Which voices are invited to the presentations and which are kept out?

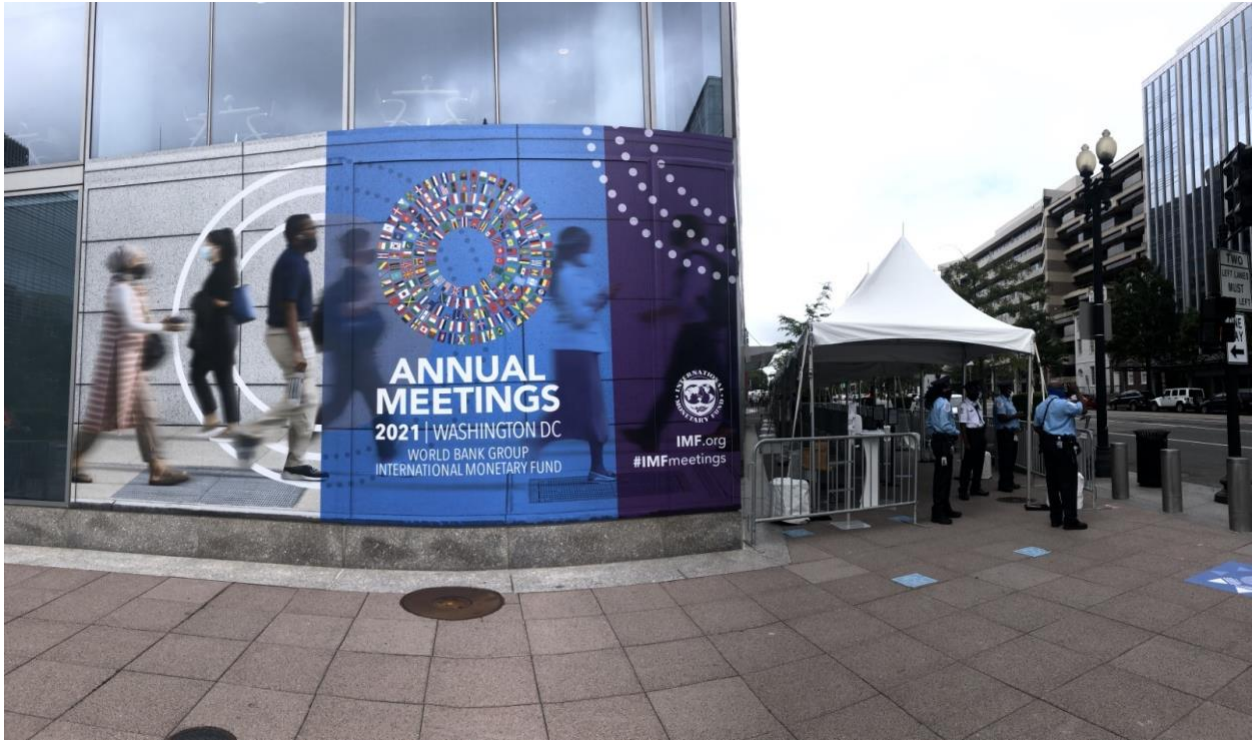


Figure 6.1: Photo outside World Bank Annual Meetings 2021



Figure 6.2: Photo outside World Bank Annual Meetings 2021



Figure 6.3: Photo of footpath outside World Bank Annual Meetings 2021



Figure 6.4: Photo of footpath outside World Bank Annual Meetings 2021

6.2 Introduction

Since the late 1990s, there has been a growing fascination with the application of private finance and insurance mechanisms to devise solutions for catastrophic disasters. Aligned with the established financial market for climate risk, the World Bank employed analogous risk modeling strategies to forge a novel market tailored for pandemic risk in response to the Ebola outbreak. In 2014, this endeavor materialized in

the form of PEF, an innovative pandemic risk facility employing a complex interplay of bonds, cash, and swaps within its financial ecosystem.

This chapter delves into PEF as more than a financial instrument; it is an entity that both emerges from historical knowledge and shapes knowledge futures for catastrophic risk. Inquisitively probing the nature of knowledge generated by PEF, the chapter seeks to unravel the mechanisms through which this knowledge is acquired. What connections are forged as a consequence? Which facets of knowledge are actively produced or replicated, and conversely, what aspects are overlooked or excluded?

Existing literature has extensively scrutinized the impact of leveraging private finance for addressing climate change and global health challenges (Calvet et al., 2022; Berg et al., 2021; Dietz et al., 2021; Chang et al., 2019). I will build on this literature by analyzing the knowledge generated by the World Bank and its financial partners in creating and supporting PEF and by seeking to understand the implications of mirroring the financial models employed to generate catastrophe finance to predict pandemic futures. The analysis will consider the implications of transplanting financial models across different global crises and the effectiveness of such approaches in mitigating pandemic risks. I will also focus on the escalating use of catastrophic risk models, bolstered by private finance, in order to contribute to the broader study's examination of normative positions and governance frameworks for pandemic risk. It highlights the intersectionality of financial and governance structures in addressing global crises and underscores the need for critical analysis of the knowledge generated by institutions like

the World Bank to inform more robust and effective responses to pandemics and other catastrophes.

6.3 Catastrophic versus Pandemic Risk Modeling

The pandemic risk model developed for PEF was a derivative of existing climate risk models. While PEF and the bonds part of PEF were derivative of ILS instruments, they are distinctly different entities. Nonetheless, many interlocutors involved in the discussions regarding the pandemic bonds drew from lessons learned from climate bonds in order to justify or critique the use of insurance mechanisms for PEF. Therefore, this chapter will attempt to identify the important differences in the risks of each.

Some critics of PEF at the World Bank suggest that the use of insurance mechanisms to address pandemic risk may be inadequate given the pandemic data currently available to accurately predict the onset of infectious disease outbreaks on a global scale. The World Bank's Caribbean Catastrophe Risk Financing Facility (CCRFF) provides a stark distinction between available data for climate risks versus pandemic risks. At the onset of a catastrophe, those most affected are those at the site of the event, such as for a person living on a Caribbean Island at the onset of a hurricane. Catastrophe risk models can also relatively accurately predict that there will be a hurricane in the Atlantic Ocean within, for instance, a given year, although there is less certainty in knowing exactly which islands will be affected. This case allows for insurance mechanisms to be useful to cover hurricane risk for both investors and beneficiaries alike.

In the case of pandemic risk, however, the people who are affected by a pandemic outbreak extend beyond the site of origin, as is the result of the COVID-19 pandemic with the first case reported to the WHO in Wuhan, China. In this case, the high level of transmissibility, which is not limited to the initial outbreak site, plays a major role in the functionality of pandemic risk mapping. This presents a unique challenge for pandemic risk models.

Some argue that the 21st century has been an “age of black swans” (Antipova, 2020). A black swan event is a term commonly used in economics for a particularly negative event that is highly difficult to predict (CFI, 2023). However, I challenge this conclusion with reference to Rumsfeld's most famous statement regarding the Iraq war while serving as George W. Bush's secretary of defense: *“As we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns—the ones we don't know we don't know.”* (Graham, 2014). Other references to this issue may be referred to as unforeseen variables or hidden unknowns.

Nassim Nicholas Taleb provides an empirical explanation for the components of a black swan event in which he describes it as an unpredictable occurrence which carries extreme impact (Taleb, 2008). The very existence of PEF with the aim to prevent large-scale damage in the case of epidemic or pandemic infectious disease outbreaks including coronaviruses disputes the possibility that COVID-19 was a black swan event. In his analysis, Taleb outlines three criteria: (1) the disproportionate role of high-profile, hard-to-predict, and rare events which are beyond the realm of normal expectations in

history, science, finance, and technology; (2) The non-computability of the probability of consequential rare events using scientific methods (owing to the very nature of small probabilities; and (3) The psychological biases that blind people, both individually and collectively, to uncertainty and the substantial role of rare events in historical affairs (Taleb, 2008).

In many ways, COVID-19 posed a classic example to Rumsfeld's "known unknown". Scientists studying infectious diseases were well-aware of the risk of potential outbreaks. In the aftermath of the COVID-19 outbreak, Columbia University Professor Simon Anthony who works in the Center for Infection and Immunity and was a key member of PREDICT - a United States Agency for International Development (USAID)-funded global program to detect and discover viruses in animal hosts with pandemic potential - insisted, "*we didn't know which virus would emerge or where, but the fact that it happened is no surprise at all*" (Columbia, 2020).

Prior to the onset of the COVID-19 pandemic, scientists predicted that the annual risk of a pandemic is comparable in scale to that of 1918 was between 0.5–1.0% with an average recurrence interval of 100–200 years (Burns et al., 2008; Fan et al., 2021). Historical data also suggests that a pandemic with a similar death toll to COVID-19 has a 38% probability of occurring in a human's lifespan (Egan, 2022). Scientists suggest this probability may double in the following decades (Marani et al., 2021; Blong 2021). Below is the representation of the Global Alliance for Vaccines and Immunization (GAVI) of the death tolls for history's seven deadliest plagues:

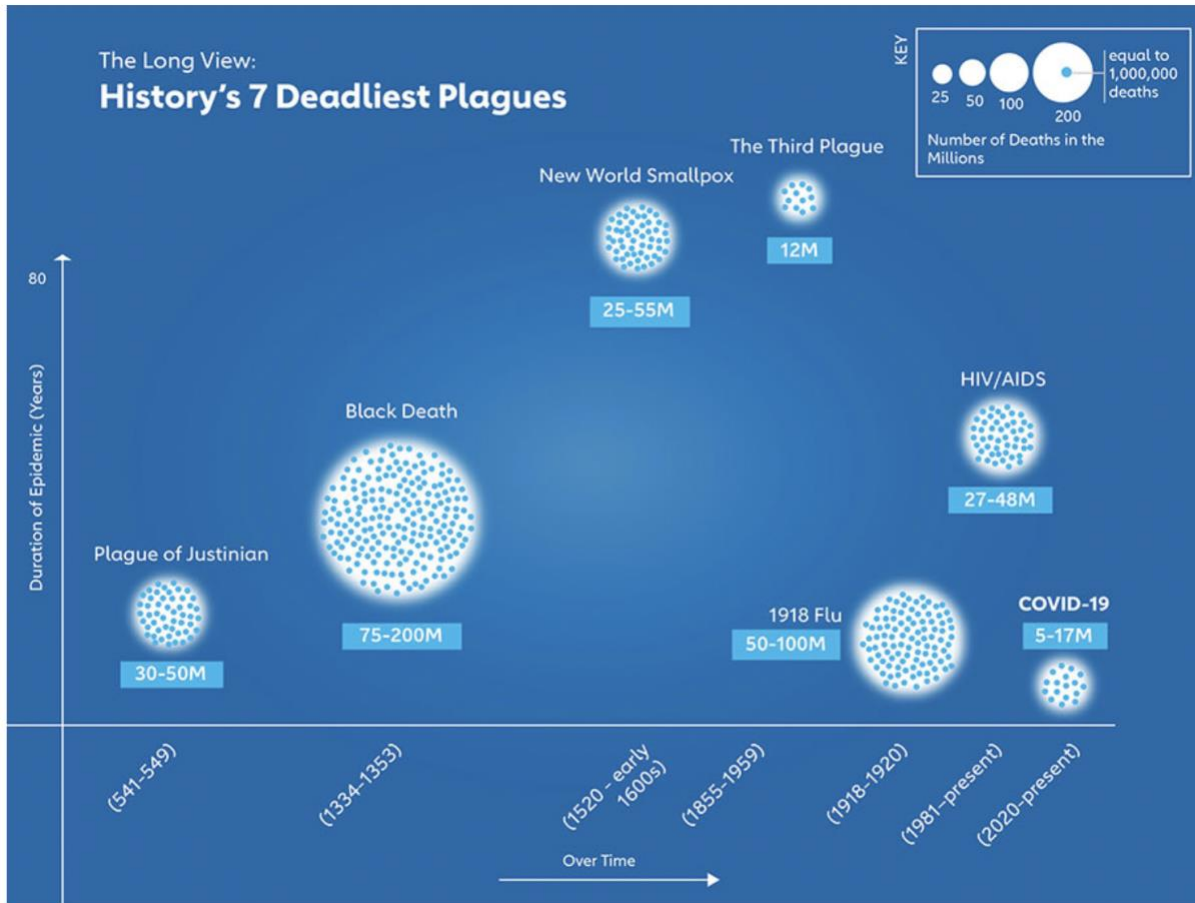


Figure 6.5: History's 7 Deadliest Plagues (Prabhu and Gergen 2021)

The graph above incites multiple questions regarding the generation of pandemic knowledge. Firstly, one must notice that the graph provides actual numbers rather than relative numbers. Given drastic changes in the global economy, exponential population growth, and technological development, comparative death toll data provides a limited view of the true potential impact of COVID-19 (McKibbin and Fernando, 2023). In this way, it is nearly impossible given this data to compare the COVID-19 cluster with the Third Plague. It remains unclear why cholera was left out of this graph. Perhaps it is due to the fact that cholera as a disease has emerged and reemerged at various locations and points in history.

Data visualization has become a primary aspect of understanding public health data (Tufte, 1985; Monmonier, 2018, 16; Bucchi and Saracino, 2016). Data visualizations can be harnessed for political gain to frame issues (Hullman and Diakopoulos, 2011; Pandey et al., 2014), give over-confident impressions of causality (Xiong et al., 2020), and make the data represented within visualizations appear transparent and factual (Kennedy et al., 2016). Data visualizations can highlight the public health issues and practices that are rooted in our past, pose solutions to how data can help us imagine futures, understand the ethical implications of the uses of data, and the impact that data visualization can have on many facets of life (Nash et al., 2022).

Some argue that we are living in a pandemic era that began with the 1918 pandemic influenza outbreak (Taubenberger et al., 2009). Recent epidemic and pandemic events such as the 2009 H1N1 influenza virus, Zika virus, and Ebola virus disease to name a few have exposed confusion about the definition of the word “pandemic” and how to recognize pandemics when they occur (Morens et al., 2009). Any assumption that the term pandemic had an agreed-upon meaning was quickly undermined by debates and discussions about the term in the popular media and in scientific publications. Arguments on the definition of pandemics ranged from a focus simply on explosive transmissibility while others assert the importance of the severity of infection (Girard et al., 2010; Altman, 2009). One must also consider the scientific advancements in understanding viral, genetic, and immune factors while noting the added complication of evolving lifestyles and underlying diseases in modern societies which impact the severity and transmission of potential outbreaks (Short et al. 2018).

6.4 AIR Worldwide: The Global Pandemic Modeler for PEF

Coronaviruses (those belonging to the phylogenetic family Coronaviridae) are among the second group of diseases covered under the PEF Insurance Window in the case of high-severity events (Section 1.01.(j) of PEF Framework). Only IDA Eligible Countries are offered PEF coverage with the Bank's reasoning being that while all countries may be susceptible to disease outbreaks, low-income countries with relatively weaker health systems may be more vulnerable and show a reduced capacity to mobilize the financial resources to effectively respond to major disease outbreaks (PEF Steering Body, 2018). In order to determine the specific criteria for triggering the pandemic bonds, the World Bank selected international catastrophe risk modeling firm AIR Worldwide to model PEF. At the time the contract was created for PEF, Air Worldwide, now under the umbrella name Verisk, boasted of having made substantial enhancements to its Global Pandemic Model. In generating PEF, the actors involved produced a novel financial object: pandemic risk finance. The definition of this object remains undefined, able to transform to fit the mold created by each actor for their own benefit.

World Bank Development Finance Manager Priya Basu expressed her support of Air Worldwide: *"The analytical structure and modeling are the bedrock of risk-transfer programs like PEF. We're confident that AIR Worldwide's analytical and execution capabilities can help ensure that funds mobilized by PEF are able to help prevent rare, high-severity outbreaks from becoming more deadly and costly pandemics,"* (Artemis, 2016). Priya's assessment of the AIR Worldwide analytical capabilities to support PEF focuses on the prevention of more deaths and costs specifically. While she does not

specify whether this referred cost is monetary or otherwise, this statement indicates that the Bank uses pandemic risk finance for outbreak containment. This involves a very narrow timeline which occurs directly after the outbreak occurs as indicated in the following timeline:

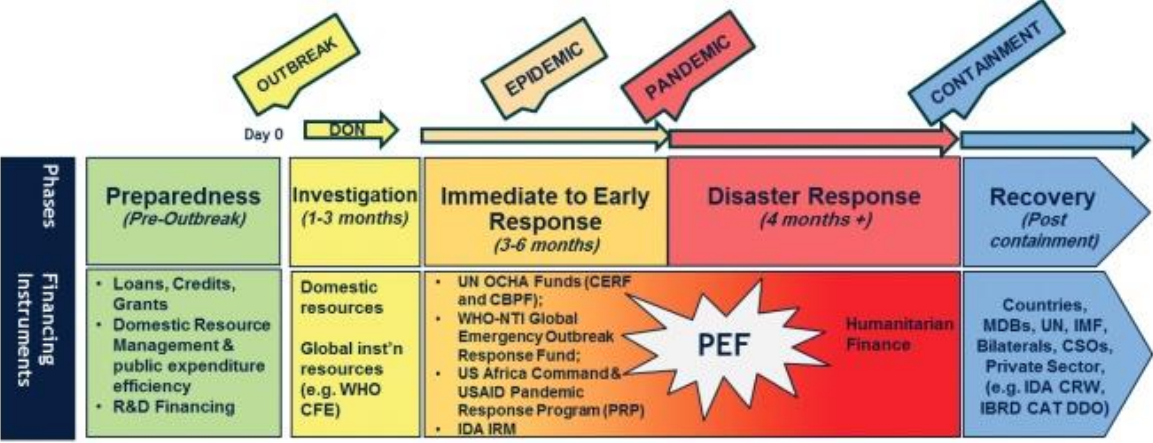


Figure 6.6: Proposed Payout Timeline from IDA for the Pandemic Emergency Financing Facility (World Bank and WHO, 2017)

According to this assessment, the mechanism will be successful if it keeps the pandemic at bay. As such, it is not the goal to prevent or even end a pandemic. It is simply meant to keep an existing outbreak from spreading to a pandemic. Yet, World Bank officials did not officially determine an agreed upon numerical threshold to define the equilibrium in the context of a pandemic.

The development of an accurate economic model from data complicated in nature. Historical economists seek to confront this task by consolidating past and present global health data. From there, one must position the data in time and space to create a unified, sensical object, with the aid of computer modeling. Therefore, until recent technological advances, generating historical data objects was nearly impossible.

Risk modeling agency AIR Worldwide (now known as Verisk) developed the Pandemic Flu Model in 2013 with the goal to analyze the potential for excess morbidity, mortality, and insurance losses caused by pandemic influenza. The model considers exposure data comparing worldwide population data, age distributions, sex ratios, and preexisting health conditions as they may mitigate and/or exacerbate the impacts of a global pandemic. The model included over 18,000 simulated events, with a range of severity, onset geographic location, and duration. The goal of the mortality modeling aspect of the pandemic model is to enable clients to enter injury or life exposures in its natural catastrophe models to estimate the resulting loss (Long, 2013).

The raw data points collected by AIR worldwide modelers lack substantial meaning on their own. However, AIR transforms incomprehensible information into a coherent form by comparing elements to tell the story of pandemic risk. Based on the model AIR has created, pandemic risk can be defined as the estimation of potential loss per country given the existing health conditions and population data. This relates back to Edwards' Vast Machine of climate data in which each individual data element is combined to compare and interpret data and models to produce stable, reliable, widely shared knowledge about the global climate (Edwards, 2010, 19).

Senior Manager of Life and Health modeling at AIR Worldwide Doug Fullam expressed confidence in his firm's ability to provide adequate data modeling. *"Modeling plays a crucial role in developing a facility such as PEF. Emerging infectious diseases pose some of the biggest threats to the life and health of people around the globe, and AIR models can help organizations anticipate the drivers of mortality and morbidity risk to facilitate optimal risk management, risk transfer, and risk mitigation decisions to help*

them better prepare financially and, more importantly, on a humanitarian level” (Artemis, 2016). The modeling agency levered the new pandemic risk finance object to address the “threat” of a pandemic. By employing the emotion of fear for the threat to life itself on the planet, the agency is able to market a solution through information. As such, AIR strives to be the information source for organizations such as the World Bank to take financial and humanitarian decisions with conviction under uncertainty (Tuckett and Nikolic, 2017; Johnson et al., 2023).

The AIR Worldwide pandemic modeling design is primarily based on mortality data. Whether this was a strategic decision or perhaps the only feasible option based on existing raw data points is not reported by the company. However, it is important to consider the impact of using this type of data source as the primary predictor of pandemic risk. The principal health impact of a pandemic is not mortality but rather morbidity, which is particularly true in the case of the COVID-19 pandemic. Pandemic outbreaks lead to a reduction in consumption of certain goods while stockpiling others and the restriction of movement generates lasting impacts on the global economy. Perhaps the most striking impact is rising inequalities. For some, the health consequences in the case of the COVID-19 pandemic have resulted in long-term morbidities. In fact, about 10% of people infected with COVID experience long COVID with the most common symptoms including fatigue, post-exertional malaise, and cognitive dysfunction for up to a year or more after infection (Thapaliya et al., 2023).

Despite being one of the major data sources informing the AIR Worldwide pandemic risk model, mortality is generally a minor cost in pandemic outbreaks. Burns et al. (2008) suggests only 12% of the economic impact of a pandemic is due to

mortality, 28% is due to illness and absenteeism, and 60% is due to efforts to avoid infection. Keogh-Brown et al. (2010) modelled the macroeconomic impact of an influenza pandemic on the United Kingdom, France, Belgium and the Netherlands. Their modelling suggests limited effects on agriculture with the rest of the economy experiencing a 5–7% decline, assuming 13 weeks of school closures and 4 weeks of prophylactic absenteeism from work averaged across the four countries.

One interlocutor from the World Bank critiqued the Air Worldwide model. *“On the risk of outbreaks of different diseases...it was just a modeling exercise. You could look at where some of the figures, the percentages, and the probabilities came from...it’s a bit of a joke, really. Now that’s the flip side to the Caribbean cat [bond]—you have data [for] all this. They created a model that will produce percentages on the basis of some assumptions. When you look at those assumptions, you question where those assumptions come from”* (Sander).

The interlocutor's critical description of the AIR model as a joke reveals their opinion that the model was not based on critical data for pandemic risk. The interlocutor's description of the Caribbean catastrophe bonds juxtaposed with the impracticalities of pandemic risk modeling suggests the interlocutor's belief in the availability of reliable data for climate risk modeling but not for pandemic risk modeling. The interlocutor seems to believe that catastrophe bonds like that of the World Bank's Caribbean cat bonds are particularly straight forward and predictable based on the available data. Pandemic risk models in general however, must be questioned in this interviewee's opinion because there is not enough data to provide concrete predictions of risk, leaving the model to be based on a collection of assumptions. This calls into

question what constitutes “enough data” for these modules. Is the determining factor the lifespan of the bond or is it dependent on the origin of the data type?

The AIR Worldwide climate risk models provide insight into this question. One example is the hurricane and flood risk models generated by AIR Worldwide (Marcella et al., 2020). The company claims that the model draws data from a wide range of climate research to leverage its industry-leading catastrophe models for U.S. hurricanes and Caribbean tropical cyclones and developed Climate Change Projections. However, in the publicly available report, the specifics of the “wide range” of data is not specified. The company uses this climate model as a tool to represent future risk, including potential changes in average annual losses and other loss metrics. Thereafter, the insurers and reinsurers reform the object for their own purposes to generate solutions for clients such as to inform mitigation and adaptation strategies, rebalance portfolios, and respond to regulatory requirements. The outcome for each of these tools is income generation.

AIR Worldwide also boasts of its new framework for modeling weather and climate extremes as having the novel ability to *“capture the planetary-scale atmospheric waves that can drive small-scale local extremes in a physically consistent manner across multiple regions and perils so that stakeholders can evaluate the global risk to their assets and portfolios for the next 10 years”* (Verisk, 2023). The model aligns with Paul Edwards’ discussion of reanalysis models from weather forecasting. Using real weather observations to produce a model of global weather forecasts by blending observations with simulation outputs to produce a data product (Edwards, 2010, XV). Air Worldwide gives meaning and value to the climate risk modeling object by marketing

an object that predicts the possibility of the occurrence of climate disasters in various locations across the globe. Thereafter, this predictive object can be sold to clients as a tool to assess their risk for company losses in each area of the world.

A corresponding financial mechanism housed at the World Bank, the Caribbean Catastrophe Risk Insurance Facility (CCRIF), generated the first multi-country risk pool in 2007 and was the first insurance instrument to develop parametric policies in traditional and capital markets (Jaramillo et al., 2020). CCRIF was developed under the technical leadership of the World Bank and with a grant from the Government of Japan (CCRIF, 2023). It was capitalized through contributions to a Multi-Donor Trust Fund (MDTF) by the Government of Canada, the European Union, the World Bank, the governments of the UK and France, the Caribbean Development Bank and the governments of Ireland and Bermuda, as well as through membership fees paid by participating governments. Much like the original goal of PEF, the CCRIF offers parametric insurance policies for tropical cyclones, earthquakes, excess rainfall, the fisheries sector and the public utilities sector through short-term liquidity after a policy within the mechanism is triggered (CCRIF, 2023).

With reference to the CCRIF, one interlocutor from the World Bank suggested that the Bank *“basically created a mutual insurance company that would provide coverage in case of earthquake and hurricanes...What is interesting is that this insurance was offered with a commitment to invest in prevention, and to reduce risk, and have contingency plans...We have to really redesign PEF to have this type of commitment, I think that this is a missing piece in PEF”* (Kuba). As a technical professional at the Bank, his opinion supposes not only that the CCRIF functions well

but also that it should serve as an example for the development of future mechanisms and that an insurance approach to pandemic risk finance is possible through the establishment of a more relevant payout structure.

Another World Bank official expanded upon this point in noting the applicability of the insurance market to climate catastrophes using the example of hurricanes. *“There is very good data for hurricanes, because every time there is a hurricane coming from the Caribbean, the National Oceanic Administration...measure[s] the pressure and the speed of the hurricane [to] know exactly where it's going to be at 5pm on Tuesday. That's the kind of data that's based on historical data and modeling. It's very well established and keeps being improved” (Leon).* Weather scholars describe the National Weather Service (NWS) as an activated organization in the face of weather emergencies (Fine 2010, 20). Yet, as Wagner-Pacifici (2000, 19) describes, an emergency puts stress on any organization, even those organizations established precisely to address it, because “the exact nature, extent, time and shape of the contingent emergencies that do occur cannot be fully anticipated.” Therefore, although climate metadata may be more established than global health data, multiple gaps still exist.

6.5 Data Modeling during the COVID-19 Pandemic

For COVID-19, a common practice by data collectors was the use of excess mortality, which measure how many more people are dying than expected compared to previous years. This circumstance relates to Edwards' conceptualization of metadata friction. At the interfaces between data 'surfaces' lies points in which data is transferred

between people, organizations, or machines, from one discipline to another, from a sensor to a computer, or from one data format to another (Edwards et al., 2011).

In order to estimate the number of excess deaths specific to COVID-19, one must add additional parameters to measure of the scale and toll of the pandemic. One interlocutor describes their perspective on improving data reliability for measuring excess deaths on the ground level. *“You have to provide the right incentives”* to gather good data on *“traditional deaths versus excess deaths in the year of the pandemic. But...that would take a while to flow through because...first they get infected, then they get sick, and then they die. The death is the crucial...last stage. So it's a good indicator, but it also takes time to occur. What's going to occur first are the infections”* (Cleo). The varying timeline between infection and death poses a major challenge for the utilization of death data to inform pandemic models.

One interviewee challenged the efficacy of pandemic risk modeling for PEF referencing the *“hundreds of pages of material...buried within the contracts issued to companies...The more you read the...three or four hundred page [prospectus], the more you realize that it looks very sophisticated, but it's based on very little really. As a consultant to a company that's been given a contract to work out the probabilities of animal to human transfer...where did they get that data from?”* (Leon). The interlocutor notes the lack of data used to inform the pandemic model and questions where the data was collected. Whether or not the excessive length of the bond prospectus was intentional by AIR Worldwide, providing an over 300-page document detailing the model inherently diminishes its accessibility to laypeople. *“When you do manage to analyze it, you realize how little substance it has in terms of predicting the probabilities of animal to*

human spillover” (Leon). In the event that one is able to analyze the document, which is likely to be limited to those who have been educated in financial policy or have worked at the Bank itself, one begins to realize how little meaning there is to the extensive document. This reality relates to Edwards’ term *metadata friction*, which signifies “the struggle to learn exactly when, how, and how much your sources revised their accounting standards and recording practices” (Edwards, 2010, 317). This occurs for a variety of reasons. One can take mortality data as an example which is a seemingly straightforward data parameter to collect.

Another drawback of using death data for pandemic risk modeling is that death is not often an isolated event, and it can be incredibly difficult to measure and report. In the midst of the COVID-19 outbreak in India, a BBC report in Spring 2022 noted that India officially reported 481,000 Covid deaths between 1 January 2020 and 31 December 2021, yet estimates from the WHO suggested that the full death toll associated directly or indirectly with the COVID-19 pandemic (described as excess mortality) between 1 January 2020 and 31 December 2021 was approximately 14.9 million (BBC News, 2022; WHO, 2022). A paper from the Lancet which utilized data from independent health research center, Institute for Health Metrics and Evaluation (IHME) used subnational all-cause mortality data from 12 Indian states to determine the mortality rate in India (Jha, 2022). The report suggested numbers similar to that of WHO and concluded that the death tolls in India as of September 2021 were six to seven times higher than the officially reported number. In the context of constructing pandemic risk knowledge, this situation emphasizes the difficulty in generating accurate and reliable information to create pandemic risk models. Each context has a unique situation

based on interconnected factors such as geopolitics, economic ties, and pandemic severity.

It is also possible that governments are influenced by political and economic incentives to over- or underreport cases. In an interview with members of the WHO advisory group for estimates of excess deaths caused by COVID-19 globally during 2020 and 2021, Ariel Karlinky expressed his *"fear that by now even if [all] the data is available, the government would be hesitant to make it public as it conflicts with their published [death] figure and the narrative that India beat COVID-19 due to various reasons,"* (BBC News, 2022). As one World Bank official described, *"they can't even measure the thing that's most measurable, which is dead people"* (Leon). This situation returns to the question of the incentives for data collection and reporting. Is it lack of resources or poor infrastructure making it impossible to obtain accurate data? What incentives are there to over or under-report cases in order to protect the country's reputation or economic status? Challenges in data collection for death tolls surely impact the excess mortality data estimates during the COVID-19 pandemic. The level of health infrastructure within a country and internal region influences the testing capacities for the virus at the ground level. Furthermore, amid an emergency, the efficiency of death registration can decrease as competing priorities take precedent.

Data modeling is further complicated by more detailed data sets such as the number of COVID-19 infections. Collecting reliable case data requires the establishment of a universal definition of a COVID-19 case as well as consistent diagnostic testing. As one interlocutor described from the perspective of the United States, *"when COVID started...you couldn't add [data from] different states because there were different*

definitions on what a case was. Even in a very wealthy country, where there's no excuse for not having at least a definition of what a case is. We have experts to define what a case is, or it should be, but every state has its own public health department" (Leon). A lack of reliable data poses a major challenge for pandemic risk modeling. International organizations have begun the attempt for data standardization in recent years to comparatively measure country progress across specified global development goals. This effort poses a challenge to sustain country ownership of data and indicators to promote active participation in shaping the development agenda. This process has been described as data harmonization, which requires navigation between country-level measures, grounded within their political, historical contexts, and global standards (Bandola-Gill et al., 2022, 41-67).

Critical data analysis requires aggregation across time and space to understand the locations and trajectories of infectious disease outbreaks (Galaitis, 2021). The reality of inadequate and inconsistent public health data results in a poor understanding of the temporal and spatial realities of the COVID-19 pandemic outbreak and creates challenges to the proposed principles guiding the triggering of PEF. During the COVID-19 pandemic, scientists struggled to find a reliable approach to analyzing COVID-19 death rates in real time. For example, Wyckoff et al. (2021), in partnership with IHME and Think Global Health, developed death rates figures to show the cumulative, reported, age-standardized breakdown of COVID-19 deaths per hundred thousand people in the 50 days following the data of the first death in each country. This is of particular importance in pandemic knowledge generation as it was a mode of analyzing

real time COVID-19 death rates, what some would call a “reliable approach” to the extent that it can be defined.

Additionally, the WHO recently generated the Joint External Evaluation (JEE) to help countries assess their ability to prevent, detect and respond to public health threats such as infectious disease outbreaks, as specified by the International Health Regulations (IHR) (WHO, 2017). Studies have found wide variations in country-level and WHO regional-level JEE scores, suggesting that many nations remain unprepared for pandemic outbreaks (Gupta et al., 2018). However, despite the study’s conclusion that the JEE is likely accurately measuring the strength of IHR-specific, public health capabilities, it is difficult to determine accuracy given vast differences in data collection capacities. Furthermore, it must be considered that the neglect of social and political features may be amplified in these instruments which privilege universalized templates and result in inadequate assessments of the impact of individual societal histories on public health responses (Mahajan, 2021).

Senegal was the seventh country in the WHO African Region to undergo a JEE in 2016 (WHO, 2017). The primary results from the study concluded that Senegal has a “solid” foundation to prevent, detect, and respond to public health threats and that the country shows a willingness to further strengthen this area of health security. This is partially based on the existence of the multisectoral platform for coordinating and monitoring operations through a One Health approach. The JEE report notes, however, the absence of formal mechanisms for coordinating work conducted jointly by various sectors, which suggests difficulty in proper management of emerging and re-emerging diseases (WHO, 2017).

The figure below indicates that a country's ranking through the JEE Score is not an accurate predictor of the number of deaths in each country, regardless of income status and region (Haider, 2020; GPMB, 2023; Milanovic, 2021). Other external factors that were not taken into consideration in this metric include political leadership and government trust. Despite having suffered immensely during the pandemic, the United States received the highest score on the GHS Index (Blake, 2021). The failure of GHS Index to accurately measure pandemic preparedness of countries necessitates a reassessment of the metrics employed to better predict real outcomes and understand what needs to be done to improve the existing weaknesses in each country. The GHS Index and JEE will be discussed in further detail later in this chapter.

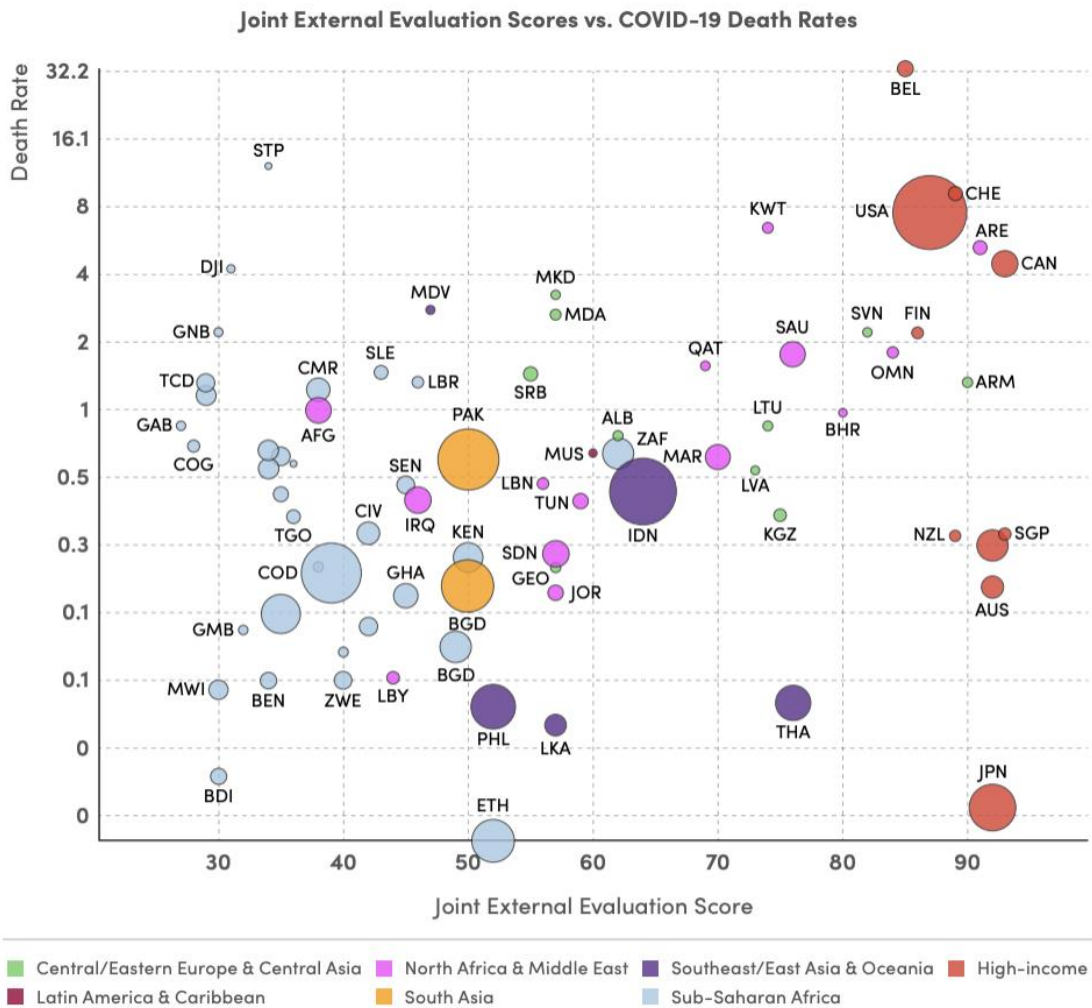


Figure 6.7: Joint external evaluations score versus COVID-19 death rates (WHO, 2023b)

One obstacle to obtaining meaningful data for COVID-19 cases in the US is the test itself. The highest-level PCR test can lead to arbitrary results depending on the number of cycles of genetic sequences that are replicated and each cycle increases the concentration of DNA present in the sample for better detection in the PCR machine (Artika et al., 2022). A positive result with a low number of cycles would indicate someone with high viral load, likely making them a high risk for transmission. By contrast, a positive result obtained only after a high number of cycles would signify

someone with a low amount of virus in their body, meaning they are in the early or late stages of their infection (Meyerowitz et al., 2021). Increasing the number of cycles results in a higher probability of viral detection regardless of the level of transmissibility of the patient. While some experts recommend limiting cycles to between 30–35, many COVID-19 tests run up to 40 cycles (Korevaar et al., 2021; Esbin et al., 2020). This arbitrary nature of what is considered a positive COVID-19 case generates increased data uncertainty when there is a lack of distinction between those who are able to spread the virus and those who are not.

A COVID-19 case report in Hong Kong presented a patient who had stayed in an open cubicle with 10 other patients for 35 hours prior to being transferred for intubation, and none of the neighboring patients or staff contacts were infected (Wong et al., 2020). The researchers relied on the risk assessment approach available published guidance for contact tracing as there is no consensus on what constitutes ‘close’ and ‘casual’ contacts (Care, 2022; eHealth Network, 2020). Despite the relatively high viral load of the patient, which had indicated transmissibility in previous studies, they did not transmit the virus to any of their close contacts, suggesting they may have been outside the window of transmissibility.

Another issue with gathering data for the COVID-19 pandemic is the absence of definition for what constitutes as a COVID-19 death. Taking the example of the US in the state of Florida in 2021, COVID-19 deaths reported by medical examiners measured 10% higher than the number declared by the state (Galaitis et al., 2021). This was due in part to the state only reporting deaths from declared residents of Florida whereas the medical practitioners are required to report all people who died in Florida due to COVID-

19. The Netherlands took an adaptive governance approach to the pandemic response both in their policy response as well as their medical response (Janssen and van der Voort, H., 2020). Adaptive governance is a term which originates from institutional theory, using concepts from political and environmental economics, and evolutionary game theory, that deals with the evolution of institutions for the management of shared assets, particularly common pool resources and other forms of natural capital (Hatfield-Dodds et al., 2007, 2). In response to the lack of testing capacity in the early pandemic, the Netherlands was missing reliable statistics on total numbers of infections and the exact causes of deaths. As a result, the National Institute for Public Health and the Environment made the decision to report cases and deaths that had been confirmed by tests without including unconfirmed infections and deaths as a result of COVID-19 (RIVM, 2020).

6.6 Lessons from Climate Catastrophes

In the aftermath of the COVID-19 pandemic, World Bank officials began exploring new approaches to pandemic risk financing while using lessons learned from established climate catastrophe mechanisms. One approach for generating new knowledge is to focus attention on combining the key elements of successful instruments. One interlocutor at the Bank described their goal of generating a new pandemic risk mechanism based on the Bank's existing and previous mechanisms as an *"ecosystem of financing instruments"* (Kuba). A healthy ecosystem includes three major components. Firstly, it must be sustainable referring to its ability to maintain its structure and organization. Secondly, it must be functional. Lastly, a healthy ecosystem must be resilient in the presence of external stress (Costanza and Mageau, 1999). This

approach evokes the following questions: What can be learned from perceiving a financial mechanism as an ecosystem? What meaning does the word ecosystem produce when attached to finance?

According to a World Bank official, supporting the sustainability of a financial system involves “*generating revenue,...delivering better on...targets, [and] realigning expenditures...So even if you're not in the climate business, you can still align your activity [to] avoid[ing] the future expenditures. That's exactly the prevention we're talking about*” (Nil). This point exemplifies the Bank’s second goal to boost shared prosperity.

However, climate finance at the Bank has been criticized for its lack of focus on those most in need. Although the Bank’s portfolio is focused on poor countries, the financial mechanisms lack a particular focus on the poor within the country. Rather, the Bank typically implements projects that bring the highest commercial earnings (Faghmous and Kumar, 2014).

While there may be lessons to be learned and adopted from preexisting climate-focused financial mechanisms already established within the World Bank, the diversity of risk, data availability, and circumstances complicates the applicability of one mechanism to the next. As one World Bank official puts it, “*there's no silver bullet*” (Kuba). This argument exemplifies the dynamic and complicated ways in which finance can be built for pandemics. Ecosystems are by nature incredibly dynamic and diverse based on a multitude of internal and external environmental factors, and there is no one right way to build a perfect ecosystem. They are also diverse around the world based on the climate as well as the organisms they provide a home for, much like the success of a Bank is determined largely by its portfolios, investors, and employees. An aquatic

ecosystem in southeastern Senegal would not thrive in the winter of Washington, D.C. and the organisms which live in the Shenandoah Mountains outside of D.C. couldn't thrive in the harsh Senegalese Sahel. The average annual distribution of reported disasters in Senegal suggests that insect infestation (18%), flooding (45%), drought (6%), and epidemics (31%) pose the greatest threat to the country's development goals (World Bank, 2011). Furthermore, the mean annual temperatures in Senegal are expected to rise by 1.1 to 3.1 °C by the 2060s and 1.7 to 4.9 °C by the 2090s with greater increases in temperature near the coast (World Bank, 2011). This is of particular importance since Dakar, located on the coast, houses 25% of the population (World Bank, 2024f).

The existence of climate change and its impact on development is widely discussed in literature (Cooper et al., 2002; Stern and Stiglitz, 2023). There are several differences between climate catastrophes and pandemics that must be considered. One ex-World Bank climate financier describes what they think may be the most important difference between climate and pandemic risk assessment. *“When a catastrophe happens, such as an earthquake, a flood, a tsunami, a volcanic eruption...the people who are most affected are the people who are on the site” (Palis)*. Indeed, climate catastrophes do not impact the entire world. In this example, one would say that the United States is not particularly affected by a hurricane in the Caribbean; although I would argue that there may be radiating consequences such as that of trade in the event that a given disaster results in severe crop destruction. Climate catastrophes disproportionately affect developing countries and the poor, exacerbating inequities in health status and access to adequate food, clean water, and other resources (OECD,

2001; Birkmann et al., 2022, 1171-1274; Nashwan et al., 2023). As a result, developing countries and the poor experience disproportionately higher levels of death, social disruption and economic damage because of climate disasters (Field et al., 2012, 25-64).

According to the World Bank expert, *“The [World Bank catastrophe bonds] in the Caribbean islands have been extremely successful, because it's known, and that's maybe a classic of the catastrophe bond. It's known that every year there will be hurricanes in the Atlantic” (Palis)*. The idea that this is “known” suggests that one can with very little risk determine that an x number of catastrophes will occur each year. *“The Caribbean islands are strung out over the Caribbean from north to south, so it's a little bit like a lottery that one knows that the hurricane will come, that it will affect some islands, but you can't know in advance which of the islands will be affected. So insurance makes a lot of sense...Let's say there are 20 island nations in the Caribbean. It is known with some certainty that one or two of those islands will be affected every year, but you don't know which. And so that makes it a classic insurance product. There is predictability that you can calculate the risk” (Palis)*. According to this interlocutor, one can predict with reasonable certainty the number disasters that will occur each year in a given region. The lack of certainty of the exact location of the impending disaster is seemingly covered by the insurance mechanism. The primary reason for his belief in the ability of insurance mechanisms to cover climate disaster risks is that the data is collected by technology. However, one must consider to what extent the collected data is reliable and what the margin for error is. To what extent can we trust climate projection models?

Data from extreme weather events are sometimes used as concrete examples to inform regional forecast models. However, the original sensor data from daily forecast cycles is not always stored, and forecasters typically work only with “processed data” - that which has already been analyzed (Edwards, 2010, 264). The manipulation of processed data by forecasters creates a collage generated by assembling, appropriating, superimposing, juxtaposing, and blurring of information for forecasting operations (Daipha, 2015). While the data collage acts as a product to predict our atmospheric futures, the data to be used in the collage is under their own discretion. In this way, I would argue that the formulation of this data product eventually increases the uncertainty of the weather predictions by introducing additional human bias based on the goal of the modeler.

Nevertheless, disaster risk modeling becomes increasingly more complicated in health-related disasters. As a result, multiple interlocutors with whom I spoke argued against the use of catastrophic risk financing mechanisms for pandemics. *“The first major difference between pandemics and catastrophes which makes them not good for catastrophe bonds is that the site of the original event is not the only site that is affected by the incident”* (Nil). Taking the example of COVID-19 pandemic, another interlocutor expands on this thought. their perspective on this topic. *“Covid is something that started in the Wuhan province, but the greatest economic cost has been a long way away. In fact, China, in some ways was less effected. And probably the biggest economic cost has been in the United States and the biggest loss of human life, relatively speaking, has been in Brazil, [although] I’m not sure who’s at the top of the ranking in this case”* (Palis). Therefore, there is a degree of universality about a pandemic in which it is not

limited to the catastrophe site. While meteorological analysis is “distributed” and “extended” across physical, virtual, and interpersonal space when it is transformed from technological data into a risk model, the expansive reach of pandemics further expands the spatial realities of pandemic models (Moore and Rocklin, 1998; Clark and Chalmers, 1998).

The market impact is more isolated in the case of climate risk. *“When you have, say, a volcanic eruption in Indonesia, it does not affect markets in London. So if you're an insurance company, or an investor in bonds in London, there is a great deal of diversification of risk. One of the biggest investors in the pandemic bonds (referring to PEF) was a company called Baillie Gifford based in Scotland” (Nil).* There is reduced risk for investors dealing with climate bonds because of the lack of correlation between climate bonds and the performance of other industries such as oil and gas. *“One of the big problems caused by a pandemic is that there is a massive degree of correlation between economic performance and insurance. So it's not very well suited as an insurance product because the risk is highly correlated with the other investments. The basic principles of investment are about uncorrelated risk. So, in any type of investment, you're looking for uncorrelated risk” (Palis).* For this reason, one can question the motivation of financing PEF through insurance mechanisms. This is also reflected in the pricing of the product, which described earlier in this chapter.

Another issue with generating an insurance mechanism for pandemic risk is that insurance mechanisms are typically set up to cover single isolated events whereas pandemics such as COVID-19 are difficult to isolate. One interlocutor used the example of an airplane crash versus COVID-19 to explain this situation. *“When an airplane*

crashes, it is a single isolated event. It either happens or it does not happen. When you get a pandemic, obviously, every pandemic starts with patient zero. I don't know how many people have contracted COVID so far, but it is pushing out into the hundreds of millions. So, what happened between patient zero and let's say patient 100 million, that process is not an easily insurable risk, you could say that you could have insurance against a patient zero, but that's not a pandemic. That's a single isolated infection. That spreading is very endogenous" (Palis).

There are also arguments in favor of the use of a mechanism to produce an intervention to address pandemic risk. In the case of a pandemic, there may be strong incentives for countries not to report the outbreak *"because as soon as you say, I've got a pandemic, everybody closes their borders to you."* In this way, *"it favor[s] insurance as much as it gives people an incentive to be honest. But there is a lot of endogeneity which takes place between...patient zero and the pandemic being declared. The country has got a lot of control over that. It would be a good thing to give countries an incentive to [declare the pandemic] as quickly as possible" (Palis).* This argument brings up theories of power in the sense that the entity which draws the pandemic risk mechanism can manipulate the recipient country to act in a manner which they see as most beneficial.

"This definitely happened in West Africa with Ebola, that countries didn't want to be open about the degree of infection because they knew it would require borders being closed and economic losses" (Palis). According to this argument, while it may be useful to adopt an incentive mechanism for pandemic risk, this insurance mechanism was not ideal in its functionality. However, one must question the process of incentivization. It is

done by whom and for whom? In the case of the 2018 Ebola outbreak in the DRC, PEF cash window was triggered after just two weeks, but the insurance window was never triggered due to the lack of disease border crossing (Brim and Wenham, 2019).

Ultimately, PEF cash window paid a USD 12 million grant which was supported by an additional USD 15 million reallocation from existing mechanisms for a total combined assistance of USD 27 million (Brim and Wenham, 2019).

6.7 Policy Recommendations for Pandemic Data Generation and Reporting

The COVID-19 pandemic incentivized international policymakers to develop new policy proposals to address pandemic preparedness efforts. To deliver the best policies and investments to better prepare for future infectious disease outbreaks, it is imperative to have reliable systems to gather country data and track preparedness progress, monitor the countries which require more investment, and to determine which countries are best prepared. The COVID-19 pandemic showed the inability of the international community to best measure countries' capacity to prepare, prevent, and respond to pandemic threats.

Despite global efforts over the last decade, assessing pandemic preparedness remains a dynamic challenge. The WHO and regional partners developed the JEE process in response to the 2014–2016 Ebola outbreak in West Africa to monitor countries' adoption and implementation of the core capacities under the International Health Regulations (WHO, 2023b). The goal of the evaluations was to assist countries in identifying “the most critical gaps within their human and animal health systems in order to prioritize opportunities for enhanced preparedness and response” (WHO, 2023b).

The 2019 Global Health Security (GHS) Index was developed by the Open Philanthropy Project, the Bill and Melinda Gates Foundation, and the Robertson Foundation with an international panel of experts (GHS Index, 2019). The GHS Index claims to provide a comprehensive assessment of country-level health security and considers the broader context for biological risks within each country. In this way, geopolitical and health system considerations and whether it has tested its capacities to contain outbreaks are used as assessment measures for a country’s capacity to respond to an epidemic (Crosby, 2020). However, given that the GHS Index data are drawn from a range of publicly available data sources consisting of individual countries, international organizations, published governmental information, data from the WHO, the World Organization for Animal Health (OIE), the Food and Agriculture Organization of the United Nations (FAO), the World Bank, country legislation and regulations, and academic resources and publications, there is an inherent challenge in assessing the accuracy of these data sources and the compatibility that each source has to one another (GHS Index, 2019).

Senegal has a 32.8 Index Score with 115/195 points on the GHS Index (GHS Index, 2019). The lowest GHS score was in prevention with an overall 2021 score of 11 as compared to the 2021 global average of 28.4. Below is a table providing an overview of the prevention, detecting and reporting, and rapid response scores in Senegal:

	2019 SCORE	2021 SCORE	2021 GLOBAL AVERAGE
PREVENTION	14.3	11	28.4
Antimicrobial Resistance (AMR)	8.3	8.3	45.3
Zoonotic Disease	27.5	7.5	19.8
Biosecurity	0	0	18.7
Biosafety	0	0	20.9

Dual-use research and culture of responsible science	0	0	2.6
Immunization	50	50	63.3
DETECTION AND REPORTING	28.3	28.3	32.3
Laboratory systems strength and quality	25	25	44.9
Laboratory supply chains	0	0	15.9
Real-time surveillance and reporting	25	25	34.6
Surveillance data accessibility and transparency	20	20	34.7
Case-based investigation	0	0	16.9
Epidemiology workforce	100	100	46.5
RAPID RESPONSE	49.5	41.3	37.6
Emergency preparedness and response planning	25	25	30.4
Exercising response plans	37.5	37.5	21.1
Emergency response operation	66.7	66.7	27
Linking public health and security authorities	0	0	22.1
Risk communication	50	50	57.9
Access to communications infrastructure	67.4	59.9	65.7
Trade and travel restrictions	100	50	39

Table 6.1 GHS Index Score Summary Senegal (GHS Index, 2019)

Arbitrary data counting poses a major problem for data reliability. Data collectors and analysts often determine their own terminology and valuation measures when analyzing data and presenting findings to other experts in the same field (Taherdoost, 2021). However, this field-specific terminology becomes an issue when it lacks distinctions for lay people or government officials trying to draw their own conclusions and generate policies. In some contexts, data collectors may engage in data fabrication ranging from active to passive acts, to subvert, resist and readdress tensions stemming from employment inequalities and challenging socio-economic conditions (Kingori and Gerrets, 2016). One must also keep in mind that data is always produced rather than simply given (Gitelman, 2013, 3).

Approaches to data collection by field scientists may be shaped by the dynamic interaction between the researcher's position at the frontline of face-to-face interactions with participants alongside their own personal ethical values and motivations (Kingori, 2013). Nonetheless, Biruk (2018) suggests that data inconsistencies are not necessarily the result of deliberate alterations. She questions the colonial assumption that fieldworkers are merely "instrumental and interchangeable" with any other data collector. This representation can cast fieldworkers as unreliable and mistake prone, leading to "dirty data". Rather, she argues that the "innovative, ad hoc, and important body of expertise they develop as they live from project to project...makes research work" (Biruk, 2018, p. 28). This idea negates the possibility of obtaining pure data free from bias. It poses a challenge to demographers, however, particularly when making a database of pandemic data gathered from international sources. How can these data be compared? To what extent is it even possible to generate reliable pandemic risk data? If it is possible, what do we mean by reliable data?

In the case of pandemics, the consequence of unreliable data may have severe consequences between life and death. In response to divergent definitions of COVID-19 deaths, an infectious disease specialist at the Bloomberg School of Public Health suggested that the presence of co-morbidities does not mean patients did not die of COVID-19. He says that "*COVID may have caused [the co-morbidities] or worked synergistically to kill them*" (Pearce, 2020).

In a discussion regarding the potential to generate reliable pandemic data in the future, one World Bank official explained the issue of time associated with gaining data points to support an appropriate pandemic insurance mechanism: "*If [the Bank]*

develop[s] the surveillance that they say is needed then you have to pull in the data for about 50 years so that you have enough data points to do the modeling. It's not something that happens 10 years from now, 20 years from now unfortunately. They should start having these surveillance systems as soon as possible” (Leon). There is a strong sense of urgency in their words pointing to the need to begin collecting this data as soon as possible to jump-start the 50-year time gap before reliable data sets are available.

As a solution to the lack of consistency in data collection and analysis, one interlocutor from the Bank suggested that *“in the health area...the WHO [could] be a third-party verifier...because they have the equipment [to] measure independently to see if the national reporting seems accurate” (Cleo).* While the WHO may be an obvious choice to verify healthcare data accuracy on an international level as the global health authority of the UN, this interlocutor may fail to understand the challenge on the ground-level of gathering reliable data in the first place. Despite the presence of equipment at their disposal in terms of labs and data analysis tools, the inconsistency in data collection at the level of the patient poses alternative challenges that the WHO may not have the capacity to manage.

Gathering case data during a pandemic outbreak is subject to major uncertainties which do not always follow a specific trend. As one interlocutor explains, *“the risks are both under reporting and over reporting. In the case of a cat bond for a pandemic, the problem would be over reporting, because then you're trying to trigger the proceeds. So that's a different problem than what we've seen where countries underreport to look good on paper. But they wouldn't have the incentive to under report if there's a cat bond*

potentially waiting to give the country money. If the pandemic reaches a certain level, then they would go to the other extreme” (Manin). This discussion suggests that the presence of pandemic bonds has further complicated the social and political dynamics which can impact a government’s decision to report cases. While in the past governments would be overwhelmingly pressured to underreport infection cases to protect the economy and their overall reputation, pandemic bonds have created a counterincentive to over report to trigger the bond payout.

Underreporting and overreporting of infection cases amid an infectious disease outbreak poses major challenges for the functionality of pandemic risk financing mechanisms. Underreporting of infectious diseases occurs for a number of reasons, including mild or asymptomatic infections, poor public health infrastructure, and government censorship (Meadows et al., 2022). This study combining epidemiological and social science theory to identify factors that may influence pathogen- and country-specific reporting rates concluded that country preparedness was positively associated with reporting. This conclusion is in line with findings that reporting rates of Dengue episodes in Southeast Asia and the Americas were positively associated with the Health Quality Index of the country (Undurraga, 2013). Furthermore, countries with higher levels of media bias in favor of the incumbent regime are associated with a decreased likelihood of reporting infectious disease cases. This aligns with a study conducted in Turkmenistan by Rechel and McKee (2007) who found that concerted efforts by political leadership to suppress infectious disease diagnosis and reporting to project an image of sound, effective governance. The mortality rate of the pathogen had the largest effect on reporting rates, with deadlier pathogens being more likely to be reported. A limitation

of the existing evidence is that the preparedness capacity of a country varies widely by pathogen. The capacity also varies across regions within a given country based on previous exposure to the pathogen and the resources for detection and dissemination (Oppenheim, 2020). The impact of global governance and government responses to pandemics will be discussed in later chapters.

One way that global health financial institutions compensate for the challenges with data accuracy and reliability in developing countries is to include excessive indicators to protect their investments. As one interlocutor at the Bank explains in an interview, *“that’s a problem with these types of indicators, which is probably why the first World Bank pandemic cat bond (referring to PEF put in a lot of other indicators to be completely sure that the data were not manipulated” (Cleo)*. Parametric risk models require the interaction of computational friction with the limits of human knowledge. A parameter is a kind of proxy which is a representation of something that cannot be modeled directly (Edwards, 2010, 293). In this way, Bank officials may have been motivated by self-preservation against the risk of uncertainty when using unreliable data sources feeding into the pandemic risk model when generating a complicated structure for PEF. In this way, the Bank was able to leapfrog over the existing risk and simply pass it onto the next consumer body.

When asked regarding the feasibility of generating reliable data on pandemics, one interlocutor explained their point of view using climate data as an example. *“It is more of a challenge than the hurricane or earthquake cat bonds. You can manipulate sensors or lie about the sensors, but that’s technology. You can [also] have different sources measuring the same thing. So, you can have more verifiable sources by having*

more than one” (Cleo). There are four diverse types of climate data sources: in situ, remote sensed, model output, and paleoclimatic (Cios et al., 1998, 1-26). According to this study, each data source brings its own set of strengths and weaknesses which must be considered in each situation. In situ provides direct observations, yet is impeded by spatial bias, satellite climate models provide global coverage while lacking continuity due to time constraints, and paleoclimate models provide the ability to use proxy data to infer preindustrial climate trends, yet the techniques to analyze such data are still evolving. To the interlocutor’s point, pooling climate data from multiple technological sources such as this may reduce uncertainty. However, the uncertainty will never be completely eliminated.

The interlocutor continues by explaining how this approach can be translated to pandemic risk models. *“You need the same thing for a pandemic because here, it’s human reporting on cases, unless they can find a way to do it without so much of the administrative apparatus needed, but I don’t think you can because you need labs and hospitals to report on what they’re seeing. Patients are seen. Infections are seen. I think it can be done, but it needs a double verification. So, you need the initial recording, but you need some kind of way to verify that it’s not manipulated”* (Cleo). While it is important to consider the ways in which data can be verified through a multi-step process, there is a limit to this assumption since they do not consider the realities within countries that create a challenge for collecting and reporting reliable data in the first place. Climate data can be verified by technological sources, thereby largely removing human error as well as social and political incentives in the data collection process, however, there are no current strategies for collecting health data in the same way.

Another interlocutor from the Bank recommends that the *“risk modeling firms in this case, [for] pandemics, could begin collecting the data now...so if a pandemic happens again such as the one that is happening or just happened, they could indeed have a good database to measure the reasonableness of new reported cases and deaths in a given country for a cat bond purpose”* (Cleo). While this may be a significant start as mentioned earlier in the discussion regarding the urgency to begin collecting pandemic data, I would argue that the challenge remains of having reliable data to collect.

This increasing uncertainty and misrepresentation of healthcare data within a given country poses a major issue for data accuracy, particularly if the data can be altered from one extreme to another based on the trigger mechanisms of a cat bond. In the final report of the WHO’s Independent Panel for Pandemic Preparedness and Response, the only mention of improving access to reliable data for pandemic risks is for open data sharing on genome sequencing data specific to the COVID-19 pandemic. In a list of five strengths to build upon, the WHO writes that *“open data and open science collaboration were central to alert and response. For example, sharing of the genome sequence of the novel coronavirus on an open platform quickly led to the most rapid creation of diagnostic tests in history”* (Sirleaf and Clark, 2021). However, this recommendation fails to address the availability of reliable data to share on open data sources. The WHO must search for solutions closer to the ground level to improve health data quality.

While working with malaria data at a health post in eastern Kolda in Senegal, the greatest challenge in obtaining reliable, accurate data seemed to be the lack of

organization and capacity within the health system. One of the many duties of the Infirmier Chef de Poste (ICP, chief nurse) at the health post was to compile and send malaria data each month to the district level hospital. There were 10 additional smaller health structures with the capacity to conduct malaria tests within the catchment area of this health post. Despite the malaria data being recorded at the health hut level, only the health post-level data was reported to the district each month. The lack of data consolidation may be attributed in part to the long distances and over-work of healthcare workers in this zone. The result of this practice was an underreporting of malaria cases in this catchment area which were collected in the peripheral structures. In this way, although there was not a specific incentive for the ICP to alter the real malaria data each month, the cases were vastly underreported due to a systematic and capacity issue. The consequences of underreporting can be widespread, particularly in curbing the ongoing malaria epidemic since lower reporting will lead to fewer resources being distributed in these areas. The COVID-19 situation in Senegal will be discussed in further detail in a later chapter.

6.8 Conclusion

Positioning PEF as a pivotal component within the infrastructure of pandemic risk knowledge production, nestled within the global health finance ecosystem, facilitates its deconstruction to elucidate both the antecedent knowledge shaping its emergence and the subsequent knowledge it engenders. Within this landscape, information infrastructures emerge as products of knowledge classifications intricately intertwined with PEF, contributing to the constructed information environment, echoing the insights of Bowker and Star (2000, 53-106).

Diverse perspectives from data scientists, scholars, and policymakers converge on the quest for accurate and reliable data, particularly in the realm of catastrophic events. Drawing parallels from the realm of weather and climate data, where established practices have evolved over recent decades, the impact of data source provenance emerges as a critical consideration. While climate and weather data benefit from technological inputs, ostensibly minimizing human error prevalent in health data, the complexity deepens when contemplating the varied approaches to data collection and analysis. The pulsating uncertainty within the metadata universe for catastrophic risk data underscores the need for concise and consistent data availability, vital for the operational functionality of catastrophic models. This imperative is starkly highlighted by the stringent and intricate measures governing financial mechanisms, exemplified in PEF payout during the COVID-19 pandemic.

Despite the acknowledged awareness among World Bank officials and data scientists of the inherent gaps in data reliability, the chapter unravels a disconcerting reality. The utilization of fragile metadata sets from Air Worldwide culminates in an overcomplicated and unreliable pandemic risk model for PEF. The subsequent chapters will build upon this foundation, delving into the ramifications of employing unreliable data models to fashion private financial solutions for pandemic risk, scrutinizing the ripple effects on global health security and financial preparedness.

Chapter 7: Managing Pandemics through Market Value

7.1 Interlude

At the farmer's market in D.C., one can buy local produce while also consuming a variety of other products such as fair-trade coffee, homemade pastries and the like as they wander around the market - always having something in hand to consume and enjoy. The D.C. markets were full of a variety of local foods: Multiple species of peaches, local honey, tomatoes, while wet markets were kept separate offering varieties of meats or seafood. As long as it was in season, one could find anything that they needed. The owners were always pleasant, and if it wasn't too busy, they would share the background of their products—the time it takes them to grow, the proper farming techniques, the difference in taste between each variety of peaches or other produce.

During the summer of 2021 in Washington, D.C., attending social activities such as a farmers' market had become intertwined with the expression of one's political beliefs since mask-wearing had become politically charged in the US during the presidential elections. There was also an emotional charge to mask-wearing. The light blue surgical masks were able to prevent the spread of the virus from the wearer to others; however, they do not protect the wearer from others. In this way, wearing a mask became a symbol of care – particularly for vulnerable members of society such as those with autoimmune diseases, and the elderly which were more likely to become severely ill from COVID-19.

It was mandatory to wear masks at the farmer's market, however, some could be seen wearing them in varied fashion covering the nose and mouth, just below the nose,

or even what became known as a “chin strap” in which the mask sat just under the wearer’s mouth at the bottom of the chin.



Figure 7.1: Photo taken at Farmer's Market in Washington, D.C.



Figure 7.2: Photo taken at weekly fish market in Washington, D.C.

There is a notable difference between the D.C. markets and those in Bologna, Italy—the small northern Italian city that I had learned to call home since November 2020. Rather than the pop-up tents characteristic of Washington D.C., many Bolognese markets have a more permanent infrastructure. Residents attend the markets any day of the week for locally produced products.

Il Quadrilatero in the center of Bologna features vibrantly colored produce and a never-ending supply of different varieties of aged parmesan and sauces in La Salumeria Simoni. Despite the relaxed nature of the city, the market bustles with energy. The fish mongers and cheese mongers move each person through the shop swiftly like a machine. It is a place which can become normal after some time, but it can never lose its beauty and simplicity.



Figure 7.3: Photo taken near Mercato di Mezzo in Bologna, Italy in 2020



Figure 7.4: Photo taken at il Quadrilatero market in Bologna in 2021

Comparing these markets to those in Kolda—the southeastern region of Senegal where I had spent a year working as a Community Health Agent and later returned for this research project—there is a striking unique nature about the way that people and food connect in each place. The markets in Senegal were bustling places where each person filled their table with their specialized product. Some sold multiple varieties of vegetables, others sold fresh shea butter. One could enjoy the light banter that filled the markets. Every interaction seemed to be an opportunity for playful connection.

Despite having multiple ethnic groups living amongst one another, Senegal is a particularly peaceful state. When approaching the market, one would zigzag through the market streets, approach a counter, and greet the smiling salesman starting with “Asalaam Malehkum” and continuing with the usual morning greetings asking about his family, work, etc. before choosing the selected item and bantering for the unfixed price of the product. It was easy to recognize someone’s origin based on their last name. If one was from a different ethnic group than another, it was often met with harmless banter. A common conversation at the market was to what someone’s last name is. In my case when I answered with the last name “Danfa”, one may respond that I should take the name “Diallo” because it was a strong Pulaar name, playfully boasting that the Diallos eat chicken whereas the Danfas eat only beans. These are interactions in the market which are harmless yet connect people. It also connected the consumption of animal proteins to wealth. The playful banter in the markets was something unique to Senegalese culture, which allowed for people from diverse backgrounds to find peace and joy in one another’s humanity despite their differences.

Masks were very common at the beginning of the pandemic in Senegal, but by late May 2021, the masks were rarely seen in public spaces. The mask itself had transformed its value and could be seen more often on motorcyclists on particularly smoggy days.

The market stands in Kolda do not have the same variety as those in Dupont Circle with three types of coffees from various countries or the varieties of tomatoes that could be found in Mercato del Erbe. They are simple. One must decide solely how many carrots rather than which species. One must take what is available. In each market, however, one can feel the connections transforming. Seeing the same people week after week, giving discounts to loyal customers, discussing the difficulty at certain times of year to produce certain products, noting the challenge the rain or the severe heat could bring to food production. The exchanges within each market environment create an ecosystem of transfer in which social, cultural, economic, and political relations are grounded in financial transactions. Ideally, all parties benefit from these transactions. The vendor provides the product for which the customer searches; the customer provides financial reward the seller; children waltz joyfully in search of sweets. And yet, tensions are also generated by these transactions. Customers argue with vendors to reduce the price of commodities and are at the mercy of what the market can offer. Producers rely on permitting weather to make ends meet, yet they must also meet the expectations of the market to provide quality products.

Farmers markets, whether in Washington, D.C., Bologna, Italy, or Kédougou, Senegal, serve as vibrant hubs where local producers directly connect with consumers, fostering community engagement and supporting sustainable agricultural practices.

These seemingly disparate markets also exhibit subtle connections to financial markets. In Washington DC, for instance, the success of farmers markets can reflect broader consumer trends and economic conditions, influencing investor sentiment and shaping investment strategies in related industries. Similarly, in Bologna, Italy, the performance of local farmers markets may impact agricultural commodity prices, influencing trading activities in regional financial markets. In Kédougou, Senegal, the accessibility and viability of farmers markets can play a role in rural economic development, impacting investment decisions and financial inclusion initiatives aimed at supporting small-scale farmers. Thus, while farmers markets primarily serve local communities, their activities can ripple into financial markets, highlighting the interconnectedness of economic systems on both local and global scales.

Farmers markets, whether in Washington, D.C., Bologna, Italy, or Kédougou, Senegal, serve as vibrant hubs for local producers to engage directly with consumers, fostering community connections and sustainable agricultural practices. However, beneath their surface differences, these markets exhibit subtle connections to financial markets. In Washington, D.C., for example, the success of farmers markets reflects broader consumer trends and economic conditions, influencing investor sentiment and investment strategies in related industries. Similarly, in Bologna, Italy, the performance of local farmers markets may impact agricultural commodity prices, thereby influencing trading activities in regional financial markets. Moreover, in Kédougou, Senegal, the accessibility and viability of farmers markets can play a pivotal role in rural economic development, influencing investment decisions and initiatives aimed at enhancing

financial inclusion for small-scale farmers. The nature of economic systems causes ripple effects of local food markets on global financial markets.

Markets connect local farmers markets and broader financial markets, illustrating how economic activities at the local level can have ripple effects on regional and global financial systems. Similarly, PEF in theory should address the economic impacts of pandemics by providing timely and coordinated financial assistance to countries in need. By supporting countries in managing the economic consequences of pandemics, PEF should contribute to financial resilience at both the national and global levels.



Figure 7.5: Photo taken in the market in Kédougou, Senegal in 2021



Figure 7.6: Photo taken of exchanges in the Vèlingara market in the region of Kolda in 2021

7.2 Introduction

The landscape of global health financing has undergone a significant transformation in recent decades, witnessing a surge in the utilization of innovative private mechanisms. These mechanisms encompass a spectrum of financial instruments, ranging from swaps and bonds to philanthropic initiatives and financial facilities that attract diverse investors. Financialization, a concept defined by the escalating importance of finance, financial markets, and financial institutions in the economy (Davis and Kim, 2015, 2), has become a central theme. Within this evolving financial paradigm, the World Bank has undergone a notable shift—from its

conventional role as a lender for major development projects to a facilitator for private investment (Jomo and Chowdhury, 2019).

Existing literature has delved into the impact of the financialization of global health (Erikson, 2015; Stein and Sridar, 2018; Cordilha, 2022), laying a foundation for this exploration. Building upon the exploration of pandemic risk knowledge in the preceding chapter, which focused on historical perspectives and future trajectories with an emphasis on data models, this chapter embarks on an analysis of the financialization of pandemic risk. The chapter explores how the design and implementation of financial mechanisms for pandemic risk, such as PEF, reflect normative positions on the most effective approaches to addressing pandemics. It will examine how stakeholders' perspectives on financialization shape the development and utilization of such mechanisms, and how these perspectives interact with broader debates on governance and institutional arrangements.

7.3 Generating a Market for Pandemic Risk

In an effort to address the growing risk of infectious disease outbreaks, in summer 2017, the World Bank launched two specialized bonds aimed at providing financial support to PEF to channel surge funding to developing countries at risk for a pandemic outbreak. The World Bank executive report for PEF stressed that *“pandemics pose a serious threat not only to global health security, but also to economic security and to our ability to end extreme poverty and achieve the Sustainable Development Goals”* (Hansen, 2016b). In an attempt to learn from the lessons of Ebola, PEF was designed to help fill the pandemic response funding gap which countries face after the

period of immediate to early investigation, assessment and response—and before large-scale disaster and humanitarian relief funding is mobilized.

Indeed, the WHO named health financing as one of the six key priorities of health systems (Evans and Etienne, 2010). In order to establish PEF, the World Bank partnered with the WHO and other partners to provide surge response funding in IDA countries to prevent rare, high-severity disease outbreaks from becoming pandemics and to complement existing global and World Bank financing mechanisms for health system strengthening and outbreak preparedness (World Bank and WHO, 2017). This indicates that from the beginning, PEF was not necessarily meant to act as the main feature of the Bank's pandemic risk financial portfolio. However, it was an important mode of financial marketing for the Bank nonetheless.

The facility held the slogan "*Protecting people, protecting economies*" from the risk of the six viruses that the WHO deemed most likely to cause a global pandemic. However, as this facility came to a close, critics argued that PEF was too expensive and ineffective, in part due to its lack of focus on preventative measures. A recent study predicts that the coordinated gross prevention costs for zoonotic disease outbreak amount to USD 22.0 - USD 31.2 billion per year as opposed to the immense potential cost of a pandemic of between USD 8.1 – USD 15.8 trillion, indicating the economic value of providing funding for prevention and preparation rather than response (Dobson et al., 2020). Reducing the likelihood of extreme outbreaks by 10% can cut expected deaths by 300,000 and reduce the cost of mortality losses by up to USD 2 trillion yearly. Reducing the likelihood of extreme outbreaks by 10% can cut expected deaths by 300,000 and reduce the cost of mortality losses by up to USD 2 trillion yearly (Bernstein

et al., 2022). Estimates suggest the median economic loss from the COVID-19 pandemic amounted to an average USD\$5.9 trillion in GDP in 2020 (Dobson et al., 2020). This prediction considers the costs of the following major risk factors:

Table 7.1 Major risk factors of the COVID-19 pandemic (Dobson et al., 2020)

Item	Values (2020 USD\$)
Annual funding for monitoring wildlife trade	\$250-750 M
Cost of programs to reduce spillovers	\$120-\$340 M
Cost of programs for early detection and control	\$217-\$279 M
Cost of programs to reduce spillover via livestock	\$476-\$852 M
Cost of reducing deforestation by half	\$1.53-\$9.59 B
Cost of ending wild meat trade in China	\$19.4 B
Gross Prevention Costs	\$22.0-31.2 B

The study above was motivated by the clear lack of investment in measures to prevent pandemics. Much attention has focused on modeling pathogens with immediate global urgency, such as influenza and severe acute respiratory syndrome while vector-transmitted, chronic, and protozoan infections are often neglected despite playing a crucial role in cross-species transmission (Lloyd-Smith et al., 2009). Studies show that preventative measures such as reducing deforestation and managing wildlife trade have been shown to be highly functional efforts for limiting zoonotic spillover (Woolhouse et al., 2012). Even median levels of habitat loss create the highest risk of spillover (Faust

et al., 2018). These efforts are examples of how public funding can be utilized to generate preventive solutions to address pandemic risk. This study has included specific elements to analyze the balancing of costs between attending to prevention or the aftermath of a pandemic. However, it must be noted that scientists do not have the means to compare the effects of neglect to the effects of a specific intervention or preventative measure since there are real courses of action that are taken. In this way, the alternative present can only be an estimate.

Despite evidence pointing to the economic importance of financing prevention and preparation efforts, the World Bank's PEF focuses mainly on response, which indicates that even the design of PEF lacked efficiency. The nature of PEF is also inherently complicated by design. The new PEF launched in 2017 was created to generate a pandemic risk market through two mechanisms. The first mechanism utilizes insurance-based financing, and the second through IBRD catastrophe-linked insurance transactions and catastrophe-linked bonds.

PEF's insurance-based component known as the iPEF was approved on a pilot basis in 2016 with the goal to obtain "prompt" and "adequate" financing to stop outbreaks of specific diseases. The resources for PEF's insurance window were provided by the reinsurance market and catastrophe bonds issued by IBRD. The maximum payout for the insurance window was marked at USD 320 million over a three-year period to IDA-eligible countries. PEF specifically targeted IDA-eligible countries noting that their characteristically weak health systems and low financing capacity in the event of an outbreak. The insurance premiums were funded by development partners and the governments of Germany, Japan, and Australia. The

insurance contracts were signed between the World Bank and major insurers and reinsurers, and the catastrophe bond was placed with Insurance-Linked Securities investors, who invest in catastrophe bonds linked to natural events, longevity, mortality, and extreme mortality events (World Bank Treasury, 2017).

The original purpose of PEF was twofold: (1) Channel essential, timely surge financing to key responders efficiently, including governments, multilateral agencies, and civil society organizations (CSOs), to stop or slow down an outbreak with pandemic potential and to minimize its health and economic consequences; and (2) help catalyze the creation of a global market for pandemic insurance instruments by drawing on resources from reinsurance and capital markets (World Bank, 2016b). During the launch of PEF in 2017, President Jim Young Kim expressed his belief in PEF to generate market value alongside positive health outcomes: *“We are moving away from the cycle of panic and neglect...[by] leveraging our capital market expertise, our deep understanding of the health sector, our experience overcoming development challenges, and our strong relationships with donors and the insurance industry to serve the world’s poorest people”* (World Bank Treasury, 2017). The Chair’s Summary report from May 2017 reinforces the goal of market generation as one of the primary incentives for creating PEF. The Directors noted that the innovative facility will help mobilize resources from both the public and private sectors, and the insurance mechanism could play a catalytic role in creating a global market for pandemic insurance instruments (World Bank Treasury, 2017). These hopeful claims at the launch of PEF reinforce the World Bank’s strong focus on market generation (Meier and Stiglitz, 2001, 495).

PEF is presented as a fast and highly accurate financial mechanism, with little space for doubt or deliberation. PEF Overview document states the following regarding the payout process: *“The payout process is guided by the principles of speed, adequacy and flexibility; it is designed to be as predictable as possible in terms of timing and allocable amounts. In situations where there is no ambiguity regarding the type, severity, growth and spread of the outbreak, and in which the pay-in is activated by unequivocally measured parametric criteria under the insurance window, the payouts will be made with minimum deliberation and will follow ex-ante established procedures”* (World Bank, 2016a, 18). One must consider what it means to be as predictable as possible. In this case, PEF overview document refers to the reliability of the payout mechanism to follow a predictable timeline once PEF has been triggered. However, as noted in detail in chapter 6, given the unpredictable and multifaceted nature of zoonotic outbreaks which are impacted by the nature of the disease, available resources, culture, location, and the environment, the emergence of a pandemic outbreak completely devoid of ambiguity it is unlikely to occur. The evolutionary properties of pathogenic microorganisms produce dynamic relationships between microorganisms, their hosts and the environment leading to the potential for widely varying pandemic futures (Morens et al., 2004). As a result, despite the positive marketing by the World Bank, triggering PEF in the case of an infectious disease outbreak is inherently complicated in the event of a real pandemic.

Each country’s health profile also impacts the risk of pandemic severity. A study was conducted in Senegal with COVID-19 cases in patients with comorbidities. Results suggest that those suffering from non-communicable diseases including diabetes,

hypertension, and cardiovascular disease over the age of 65 years were associated with higher risk of death (Diarra et al., 2022). Non-communicable diseases (NCDs) are pose a significant health threat in Senegal. The age standardized mortality rate of the four major NCDs including cardiovascular disease, chronic respiratory disease, cancer, and diabetes was 570 per 100,000 in males and 521 per 100,000 in females in 2021 (WHO, 2023a). The Senegalese population, however has only 3% over the age of 65, leading to a low mortality risk from COVID-19. Below is the percentage of the population by age group.

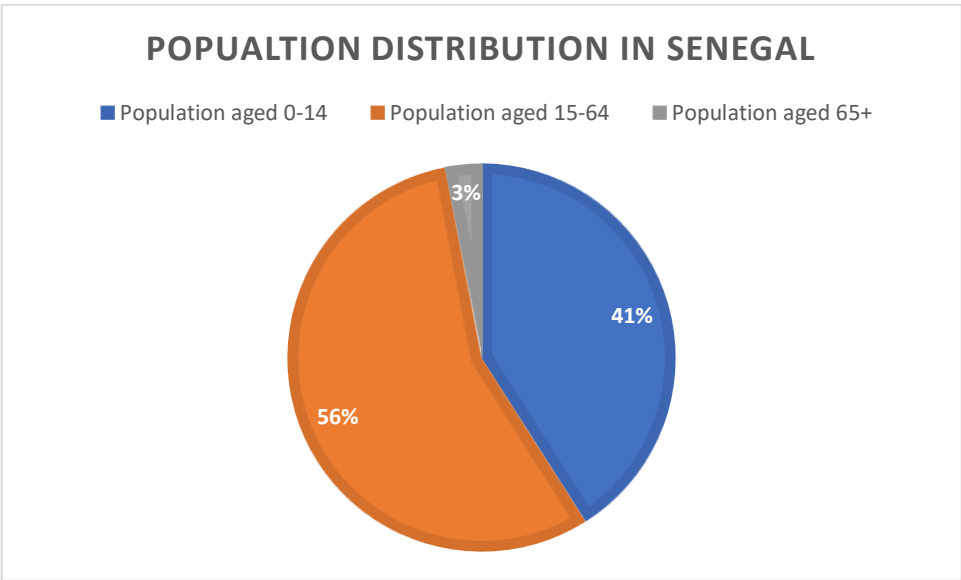


Figure 7.7 UNFPA, 2024

The statement later notes that *“in all other cases, payouts will be made following due consideration by the steering body based on expert advice and evidence and will be tailored to the outbreak situation. Time limits will be set to ensure that the deliberation process does not delay payouts”* (World Bank Treasury, 2016). The Bank boasted of the innovative approach of the insurance model which once the activation criteria are met, *“can be settled in days compared to the time it takes for indemnity*

insurance payments to be disbursed” (World Bank Treasury, 2016). Despite these claims, it is not indicated in official documents whether a time limit was officially set. In the case of the COVID-19 pandemic, PEF did not pay out for months after the WHO had officially declared the pandemic. The problem of time in the case of PEF payout has much to do with the insurance mechanism of PEF.

Building on the argument in the previous chapter that pandemic risk is not currently well suited to be financed by insurance, one World Bank economist explained that in insurance mechanisms, the *“insurer must be compensated for the uncertainty in the estimates of the probabilities. That’s what required the [annual] payment on the [PEF] bonds...to compensate for the uncertainty in the model for diseases”* (Leon). Not uncommonly in this case, the total economic or business cost of a major or catastrophe loss event significantly exceeds the insurance claims payment (Putner, 2016). In agreement with the argument against the insurability of pandemic risk, another World Bank official compared the insurance market for pandemics to the familiar market of a mortgage. While pandemic risk and housing risk should not be conflated, this excerpt provides interesting insight into the perspectives of World Bank financiers when considering insurance mechanisms for various risks. *“You can insure...houses or mortgages because there’s very good data on...how many houses are broken into [or] how many houses burned down [each year]. [Even] in developed countries there is good information. So the insurance company can actually calculate what the premium is for these. But for outbreaks, basically, they should forget about it”* (Phen). With a global spotlight shining on the COVID-19 response, there was an increased global effort to gather and analyze case data. However, considering the risk profile of PEF in the case

of the COVID-19 pandemic, the outbreak risk is compounded on multiple additional uncertainties: the lack of available historical data on coronaviruses, a lack of available real-time data on new cases, and the disincentivization of case reporting at the community and national levels – a topic which was discussed in detail in the previous chapter.

7.4 PEF Case Studies: Comparing Payout for Ebola and COVID-19

Even prior to the Ebola outbreaks, health care response-ability was overshadowed by historical political tensions and war which left less money available from government funding (Haraway, 2016, 104-116). The lack of funds available for national public financing provided the space for PEF to be marketed as a savior for government failure (Erikson, 2019). As such, PEF represents the larger trends away from sustainable and direct investment in health care systems and towards a supply- and demand-oriented architecture such as pay-for-performance financing and accountable care systems (Soucat et al. 2017; McClellan et al. 2014). The following discussion of the 9th and 10th Ebola outbreaks provides an example of the disorganized and broken private financing system for disease outbreaks and the minor role that PEF played despite its large-scale marketing.

Consideration of the anthropocentric nature of PEF through a multi-species lens reveals how human-centric perspectives often overlook the complex interconnections between humans, animals, and the environment in disease emergence and transmission. As highlighted by scholars such as Haraway (2013, 31) and Tsing (2015, 155), adopting a multi-species perspective is essential for understanding the intricate entanglements between different species and ecosystems, particularly in the context of

zoonotic disease spillover events. The spillover events for diseases like Ebola and COVID-19 underscore the interconnectedness of human and non-human actors, as these pathogens originate from animal reservoirs and undergo transmission pathways that involve human-animal interfaces (Jones et al., 2008; Morse et al., 2012).

PEF, however, tends to prioritize a narrow biomedical approach that focuses primarily on human health outcomes and epidemic response measures, often overlooking the broader ecological and socio-economic factors driving disease emergence and transmission (Gostin and Friedman, 2015). While PEF aims to provide rapid and flexible financing to support early response efforts during pandemics, its design and implementation largely neglect the underlying root causes of zoonotic spillover events, such as deforestation, habitat destruction, wildlife trade, and intensive livestock farming (Allen et al., 2017; Dobson et al., 2020). Consequently, PEF does not have the capacity to mitigate future spillover events unless it incorporates a more comprehensive understanding of the socio-ecological dynamics underlying disease emergence and transmission.

In order to address this limitation, future iterations of PEF could benefit from integrating insights from multi-species approaches and One Health frameworks, which emphasize the interconnectedness of human, animal, and environmental health (Fèvre et al., 2017; Hinchliffe et al., 2018). By adopting a holistic perspective that considers the socio-ecological drivers of zoonotic diseases, PEF can better target interventions aimed at preventing spillover events and enhancing pandemic preparedness at the interface of human and non-human ecosystems.

The first confirmed cases of Ebola in the DRC were recorded on April 23–25, 2018. The DRC experienced 10 outbreaks since 1976 through July 2019. Despite the death toll in previous Ebola outbreaks, only the 9th and 10th Ebola outbreaks in the Democratic Republic of Congo (DRC) met the trigger requirements for PEF payout.

The 9th Ebola outbreak was graded as a WHO Level 3 outbreak, requiring intervention by the WHO Headquarters and was declared ended on July 24, 2018. In total, there were 54 cases resulting in 33 deaths, and it took 77 days to contain the outbreak (WHO, 2018; Georgetown University, 2019; Gupta et al., 2021). The 10th Ebola outbreak in the North Kivu and Ituri provinces of DRC was declared by the Ministry of Health in August 2018 in the midst of ongoing insecurity and humanitarian crises, resulting in delays in outbreak detection, declaration, and response (Munster et al., 2018). The 10th Ebola outbreak was the second largest Ebola outbreak to date with 1,400 confirmed and 66 probable cases, including 92 health workers; and over 957 deaths as of May 1, 2019 (World Bank, 2019a, 19). Deaths caused by the outbreak reportedly began in April 2018, but alerts were delayed three months due to related difficulties in accessing the region and frequent health care worker strikes for nonpayment of salaries (Salama et al., 2019; Stone et al. 2024).

Figures 7.8 and 7.9 below depict the World Bank’s collective financing efforts during the 9th and 10th Ebola outbreaks in the DRC:

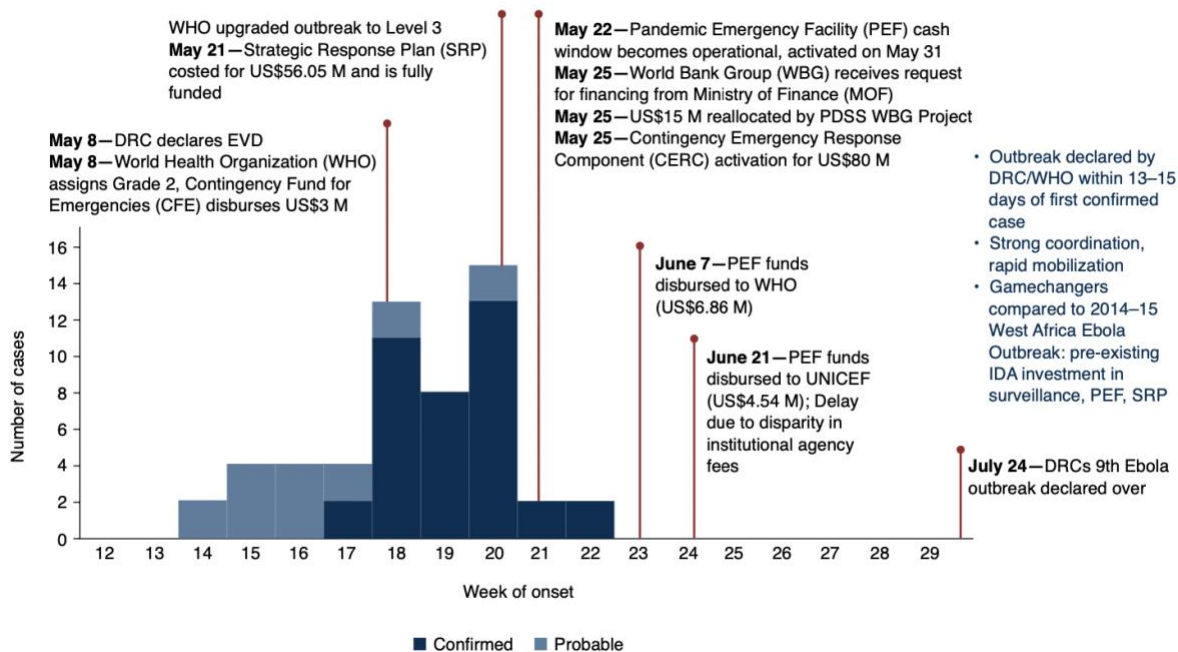


Figure 7.10: DRC 9th Ebola Outbreak: Epidemiological Curve, Key Events, and Funding Commitments, 2018 (World Bank, 2019a, 27)

During the DRC 9th Ebola outbreak, PEF contributed USD 11.4 million out of the total USD 165.45 million contributed by the World Bank in total. On May 22, 2018, the World Bank activated PEF cash window for the first time, which produced a payout of USD 11.4 million financed by the German government (funded by German taxpayers). At MOH’s request, the funds were disbursed to WHO (USD 6.86 million) on June 17, 2018, and to UNICEF (USD 4.54 million) on June 18. This amount accounts for just 6.89% of the total response financing and was the final mechanism to be paid out during the duration of the outbreak both over a month after the DRC declared the presence of Ebola Virus Disease (EVD). The Bank claimed that the delay in payout to UNICEF from PEF on a “disparity in institutional agency fees”, which is indicative of a complication in the mechanism (World Bank, 2019a, 27).

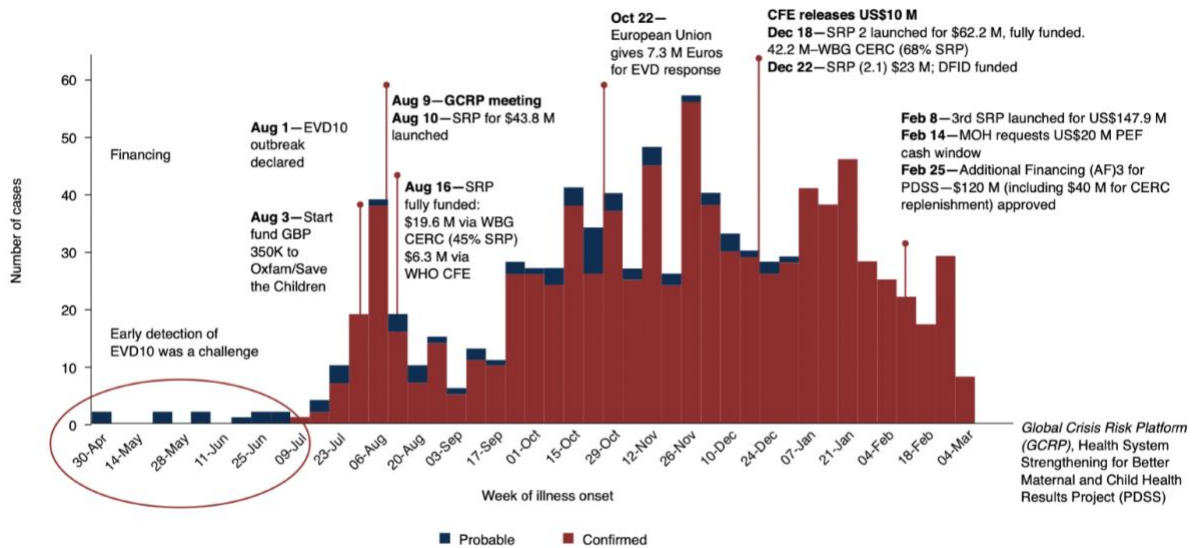


Figure 7.11 DRC 10th Ebola Outbreak: Epidemiological Curve, Key Events, and Funding Commitments (World Bank, 2019a, 28)

During the 10th EVD outbreak, the World Bank funded 45 percent of the 1st Strategic Research Program (SRP) - a strategic partnership between the Department for International Development (DFID) and the World Bank (USD 19.6 million, of which US\$10.5 million went to the UN agencies), and 68 percent of the 2nd SRP (USD 42.8 million, of which US\$30 million went to the UN agencies). The partnership between DFID and the World Bank aligns with former Secretary of State for DIFID, Andrew Mitchell, whose goal was for DFID to behave as a Sovereign Wealth Fund rather than an aid agency (Mawdsley and Taggart, 2022). The financialization of government spending on aid in the UK during this time mirrors the World Bank's shift toward market value through private partnership (Kamensky and Morales, 2006, 143).

Other donors leveraged pooled funds to finance the response, including EU's Emergency Aid Reserve, WHO's Contingency Fund for Emergencies. The leveraging of pooled funds to finance pandemic response can seek to address the fragmentation of

management of collective public financing for health which has historically resulted in poor and unequal coverage of costly catastrophic events (Mathauer et al., 2020).

Pooled funds are not dramatically new and have been used in numerous countries with a decentralized financial system including Spain and the UK (Bernal-Delgado et al., 2018; Buck and Dixon, 2013).

The 3rd SRP of approximately US\$147.9 million was issued to address the continuing outbreak (Guetiya Wadoum et al., 2021; Africa CDC, 2019; WFP, 2019). USD 20 million of Contingency Emergency Response Component (CERC) money is available for the 3rd SRP, and the World Bank prepared additional financing of USD 120 million in IDA grants to replenish PDSS project activities and add USD 40 million to the CERC. While the Government of DRC requested that USD 20 million be mobilized for PEF Cash Window to contribute to the 3rd SRP funding gaps, this minimal potential addition to the 10th EBV response from the Cash Window did not pay out. Additionally, the insurance window of PEF from the pandemic bond was never triggered by any of the EVD outbreaks in West Africa (Ghanem, 2019).

The takeaway from these amounts of funding that are circulated and not sufficient suggests that decentralized financial mechanisms for high-stake pandemic outbreaks is not a tangible solution. Studies suggest that reducing the impact of epidemic and pandemic outbreaks such as Ebola requires improved long-term investments in health system strengthening, improved international collaboration between financial stakeholders, and more funding for research and development efforts aimed at prevention, preparedness, and response rather than the siloed approaches to response that primarily characterized the Ebola outbreaks (Elmahdawy, 2017).

Table 7.2: Selected World Bank Public Health Emergency Financing Tools and Contingency Instruments (World Bank, 2019a, 33)

Instrument	Description	Activation in Africa	Major Source of Funding
PEF—Insurance	Parametric outbreak insurance financed by pandemic bond	Has not been activated	Germany, Japan, WBG
PEF— Cash Window	Ad-hoc cash grants to fund the financing gap in national emergency response plan to outbreak	2018/DRC-USD11.4 million	Germany, Japan, Australia
Contingent Emergency Response Component (CERC)	Instrument to reallocate WBG Investment Project uncommitted funds among emergency response components	Lassa Fever/Nigeria-USD2.5 million; 2018/DRC-USD80 million	Country portfolio, REDISSE Project/Nigeria and PDSS Project/DRC
Crisis Response Window (CRW)	IDA instrument to provide funding to projects to address recovery and reconstruction. CRW complements core IDA allocations	Emergency Response Project/West Africa Liberia, Senegal, Sierra Leone-USD390 million EERP	IDA-multi donor

The WBG financed a total of over USD 157 billion for the COVID-19 pandemic between April 2020 through the end of fiscal 2021. The response was financed largely by the 2018 IBRD and IFC General Capital Increases and the IDA19 Replenishment (World Bank, 2021a). It includes USD 45.6 billion from IBRD allotted to middle-income countries, USD 53.3 billion from IDA in the form of grants, concessional terms, and built in debt relief high risk countries; USD 42.7 billion¹ from IFC to private companies and financial institutions; USD 7.6 billion in guarantees from MIGA to support private sector

investors and lenders; and USD 7.9 billion from recipient-executed trust funds (World Bank, 2021a). In April 2020, the Bank employed the Health Strategic Preparedness and Response Program (HSPRP) financed by the global multiphase programmatic approach (MPA) to eligible countries to address health needs. Between April 2020 and June 2021, the Bank financed USD 8.4 billion for COVID-19 response operations under the MPA and reprioritized USD 3.1 billion (World Bank, 2023f).

Despite the strong marketing efforts of PEF at its launch, the World Bank Annual Report 2022 has little mention of PEF. The report boasts that between April 2020 and March 2022, the Bank committed over USD 200 billion to respond to the impacts of the pandemic, which included over USD 73 billion of IDA resources for the poorest countries. Since the beginning of the pandemic, the Bank has committed USD 13.1 billion to support countries' COVID-19 responses in Eastern and Southern Africa. The Bank also provided USD 2.9 billion to help 20 countries to buy and distribute vaccines, expand storage and cold chains, develop tracking systems, train health workers, engage citizens and communities, and strengthen health systems (World Bank, 2023a). Yet, nowhere in the annual report is PEF mentioned. This is perhaps because the total payout for PEF, though meeting the maximum limit, amounted to less than USD 196 million divided amongst 64 recipient countries (World Bank, 2021b). The pandemic response devoted to promoting PEF might have encouraged complacency that actually increased pandemic risk (Leon). Financial mechanisms including PEF transform the World Bank from a financial lender to a broker for private sector investment and has in effect transformed population health into a financial market indicator (Stein and Sridhar, 2018). PEF thereby serves as an example for how private money on capital markets

may in the future be directed into healthcare for the world's poorest populations. The financialization of pandemic response through PEF calls into question whether pandemic and catastrophe bonds will continue to be the future of global health and disaster finance (Erikson, 2019).

7.5 Alternatives to Insurance Mechanisms to Address Pandemic Risk

In addition to assessing the effectiveness of PEF payout mechanism, it is useful to consider alternative pandemic risk financial mechanisms other than insurance. As one Bank official described, one must understand *“the risks that you have to insure and those you don't. Because pandemics affect wealthy countries, economically for most, they might not have normally speaking, the greatest loss of life”* (Beck). Referring to the COVID-19 pandemic, *“because the richer countries tend towards the medical response, that the loss of life has also been greater in the richer countries”* (Beck). This point complicates the prospect of generating an insurance mechanism for pandemic risk since each country will experience different sets of risks for various disease outbreaks, such as higher risks for areas of high population density (Madhav et al., 2017b; Richter et al., 2020). This builds on the argument in the previous chapter regarding the transmissibility of financial mechanisms for climate risk to those of pandemic risk. In a similar way to a hurricane, a pandemic insurance mechanism must also compensate for the different types of impacts that the pandemic will have (He et al., 2023). In the case of a hurricane, it is true that infrastructure and lives can be lost at varying degrees, but there is a predictable nature to the economic, environmental, and health impacts (Botzen et al., 2019). In the case of a pandemic, however, the loss is much less predictable given the multitude of economic and health outcomes that can be affected.

Here the topic of decolonization within the context of pandemic response funding should be considered. Providing funding to poorer countries can inadvertently reinforce colonial structures by maintaining dependency relationships and perpetuating unequal power dynamics. This calls into question whether such funding constitutes a form of insurance for richer countries' own pandemic preparedness.

Historically, global health financing has often reflected colonial legacies, with power imbalances evident in decision-making processes, resource allocation, and program implementation. The provision of funding from wealthier nations to poorer countries may be viewed as a continuation of colonial-era paternalism, where the former dictate terms and conditions, often without meaningful consultation or consideration of local contexts (Smith, 2019).

Critics argue that such funding arrangements create a form of dependency, perpetuating a cycle of reliance on external assistance rather than fostering self-sufficiency and autonomy (Chapman et al., 2020). This dependency can be seen as a result of ongoing colonial relationships, where wealthier nations exert control over the global health agenda and dictate priorities based on their own interests (Crane et al., 2021).

Furthermore, the provision of funding to poorer countries for pandemic response may be perceived as a form of insurance for richer countries' own pandemic preparedness. By investing in global health security measures abroad, wealthier nations seek to mitigate the risk of infectious disease outbreaks spilling over into their own territories (Kickbusch et al., 2019). This approach, however, fails to address the root

causes of health inequities and may perpetuate a cycle of dependency and unequal power relations.

The Senegalese health system is dedicated to achieving UHC – a goal which is highly influenced by international actors and far from a neutral decision (Ridde et al., 2023). Resource disparities in the health sector lead to increased health risks and significant gaps in health service delivery (Paul et al., 2020). Social determinants of health and lack of fiscal space impair progress (Carter et al., 2024).

To truly decolonize pandemic response financing at the World Bank, there is a need for a paradigm shift towards equitable partnerships based on mutual respect, solidarity, and shared decision-making. This requires acknowledging historical injustices, redistributing power, and centering the voices and priorities of communities most affected by health crises (Yamin et al., 2022). Decolonization in pandemic response financing entails not only providing funding but also dismantling oppressive structures and fostering genuine collaboration and solidarity across nations.

This point also connects with the issue of global health security since pandemics transcend borders, and therefore, an outbreak in one country poses a risk to all others (Madhav, 2017c). The interlocutor's point negates the idea that rich countries offer selfless aid to developing countries in supporting pandemic risk efforts. Rather, they are offering protection to one country in partial self-interest of protecting themselves. In this way, this act conducted between the two countries has multiple functions and effects which connect the groups—in this case the national governments—to which the countries belong (Mauss, 1966, p.66).

The official went on to say that *“it makes sense for rich countries to give money regardless, and they don't need to insure to do that” (Palis)*. The interlocutor argues that wealthy countries should not rely solely on motivation from the outputs of the financial mechanisms themselves in order for the insurance schemes to be a useful and rational option to provide support for pandemic response to poorer countries. This point calls into question whether providing funding to poorer countries is not a form of insurance for their own pandemic response.

One alternative option for pandemic risk finance at the World Bank which was foreshadowed earlier in this chapter is the use of IDA financing as the primary financial contributor to the Bank's pandemic prevention and response. In a 2019 World Bank PEF performance report, World Bank official Olga Jonas argues for the use of IDA funding rather than a risk-financing instrument such as PEF noting that *“IDA is a substantial fund with \$29b of liquid assets [which] support its current financing capacity of about \$25b/year [and which is] regularly replenished and can also issue bonds”*. Indeed, the IDA is the largest multi-lateral channel of concessional financing in the world (Australian Government, 2012). The more recent IDA20 which was developed after the COVID-19 pandemic emerged specifically outlines one of its financing goals as crisis preparedness, indicating that it is dedicated to providing finance to strengthen national systems that can be adapted quickly, and shock preparedness investments to increase country readiness (World Bank, 2022a).

One Bank economist argued that *“the risk transferred by the iPEF to the financial markets is not that of an outbreak in an IDA country, but the risk that IDA's resources would not be sufficient to rapidly finance the amounts set out in the iPEF (Leon)”* In this

way, the iPEF exists based on the assumption that it can provide lending which is not already sufficiently covered by IDA. However, in the case of PEF, IDA has far more money than that which could be paid out by PEF. The interlocutor argues that “*there was thus no risk...needed to [be] transfer[ed] to the market (Leon).*” Furthermore, they argue that while PEF reports suggest that “*USD 425m of risk was transferred to the market...the risk was [only] USD 61m (the USD 425m is the three-year cap on pay-ins from the bonds, which the risk model showed was unlikely to be reached) (Leon).*” In this way, the effort to generate PEF were extremely inefficient in part due to the cost of the mechanism itself. Note that in this conversation the USD 425 million refers to the pandemic bond totals including both the bonds and swaps.

One interlocutor recommended establishing “*a basic principle that you only need to insure against costs which are beyond your borrowing capacity. If you can borrow for the cost of something, and if your ability to borrow is not going to be impaired by the event, you shouldn't insure against it*” (Palis). In the case of PEF for a coronavirus disease outbreak, IDA has the capacity to cover the maximum pay-out amount (Brim and Wenham, 2019). According to this viewpoint, while there may be insurance mechanisms which can be suitable for pandemic risk, PEF financing mechanism should not have included insurance. In order to explain this further, the official takes the example of house insurance. “*You can see that, for example, you insure against your house burning down or losing your house because that's a big expense. And if you're homeless, because you don't have a house, you're not exactly going to be a very good credit either. So it makes sense for us to insure against our houses burning down because that's the kind of cost that is very difficult to address*” (Palis). Taking mobile

insurance as a counterexample, *“most people don't insure their mobile phone...Mobile phone insurance is bought by people who are less well off...Where you are on the income spectrum determines what kinds of risk you should insure...most of the economic cost of the pandemic comes from rich countries, the rich countries do not need to insure to cover that cost. They can just borrow.” (Palis).*

The position of an individual, organization, or government on the income spectrum determines the risk that they should seek to insure (Arrow, 1974, 47; Lazzarato, 2009). The larger implications of this perspective that high-income countries do not need to insure against pandemic risk in the same way as developing countries suggests that there is space for investor engagement in pandemic funding. However, according to this perspective, PEF was unnecessary because it insured against the risk that the IDA was already capable of covering. In this way, making PEF available to IDA-eligible countries would be logical only if the pay-out amount were to extend beyond the borrowing capacity of the given country with IDA. This was true in the case of Senegal where the World Bank's Senegal COVID-19 Response Project paid out USD 154 million, whereas PEF paid out USD 1.56 million as referenced in the background chapter (World Bank, 2024d).

From the perspective of the World Bank, insurance mechanisms for pandemic risk are useful insofar that they diversify private investor portfolios and because investments in preparedness yields significant returns (World Bank, 2016b). However, private investing in global health points to the tensions between capital interest and health care coverage for the poor (Stein and Sridhar, 2017). Therefore, in relation to pandemic risk, low-income countries would be more eligible for an insurance

mechanism than higher income countries. Yet, studies suggest it is unlikely that the insurance industry alone will be able to provide sufficient coverage for the impacts of pandemics such as the COVID-19 crisis (Gründl et al., 2021). This leaves the question which will be discussed in later sections of what system of funding should characterize the future of pandemic risk finance?

7.6 The Power of Incentivization for Catastrophe Bonds

Since the first catastrophe (cat) bonds were issued in 1977, these financial mechanisms have become increasingly important as risk transfer mechanisms in capital markets. The catastrophe bonds revolutionized the insurance market by offering insurers access to broader financial markets while also providing institutional investors, such as hedge funds, pension funds, and mutual funds, the option to obtain a high return on investment which was uniquely uncorrelated with the returns of other financial market instruments (Polacek, 2018).

Over the last two and a half decades, insurance and reinsurance companies have developed insurance-linked securities (ILS) and derivatives to protect insurers from risks of extreme losses in the capital market. ILS typically have a multi-year lifespan, which allows the sponsor to partially uncouple from the market volatility due to pricing cycles in the insurance and reinsurance industries (Fehr and Chennell, 2011). Cat bonds are an instrument that allows natural disaster risk to be traded as a commodity within the market. Cat bonds are issued through a special purpose vehicle (SPV) which holds the principal paid by investors in the form of highly rated collateral (Braun et al., 2013). The sponsoring company of the cat bond generates a reinsurance contract, also known as a cat swap, with the SPV. In the event that a catastrophic event

occurs which meets the trigger requirements, the cat swap is reimbursed with the proceeds of the collateral while investors lose all or a portion of their principal depending on the parameters of the event. To determine whether a payment under the embedded reinsurance contract is due, cat bond structures can feature a variety of different trigger mechanisms (Swiss Re, 2023).

Prior to a trigger event or maturity of the bond, investors are compensated for bearing the natural disaster risk through regular coupons that consist of a floating interest rate in addition to the cat bond spread (Braun, 2016). For this reason, investors may find value in cat bonds for their low correlations with conventional bonds and stocks (Schöchlin, 2002). Despite the potential benefits, the cat bond market is dominated by money managers and specialized investment funds. In the case of pandemics, the market value is further complicated, which raises questions regarding the institutional demand for cat bonds (Braun et al., 2013).

Despite the risks associated with cat bonds, policymakers and governments alike are acutely aware of the need to scale up rapid financing in the case of a catastrophic event. However, critics of using the insurance market to address catastrophic risk question the efficacy of opening up disaster financing to the public sector. In one conversation on this topic, a World Bank financier described their opinion on investor incentives for cat bonds as they are used to address climate disaster risk. Cat bonds for climate disasters measure *“the probabilities of a hurricane or an earthquake [to] have a big magnitude, which is what [cat bonds] really go for. They don't go for small earthquakes or small hurricanes. They do have a probability function...to say, what are the probabilities of this hurricane occurring? They might say it's 1%, meaning every 100*

years it may happen once, or 1% probability basically....Then the investors know...well, if it's 1%, then I need to be paid X amount of interest to compensate for that risk. And, of course, there is a risk of the event occurring" (Cleo). The ability of the World Bank to issue cat bonds under their "capital-at-risk" notes program as a AAA rated agency allows them to implement the bond structure without a special purpose vehicle, leaving increased flexibility for the use of funds, and greater attraction and reduced risk perception for investors (White et al., 2022).

Cat bonds typically last for between one to three to five years, which is short in comparison with other types of financial bonds. Despite this short timeframe, one interlocutor explained that *"the investors take the risk, because they figure well, if I get a nice interest rate, and I can beat the odds of losing my money when the event occurs, then I'll be okay. I mean they can compare it to other bonds [such as] a smaller company corporate bond that's issued on the market which might have the same probability of default, or even larger probability of default"* (Beck). Psychologists suggest that people may favor risk betting on themselves more often when their skill is involved over equivalent random bets, indicating a general preference for control (Beniot et al., 2019). In this way, it is possible that the diversification of risk in catastrophe bonds as opposed to the traditional market provides investors with investment incentives since this can lead to increased perception of control over one's investment portfolio.

Cat bonds are also often treated as a rating for other bonds by measuring the probability of default. A Bank interlocutor explains that *"in this case, the fault is a catastrophe occurring, and they have to lose their money because it has to be paid to the beneficiary. So it's a very analytical, market-based process. And as long as the*

modelers' data aren't wrong, these investors feel pretty reassured that they're taking a similar risk to a financial market risk, but in a kind of different instrument" (Cleo). Given the presence of third-party data sources to predict climate disaster risk for hurricanes and earthquakes, an investor can make a reasonably evidence-based decision regarding whether or not to invest in a climate bond. The question remains as to what information is provided to the investor to ensure adequate data quality prior to investing in the bond.

An additional incentive for cat bonds investment is that they can diversify investors' portfolios by taking on risk that is independent from the financial market. As one interlocutor describes, *"In bond or stock market risk, it [is] naturally...uncorrelated. Stock market or bond market default has to do with what's happening with corporations, or government finances, which affect the price or the riskiness of those bonds. The riskiness of these cat bonds is all to do with the likelihood of hurricanes, earthquakes or pandemics. It's not really related to the financial market"* (Cleo). This description suggests the possibility that the uncorrelation is an attractive quality of bonds for investors as it offers an alternative to investing in the fluctuating market (Credit Suisse, 2022). They are aware that the financial market gyrations will not significantly affect these cat bonds, because *"the risk is completely in a separate universe, so to speak, so that uncorrelation is good"* (Cleo). This quote highlights the perceived insulation of cat bonds from the volatility of financial markets. The use of the metaphor "completely in a separate universe" suggests a distinct realm of risk, emphasizing the belief that cat bonds operate independently from broader financial market gyrations. The characterization of this "uncorrelation" as beneficial underscores the strategic appeal of

cat bonds as a risk management tool, particularly in diversifying investment portfolios. This analysis underscores the perception of cat bonds as a stable and insulated asset class, valued for their ability to provide a hedge against correlated financial risks.

Catastrophe bonds also generally offer different classes which harbor different levels of risk. As one interlocutor explains, *“in some cases, you can invest just in one class. Some bondholders don't mind the higher risk because they figure they can tolerate the probability of the event. And if the bond is for two- or three-year periods [and] if it has the one or 2% probability in that period, they just take the risk. Of course, it could happen, which is why it's, you know, risky”* (Cleo). As with each investment, cat bond investors must determine the level of risk they are willing to take on depending on their portfolio and level of risk aversion. In order to make the most appropriate monetary decision, the investor must determine the asset position and the magnitude of change for their investment based on that reference point (Kahneman and Tversky, 1979).

The relatively high probability of return from the uniquely high interest rates associated with cat bonds does not mitigate the risk of financial loss in the case of the bond triggering. *“The interest rate is not going to compensate for many, many years. It just doesn't add up that quickly. You may have a bond for let's say US\$100 million dollars which maybe pays 7% interest. It'll take a lot of years to add up to US\$100 million. It's much more than the usual term on the cat bonds. So they do take a risk. In fact, a lot of cat bonds are just one year in duration. Pretty short”* (Cleo). In this way, the investor may be more willing to take on a higher risk bond such as a cat bond because of their short lifespan.

Another interlocutor further explains that the investor incentive for cat bonds stems from the possibility for high-risk, high-reward. *“In two and a half years, the interest rate will be good, but it certainly won't compensate enough if the event strikes. And in that period, you need more than 10, maybe 20 years for the interest earnings to compensate. So, investors do take a risk, but they take a risk because the probability is relatively low. Sometimes it's a lower probability than even some subpar corporate bonds that are issued currently in the market, which could have a default rate of 3%”* (Cleo). Investors have the ability to measure the risk of the cat bond against other assets in the markets, which will ultimately reduce the overall risk that they take on.

Despite providing the opportunity for investors to diversify their investment portfolio by tapping into a different risk pool than the stock market, the nature of a catastrophe offers a less predictable risk than those which follow financial market flows which must be taken into consideration by investors. *“The only thing that [cat bonds] cannot do compared to the normal corporate bond market, is you can't see leading indicators coming up and saying, Oh, I see this indicator and big sales and inflation, and maybe I better get out of this corporate bond because I see it coming. That's the problem with disasters. You don't really see it coming. With hurricanes, you see it coming, but usually, the bond investors are invested way before that”* (Cleo). In the case of a cat bond, the rationale differs from investing in corporate bonds. Investors must search for an equilibrium to decipher whether the potential benefit portfolio diversification outweighs the insecurity of a potential catastrophe occurrence (Røste, 2021, 163-207).

The interlocutor explains an additional risk which does not exist in financial markets that investors and beneficiaries alike must consider with regard to cat bonds, namely, geographical location. One must consider the risk of damage attached to a specific location such as in the case of a hurricane. *“If it's not correlated sufficiently with that property or asset that's on the ground, then it could have two problems. You could have a problem where say a structure gets severely damaged by a hurricane, but the hurricane was below the strength level, or the location was in that area [where] it didn't qualify for a payout for that property”* (Cleo). This is considered a basis risk in which the property is damaged, but the contract does not trigger because it was just not up to that trigger point (Miffre, 2016). It is also possible to have the opposite situation in which the cat bond is triggered because the catastrophic event occurred at the specified location in the bond and met the minimum strength level to meet the conditions, yet the property did not suffer any damage. One interlocutor suggested that this is not necessarily detrimental *“because [countries are] not concerned about one individual property being destroyed or not. They are concerned about the whole collective and about reconstructing damages that they would use their budget for”* (Cleo). This idea supports the argument that cat bonds can be a useful product at least for climate catastrophes such as hurricanes in terms of the uncorrelation of risk with the actual damage. Insuring against the potential for damage in a general location such as in a specific country or region is useful for governments who work on that level.

However, catastrophe bonds do not always trigger payouts as expected. As an example, one interlocutor references the use of the World Bank's climate catastrophe bonds in Mexico. *“They had a lot of damage, but the cat bond didn't trigger because it*

was just not in the exact location specified. So they complained that the measurement of the location wasn't proper, and I'm not sure how they resolved it" (Cleo). In this instance, the government would have benefitted from the bond payout, but the parameters failed to trigger and the government did not receive the payout.

While catastrophe bonds offer a mechanism for transferring risk, they are not immune to operational challenges and limitations. For instance, as exemplified by the case of the World Bank's climate catastrophe bonds in Mexico, discrepancies in the parameters defining the triggering events can result in non-payouts, despite substantial damages incurred. Similarly, PEF faced criticism for its delayed response during the Ebola outbreaks and the COVID-19 pandemic, where the predefined parameters did not align with the evolving nature of the crises. However, it's crucial to note that while pandemic risk should not be conflated with climate risk, examining the operational complexities and failures of risk transfer mechanisms like catastrophe bonds in both contexts can offer valuable insights into enhancing future pandemic preparedness and response strategies.

A similar situation occurred for PEF during multiple Ebola outbreaks, which despite being clearly defined as epidemics, did not meet the parameters to trigger the mechanism. Only in the 9th and 10th outbreaks as examined earlier in this chapter did the Ebola outbreak trigger the bonds. In the case of the coronavirus pandemic, PEF was not triggered until 12 weeks after the WHO published its first "situation report". In fact, due to the parameters initially set out in the mechanism, the earliest the bond could have been triggered would be March 23rd, 2020.

The concept of moral hazard, particularly as it relates to PEF, highlights the complex dynamics of risk and incentivization within global financial mechanisms (Bärnighausen et al., 2023). Moral hazard typically refers to the tendency of individuals or entities to take on greater risks when they are protected from the consequences of those risks (Cantor, 2020). In traditional insurance models, moral hazard is mitigated through mechanisms such as deductibles, co-payments, and risk-based pricing, which encourage insured parties to act responsibly and avoid excessive risk-taking (Froot, 2001).

However, in the case of PEF, moral hazard was inherently embedded in its design, particularly in the way it provided financial coverage for low-income countries facing pandemics (Patterson and Baroch, 2021). By offering insurance coverage to IDA countries, which are typically among the world's poorest nations, PEF effectively shielded these countries from the full financial consequences of pandemics, regardless of their efforts to mitigate risk or strengthen health systems (Van de Pas, 2023). This dynamic created a moral hazard situation wherein IDA countries may have been less inclined to invest in pandemic preparedness or prioritize public health interventions, knowing that they would be financially supported in the event of an outbreak (Gostin and Friedman, 2022).

Furthermore, PEF's structure, which relied on complex triggers and criteria for payout eligibility, may have further exacerbated moral hazard by creating uncertainty and ambiguity around the availability of funds (Ritchter and Wilson, 2020). In practice, this meant that even when pandemics occurred, disbursements from PEF were not always timely or sufficient to meet the needs of affected countries. This lack of

predictability and transparency in payout mechanisms could have undermined incentives for countries to invest in strengthening their pandemic response capacities (Gentilini et al., 2020).

In Senegal, for instance, where PEF was activated in response to the COVID-19 pandemic, the effectiveness of incentives in promoting proactive risk management is questionable. While the country received financial support through PEF, the extent to which this incentivized comprehensive pandemic preparedness and response efforts remains unclear. Moreover, the moral hazard inherent in PEF's structure may have inadvertently discouraged Senegal and other IDA countries from implementing robust public health measures or investing in resilient health systems, as the financial safety net provided by the facility could have led to complacency or a reliance on external assistance (Hatefi et al., 2020).

Overall, the case of PEF illustrates the complex interplay between financial mechanisms, risk management, and incentivization in the context of global health emergencies. Addressing moral hazard requires careful consideration of how financial instruments are structured and implemented to ensure that they effectively balance risk-sharing with incentives for responsible behavior and long-term resilience-building (Ahangar et al., 2018).

As Dr. Jonas stated regarding PEF, *“The whole mechanism is highly unfortunate”* (McVeigh, 2020). The realities of the bond completely contradict the objectives of the bond to support rapid financing for the poorest countries to respond to a pandemic outbreak. *“Infectious disease spreads exponentially and the coronavirus has a very rapid growth rate, but the bonds only get triggered when the disease has spread for a*

long time...What's obscene is that the World Bank set it up this way. It waits for people to die" (McVeigh, 2020). Again, despite the goals of PEF outlined in the media, this case supports previous studies of the Bank's valuing profit over people (Frediani, 2007; Fantom and Serajuddin, 2016). Dr. Clare Wenham, assistant professor in global health policy at the London School of Economics offered a recommendation to improve the bond. *"If you really wanted to ensure global health security, you would link the payout of the bonds to a decision around declaring a public health emergency of international concern or a national emergency"* (McVeigh, 2020). In this way, Dr. Wenham offers a solution to the problem of time for the bond triggering. However, this is only one aspect of the bond which appears to be broken. It should be noted that the very rhetoric of global health security as a slogan in the global health sphere for pandemic prevention characterizes pandemic risk as a security threat for rich countries as opposed to a problem for an individual country.

It is notable that throughout my discussions with interlocutors from various backgrounds from academia, the World Bank, and partner organizations coming from a health, climate, or financial perspective, not one interlocutor described "doing good" as an incentive for investment in cat bonds. The most common mentioned incentives were portfolio diversification and risk mitigation by avoiding stock market fluctuations. Further research may provide insight into additional investor incentives for cat bonds.

While discussing the reasoning behind the lack of incentivization for prevention in the case of the COVID-19 pandemic, one Bank official argued that *"there was no incentive for countries to invest in long-term prevention or even preparedness while there was a lot of benefit in spending money for a quick response, social safety nets—*

things that people could see. Health care wards and protective equipment and things like that were needed. I'm not challenging that. It was badly needed. But the thing is that it simply fuels this cycle of panic and neglect that that we describe" (Halston). This description suggests that while providing funding for pandemic response efforts is necessary, it is also imperative to support pandemic prevention and preparedness efforts in order to break the cycle of "panic and neglect".

The World Bank official may be referencing the 2017 World Bank report entitled, *From Panic and Neglect to Investing in Health Security: Financing Pandemic Preparedness at a National Level*. The World Bank report was developed in the aftermath of the Ebola crisis that began in West Africa starting in 2013 which called for the urgent prioritization of global health security efforts. The report developed a private business proposal to increase investment in preparedness and response efforts and to identify approaches to prioritize investments on the country-level and international scale. The report sets out an overall timetable for financing this agenda against which countries and the international community can hold themselves accountable (International Working Group on Financing Preparedness, 2017, 10).

The Bank ironically developed this report focused on the need for investment in preparedness and response along the same timeline as it created the highly response-focused PEF. In a section entitled *The Challenge of Financing Preparedness*, the report suggests that *"countries chronically underinvest in preparedness planning, disease and risk monitoring, and primary care. Health sector development strategies commonly lack focus, and public finance management lacks means to target resources. External assistance prompts governments to shift budgets away from health, and the financing of*

health often falls short of any internationally agreed target” (International Working Group on Financing Preparedness, 2017, 18b).

The paper also directly critiques PEF noting that *“PEF does not directly incentivize recipient countries to invest in preparedness in order to reduce premiums; is focused just on IDA countries...has a limited basis of (re) insurance carrier support....[and] is silent on the opportunities to provide business interruption type insurance into the private sector...to incent preparedness”* (International Working Group on Financing Preparedness, 2017, 56c). While the report suggests that PEF 2.0 could be an option to address these issues, the Bank later made the decision in 2020 to completely remove PEF from the market and start anew.

Critiques of PEF in the aftermath shed light on the incentives to generate this financial mechanism in the first place. One Bank official explains that *“all the analysis was done before the [PEF] was launched. This is not the benefit of hindsight...These are all the arguments that we presented at the time”* (Leon). This indicates that there were doubts regarding PEF by the preparation team prior to its launch. However, despite these existing concerns from the development team, in the management level *“there was just no interest. They just wanted to do it, and they wanted to do it in the private sector”* (Leon). These anecdotes suggest that there may have been an outside incentive pushing the private financial mechanism through to fruition despite doubts flagged by staff members.

The World Bank’s former chief economist Larry Summers furthers this argument by providing his insight during in a Devex interview and referring to PEF as *“an embarrassing mistake”* generated by *“goofy governments who wanted to have an*

initiative for the G-7,...World Bank officials who didn't understand the first thing about finance but...loved the word 'private sector involvement, [and] bureaucrats at the Bank who were looking to make their careers by having had a major innovation" (Igoe, 2019). Summers' opinion relates back to the second mission of PEF to generate a market for pandemic risk. However, it suggests that the market creation was conducted at the expense of the first goal of PEF to protect against the spread of pandemics. Therefore, rather than putting focus on the goal of generating new opportunities for public-private partnership in the pandemic risk financial market on positive economic and health outcomes, the Bank approved the mechanism based on the promising prospect of new financial partnerships.

Summers went further to critique the mechanism's moral credibility noting the failure of PEF to pay out during multiple Ebola epidemic outbreaks despite the need for funds: *"I think it is morally incumbent on an institution that spends \$2.5 or \$3 billion a year administering itself as it provides lending assistance to engage in some serious analytics and metrics around its budget per dollar delivered, budget per bit of expertise delivered, and to explore whether it is fundamentally sized correctly — and I am not persuaded that it is"* (Igoe, 2019). Summers's disappointment is clear from his discussion of the data analysis conducted by the preparatory team for PEF at the World Bank prior to the launch of the new mechanism. If the analysis suggested that the mechanism was inefficient from the beginning and this information was relayed to the senior staff, the motivation for launching PEF valued the opportunity to invest in the private market over the generation of a reliable mechanism in itself, which emphasizes the focus on self-interested market expansion and growth-oriented valuing of PEF

(Osei-Kyei, 2017). In this way, growth and reward were valued over the goal to reduce the risk to human lives and to protect the economic wellbeing of countries (Jamison et al., 2013; Martin, 2019).

Charlie Munger, American billionaire investor, businessman, and former real estate attorney famously asserts, *“Show me the incentive and I’ll show you the outcome”*. The incentive of the people involved in a transaction -- or in this case, a global health financial mechanism can provide insight for the future. One Bank official referenced Munger when explaining that *“people will say it is important to have a private sector engagement, but that doesn’t appear to me the appropriate structure”* (Sina). They applied Munger’s famous phrase to the insurance industry which had an incentive to push for private partnership to make money even if it was not the most logical approach (de Bettignies and Ross, 2004). As an alternative to an insurance mechanism, the interlocutor recommended using *“something which would be prefunded to have a process involved for preparation...which...exist[s] for the catastrophe bonds...It was never going to work because when a poor country has an earthquake, you’re not going to sit back and say, tough, we’re not going to help you because you didn’t prepare. But the principal is in place, and the World Bank has the ability to monitor”* (Palis). The power of the World Bank to maintain decision-making and incentivization power over developing countries has a major impact on the evolution of the Bank’s projects (Tichenor et al., 2021). The incentivization power that this Bank official asserts in this case regarding pandemic risk finance supports scholarly analysis related to the historical exertion of voting power employed by the Bank to maintain western influence over development projects while making it appear as though it is giving power to

developing countries (Vestergaard and Wade, 2013). Stating that the Bank has the ability to monitor progress, one must consider the ways in which the financial monitoring capacities of the Bank enable, translate and regulate certain behaviors (Mosley et al., 1995, 67; Mackay, 2010).

The World Bank approaches its monitoring power in a number of ways. One World Bank financier notes the World Bank's country engagement program. He notes that *"every year we'd be given a survey, and we had to score the country on their policies in our areas of expertise. That score would be aggregated, and the amount of money an IDA country is given was a function of their score"* (Palis). In this way, Bank officials have the individual power to determine the amount of financing to any IDA-eligible country using internally established expertise. Only after this designation does the Bank begin to involve the recipient government ministries in determining the destination.

An interlocutor describes that *"basically...if our policy recommendation is that you should [involve] private sector banks, and the government said no way, we're never going to allow private sector banks, we'd give them a zero. And then when it came to their allocation of funds, they would get less money"* (Palis). Since this is the Bank's policy for involving as a private organization, this point brings into question the coherence of the Bank's country-level investment program with the health priorities of IDA-eligible countries. One must also question to what extent the client countries have the ability to voice their priorities to the Bank prior to obtaining funding for various programs (Stewart and Wang, 2005, 9). In this way, this allows the Bank to restructure

the projects on the ground, to reaffirm its own expertise in pandemic risk finance, and to ensure its continuing influence (Neu et al., 2006b).

Specifically for PEF, the facility was governed by a steering body which served as the decision-making entity responsible for setting the strategic direction, policymaking, allocation of payouts, and monitoring and evaluation. Representatives from all donor countries contributing to PEF acted as members of the steering body, while other parties including IDA borrower country representatives and the WHO were eligible to join the steering body only as non-voting members. Furthermore, the World Bank held multiple roles as coordinator, issuer of the catastrophe bond, beneficiary of the insurance contracts, and Trustee of the FIF established to support PEF (World Bank, 2016a).

Some World Bank officials also suggest motivating governments to engage in pandemic preparation through incentivization. One Bank official suggests, *“If there was a process in place to encourage pandemic preparation, it could be incorporated into the annual country assessment program. If a country was not seen to be doing enough for pandemic preparation, they would be punished in advance. And again, you can't keep on punishing them, but the incentive structure, the dialogue basically, works that over the years countries do get nudged in the right direction by being given more resources”* (Palis). According to this interlocutor, the Bank can use its own standards to incentivize countries to invest in the “right” kind pandemic preparedness. The interlocutor seems to present the idea of assuring basic financing even in the instance that a country fails to adequately prepare for a pandemic as a moral obligation to promote human flourishing

(Ruger, 2006). This may also build upon to Moon's theory of economic power, which involves the leverage of material resources to affect another's actions (Moon, 2019c).

7.7 Policy Recommendations for Pandemic Risk Finance

There are many opinions as to how pandemic risk should be financed. In the midst of the COVID-19 pandemic, the Center for Global Development (CGD) published the *Payouts for Perils* report outlining four specific actions which they argue are necessary to overcome the challenges associated with the utilization of insurance markets for emergency response (Talbot et al., 2017). The first of which is the use of pivot funding, which involves pre-enrollment of authorities in existing finance windows for guaranteed funding against future risk. The goal of this approach is to reduce the uncertainty of the insurance mechanism by providing planned spending options. The second recommendation involves obtaining a dividend by tying reliable funding to requirements for investments in risk management. Taking the example of investment in flood defenses, agencies could agree to pre-position emergency supplies and coordinate disaster plans with governments as an incentive to create a more equitable, transparent response (Tozier de la Poterie et al., 2018). Thirdly, CGD calls for sharing of technical advice. This may involve providing agencies and governments with technically accurate, independent, and confidential information regarding the potential losses and insurance costs (Fung, 2007, 110). They recommend that donors take the initiative to support a sophisticated advisory facility to provide pandemic responses since it is considered a public good. Lastly, the CGD calls for faster action to catalyze the insurance mechanism in the case of a catastrophe. They suggest that donors put money on call to respond quickly in the case of the most expensive and rare

catastrophes by transferring risk to insurers (Froot, 2001). In order to increase incentives for insurance agencies to mitigate risks, requirements for resilience planning would need to be built into the insurance contracts.

7.8 Conclusion

Catastrophic mechanisms inherently come with a variety of risk metrics that one must be aware of. This chapter expanded on the previous discussion of the past and future of pandemic risk knowledge by exploring the financialization of pandemic risk through the lens of the World Bank's pandemic bonds as they were used for the COVID-19 pandemic. The chapter does so by considering PEF as an object of financialization in global health which both influences and is influenced by the ecosystem of financiers, investors, and policymakers which surround it.

This chapter considers the way in which PEF represents modern economic transitions in international development towards the use of private finance and critiques its success in finding the desired balance to both generate solutions for people affected by pandemics with the adjoining goal to generate a profit for investors and financiers. I analyzed what financial solutions PEF generated, which relationships and tensions were generated as a result between various bodies involved, and how the financialization of pandemic risk through PEF alters the ethical and economic incentives for pandemic risk management. The following chapter will expand upon the analysis presented thus far by examining the geopolitical landscape associated with pandemic risk finance.

Chapter 8: Navigating the Nexus: The Politics of Pandemic PPR and One Health at the World Bank

8.1 Interlude

Summer mornings in Washington, D.C. are characterized by the sound of the birds chirping and the wind rustling the leaves of the trees which are dimmed by the buzz of the morning commute and ambulance sirens. There is also another constant buzz that was quintessential of summertime in Washington, D.C.: the whistling of cicadas. Washington, D.C. is home to three species of cicadas. There are over 3,000 species of cicadas in the world, ranging from annual cicadas, which are seen every year, and periodical cicadas, which remain underground for the majority of their lifespan before emerging from the soil every one to two decades at a regular interval.

The familiar green coloring of the annually emerging species can be seen each May throughout the city. This year was also special in Washington, D.C.: the year of the Brood X cicadas. Brood X is one of the largest of 15 broods of periodical cicadas in the US, consisting of three species known for fire-engine-red eyes, loud choruses and emergence every 17 years (Berkowitz and Galocha, 2021). These cicadas wait for the perfect soil temperature about 12 inches below the surface to reach 64 degrees Fahrenheit, and then begin to make their appearance on the Earth's surface.

When a group of male Brood X cicadas come together and vibrate their tymbal membranes, their song can reach 105 decibels, which is louder than the sound of a lawn mower. Despite their density and loud calls when they emerge, cicadas are all but harmless and are easy prey for many animals. The reason for their survival is predator-satiation defense, which as scientist Michael Raupp describes, a means to “overwhelm

the predators by filling their bellies, and there's still enough left over to perpetuate the species" (Berkowitz and Galocha, 2021).

The lifecycle of cicadas is a powerful symbol for many cultures dating back to ancient times. In Chinese culture, cicadas symbolize the arrival of summer as well as more complex themes of rebirth, immortality, and the pathos of nature, which reminds us that we are all prey. In Chinese ancient lore cicadas resembled purity - because they subsist on dew - and loftiness - because of their perch in high treetops. High-ranking Chinese officials sought to mimic cicadas by residing high, eating a pure diet, and having sharp eyes (Stuart, 2016).

While ancient Chinese culture valued the cicadas for their elegance and high status, modern American culture overwhelmingly considers them to be a nuisance to humans. Local news outlets publishing articles with headlines such as *"DC deals with a massive cicada invasion for the first time in 17 years"* suggesting that the cicadas were trespassing in the space that belonged to humans (Pritchard, 2021). Other outlets suggested that cicadas could also be of value to humans. Indeed, the U.S. Environmental Protection Agency (US EPA) recommended Washington, D.C. resident to add cicada carcasses as a nitrogen-rich addition to their compost mix (Berkowitz and Galocha, 2021).

During these few short few weeks, Brood X was the talk of the town, and even became a common opening topic for my research interview sessions. Most interviews and interactions during this time were held online due to the ongoing COVID-19 pandemic. Interviews were in some ways less intimate due to the distance that an online meeting creates. In other ways, the sessions were also more intimate as people's

work lives became inherently intertwined with their home lives—children and pets often appeared on camera during meetings, interlocutors asked to pause a call in the middle of a conversation to answer a question from their partner, people’s wardrobes became more relaxed as t-shirts replaced the blouses and button-down shirts commonly worn to the office.

During one of these online interviews in the middle of the pandemic lockdown in Washington, D.C., one longstanding D.C. resident and environmentalist recommended that I get out and *“look at the cicadas and the pest that they create. It is an amazing phenomenon. But on the other hand, this is their life cycle. We are the invaders, not them. They've been doing that for ages.”*

The rhetoric around cicadas reminded me of conversations I had throughout my research regarding the COVID-19 pandemic and the topic of One Health – an approach to health which considers the relationship between humans, animals, and the environment. Spending much of my fieldwork in Washington, D.C. during the COVID-19 pandemic revealed in new ways the connection between humans, animals, and the environment. While conducting ethnographic research in Washington D.C. in the height of the Brood X emergence, my interlocutors juxtaposed their discussions of pandemic preparedness with this longstanding entanglement of humans, animals, and the environment, making clear the importance of a more entangled approach to health. Drawing on my fieldwork in Washington, D.C., this chapter seeks to tell the story of pandemic prevention, preparedness, and response (PPR) amid the emergence of the Brood X cicadas and the ongoing COVID-19 pandemic.

In much the same way that the One Health approach considers these interdependencies in addressing health challenges, the realities of PEF highlight the importance of adopting a comprehensive and multifaceted approach to pandemic preparedness and response, which encompasses not only human health but also factors such as environmental degradation and animal-borne diseases. The contrasting views of cicadas in Chinese and American cultures also reflect different value systems and perceptions of nature. Similarly, PEF may draw attention to the cultural, social, and political factors that influence the design and implementation of global health interventions. Understanding and incorporating diverse cultural perspectives can enhance the effectiveness and sustainability of pandemic response efforts.



Figure 8.1: Rock Creek Park, Washington, D.C.



Figure 8.2: Rock Creek Park, Washington, D.C.

Rock Creek Park is an oasis for people and (some) animals. A place where humans can suddenly leave behind the noise of sirens and cars, clear their minds, and surround themselves in canopied trees. A place where birds, small animals such as rodents, and an abundance of cicadas can freely sing within the city.



Figure 8.3: Rock Creek Park Washington, D.C.



Figure 8.4: Rock Creek Park Washington, D.C.



Figure 8.5: Rock Creek Park Washington, D.C.



Figure 8.6: Rock Creek Park Washington, D.C.

The human touch is ever present in Rock Creek Park. The safety, comfort, and security of the people is the top priority.

8.2 Introduction

One Health is “*an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems...The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development*” (WHO, 2021). The One Health paradigm stands as a collaborative, multisectoral, and transdisciplinary approach, intricately woven to optimize health outcomes by acknowledging the interconnectedness of people, animals, plants, and their shared environment (Mackenzie and Jeggo, 2019). Operating seamlessly across local, regional, national, and global realms, One Health has emerged as a pivotal strategy for pandemic preparedness, prevention, and response (PPR), its significance underscored by past infectious disease outbreaks such as the 2014-2016 Ebola crisis in West Africa and the ongoing global COVID-19 pandemic. Notably, the World Bank incorporated One Health principles into its groundbreaking pandemic bonds, strategically designed to mobilize surge financing explicitly for infectious disease outbreaks constituting pandemic response efforts (World Bank, 2018a, 1).

Overall, this chapter analyzes how governance dynamics, stakeholder perspectives, and institutional frameworks intersect with efforts to address pandemic risk. Analysis will explore how the design and implementation of PEF reflect normative

positions on pandemic risk governance and financialization, and how these perspectives shape decision-making processes. The discussion will also assess how normative positions on pandemic risk governance vary among stakeholders. By analyzing these diverse perspectives on a global scale and within Senegal, the chapter considers the implications for shaping more inclusive, adaptive, and sustainable approaches to pandemic preparedness, prevention, and response at local, national, and international levels.

8.3 Understanding the Politics of Public Health at the World Bank as an Approach to Pandemic Risk

The concept of public health is distinct from nationalized or otherwise accessible health care. Public health is its own discipline, founded on health statistics and population health. It is a concept which is often in a department within governmental systems on the municipal, county, state, national level and can at times be at odds with individual health care. The purpose of outlining the distinct nature of “public health” is to highlight the ambiguity in some of the references to public health throughout the interviews in this chapter. While some interlocutors have strong stances on ‘public health’ as a necessary component of health development, it is commonly described in relation to the population health or to the determinants of health.

In practice, investments in public health systems seek to prevent mortality and morbidity as well as to reduce health care costs. However, research suggests that preventive care is often deprioritized by governments because it is a public good that requires the resource allocation in the present to generate solutions for the future. As a result, public health can be referred to as a “quiet” policy that does not receive urgent

support by interest groups or public opinion (Jacques and Noël, 2022). Major challenges in the Senegalese public health system are characterized by a shortage of health workers, resource disparities between rural and urban areas, and lack of sufficient health financing (Zhang et al., 2021).

One interlocutor supported this view in their description of the political nature of public health spending: *“The biggest problem is that public health is not taken seriously by governments”* (Arkan). Indeed, research suggests that bounded rationality, fragmented political institutions, resistance to concentrated interests, and fiscal constraints can shift the focus of political leaders away from large scale public health investments. As an example, resistance from concentrated interests and fiscal constraints can lead political leaders to adopt incremental policy changes rather than comprehensive reforms even for serious public health problems. (Oliver, 2006). In Senegal, the public health system has been subsidized by growing influence from the private sector which represents approximately 70% of health service provisions (Paul et al., 2020).

One interlocutor compared the importance of a functional police force with that of a public health system. This discussion was politically relevant at the time of the interview when the US police force came under scrutiny during the COVID-19 pandemic starting with the murder of George Floyd by the Minneapolis police in May 2020 (Kreiger, 2020; Jean, 2020). They noted that *“the security of the police force...is a core function of any city. Every city has a police department which has been molded in such a way that if it gets out of hand, you have a political problem. For public health, this just doesn't exist”* (Arkan). In a similar way that societies must rely on a functioning police

system to maintain order, the interlocutor suggested that public health surveillance must also be seen as imperative for the functionality of society. However, despite the challenges within the public health system in the US, the lack of resulting political importance prevents change from occurring. The interlocutor further explained, *"if the police are looking for suspicious activity and there is something happening, they take measures. It also requires the cooperation of the community which is an aspect of surveillance"* (Arkan). In the event of unlawful activity, it may appear obvious that a functional police force would step in to resolve the issue, and that it is the citizens who should also report any suspicious activity that they see. Much the same in a functioning health system, they suggested that *"you need people to report symptoms"* (Arkan). Comparing a functioning police force with a functioning public health system suggests the interlocutor's view of public health systems as a form of security for a country for pandemics. The following section will discuss the idea of public health systems as means for pandemic prevention and control more in depth.

When the World Bank began operations in 1946 to finance European reconstruction after World War II, it had almost no involvement in global health or international development as would have been known at the time. By contrast, today the HNP sector of the Bank is the world's largest financial contributor to health-related projects (Ruger, 2011). One academic described the power of the World Bank in the health sphere. While it can be positive, *"you have to be aware you awaken the sleeping bear now, the World Bank can dominate because [it is] better resourced than a lot of others"* (Armin). Referring to the World Bank as a "sleeping bear" indicates that there is potential for destruction, but also that from their perspective, the Bank's power is

beneficial due to the institution's ability to make substantial improvements in national health systems.

Indeed, the World Bank reports that total per capita health spending from all sources is very low in developing countries, averaging \$40 in low-income countries (LICs), \$135 in lower middle-income countries (LMICs), and \$477 in upper middle-income countries (UMICs) as compared to \$3,135 in high-income countries (HICs). A major challenge lies in the potential for countries to determine and implement policies for maximum efficiency. Low- and middle-income countries (LMICs) face a greater challenge of financing public health while promoting economic growth. In Senegal, 55% of the national health expenditure in went to out-of-pocket spending in 2013 (GHED, 2014). The health system also faces weaknesses due to the low density in health centers in rural areas and poor distribution of the work force, and the inadequate performance of health workers – reportedly due to lack of incentives and accountability mechanisms (Azevedo, 2017).

The COVID-19 pandemic exemplified the importance of public health interventions as a means to prevent diseases and support population health security (Heymann and Shindo, 2020). Studies have shown that public health interventions can aid in mortality prevention, generate population health benefits, and reduce the cost of health care (Mays and Smith, 2011b; Bernet et al., 2020; Masters et al., 2017b). However, the lack of funding for public health interventions is commonly cited as a reason for the relatively low investment in public health (Wise and Nutbeam, 2007).

According to one World Bank financier, the problem is that *"all of this is funded by a poor government budget...People pay taxes for public goods, and [preventative*

measures] are public goods, so it should be funded from government budgets ahead of everything else in the health sector” (Armin). Nonetheless, another interlocutor describes that when the government runs out of its budget prior to the end of the fiscal year and “there is no agreement on the next budget, there is always a crisis” (Balthus). In response, “agencies in the federal government close down things that are visible to the public...The national parks close because that immediately makes headlines...[as] a way to put pressure on Congress” (Balthus). This suggests that funding pandemic prevention and preparedness should be a high public health priority. Indeed, while the health sector applies pressure on the government to act quickly in the case of an emergency such as the onset of the COVID-19 pandemic for rapid response, it is difficult to generate preventative funding through public financing.

One option for investing in pandemic prevention is through the One Health approach as described above. As part of the Senegalese government’s initiatives to support the Global Health Security Agenda (GHSA), the National High Council for Global Health Security (SSM) One Health was created with the goal of defining the strategic directions of the One Health Global Health Security program within the framework of International Health Regulations (Measure Evaluation, 2018). The One Health platform and other initiatives in Senegal are not influenced by outside funders including USAID, WHO, CDC, the World Bank, and FAO, which may impact the approach to One Health programs in the country (Measure Evaluation, 2018).

Referring to the United States public health system, another financier at the World Bank argued that the fact that *“there are poor people in the United States who don’t have proper health care is distinctly American. It’s expensive. It’s not accessible.*

It's racialized... You look at all the other developed countries, everybody's got a public health system. Everybody's got public health surveillance. Some of it works, some of it does not, but they acknowledge that there is a lot to be said for public health"

(Canaletto). Noting the failure of the American public health care system to protect the common good of all people, the interlocutor may be calling for a reprioritization of value in public health. Although a sufficient public health care system is uniquely lacking in the US, the interlocutor recognizes that existing public health systems in developed countries are not perfect. In this way, this suggests that the key factor for improving public health systems in developing countries is dedication rather than perfect execution and planning.

Another financier built on this argument with regard to the lack of investment in public health services in the US by describing an ex-World Bank colleague who spent their previous career at the US Center for Disease Control (CDC) working with the Medicare program—the federal health insurance for people 65 or older, and some others with certain disabilities or conditions—and Medicaid program—the joint federal and state program that helps cover medical costs for some people with limited income and resources (Social Security Administration, 2024). They recalled that during their colleague's time at CDC, *"the last budget priority was Medicare and Medicaid, [while]...medical research at the National Institute of Health (NIH) gets multiple billions"* (Cassandra), referring to the actions taken by public health departments such as epidemiology and population-based interventions. The US health budget for the CDC and the state public health departments across the country are 1% or 2% of global spending on health, and the interlocutor argued that *"it should be more because the*

impact is so much greater" (Cassandra). The financier called for leaders to reprioritize health spending to support PPR in the US by noting that "the people at the top of the hierarchy in the US Department of Health and Human Services (DHHS) will decide between priorities...So they have to continuously look at the priorities within the sector for the prevention versus response" (Cassandra). Scholars support this view that all levels within health systems should be held accountable for explicitly including health equity in strategic plans and goals (van Roode et al., 2020).

The business case for investing in accessible and affordable health care in LMICs is challenging, and investments are perceived as too high risk, even by seasoned impact investors. Investors may be put off from LMICs due to low profit margins from government supply-side financing. Furthermore, many investment efforts in LMICs require upfront costs which increase the risk of repayment over the time. Lastly, the lack of diversity in financial support in LMICs outside of government financing increases the perceived risk for outside investors (Brown et al., 2023).

One World Bank official questions, *"why is public health a major problem in developing countries? Is it political? It's not money because the interventions seem pretty cost effective, and there's a huge amount of private philanthropic activity there, very evidence-based that you could rely on" (Arkan). The interlocutor suggests that a major challenge to generating successful public health systems in LMICs countries is institutional capacity. However, they noted that "you can fix that...We're not talking about barefoot doctors anymore. We are talking about the relatively simple layering of a health system, where you have the village, the prefecture, the province, the capital, and the whole hospital system. If you work on it, you say it's going to take 20 years. We*

don't have 20 years...But at the same time, you need to start, because lives depend on it" (Arkan). The interlocutor's discussion of the need for prioritization of public health systems in LMICs matches the critique of the US above. They suggested that the issue lies in political and fiscal priority setting and that there is a need for stronger investment in public health systems despite the recognition that necessary improvements will take a number of years.

Despite this argument, Senegal has shown a history of public health investment in PPR even prior to the COVID-19 pandemic. This may have aided in the national response against the outbreak. After the Ebola outbreak in 2016, Senegal established the National Epidemic Management Committee (NEMC) to manage regional, departmental, and local committees involved in health disasters (Ridde and Faye, 2022a). The Health Emergency Operations Center (HEOC), established in 2018, coordinates the response to health events of national and international scale collaborates with national bodies, and coordinates the response of the Ministry of Health and Social Action (MSAS) (Ridde and Faye, 2022b).

8.4 Critiques and Challenges in the Implementation of Pandemic Risk Management Strategies

One World Bank interlocutor described their former colleague's experience as part of PEF payout team during the COVID-19 pandemic. In the midst of the emergency response to COVID-19, *"he told me that PEF grant was just the most difficult thing to process from an administrative point of view that he has ever seen in the Bank. It was much easier to process...\$200 million dollars for the same country, as it was for this \$1 million [from PEF] because they had to get approval from the steering committee"* (Arkan). The financier's description of their colleague's experience in processing PEF

payout during the COVID-19 pandemic emphasizes the overcomplicated nature of the mechanism. While the steering body was originally put in place as a security measure to oversee PEF, it created a cumbersome payout process which resulted in the extended timeline for countries to receive funding.

The fact that the process was described as far more difficult for such a small amount of money reveals the financier's disappointment in the inefficiency of the mechanism which not only produced a long payout time for PEF itself but reduced the time available to spend on other response efforts. This idea supports the argument that the complicated payout structure of PEF was generated with the goal of securitization for the investors rather than the beneficiaries. In this way, the securitization of PEF builds the bridge whereby the capital markets become connected to the wider health ecosystem (Kothari, 2006, 86).

Another interlocutor described the tension between public and private investment and priority setting with relation to PEF. *"Because the choice was to use private [financing], that meant that there were no funds available to invest in prevention, which is kind of useless" (Dida)*. Since the private sector was the major driver of PEF, the focus of private interests on response efforts guided the mechanism's focus. This idea has consequences for our collective global health futures in that unless private sector interest can grow towards prevention, insurance mechanisms cannot be used in those cases. In the case of PEF, a *"global public sector intervention would have made a lot of sense...It should not have been conditioned [by] somebody evaluating power loss, because insurance companies [have] shareholders and stakeholders and so forth. They are right to only pay when they have to because that's loss for their investors. Whereas*

the appropriate response was to give money as quickly as possible, ideally even before, to have a very effective response [and] to encourage people to disclose. So...not focusing on the health response but focusing on the economic costs—encouraging people to close down markets, encouraging people to limit movement, to do all these non-medical things which are actually effective in stopping pandemics” (Dida).

Another interlocutor described the difficulty in multisectoral collaboration for global health threats. The interlocutor critiqued the Gates Foundation and the widespread pool of private capital funders by explaining that *“every time there is a realization of some problem—and in health it seems to be much more common than other sectors—they start a new fund. It’s a complete mess. Nobody is really in charge. In the [G20 One Health] report, they have the recommendation that the World Bank be much more active in this area and coordinating. I think it’s really important. It’s a major catastrophe for the world, so you need some adult in charge. So, IMF and the World Bank board can make a valuable contribution” (Geki).* Referring to the World Bank as an adult in comparison to private actors such as the Gates Foundation suggests that private funders are squabbling children who need guidance from an authoritative figure in order to make competent global health decisions. Powerful actors within and beyond global health often provide political critique and suspicion. A number of conspiracy theories suggested that the COVID-19 pandemic was not real but was a plot by Bill Gates (Blunt, 2022). Others suggested that the large investments by the Gates Foundation in vaccine development was a plot to implant people with tracking devices hidden in COVID-19 vaccines (Miller, 2023).

With regards specifically to the approach to pandemic response efforts, the approach of PEF which was dominated by private money does not work well for pandemic response. The use of private finance for PEF guided the mechanism's focus solely on the medical response rather than wider economic consequences.

Furthermore, as touched on in previous chapters, the mechanism of PEF which sought to protect investors by putting multiple trigger requirements in place led to inefficiency in the bond payout at the onset of the pandemic. According to this argument, the use of public financing could help to mitigate some of the payout challenges observed with PEF by adding more effective conditions to the financing mechanism to promote investment in preventative efforts as well as a quick response (Dobson et al., 2020).

In a conversation in Washington, D.C. with another World Bank official working on the One Health interface in the summer of 2021 noted that PEF was closed the previous June after the Bank made the executive decision not to generate PEF 2.0 as was originally planned. In order to immediately compensate for PEF, a new trust fund to address the issue of preparedness was generated called the Health Emergency Preparedness and Response (HEPR) Program amidst the *"quiet close down of PEF"* (Gimax). This suggests that the HEPR was the trust fund that was created for pandemics after PEF didn't work well enough. Indeed, referring to PEF, the interlocutor reiterated that *"it didn't work basically if you if you look at the figures"* (Gimax). This topic will be elaborated in more depth below.

They went on to say that *"what really was the response brought up by the Bank was through existing projects—the Regional Disease Surveillance project (REDISSE) and what we call CERC"* (Gimax) which is a zero-dollar component in World Bank

projects. *“It's there in case of emergency. And basically, in case of emergency, you shovel the money from the project into that component. So you address your emergency without going through the hassle of creating a project, going to the board, and blah, blah, blah, negotiation” (Gimax).* This explanation suggests that during the COVID-19 pandemic, the Bank compensated for PEF by repurposing financial resources through the REDISSE and the CERC, which are both previously established mechanisms. The term “shovel” used by the interlocutor above when referring to the movement of response funds from the CERC for the COVID-19 pandemic suggests that this mechanism provides the option for the Bank to swiftly reallocate large sums of money for a variety of One Health-related purposes.

REDISSE stands for the regional multi-sectoral program which is present in sixteen West and Central African countries and aims to strengthen national and regional capacities to address disease threats at the human, animal, and environmental interface (World Bank, 2016c). The World Bank notes that the zoonotic disease threats associated with REDISSE are *“the source of most known epidemic-prone and novel pathogens”* which exemplifies the Bank’s interest in the concept of One Health. The REDISSE program initially received a total financing from the World Bank of US\$657 million and received two additional financing additions in 2022 from IDA bringing the grand total to US\$688.13 million (World Bank, 2022b). The REDISSE program was a major financing mechanism in the initial emergency COVID-19 response activities as it was used to repurpose its funding to support of participating countries to undertake surveillance and contact tracing activities; conduct laboratory testing and diagnosis;

procure essential drugs, equipment, material, and commodities; and organize healthcare staff trainings (World Bank, 2022b).

This was the case in Senegal in which additional support was provided under the existing REDISSE project to strengthen health systems and disease surveillance as part of the national COVID-19 response plan (World Bank, 2020b). The World Bank country Director, Nathan Belete boasted that *“Senegal has built its response to COVID-19 on successful experiences in containing disease outbreaks in recent years through timely identification and response. The Bank is confident that the project will be implemented efficiently and in close coordination with all relevant partners and stakeholders”* (World Bank, 2020c). The document also notes that the REDISSE program was also supported by a USD 20 million additional credit from IDA in Senegal.

The fact that the Bank repurposed financing which was otherwise meant for other One Health-related purposes suggests that the Bank has the flexibility to adapt its financing mechanisms to respond to health disasters such as COVID-19 and calls to question the necessity of PEF. Boutheina Guerhazi, World Bank Regional Integration Director for Sub-Saharan Africa, the Middle East and Northern Africa supports this argument in noting that *“the existence of the REDISSE program in the countries prior to COVID-19 allowed the use of an already established platform, nascent systems, and financing to quickly kick-start COVID-19 emergency response, thanks to the flexibilities allowed by the program’s design”* (World Bank, 2022b).

Moreover, Guerhazi suggests that the *“additional financings will help Benin, Senegal, and the West African Health Organization (WAHO) to complete the remaining originally planned activities to enhance surveillance and information systems,*

strengthen the laboratory systems, and build capacities to foster inter-country collaboration and coordination of disease surveillance and epidemic preparedness in West Africa” (World Bank, 2022b). In this way, the support for REDISSE suggests that this mechanism was dynamic enough to be altered in the case of an emergency while maintaining its primary focus on prevention and preparedness efforts. Comparing the power of REDISSE, which mobilizes large sums of money for various One Health needs including, but not limited to the COVID-19 pandemic, supports arguments that PEF was a failed experiment.

The second mechanism used by the Bank to respond to the COVID-19 pandemic is the Contingency Emergency Response Component (CERC), which is a World Bank financing instrument that allows for the rapid reallocation of funds from ongoing operations, to cover immediate needs in case of a disaster or public health emergency (World Bank, 2023c). CERCs are an outcome of the World Bank’s Immediate Response Mechanism (IRM), which was generated in 2011 to compensate for the absence of a fast-disbursing instrument for IDA countries (World Bank, 2023c). The IRM initiative encourages the introduction of CERCs in all IDA operations, which indicates that the lack of rapid financing from IDA was noted by the Bank as early as 5 years prior to the launch of PEF.

The CERC can be described as a zero-dollar component because it can avert the need for time-consuming project restructuring since the budget line is built into existing projects allowing up to 5% of an undisbursed IDA portfolio in an affected country to be channeled through any CERC (UNFCCC, 2023). In Senegal, the CERC was a component of the additional USD 67 million credit during the COVID-19

pandemic through IDA from the Bank (Diagana et al., 2021). In this way, the Bank allows itself to have flexibility when a disaster occurs to quickly reallocate its funding. With these mechanisms having been established prior to PEF with relatively high support, the existence of mechanisms such as REDISSE and CERCs calls into question the motivation behind creating PEF.

Another aspect of the Bank's response to the inadequate funding for the COVID-19 pandemic from PEF was the introduction of the new Multiphase Programmatic Approach (MPA). A World Bank official described that *"in March 2020, we put in place this fast-track facility to respond to COVID and a multi-phase programmatic approach (MPA), and in this MPA, basically what we offered to the countries was to respond to the immediate needs of COVID-19, and also to start working on their systems so that they would shift their attention from response to preparedness and prevention"* (Gimax). The interlocutor discussed this mechanism in connection with PEF to express that the MPA offered improved organization because, unlike PEF, it both provided immediate response in March 2020 at the beginning of the pandemic and focused on preparedness and prevention in addition to response.

The MPA aligns with the One Health approach since, as one World Bank official suggested, was *"one part was response the other part was reinforcing the health systems with a long-term goal and clearly One Health as a as a guiding principle"* (Gimax). It is interesting to note that they offer support for the MPA for its health systems approach and long-term foresight. This reinforces the idea that for some World Bank officials, both a long-term health systems approach alongside the One Health approach are important aspects of a successful health approach.

However, conversations regarding the MPA approach for the COVID-19 response revealed potential pitfalls in terms of the organization and power allotment between the World Bank and IDA countries. One Bank official argued that the “*MPA doesn't have the right incentives. So...we need to use innovative financing to change the game and to move from paying for response to paying for prevention*” (Halston). They recalled, “*the client decided that they needed that money. Then with the vaccine coming into the equation when additional financing was available for the MPA, most countries went for vaccination activities. So it's not looking great. It's not looking great. It shows to me that when it comes to prevention as a global public good, the traditional mechanism of IDA and IBRD doesn't work. So, when we look at our model, which is country demand driven model, it doesn't work for global public goods like prevention*” (Halston).

It is notable that the interlocutor defines pandemic prevention as a global public good. As discussed in the previous chapter on knowledge of pandemic risk, global public goods have been defined by theorists as meeting two criteria. The first is that they are marked by nonrivalry in consumption and non-excludability; the second is that their benefits are essentially universal in terms of countries, people, and generations (Rich et al., 1997, 2).

In relation to PEF, anthropologists suggest that generating market-based solutions to global health concerns results in increased tensions between the pursuit of profit and the goal of providing healthcare to the world's poorest people (Stein and Sridhar, 2017). In the case of PEF, the Bank official critiques the original structure of the financing mechanisms for IDA and IBRD countries for not having a strong enough long-

term One Health approach. Taking the example of the MPA, the original goal of this mechanism was to incentivize governments to switch their focus from response efforts to prevention and preparedness efforts. However, during the COVID-19 pandemic, IDA and IBRD countries most often channeled World Bank funding toward vaccines, which eventually pulled money away from prevention and preparedness efforts.

The official's argument exemplifies the World Bank's ability to leverage its lending power to determine country financing allocations (Sridhar and Batniji, 2008b). Within client countries, the World Bank can leverage connections with ministries of finance and provide technical support for health sector projects. On the international level, the World Bank can define concepts and measurement tools for country progress as well as collaborate with private financing institutions (Sridhar et al., 2017b).

8.5 Beyond Universal Health Coverage – Using the One Health Approach to Address Pandemic Risk

The World Bank's health efforts are implemented through the health, nutrition and population (HNP) group which embraces Universal Health Coverage (UHC) as its primary development target. The HNP global strategy for health *“supports countries’ efforts to achieve universal health coverage through stronger primary health systems and provide quality, affordable health services to everyone—regardless of their ability to pay.”* (World Bank, 2023a). UHC is defined by the WHO as ensuring that all people have access to promotive, preventive, curative, and rehabilitative health services of quality, when and where they need them, without financial hardship (WHO, 2023d). UHC is commonly used as an indicator for global health development. Research suggests that the policy instruments employed for the COVID-19 pandemic in Senegal

have delayed progress to UHC by over a decade (Lavigne Delville and Schlimmer, 2020; Ridde and Faye, 2022c).

Investment in UHC seeks to support partner countries in identifying qualitative and necessary health services, enhancing access to services, and promoting access to quality health care services without the risk of further impoverishment (European Commission, 2023). However, in the context of pandemic risk prevention, critics argue that “*it doesn't make much sense*” (Geki). This is in part because of the hyperfocus of UHC on human health and preparedness and response efforts rather than holistic preventative efforts (Aarstrup et al., 2021).

One can compare the human-centered approach of UHC with REDISSE. REDISSE aims (i) to strengthen national and regional cross-sectoral capacity for collaborative disease surveillance and epidemic preparedness in West Africa, thereby addressing systemic weaknesses within the animal and human health systems that hinder effective disease surveillance and response; and (ii) in the event of an Eligible Emergency, to provide immediate and effective response to said Eligible Emergency (World Bank, 2016c). One interlocutor noted that this was the “*only public health project*” (Balthus) the World Bank conducted in the last 10 years. This interlocutor took a strong stance that UHC is a form of “*retail healthcare, as opposed to public health*” (Balthus). The consideration of UHC as retail healthcare suggests that it is inherently tied to capital gain through supply and demand rather than health needs (Malvey and Fottler, 2006). Given the major role that private finance has on global health finance, monetary power continues to be a strong driver in health policy (Krech et al., 2018).

One interlocutor offered an explanation for the human-centered approach to health finance. In comparison to One Health, *“the problem is that...human health...is much more powerful [with] greater social status. When the high-profile, high-status organizations like the National Academy of Medicine...have seminars on One Health, they rarely invite a veterinarian. It's like they don't know each other...So that's very discouraging...I think [due to] the status and the fact that human health [experts] just do not see the value of animal health...they don't invite them to be part of things when they should be”* (Halston). This touches on power and status in the One Health sphere in that veterinarians have a lower status in the health sector despite their expertise and high value for One Health. As a result, One Health focused conferences remove much of the animal health-focused experts from the table, which further promotes a stronger human health focus on One Health efforts. Studies suggest, however, that translating veterinary knowledge to human health will require a “one literature” collaborative approach to break through species barriers (Christopher, 2015).

In practice, designated One Health financing is often channeled to human health projects to *“building up the sector, making the sector bigger, bigger and bigger. Building health centers, building hospitals, training health workers, and they don't see the prevention side. I am not saying there shouldn't be more hospitals and clinics in poor countries. Clearly there is a burden of disease that's not being dealt with correctly, or adequately, but by ignoring the prevention, they're just ensuring a bigger burden of disease in the future”* (Halston). The interlocutor points to the tension of the economic power of the health sector which determines where the health financing is distributed. It is important to note that the interlocutor recognizes the importance of response efforts

and human health care as well as the work being done to promote local health system improvements and UHC. However, they critique the disregard of prevention efforts that results from the human-centered approach to health. This discussion calls into question the meaning of pandemic prevention to various types of interlocutors. What is the relationship between prevention and One Health? These questions will be explored in more detail below.

With regard to the poor incentive structure of the MPA, one World Bank official argued that “*the concept of preparedness is very ambiguous. And I think that the ambiguity resides in the fact that...preparedness is essentially being prepared to respond. And when you mention prevention, people say yes, yes, yes, of course. But I don't think we're talking necessarily about the same thing. With prevention, I think that public health sectors think in terms of vaccination, these types of things. Where[as] I'm thinking [of] addressing the drivers of the emergence of diseases – issues of land use, of food systems, and so forth*” (Kuba). The interlocutor made a distinction between public health, i.e., population-based, and One Health, a human-animal-environment nexus approaches to prevention. This is separate from a human-centered approach like UHC. The interlocutor argued that on the spectrum from prevention to preparedness to response, the types of interventions that current global health actors call preparedness do not go as deeply to the root of the global health issue as they should. As a result, the official suggested that “*this ambiguity is creating a lot of tension [which] people have not realized...or they don't want to*” (Kuba).

The issue with the ambiguity of the conceptualization of "prevention" amongst various actors in infectious disease management is particularly relevant to the concept

of One Health. Public health experts primarily adopt human-centered approaches to disease management such as investing in vaccines, while agricultural experts tend to focus on wider environmental risks (Destoumieux-Garzón et al., 2018). This description also incorporates questions of time since vaccine management as a preparedness indicator occurs further ahead in time than the agricultural perspective considering the root of the risk such as with land use and food systems (DeSerpa, 1971; Pertwee et al., 2022). This encourages improved communication, collaboration, and exchange of ideas across sectors to achieve proper One Health outcomes.

The siloization of infectious disease experts across varying fields of study generates barriers and tensions for collaboration. One World Bank interlocutor in the agricultural sector describes the pressure of “*sectoral responsibility*” (Gimax) in which officials from different sectors at the Bank place blame on one another to control their sector in the midst of various infectious disease outbreaks. World Bank officials outside of the agricultural sector argued that those in “*agriculture should do their job properly. But on the other end, we're stuck with the same problem that agriculture ministers are interested in developing production and productivity, they're not interested in taking care of other things*” (Halston). As the global population is growing alongside technological advancements, demand for animal source foods is growing substantially in lower-income countries in recent years. Benefits of agricultural investments such as the expansion of livestock production offer key gains to human welfare in both regions. Furthermore, investments to improve animal productivity and markets have been shown to enhance nutrition and incomes (Enahoro, 2019; Ndumu et al., 2018).

The agricultural team at the World Bank experiences multiple interwoven challenges when collaborating with various stakeholders such as the Bank's public health and finance teams and with client country government ministries. According to the official, the health and finance teams place blame on the agricultural team for the control of zoonotic disease spillover. However, when it comes to implementation, the agricultural team faces the challenge of meeting the priorities of the client countries and their agricultural interests while achieving the established World Bank indicators.

It is interesting to question the motivation of agricultural ministries to engage in production and productivity over pandemic preparedness efforts. Does this motivation emerge from the need for constant capital growth? Is there motivation for personal gain from generating agricultural production over zoonotic spillover prevention? In what way does the potential for profit drive agricultural policy? What is the World Bank's place in this scenario to mitigate this motivation?

The theory of Doughnut Economics outlines the social and planetary boundaries between which humans can thrive while limiting consumption. The outer circle of the doughnut, known as the environmental ceiling, has nine planetary boundaries which set the limit for consumption to prevent environmental degradation and potential tipping points in Earth systems (Rockström et al., 2009). The twelve elements of social foundation are inspired by the internationally agreed minimum social standards to achieve the Sustainable Development Goals (DEAL, 2020). Within the social and planetary boundaries lies the ideal space for humanity to sustainably thrive (Raworth, 2017c, 26).

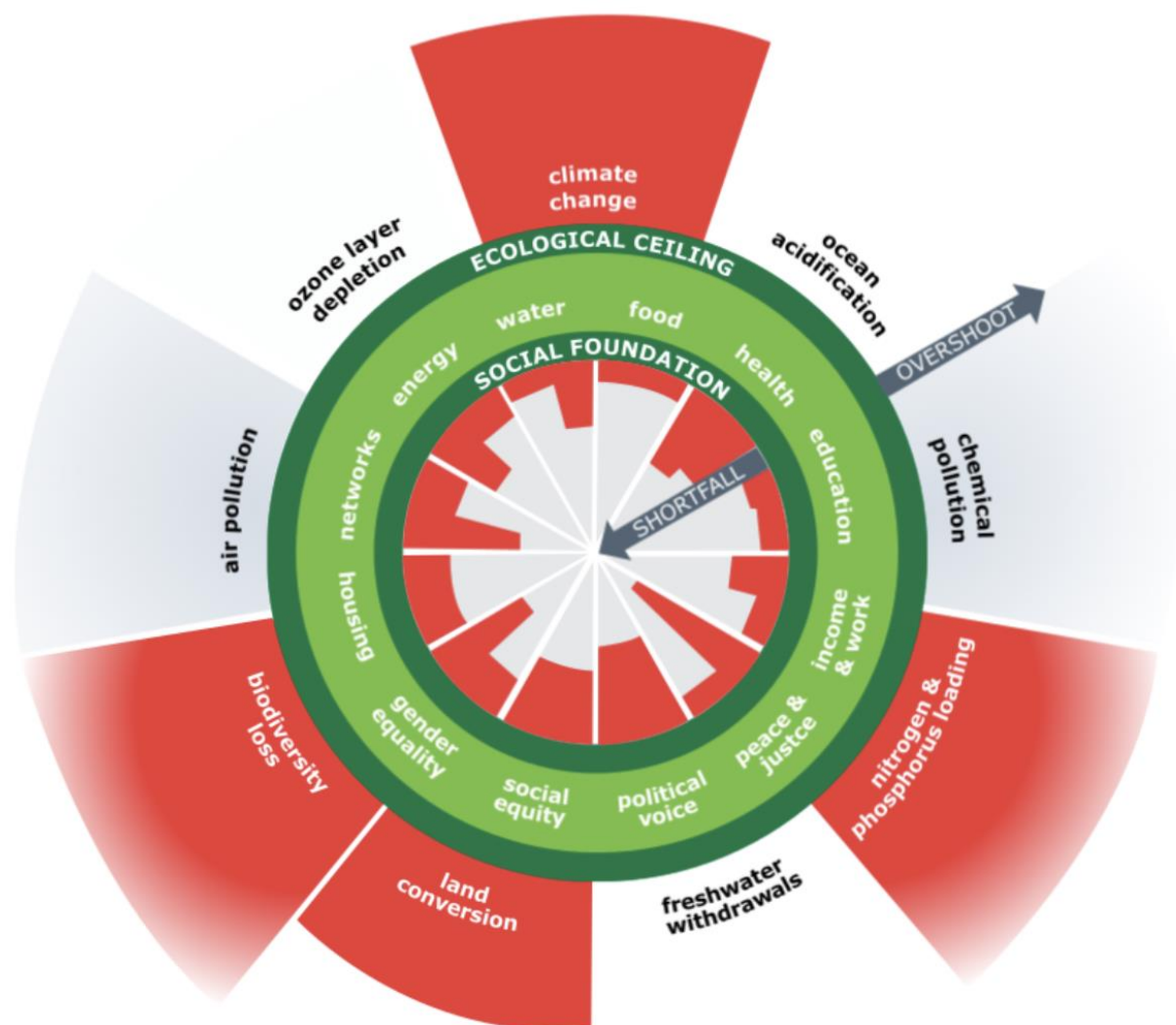


Figure 8.7: The Doughnut of social and planetary boundaries (Raworth, 2017d)

One World Bank official referenced Doughnut Economics in an interview regarding the ideal financing approach from the World Bank.

“It allows us to visualize a sort of a safe space where we could have our economic activity...and this is where PEF is...very interesting. Not so much as an instrument to ensure being prepared to respond, but as an instrument to ensure that we will help you to respond, given that you’ve done what was necessary to put yourself into that safe space. We know that even if you’re in that safe space, things happen. And I don’t think there’s much we can do about that. But they should happen in a way where they would be easily controlled at a very early stage so that the impact would be limited. So [the] intention is to revisit PEF and

look into the mechanics to make sure that we're pushing the countries to invest in the right direction” (Halston).

This description considers the connection between the theory of Doughnut Economics and potential improvements to the approach of PEF. The interlocutor critiques PEF for neglecting prevention and preparedness while recognizing the importance of the Bank to provide response financing. Ideally, it seems that a future mechanism would incorporate the theory of Doughnut Economics into the structure to increase sustainability (Stopper et al., 2016). The rhetoric of pushing countries to invest in the right direction connects to discussions in the first chapter on the knowledge of pandemic risk. The Bank has positioned itself as the “Knowledge Bank” in which it seeks to be a leader in development expertise and knowledge transfers in the international development space (Mehta, 2005).

Since the primary goals of the World Bank are to reduce poverty and to generate profit, the focus of the World Bank is more oriented to the inner circle to push people above the poverty line rather than preventing overconsumption in the outer circle. While many global health actors would argue for the right to health, the Bank’s focus on profit generates a tension in its health development approaches (Sridhar et al., 2017c). The Bank’s policy-making power is evident in this discussion as the interlocutor proposes the creation of a mechanism which binds countries to implement strategies for prevention and preparedness in order to be eligible for Bank-sponsored benefits. A change in mechanisms as such brings more control into the Bank to determine the eligibility of client countries.

A conversation with a Bank agricultural official builds on the goal of profit accumulation at the Bank. They recalled an economic analysis conducted by the Bank

in the previous decade calling for the *“invest[ment of] 3.5 or 3.4 billion a year in health systems for a projected 80% return on investment. And no brainer. No brainer. But this is not happening. So there's something wrong”* (Balthus). Here the official stressed the need for investment in health care as well as the return on investment. According to this statement, investors had a clear motivation to invest in pandemic prevention and preparedness because there is reasonable evidence according to World Bank policy knowledge that they would receive a high return. The primary motivation behind increased investment in pandemic prevention in terms of return on investment (ROI) relates to the Bank's approach to development in the SAPs where health is regarded as a private responsibility and health care can be seen as a private good.

The privatization of pandemic risk leads to the production of health policies based on two principles: the reduction of state intervention and public responsibility, and the promotion of diversity and competition through privatization (Laurell et al., 1996). This concept emerged during an interview with a World Bank official in which they explained the challenge of collaboration between the World Bank policies and national country policies with their approaches to pandemic prevention and preparedness. Referring to client countries, the official argued that *“they are asking for roads, for hospitals, or for water and sanitation, or livestock”* (Balthus) rather than investing in fighting against antimicrobial resistance. There is a disconnect between the knowledge of the World Bank on the best approaches to prevention and preparedness and the approach of its client countries. There is another disconnection between the Bank and what its client countries understand as their greatest needs. Returning to the previous discussion, this is perhaps partially due to a difference in motivation between the two

actors. This is also a question of time in that the investments that the World Bank interlocutor is in favor of are long-term goals, the outcome of which would not be seen for a number of years. The examples of the client-country approaches, however, suggest that there may be urgent development needs which take precedent over long-term One Health efforts.

As a result, the interlocutor suggests that *“this is our duty...to say, you invest in livestock, but you don't use growth promoters anymore. [We] can identify a core benefit of an investment in livestock, by removing growth promoters, and by doing so having a positive impact on antimicrobial resistance. But this is, of course, very difficult, because we don't know how to calculate those co-benefits”* (Halston). The resulting controversy generates a burden on developing countries to abide by the World Bank policies which may or may not align with their national development agenda for pandemic prevention in order to receive financing.

There is also a burden for development finance to invent targets on measurable indicators such as for gender, climate systems, and pandemic prevention because determining measurable targets on antimicrobial resistance *“doesn't work”* (Gimax). It also shows how this approach is not seen as realistic as it overburdens the data and finance teams at the World Bank to quantify and track these indicators. The interlocutor's use of the word duty may indicate their view that the Bank should act as a knowledge guide for client countries to make the appropriate investments in pandemic preparedness and prevention. This point will be expanded in the following chapter through the case study on the COVID-19 pandemic response in Senegal.

In a conversation with an agricultural-focused World Bank interlocutor, they described the challenge the Bank faces to conduct One Health-focused projects as of 2021: *“When you look at the number of projects that have been financed, only 15% even mention One Health...and less than 6% of the of that financing [is] going to One Health activities. So, that was heartbreaking, honestly, very disappointing. Because had we prepared the land so that we would learn from our past mistakes, we would move rapidly to those medium/long-term investments”* (Balthus). The interlocutor shows their disappointment in the Bank’s One Health financing strategy urging that the amount currently allotted to One Health is not enough. There is even a smaller percentage of financing going directly to One Health activities than is intended. This may in part be due to the difficulty in determining One Health-focused indicators as well as the World’s focus on response efforts when the COVID-19 pandemic began. As an example, the official described that the Bank’s *“champion at the time was India, and if you look at the India project for the COVID-19 response, I think it was \$100 million on One Health, but very rapidly, we realized that this money was not going to One Health”* (Balthus). Even with the MPA backed by the Operational Framework for One Health, the interlocutor described many issues in which One Health projects are redirected toward response efforts.

A potential solution within the IDA mechanism to improve One Health efforts at the Bank is the replenishment of the IDA 20. As one interlocutor and health economist at the World Bank describes the option to use a pledge for the Global Public Good Window, which would allow *“countries investing in prevention in One Health [to] use that window without depleting their own envelope”* (Canaletto). According to the interlocutor,

this solution would incentivize countries to invest in national One Health efforts in accordance with World Bank policies by allotting money specifically for that purpose without depleting their IDA funds.

One potential issue with this prospect is that pandemic prevention and preparedness through One Health is a global issue which must be invested in by more than the 174 eligible IDA countries. Therefore, this approach to One Health investment results in the Bank having power only over the world's poorest countries. To incentivize non-IDA eligible countries, one can turn to the G20 Italian presidency, which applied One Health as a central topic of interest through the establishment of a global fund. However, one must question whether the fund will reproduce the same mistakes which have been made in the past.

Reflecting on the potential solutions drawn out during the conversation, the interlocutor returned to the reality of the COVID-19 response. *“Our response to COVID-19 is another example of our collective failure, and our window of opportunity to impact is shrinking quite rapidly” (Canaletto)*. In this case, the collective failure being referred to is not only with regard to the payout of PEF as a mechanism, but that COVID-19 revealed the consequences of the longstanding global neglect of preparedness and prevention efforts. In this way, the collective failure includes all actors working in pandemic risk. The acknowledgement of the shrinking window of time for impact refers to the way in which society moves on rapidly from one problem to the next based on the global problems at hand. While pandemic risk became a major topic of discussion as a result of the COVID-19 pandemic, it was not a global priority previously, and the

interlocutor expressed skepticism that it will remain a global priority once the pandemic was under control.

The challenge of implementing One Health projects on the country level is mirrored by the siloization of the health and agricultural teams at the World Bank. As one interlocutor describes the Health, Nutrition, and Population (HNP) Family of the World Bank's Human Development Network (HDN) conducted a project totaling “\$1.3 billion for avian flu response which was all One Health, mean[ing] for the veterinary services, and for public health surveillance, [which] was a major program in 60 countries” (Balthus). The project ended in 2011 when the HNP team changed the focus “to do Universal Health Coverage”. It is important to note that the interlocutor describes the focus-shift of the HNP family as a mistake since it brings the focus away from One Health and towards a human-centered approach to health. The interlocutor’s position against UHC contrasts the support from the UN General Assembly during the unanimous adoption of a resolution on global health and foreign policy “encouraging governments to plan or pursue the transition towards universal access to affordable and quality health-care services” (United Nations, 2012). The interlocutor puts higher value on programs which consider a more-than-human approach to health.

The approach to health from a human-animal-environmental perspective establishes a framework for understanding value as being in constant motion. One which shifts depending on the context of the relationships which emerge from the shared health of humans and non-humans. From this perspective, there is an inherently reciprocal symbiotic relationship amongst all creatures such that attending to the health of one requires attention to the health of the other. More-than-human care ethics comes

from research by Puig de la Bellacasa (2017). It is important to recognize that the more-than-human approach to health does not indicate a higher value for animals or the environment.

However, the valuation of a MTH approach to health does not indicate a higher value for animals or the environment over humans. Rather, it indicates at a minimum the higher efficiency in an approach that incorporates all actors in the global health space. COVID-19 is an example of the complex series of multispecies encounters shaped by humans, non-human animals, and the environment. Anthropologists argue that certain human lives are protected and helped to flourish while others, both human and animal, are forgotten if not sacrificed. Addressing pandemic risk therefore requires embracing anti-colonial humility, confronting debts owed to lab animal frontline workers, and rethinking economic systems that helped unleash COVID-19 and ensured it became a disaster (Lunstrum et al., 2021).

The interlocutor is likely referring to the Global Program for Avian Influenza Control and Human Pandemic Preparedness and Response (GPAI), which was a multisectoral program comprised of 72 projects in 60 developing countries in all regions (Jonas and Warford, 2014). The goal of the program was to build the capacity of developing countries to strengthen early and effective disease control. According to Harvard University professor and former US Treasury Secretary and former Chief Economist at the World Bank Lawrence Summers, *“veterinary and human public health systems are...probably the single most important area for productive investment on behalf of mankind.”* Results from the project confirmed the substantial reduction in the circulation of the highly pathogenic avian flu virus, which may have reduced the risk of

pandemic onset and built the capacity of public health systems to reduce locally relevant health threats (Jonas and Warford, 2014).

The interlocutor built on their argument for the lack of resources within the Bank for One Health projects by describing the challenges faced by the agriculture team. They noted that across the World Bank, *“there are only about five professional staff that are qualified to talk about animal health. Five. For the whole world. And on the human health side, there are probably 200 personal professional staff qualified to talk about human health policy matters and projects. There is an imbalance. One Health should be embraced by the much stronger part of the Bank that does human health. But instead, it only survives, because the agriculture team is...leading it”* (Halston). According to the World Bank official, the HNP team has far more resources and therefore holds the responsibility to support One Health projects. The use of the word “survives” personifies One Health as a movement, indicating the interlocutor’s opinion of the gravity that comes with a lack of investment. The following section will describe the ways in which the One Health approach can be used as a tool to improve pandemic PPR.

In a discussion of pandemic prevention and preparedness on the local level with one World Bank interlocutor, they described the way in which zoonotic spillover theory could be used to generate measurable indicators. In the case of the Ebola virus disease, there were *“a number of drivers: access to forests, changes in agro-economic practices, butchering, and hunting wildlife. For example...forest fragmentation [leads to increased] access inside of the forest...easier access to the forest [leads to] increase[d] capacity to hunt and butcher wildlife. So drivers are not driving alone. Drivers are driving in networks”* (Gimax). The interlocutor suggested that an analysis of these indicators

can be used to collaborate with national governments to improve pandemic prevention and preparedness capacities on a case-by-case basis. A country's "access to the [new] facility would be indexed on...increasing the coverage or increasing surveillance of wildlife or a number of things that [the Bank] would recommend" (Gimax). Again, there is a potential tension in the Bank asserting its power as a Knowledge Bank in determining the best approaches to One Health for client countries.

The official recognized the challenge in doing so. "How we put that into practice will be extremely difficult. That is Ebola, [but] diseases like influenza, for example, would have nothing to do [with] this type of situation. In that case, it would probably be the density of farms or livestock and their surveillance in farms etc., but it's extremely difficult to cover all the scenarios" (Gimax). The generation of a new facility which would address more specifically all the potential spillover possibilities on a case-by-case basis poses a major technical challenge for the Bank in comparison to the approach to PEF which as discussed in previous chapters involved only response triggering for a small list of diseases.

In addition to the complicated nature of pandemic risk prediction through the use of country-based spillover indicators, one interlocutor noted the challenge of cross-sectoral collaboration and the difference in values and knowledge which further complicate the issue. "The medical world doesn't understand what [the agricultural team] is talking about when we talk about prevention. At best, they would recognize that you need veterinary services, but they have no in-depth understanding. So being together is a bit difficult when you're always ignored. It's like being invisible in a room or in a party...When we talk among environment and agriculture [teams], we understand

each other. Most of the things we do are interconnected in a way. We work together. So that's much easier" (Gimax). The contrast between the collaboration between the agricultural team with the health versus the environmental team suggests that the development values of the agricultural team are more closely aligned with those of the environmental team than with the health team. This is particularly important not only because it impacts the way in which the teams can collaborate on One Health, but all cross-cutting issues that may involve these teams in unison. As a result, it is reasonable to understand that mechanisms such as PEF which were housed by the health team of the Bank were far more human health centered and therefore more heavily focused on response efforts than preparedness efforts which inherently involve the wider agricultural and environmental landscape.

The monetary aspect of this divide also plays a major role. The WOA and FAO consolidated 2023 budgets amount to US\$ 44.96 million and US\$ 3.25 billion, as compared to the WHO budget of US\$ 6.72 billion (WOAH, 2023). The agricultural team therefore must determine the most efficient approach between working as a *"big fish in a small pond"* (Halston) or the opposite in terms of where the focus-area should be. On one hand, the agriculture team can remain within its own niche to focus on projects of biodiversity, climate change, environment, and forests in which the Bank's agriculture team is a major player with power to incentivize larger and faster change. However, although the interlocutor seems to hold One Health in high value, there is the risk that the team will not be able to generate the same level of change as they hold less power in the health sphere.

According to World Bank officials, the impact of establishing this balance is imperative for the Bank's two major goals of ending poverty and promoting shared prosperity in a sustainable way. *"Reducing risk cannot be business as usual... We already invest a lot in those sectors...but we're not doing that in a way that has an impact on emerging infectious diseases"* (Gimax). The motivation of the official to maintain the urgency in establishing a One Health-based approach to pandemic preparedness and prevention indicates a fear that the goals will not be achieved if the approach is conducted as business as usual. This point emphasizes that time is running out for cooperative collaboration across the health and agricultural sectors.

Describing the current pandemic finance situation, the interlocutor argued that *"we have a very good mechanism, but it has no teeth... We need to attach them to a mechanism...and of course, we need to do that with the technical partners: WHO, OIE, FAO, and the UN agencies at large because...pandemics [are] handled by bilateral organizations and institutions, and we need to let them play their role as well. So you don't want to build something that will be completely independent or get in the way of an organization"* (Gimax). The teeth refer to the IDA and IBRD mechanisms which, as described earlier, provide the flexibility to transfer large sums of money quickly in the case of an emergency and to reallocate money based on need. However, the interlocutor describes them as having no teeth likely to indicate the lack of accountability for client countries to make their own investments to mitigate pandemic risk.

The vast monetary power of the Bank is exemplified in two ways in this description. The personification of IDA and IBRD as having teeth creates a metaphor of the mechanisms as animals threatening client countries to adhere to the pandemic

preparedness recommendations outlined by the Bank, or they will be bit. Furthermore, letting the technical partners play their role indicates the acknowledgement of the necessity for collaboration to create the highest impact while also indicating that the Bank holds the ultimate power to decide how much involvement the partners can have.

8.6 Conclusion

In analyzing the pandemic prevention, preparedness, and response (PPR) approaches within the World Bank, this chapter has undertaken a deconstruction of PEF as a component of the global health finance ecosystem. Situating PEF within the infrastructure of pandemic risk policy provides a lens through which to unravel the motivations underpinning its establishment and its subsequent influence on overarching policies and approaches. The diverse perspectives among scientists, scholars, and policymakers contribute to a landscape wherein tensions surface across major policy actors encompassing public health officials, agricultural experts, environmentalists, and financiers. The reliance on private finance in global health financing significantly molds the World Bank's PPR project approaches, engendering tensions marked by varying priorities within the HNP, agriculture, and environment teams. This diversity of perspectives generates tensions between the human-centric and more-than-human approaches, notably embodied in the One Health paradigm. Stakeholders emphasize the imperative of strong collaboration and effective programming for the functional efficacy of pandemic risk management, a sentiment echoed by World Bank officials, policymakers, and academics who advocate for projects with highly specific indicators to gauge progress and success.

In light of movements toward a human-animal-environmental approach to pandemic risk management, this chapter underscored the emergent reality wherein competing influences within the global health financing landscape have propelled a response-focused, human-centered orientation of PEF. The following chapter will extend the discourse by delving into the intricate case study of the COVID-19 pandemic in Senegal, offering a granular analysis of the impact of PEF and the formidable challenges encountered at the local level within one of the World Bank's IDA-eligible countries.

Chapter 9: Contextualizing Pandemic Risk Finance through the COVID-19 Pandemic in Senegal

9.1 Interlude

It was the end of May and the beginning of hot season in Senegal. Dakar inhabitants could still feel the cool breeze coming off of the ocean as the noise of the city was beginning to rise as quickly as the sun.

Dakar residents exchanged greetings assuring peace within one another's bodies, families, and working life. The honking of cars buzzes while men, women, and children exchange coins for breakfast sandwiches, porridge, and coffee at small stands along the roadside. At the fish market, large colorful Senegalese fishing boats returned to port after an early morning on the water. The men disembarked from the boats and walked to the market, some had many fish, and others had nothing to sell for the day.

Women in the markets welcomed the fish to their vending tables as they add them to their bundles of fruits, vegetables, spices, and rice to sell that day. The narrow market pathways were filled with people, goats, and chickens. The market opens to the view of old, retired boats which have been laid to rest onshore. As the forest of boats begins to thin, the beach opens to a long stretch of sandy soccer fields one after another. Some men worked out in groups following their designated leader who guided the others through each exercise.

I was lucky enough to be living with two friends in Dakar. One American and the other Senegalese, both of whom I met during my previous field experience in Senegal. The security guard of the house was a Guinean immigrant who would visit in his off time to share rounds of ataya (sweet Senegalese green tea) in exchange for informal French

lessons. Living in this communal space invited a fusion of ideas, languages, and cuisine, which mirrored the atmosphere of Senegal itself.

My friend and I sat outside to enjoy breakfast while catching the last cool moments of the morning before the hot air would settle over the sandy concrete landscape. We sat in the morning sun, noting the rise in temperature compared to the cool, cloudy morning the previous day.

Our neighbor sat outside his simple one room cement home, quietly washing his clothes in a small black bucket in the shade. A distinct squishing sound could be heard as he slid the pieces of fabric between his hands to remove the dirt from the previous day's work. He is a construction worker for the many housing projects in the neighborhood. He lives in a very simple home to be able to send the maximum amount of remittance to his family living in a distant Senegalese village.

The man belongs to the Baay Faal sect of the Mouride Islamic Sufi brotherhood – and he also goes by the name Baay Faal himself. Members of the group often dress in colorful patched clothing with long black leather amulets around their necks picturing their spiritual leader. The Mouride brotherhood was named Baye Faal who was a disciple of the Ahamadou Bamba Mbacke, the founder of the Mouride brotherhood. Faal emphasized the importance of living a humble lifestyle and manual labor. As a result, the Baye Faal consider manual labor as a form of prayer and many Baye Fall live simply while working in agriculture and construction.

Next door to Baay Faal, Amadou lives in an unfinished building with clothes lines sprawled across the open vertical walls. Neighborhood residents use this space to hang their wet clothes for a small fee. Behind the covered parked car outside of Amadou's

home, the words “pay 1000 cfa” are painted in red, which indicates that anyone who parks a car outside of their home must pay a fee which Amadou and Baye Fall share.

There is a gate at the end of the road, outside of which the construction workers built a small covered sitting area where they relax together on work breaks and share lunch and rounds of steaming ataya. Beyond the locked gate lies more apartments similar to those in the rest of the neighborhood. A few months prior, the empty public space around the apartments were inhabited by a small community of Guinean Pular migrants living in tents on the public property. The Senegalese apartment dwellers disapproved of the settlers and subsequently collaborated with the local guards to remove the invaders from their view and built a gate to permanently keep them out of the area.

In the midst of the quiet morning, there are multiple ongoing informal activities which shape the daily Senegalese lifestyle. The purpose of this vignette is to paint a picture of the importance of informality in daily Senegalese life and the impermanence that it generates. The social and economic encounters create a community in which informal workers rely on one another through a web of exchanges for their daily needs.

Recall Marcel Mauss’s gift theory from the Māori example of the ‘hau of the gift’ in which the spirit of the gift is returned to its original owner or place of origin as mentioned in the introduction of this dissertation (Mauss, 2011a, 9). The spirit of the gift given in Moari, *toanga*, can be compared to the common word used to exemplify gift in Senegal - *teranga* (Mauss, 2011b, 9). *Teranga* represents the importance of good hospitality in Senegal and has a meaning which spans across everyday life from meal sharing to welcoming strangers into the community. In this way, the value of exchange

can be regarded as technical as well as moral, social, and political, linking each member of society into a set of deeply interconnected obligatory hierarchies.

Informal economic exchanges and networks are crucial for many individuals and families in Senegal, particularly those engaged in informal labor, such as construction workers and vendors in local markets. These informal economic activities are often overlooked by formal financial systems and may leave vulnerable populations without adequate support during crises such as the COVID-19 pandemic. Within the larger project, this passage sets the stage to question the responsiveness of PEF to the needs of informal workers and marginalized communities, questioning whether its financial mechanisms effectively reach those most in need. Furthermore, community-based approaches to pandemic response and recovery help to leverage existing social networks and community organizations, which may supplement formal financial interventions. By empowering local communities and strengthening social cohesion, such approaches may enhance the overall effectiveness of pandemic response efforts. Lastly, cultural norms and values influence perceptions of aid and assistance, as well as the distribution of resources during times of crisis. A culturally sensitive approach to pandemic financing should take into account local customs and practices, ensuring that interventions are respectful, inclusive, and responsive to community needs.



Figure 9.1: Beach in Dakar, Senegal 2021

9.2 Introduction

The previous chapter examined the ways in which financial approaches to pandemic risk, such as through PEF, may create privately funded projects which deprioritize effective pandemic preparedness, prevention, and response (PPR) approaches against those which lead to financial gain. It also explored the distinction between human-centered approaches to health including Universal Health Coverage (UHC), health care systems strengthening, population-centered approaches to health (public health), and emerging human-animal-environment-centered approaches to health (One Health). Lastly, it introduced the World Bank's specific pandemic response efforts in Senegal to provide insight into the ways in which different mechanisms were employed.

In this chapter, I aim to delve deeper into the implications of the COVID-19 pandemic on the informal economy within Senegal. Building upon the foundation laid in the preceding chapter, which examined the macro-level impacts of pandemic response efforts, this section adopts a community-centric lens to consider the realities faced by diverse populations.

Much of the current literature analyzes the impact of government responses to the COVID-19 pandemic to understand access to essential medicines and vaccines in Senegal (Bouderhem, 2022; Ba et al., 2022; Saied, 2022). This chapter takes a localized perspective on the implementation and effectiveness of pandemic response efforts to contextualize pandemic risk finance during the COVID-19 pandemic in Senegal. This chapter examines how PEF has been utilized in Senegal to address pandemic risk during the COVID-19 pandemic. In doing so, it assesses the extent to which PEF has been accessed or utilized by Senegal, and explores the effectiveness and shortcomings of its implementation within the Senegalese context. By surveying public health activities in Senegal, the chapter would provide insights into how financial mechanisms like PEF have been integrated into the country's pandemic response strategies.

This chapter will also explore how key principles such as community engagement, local governance, and adaptive management have been incorporated into pandemic response activities in Senegal, and assess their impact on the country's ability to effectively manage pandemic risks. This analysis will also examine how normative positions on pandemic risk governance vary within the Senegalese context from bustling metropolis of Dakar, the political and economic heart of Senegal, and

spans into the rural landscapes of the southeastern regions of Kolda and Kédougou near the Guinean border, particularly among public health officials, policymakers, healthcare workers, and community members. It explores how these stakeholders perceive the role of financial mechanisms, governance frameworks, and community engagement in addressing pandemic risks in Senegal, and assesses the implications for shaping more inclusive, adaptive, and sustainable approaches to pandemic preparedness, prevention, and response in the country. By broadening the scope geographically, I intend to capture the multifaceted nature of the pandemic's effects particularly on informal economy workers, transcending urban-rural divides and encapsulating the socio-economic dynamics at play in different settings.

This chapter serves as a bridge between the macro-level analyses of pandemic response strategies and the micro-level intricacies of community experiences. By shedding light on the dynamics at play within both urban and rural contexts, it aims to contribute significantly to our understanding of the pandemic's impact on the informal economy in Senegal.

9.3 The World Bank's COVID-19 Pandemic Response in Senegal

As referenced in previous sections, a report on the country allocation amounts announced that as of February 2021, Senegal received a total of USD 1,564,968.47 from PEF funds, which were designated to UNICEF and the WHO for the COVID-19 response efforts. It is important to highlight that while Senegal received a similar amount of money in comparison to other IDA countries from PEF, it was a minimal amount in comparison to the World Bank's overall COVID-19 response in the country.

One World Bank official in Senegal described the priorities of the Bank's response in Senegal: *"Before the vaccine, you need to have a good health system for the country. We did a lot of procurement for the equipment and a lot of equipment for protection. That is why we need to strengthen the system. When it comes to the vaccine, each country will see if there are more vaccines to get more people vaccinated"* (Abdou). Much of the conversation on response and priorities was focused on increasing the number of people receiving vaccinations as was much of the response globally. *"In Senegal it is really to see how we can reach 35% of the population. COVAX got 25% of the population. The target group which is 80 years old is really the 35%. If you take 20% from COVAX and 25% for IDA you can reach it. But now we have a challenge because of the no vaccine campaigns in the country"* (Abdou).

They expressed their support for PEF during the summer of 2021. They described that *"during COVID, the funds were coming from PEF. I think it was 1.5 million USD, and they decided to transfer the money to WHO and UNICEF to help the organization to implement directly. All 1.5 million USD was used in the country."* (Abdou). Reports show that PEF payout was USD 1,564,968.47 which was used in the country and was allotted to these two organizations. When asked why the WHO and UNICEF were chosen as the recipients of PEF money, they explained that *"is because this way the money is sent directly to the organizations. The World Bank, as you know, has too much paperwork, so it's better to send the money directly to the organizations"* (Abdou). The Bank official here notes an ongoing challenge in the Bank to deal with inefficiencies due to the large amount of paperwork. This discussion suggests that the

main reason for PEF's payout to the WHO and UNICEF may have been primarily incentivized by the goal to reduce paperwork rather than a specific programmatic need.

Other than PEF, the World Bank contributed to the COVID-19 response in Senegal through several mechanisms. As soon as the COVID-19 pandemic was declared present in Senegal, "*the Minister of Health started using the REDDISSE program to fund the response*" (Abdou). The Regional Disease Surveillance Systems Enhancement Program (REDISSE) is a regional multi-sectoral program involving sixteen countries including Senegal in West and Central Africa. The goal of the program is to strengthen national and regional capacities to address disease threats at the human, animal, and environmental interface and was approved in four phases. Although the REDISSE program was originally designed specifically for pandemic prevention rather than response efforts, the flexibility of the mechanism's design "*allowed for the use of an already established platform nascent systems, and financing to quickly kick-start COVID-19 emergency response*" (Ms. Boutheina Guerhazi, World Bank Regional Integration Director for Sub-Saharan Africa, the Middle East and Northern Africa; World Bank, 2022b).

A World Bank official in Dakar confirmed the efficient and rapid repurposing of REDISSE for the COVID-19 response efforts in Senegal, rather than strictly for pandemic response, noting that "*for the COVID-19 response, REDISSE mobilized about USD 3-4 million [and] they started using REDISSE funds right away. REDISSE funded PPE like masks and other supplies...But REDISSE is not a response project. [The World Bank] ha[s] all of the components in REDISSE for strengthening the laboratory*" (Abdou).

On April 2, 2020, the World Bank Board of Executive Directors approved USD 20 million credit from the IDA for the Senegal COVID-19 Response Project. The project was intended to “fill critical gaps in implementing the REDISSE project, strengthen the prevention activities, rapid detection, preparedness and response to COVID-19 outbreak” (World Bank, 2020d, 5). One World Bank economist in Dakar explained that they “used the money to purchase equipment for labs, vehicles, built treatment centers in Dakar, and in one year they spent all the money” (Abdou).

The components of the project were broken down as follows:

Table 9.1: Senegal COVID-19 response project components (Diagana et al., 2021)

Component	Description	Amount
Emergency COVID-19 Response	Provide immediate support to Senegal to prevent COVID-19 and to limit local transmission through containment strategies	USD 16.5 million
Community Engagement and Risk Communication	Support activities that will ensure effective risk communication and community engagement to raise public awareness and knowledge on prevention and control of COVID19 among the general population	USD 2 million
Implementation Management and Monitoring and Evaluation	Provide program management and monitoring and evaluation for the project	USD 1.5 million

The following year in 2021, the Bank approved a project for Additional Financing (AF) for the Senegal COVID-19 Response Project of USD 67 million in IDA credit and USD 67 million in an IDA grant for a total of USD 134 million. The goal of the additional

financing was to support the previous Senegal COVID-19 Response Project which used the Multiphase Programmatic Approach (MPA). The MPA was discussed previously from interviews with World Bank officials in the Washington, D.C. office. The officials described the MPA as a promising mechanism as it has flexibility for reallocation of funds in the case of emergency such as COVID-19. The cause of the downfall of the MPA as described above was that it did not generate strong enough incentives for IDA-eligible countries to invest in pandemic preparedness, prevention, and response (PPR).

The use of the MPA in Senegal supports the idea that the MPA does not generate enough incentives since the MPA provided a large sum of money through reallocation efforts for the COVID-19 response efforts in Senegal, but it was only used for the response efforts rather than PPR. The *“purpose of the proposed AF is to provide upfront financing to help the Government of Senegal purchase and deploy COVID-19 vaccines that meet the World Bank’s Vaccine Approval Criteria (VAC) and strengthen relevant health systems that are necessary for successful deployment and to prepare for the future”* (World Bank, 2020b, 15).

Despite critiques previously that the MPA was too focused on response efforts, the Bank officials in the Dakar office seemed to support the way in which the MPA was implemented for response in Senegal and noted that they were seeking to replicate the mechanism. In an interview, one Dakar official mentioned that *“there is an ongoing discussion...to see if we can have a multiphase approach to pandemics. We call it MPA, and we did it for the pandemic too. Now we want to have MPA for pandemic responses. It is not a 5-year project. It can be more than a 10-year project because it is multiphase”* (Abdou).

Despite the relatively modest disbursements from PEF, the broader financial support provided by the World Bank played a pivotal role in Senegal's response to the COVID-19 pandemic. While the direct impact of PEF disbursements may have been limited, the financial assistance facilitated by the World Bank encompassed a range of initiatives for bolstering the country's healthcare infrastructure and implementing public health measures. However, the tangible effects of Senegal's response to COVID-19 were felt most acutely at the grassroots level, where government intervention and shifts in daily life intersected with the dynamics of the Senegalese informal economy. These intersections underscored the intricate relationship between global health financing mechanisms and local realities, emphasizing the need for nuanced approaches to pandemic response that account for socio-economic dynamics at the community level. Therefore, this chapter will delve into the multifaceted implications of the COVID-19 response efforts in Senegal through its impact on informal economy and public health status.

9.4 On Informality and Community

In anthropological terms, the concept of "informal" carries a complex and contested nature, with scholars often grappling to establish a precise and universally accepted definition. The term is frequently used to describe economic activities, labor practices, and social structures that operate outside formal institutional frameworks and regulatory structures. According to Hart (1973), the informal sector encompasses a diverse array of economic activities and employment relationships that exist beyond the purview of official statistics and government regulation. While some anthropologists, such as Portes and Schauffler (1993), emphasize the inherent flexibility and adaptability

of informal systems, others, like Williams et al. (2007), underscore the stratified and hierarchical nature of informal economies. It is crucial to acknowledge the inherent difficulty in pinning down a singular definition, as the informal is characterized by its heterogeneity and context-dependent manifestations. This definitional fluidity becomes particularly pronounced in ethnographic studies, where the lived experiences of individuals engaged in informal activities defy rigid categorizations, highlighting the need for a context-specific understanding of the term "informal" in anthropological discourse.

In the context of Senegal, the lens through which informality is viewed takes on a distinct character shaped by the country's unique socio-economic landscape. Senegal, like many African nations, boasts a vibrant informal economy that plays a pivotal role in the daily lives of its citizens (Charmes, 2000). This informal sector encompasses a diverse array of activities, ranging from street vending and artisanal crafts to small-scale agriculture and service-oriented enterprises. The resilience and adaptability inherent in these informal practices have historically enabled individuals and communities to navigate economic uncertainties and fluctuations. However, the onset of the COVID-19 pandemic introduced a seismic disruption, challenging the very foundations of Senegal's informal economy. As formal lockdowns, restrictions, and public health measures were implemented to curb the spread of the virus, the informal sector bore a disproportionate brunt of the economic fallout. The intricate interdependencies within informal networks, often characterized by close-knit community ties, were strained as mobility restrictions and decreased consumer activities impeded the usual flow of goods and services (UNU, 2021). This chapter endeavors to unravel the complexities of these dynamics by examining how informality in Senegal has been both a coping mechanism and a

vulnerability during the unprecedented challenges imposed by the global health crisis. Through ethnographic exploration in urban centers like Dakar and rural regions such as Kolda and Kédougou, we aim to shed light on the intricate ways in which the informal economy has both adapted to and been impacted by the COVID-19 pandemic in Senegal.

In anthropological terms, the concept of "community" poses a definitional challenge due to its dynamic and context-dependent nature. Anthropologists have explored community through diverse lenses, recognizing it as a complex and evolving social construct. Radcliffe-Brown (1940) approached community as a structural unit within social organization, while Barth (1999) highlighted the fluidity and boundary-making processes inherent in community formation. Despite these perspectives, the term remains elusive, with scholars like Hastrup (1992) underscoring the need to embrace ambiguity and recognize that communities are not homogenous entities but dynamic networks shaped by social, cultural, and historical forces. This acknowledgment of the multifaceted and evolving nature of community is crucial for understanding its role in anthropological studies.

In the specific context of Senegal, the notion of community takes on profound significance, deeply interwoven with the fabric of daily life. Senegalese communities, whether in urban centers like Dakar or rural regions such as Kolda and Kédougou, are characterized by strong interpersonal ties, shared cultural practices, and communal support systems. The communal ethos is particularly evident in the informal economy, where networks of reciprocity and mutual assistance underpin economic activities (Bertelsen, 2003). However, the COVID-19 pandemic disrupted these communal

dynamics, as stringent measures and restrictions strained the social and economic bonds that traditionally sustained communities. The impact of the pandemic on community life in Senegal extends beyond health concerns, encompassing disruptions in traditional ceremonies, communal gatherings, and economic activities. This chapter endeavors to explore how the resilience of Senegalese communities has been tested, examining both the challenges and adaptive strategies employed within these social units in response to the unprecedented disruptions caused by the global health crisis. Through ethnographic inquiry, we seek to unravel the intricate ways in which the concept of community in Senegal has been redefined and reshaped in the face of the COVID-19 pandemic.

9.4 COVID-19 Cases in Senegal

Senegal is the westernmost country in West Africa which borders Mauritania in the North, Mali in the East, Guinea and Guinea Bissau in the South. Senegal is a flat land with sandy grounds with an altitude lower than 130 meters except in the southeast, near the Guinean border in the region of Kédougou where part of my fieldwork was located. Senegal has a population of 17 million people, 25% of whom live in the Dakar region which encompasses approximately 0.3% of the state. Extreme poverty is concentrated in the southeastern parts of the country with four regions (Tambacounda, Kaffrine, Kolda, Kédougou, and Sedhiou) where it exceeds 15 percent (World Bank, 2024a).

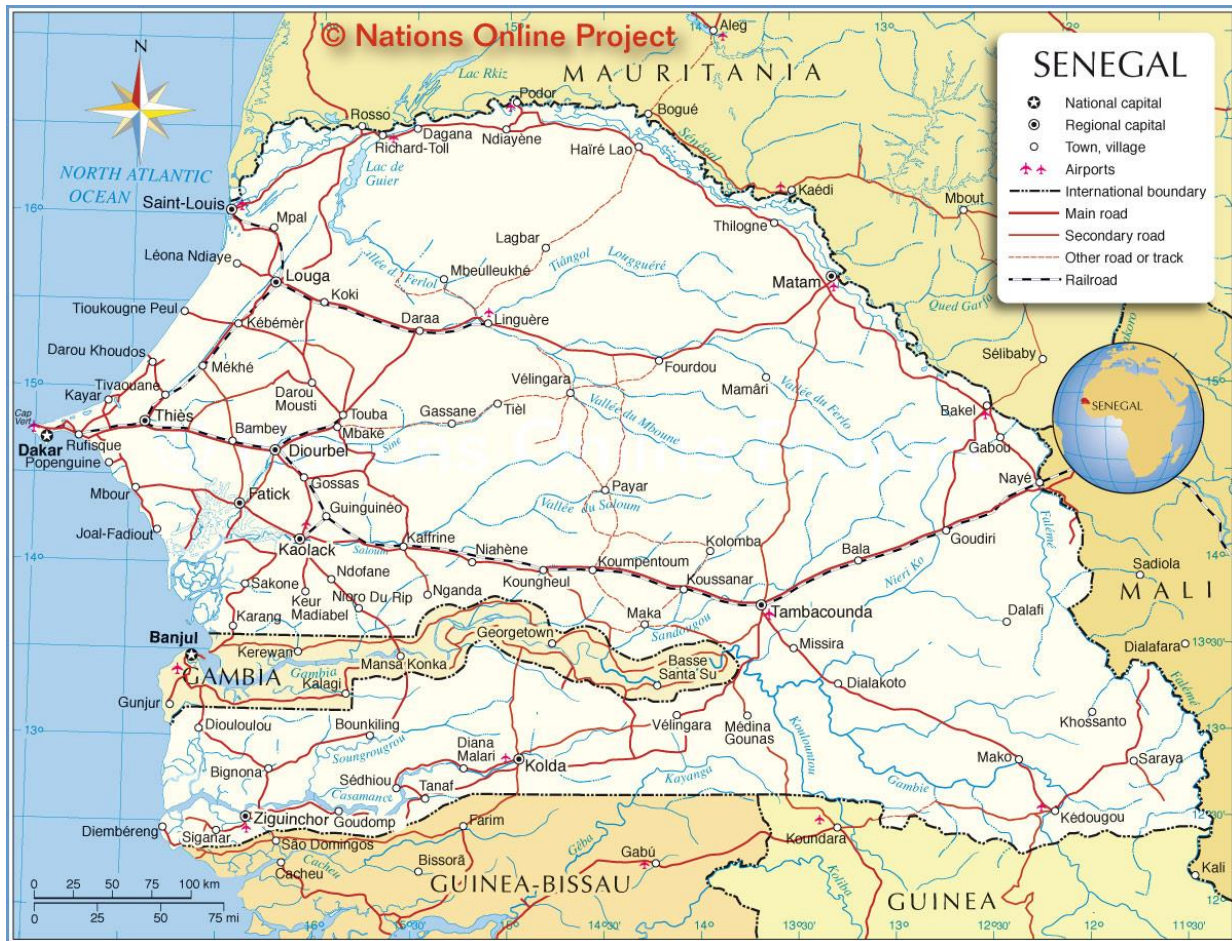


Figure 9.2: Map of Senegal (National project, 2021)

The COVID-19 pandemic reached Senegal on March 2, 2020, through an imported case from Europe, making it the fourth country in Africa to confirm the presence of the virus (Dia, 2020). The Ministry of Health and Social Action (MoHSA) led all standard operating procedures for the detection, notification, case management, and transport of people with suspected positive cases of COVID-19 (Dia et al., 2020). There were 88,926 confirmed cases and 1,971 deaths reported in Senegal as of October 2023 from the COVID-19 pandemic (Johns Hopkins, 2023). However, with the persistent issue of under-reporting, asymptomatic or untested cases, the actual case fatality rate may be much lower (Gning, 2022; Rahmandad, 2021). The porous national borders,

densely populated urban areas, limited access to handwashing stations in households, and limited access to quality health services particularly in rural areas posed significant challenges to pandemic prevention, preparedness, and response (World Bank, 2021e; Madhav, 2017d).

The potential magnitude of the COVID-19 pandemic outbreak was noted by the Senegalese government as early as January 2020 (Diouf et al., 2020). The following maps depict the reported cases throughout Senegal as of August 7th, 2020. The vast majority of cases occurred in the region of Dakar, which has the highest population density and the largest number of expatriates.

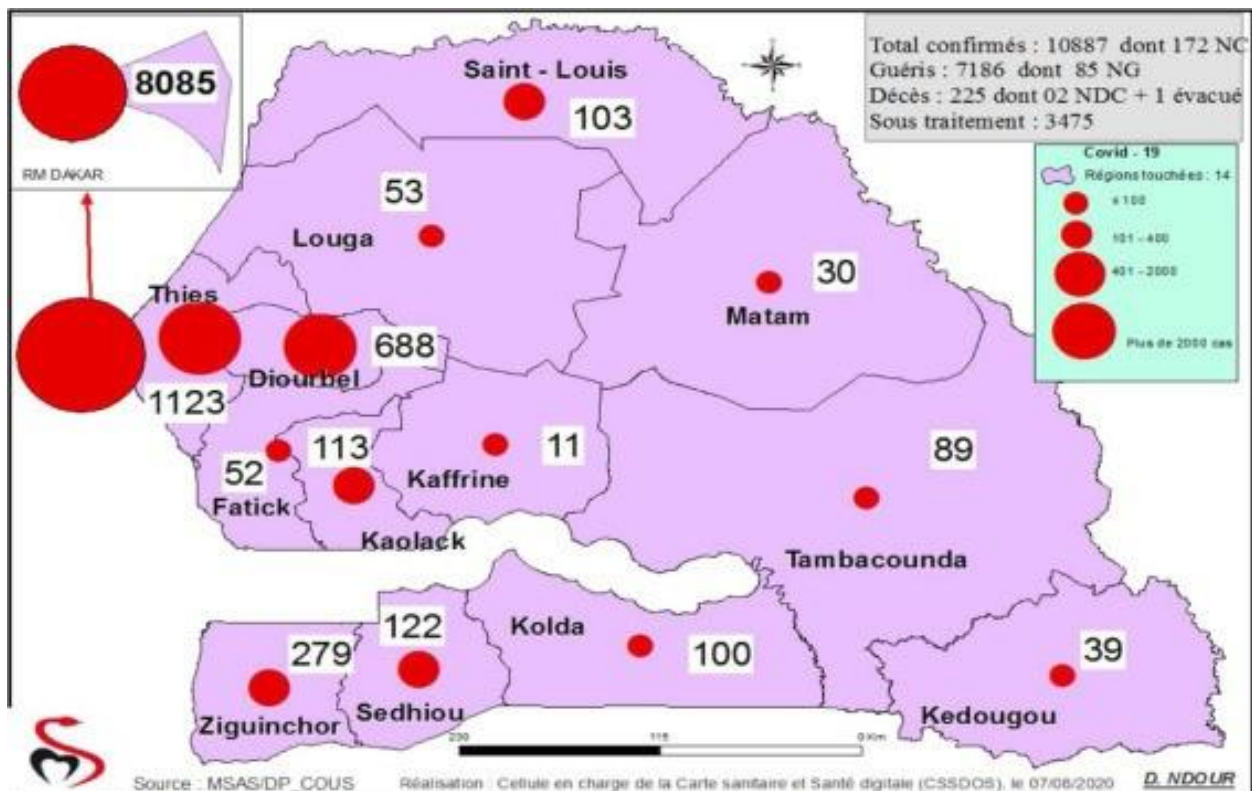


Figure 9.3: Depiction of COVID-19 cases across regions of Senegal (Diouf et al., 2020; Ministry of Health and Social Action Senegal, 2020)

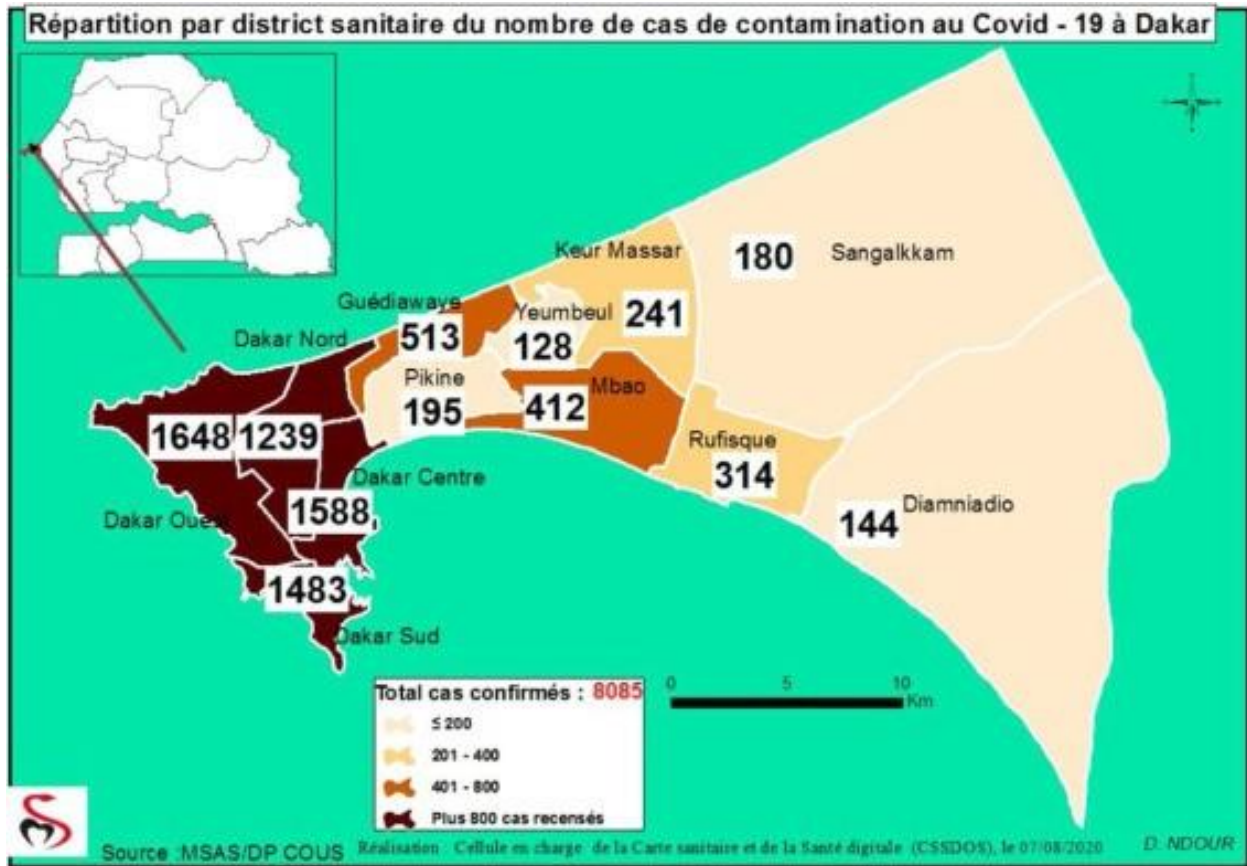


Figure 9.4: Depiction of COVID-19 cases in the Dakar region (Diouf et al., 2020; Ministry of Health and Social Action Senegal, 2020)

According to Diouf et al., 2020, the primary difficulties reported in implementing the COVID-19 contingency plan in Senegal include the following: Inadequate numbers of intensive care beds, most of which were in the capital; lack of authorized laboratories carrying out COVID-19 tests which resulted in journeys over more than 300 km (about 186.41 mi); decline in visits to health establishments for other pathologies; lethargy of preventive health programs (maternal and child health, malaria, HIV/AIDS, tuberculosis); insufficient supply of internationally manufactured personal protective equipment (PPE); and health personnel shortages (Diouf et al., 2020).

9.5 Interlude: COVID-19 Vaccine in Dakar

It was a dreary morning at the beginning of the rainy season in Dakar. I left the house as it began to drizzle slightly, and the sky was a dark grey hue. The construction workers walked to work and carried materials for their daily work on a new apartment structure.

I had hoped to walk the 25 minutes to the Centre de Santé in Ngor where I would receive my vaccine booster, but the rain became too heavy. I negotiated with the taxi driver and hopped in the backseat, safe from the storm.

I arrived at the health center. A woman sat on the ground outside and two men stood on the opposite side outside the door. I walked up the stairs to the open area and waited for the doctors to arrive. There was no line for the vaccine, unlike the group of fifteen people sitting on the opposite side of the hallway waiting to be seen for a general consultation.

I noticed a man speaking Pular as I waited by the doctor's office and walked over to greet him. It was always nice to hear Pular-speakers amidst the sea of Wolof speakers in Dakar. He had two crutches beside where he lay on a brightly colored tiled bench, and his daughter of about 9 years waited with him sitting up straight in flip flops and a long patterned wrap skirt. He sat up with a smile when he realized we could speak Pular together.

His daughter swayed back and forth to show off the way her pretty long dress could catch the wind before coming over to take a seat next to me. Despite being a young girl, she accompanied her father as a caretaker to his appointment. I wondered whether she had taken the day off from school to bring her father to the appointment (it was a Thursday) or if she didn't attend school at all.

The man explained that he was from Diourbel, Senegal. A town about 50 kilometers west of Touba, the seat of the Muslim brotherhood of the Mourides and the second most populated city of Senegal which experienced one of the largest COVID-19 outbreaks in the country.

He asked me if I was working in Dakar, and I explained my research project. He said he had to stop working because of his body because he could no longer walk without crutches. He used to work in manual labor, a job which led him around the country from Diourbel to Kolda. The doctor told him he could no longer work and had to stay resting. I asked him if he got into an accident, but he said no, just the "tamperenden" - a word in Pular which means "tiring" and which people often use to describe the fatigue of the lifestyle, work, etc.

The doctor called me in. I asked where the main doctor was and was informed that she could not come into the health center today as she was home sick. I asked for the COVID-19 booster shot and she asked which option I preferred between Pfizer and Johnson and Johnson. She didn't mention any other options despite the presence of Moderna and Sinopharm. Perhaps she assumed the two options were the only ones that I would have preferred.



Figures 9.5 and 9.6: COVID-19 Vaccination Coolers/Chairs, Dakar 2021

She took my ID card and recorded my patient information in a book that resembled those I had previously worked with at the Poste de Santé in Kolda.

Another doctor came into the consultation room and greeted us both. They chatted for a minute before the first doctor got up and left the room a couple of times without an explanation. When she returned, she excused the disturbance, and she assured me there was no issue. We chatted a bit about the vaccines and she noted that they were more popular when they first arrived in Senegal, but now much less. We joked about my nerves to receive vaccines despite my work in the health sector.

She came around the table to sit on an empty upside-down container next to me and prepared the syringe from one of the two small blue coolers on the ground. After the injection, she filled out a green card resembling the CDC card in the US and told me

that I was free to go without charge, and to wait for fifteen minutes before heading home to assure my safety in the case of an adverse reaction.

I returned to the bench outside to write and relax a bit before leaving the hospital. The man and his daughter returned after a few minutes and joined me on the bench. The young girl took her spot once again right next to me. I learned that she didn't speak Pular yet because she had grown up here in Dakar, although her older brother spoke fluently.

We continued to chat for a few minutes before he was called back into the consultation room. His daughter helped him and carried the money as she walked in with him. General consultations came with a hospital fee for all rather than the free COVID-19 vaccine mandate.

While the formal interactions with the doctor resembled that of my experience receiving the vaccine in the United States previously, there were many informal interactions which were particular surrounding the experience. It was evident in the hospital that the COVID-19 pandemic had become a low priority for people and families as they seemed to be visiting the hospital to receive other health care services which had previously been disrupted by the pandemic. This anecdote sheds light on the informality of daily interactions and the experience of work. In the absence of the main doctor which was ill at home, the surrounding hospital staff organized to cover the primary physician which was ill at home.

There are similarities between this health center and the health post in the Kolda region of Senegal where I had previously worked. There were two licensed health professionals in the health post, one of which was in charge of general consultations

and the other for maternal child health. Each of them was from the distant region of Kaolack and lived away from their husbands who remained in the capital of Dakar. When one of the two physicians traveled or was unable to work due to an illness, the informal workers which normally acted as their assistants temporarily stepped into their place-at times for multiple weeks. The health post covered the territory in the district of sixty-two villages. For this reason, patients from distant villages often travel for multiple hours to arrive at the health post for an appointment or emergency and plan to be away from their daily work for the entirety of the day as they waited to be seen on a first come first served basis. In the case of a particular visit in which the doctor was absent, the patient may be sent away and told to come back another day. In this sense, informality, waiting, and disruption of daily life also infiltrates the experience of seeking health care services and can generate increased anxieties about thriving in the midst of crises. The sense of informality, waiting, and disruption is even more present in rural areas as the distance to the health centers and lack of health staff and resources becomes more apparent.



Figure 9.7: Patient Consultation room in the Nemataba Poste de Sante in the Kolda region of Senegal 2020



Figure 9.8: Outside Poste de Sante in Nemataba of the Kolda region in Senegal, 2020



Figure 9.9: Women waiting to vaccinate children with mobile clinic in the catchment area of Nemataba in the Kolda region of Senegal, 2020

9.6 Government response to COVID-19 in Senegal

The policy approach to the COVID-19 response by the Senegalese government involved multiple agencies, which resulted in significant challenges in leadership and coordination of responses. One interlocutor celebrated the Senegalese efforts to incorporate One Health into pandemic response through the “*One Health Secretariate*. *Senegal is a good example for other countries because there is one place to lead One Health. In other countries you have just a committee. You have to organize the different actors. But in the case of Senegal [during] COVID, they played a good role in mobilizing the actors...for the pandemic response...It is not a Ministry, but now it is at the*

President's bureau. That's why they have the capacity to mobilize all the sectors in One Health" (Abdou).

It is common practice for presidents in Senegal to create a separate board that reports directly to the President around topics that are particularly important to them. Another longstanding example of this is the Malnutrition Office in Dakar. This practice often makes these movements structurally separate from the other health programs. Both the proximity to the President and recognition that is necessary to overcome barriers of working across multiple sectors and government bureaus such as in human health, veterinary medicine, and finance.

I note here that during interviews with community members, there was little discussion of the World Bank's efforts specifically in the COVID-19 pandemic, indicating the hands-off nature of the organization in the community. This may reinforce the barrier between the World Bank and the community in which policies and programmatic approaches from the Bank are directed by government efforts. The following analysis section will consider the impact of the World Bank's strong partnership with national governments in response efforts on community members. I will discuss the tensions that are created and mitigated between the government and community members in different regions of Senegal as a result of these relationships. I will also question the influence and power of community members in shaping pandemic responses.

International stakeholders played a significant role in determining the approach to response efforts throughout Senegal. In April 2020, the government launched the COVID-19 response plan through the national economic and social resilience program with a total budget of 1,000 billion CFA francs. The famous "le mille milliards" (one

thousand billion) CFA” became a buzzword for the national COVID-19 response which was discussed in multiple interviews with community members. In a discussion about the government response to the pandemic, one interlocutor and resident of Dakar described that *“there was the one thousand billion, but no one knows where that went” (Ibrahima)*. In fact, no one during the course of my interviews with various stakeholders was able to describe the ultimate destination of the thousand billion.

An audit report by the Court of Auditors of Senegal, published in mid-December, concerns the expenditure made in 2020 and 2021 on the “Fund to fight against the effects of COVID-19.” The document pointed to “shortcomings”, “over-billing”, “lack of justification” for expenses, some of which, moreover, are “not linked to covid”. The audit concluded that the fund, financed by the Senegalese state and donors, is worth 1,000 billion CFA francs (1.5 billion euros), approximately 740 billion CFA francs (more than 1.1 billion euros) have been officially spent, according to the report. Another report from March 2021 concluded that 773 billion CFA francs had been obtained by the government, with 84% of the contribution from international donors in the form of grants and loans, 13% from the Senegalese government, and 6% from individual and national company contributions (Ministere des Finances et du Budget, 2021). In total, 112 billion CFA francs were designated to the health sector.

Many critics also pointed to the government’s lack of collaboration with communities and scientific experts to generate response efforts (Diouf et al., 2020). One Dakar resident argued that *“the government was following the French response rather than figuring out how to make a local response that was good for people here. People were not getting as sick, but they were suffering a lot from the lockdowns” (Ibrahima)*. In

this case, the interlocutor is referring especially to the strict lockdown measures which were undertaken in France. The first confirmed COVID-19 cases in France were identified on January 24, 2020, in Bordeaux and Paris in travelers who had recently visited Wuhan (Stoecklin et al., 2020). The French government declared a full lockdown of commercial and social activities on March 16, 2020, which lasted through May 11, 2020 (Germain et al., 2021). The timeline below shows the French COVID-19 response efforts.

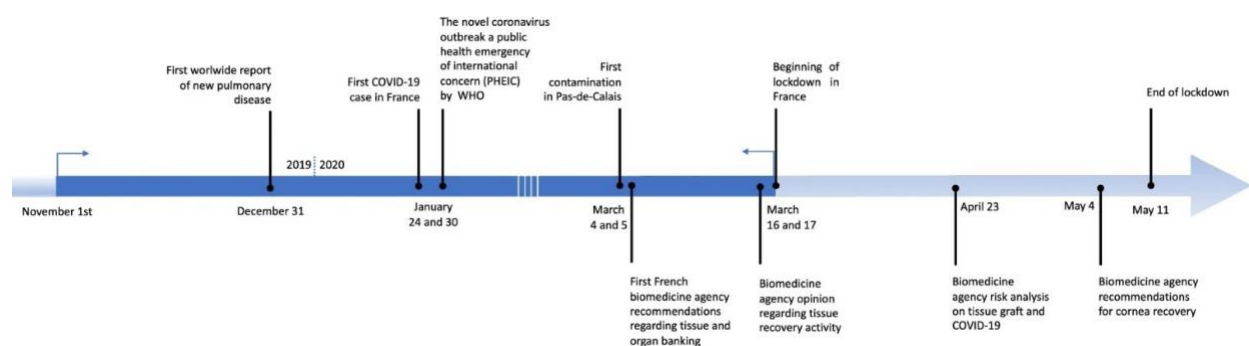


Figure 9.10: Timeline of the COVID-19 pandemic lockdown measures in France (Germain et al., 2021)

The Senegalese COVID-19 lockdown measures mirrored the French in many ways despite the difference in lifestyle and social realities. The timeline for the COVID-19 pandemic response measures by the Senegalese government between March 2020 and July 2020 is presented below:

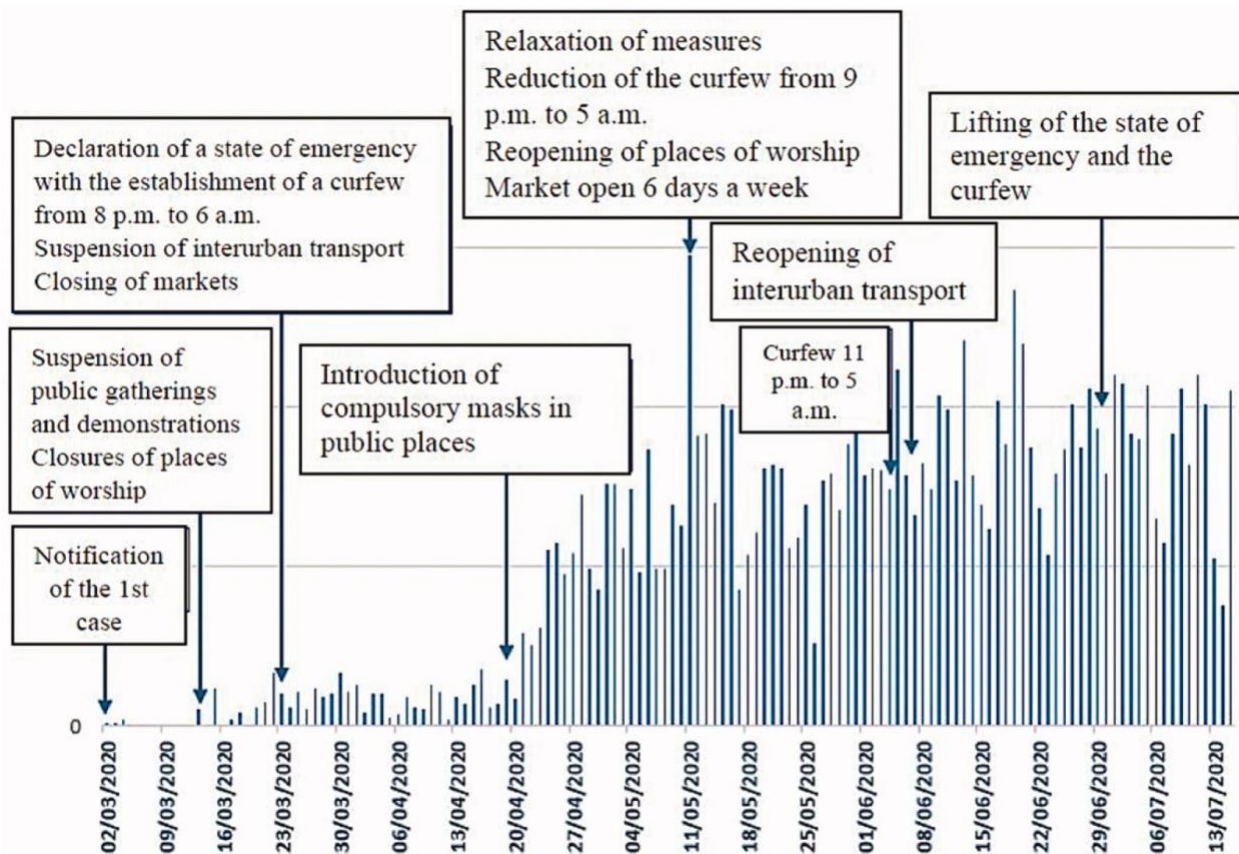


Figure 9.11: Evolution of the leading state measures in response to COVID-19 in Senegal (Ridde and Faye, 2022d)

The economic and social consequences of the COVID-19 pandemic were devastating on a global level. The pandemic posed significant challenges to livelihoods, public health, food systems, work life, and social activities (WHO, 2020c). Senegal is a particular example to show the vulnerability of informal economy workers due to the absence of social and workers protection as well as limited access to quality health care services. Furthermore, without the means to earn an income during lockdowns, many people struggled to access quality food sources.

The introduction of lockdown measures including the suspension of public gatherings and demonstrations, closures of places of worship, and the subsequent establishment of the curfew from 8 p.m. to 6 a.m., the suspension of interurban

transport, and the closure of markets took a significant toll on Senegalese livelihoods. In Senegal, agriculture accounted for approximately 16% of GDP in 2020 with 60% of the workforce engaging in food crop production (ITA, 2023). The government mandated border closures both within and across regions of Senegal in response to the COVID-19 pandemic largely disrupted both domestic and international food supply chains. Farmers were prevented from accessing markets to buy and sell produce, and consumers were unable to access diverse products at the markets and relied on what they produced themselves (WHO, 2020c; van Hoyweghen et al., 2021).

9.7 The Impact of the Pandemic on the Senegalese Informal Workforce

I circle back to Alphonse Mendy's character called Goorgoorlou as I described in the literature review which is a comic depicting neoliberalism in postcolonial Senegal (Seck, 2018). The Goorgoorlou introduces a compelling lens through which to analyze the economic repercussions of the national COVID-19 pandemic response in Senegal. The character's trajectory, losing formal employment post the first SAP, and subsequently navigating the informal economy for survival, resonates with the financial struggles faced by a significant section of the Senegalese population. Seck's analysis, rooted in the character's resilience and ability to find joy amidst daily challenges, sets the stage for an exploration of how Senegalese community members may have responded to the economic difficulties posed by the pandemic. The parallel between Goorgoorlou's experience with SAs and austerity measures and the anticipated economic challenges associated with the COVID-19 response presents a poignant connection. By drawing on this literature, the analysis can delve into the collective resilience and coping mechanisms employed by the Senegalese community, shedding

light on how historical experiences with economic hardship shape contemporary responses to crises and the implications for community well-being.

Interviews with community members in Dakar supported the widespread economic difficulty faced by informal workers as exemplified by Goorgoorlou. As one interlocutor described, *“People that are informal money earners...have to go downtown to see what they can do to earn their money for family to spend for the day after”* (Amadou). This description exemplifies the life of the Goorgoorlou which is common amongst the Senegalese population.

Further discussions made it clear that the national COVID-19 pandemic response measures exacerbated these challenges. *“They really suffered from the restrictions, and especially from the curfew. It was difficult for transport. A lot of people, several of them lost their job during that time because they were doing a temporary job, or even a daily job...Even here [in Dakar] I saw some building undertakers...for masonry...who really sold a house that might cost for example, 20 million CFA francs here, and they sold it for 5 million CFA francs because they don’t have money, or they are struggling...And I think from the last statistic that I have seen, 30% of people lost their job, and another percentage of people changed jobs because they weren’t able to continue with their primary job. You see?”* (Amadou). This relates to the work of Keith Hart (1973) on informal income opportunities in Northern Ghana in which he critiques the inadequacy of international economic analysis of poor countries by recognizing the important role of informal economic activities to produce autonomous income and economic growth for the urban and rural poor. In Senegal, this research has been built upon by analyzing the importance of socio-religious networks including Mouridism which has created a degree

of entrepreneurialism which drives a non-capitalist spirit of commerce in the informal sector in Senegal (Minard, 2009).

Despite reported widespread economic challenges to informal workers, the experiences of people living in Dakar diverged from those in rural areas of Senegal. One interlocutor working as a professional in the formal sector in Dakar explained their perspective that *“people living in Dakar really were hit...I think that rural populations have more leeway than the Dakar residents because the surveillance was stricter here in terms of mobility compared to the villages. In the villages, you could go to the field, you could go around, but here you could not go to the station without being halted by a policeman.”* The interlocutor here suggests that the experience of COVID-19 in the Dakar region was much more restrictive and thus more difficult than that of the rural areas of the country.

Another interlocutor when asked about his experience with the COVID-19 pandemic expressed his point of view as an informal fruit seller in Dakar and an immigrant from the neighboring country of Guinea where his family still lived. The following discussion is a translation from an interview in his local language of Pular. *“No saati moya.” (They continued repeating no saati, meaning it was very difficult). During COVID, we weren’t allowed to leave the house. We stayed in our homes only. And here in Dakar you are on your own. In the village it is better because if you don’t have food, you can go and eat at someone else’s house. People take care of you. COVID was hard because we didn’t have any work. It was hard to have food. It was hard to have a place to sleep. It was hard to have work. Here I have to buy everything. I buy my food. I buy my room. I pay someone for food” (Moussa).* Moussa did not travel home to visit his

family during the pandemic, but he was aware of the stark difference between his personal struggle in Dakar and the experience of his family at home in rural Guinea.

Mauritanians, Malians, and Guineans account for over 50% of the migrant population in Senegal, the majority of which work in the informal sector (Integral Human Development, 2022). Many immigrants living in Dakar from neighboring states left their families behind to search for economic opportunities that Senegal had to offer, taking on the responsibility not only to live far from the community in which they grew up, but also to provide remittances to their families they left behind. Taking on informal work opportunities leaves the immigrants more vulnerable than those in other regions, which became particularly apparent during the COVID-19 pandemic.

Not unlike many immigrants living in Senegal from nearby states, Moussa not only struggled to make ends meet for himself, but also provided the primary source of income for his family in Guinea to whom he sent money each month. He described his additional struggle during the pandemic, *“I wasn’t able to sell my vegetables. And I send money for the children in Guinea. I had to give them everything. I had to start over. And they stopped school. I had to give them everything and then figure everything out (motioning with his hands and his head to indicate his stress during this time)”* (Moussa). Despite this challenge, Moussa was a joyful man who embodied *Teranga* and even offered extra fruit as gifts to loyal clients. Perhaps this gift giving was a way to retain his clients and to bring in new ones which may outweigh some daily loss of fruit. There seems to be a mode of kinship in rural areas of Senegal and nearby Guinea characterized by a mutuality of being in the sense that persons in the same community are members of one another and participate intrinsically in one another’s existence in

the form of sharing (Sahlins, 2011; Viveiros de Castro, 2004b). In rural areas, this sense of kinship and interconnectedness was not disturbed by the pandemic, but rather, the pandemic became a part of what it meant to be connected with one another. The pandemic may even have brought relatives closer together as they took care of one another from afar.

The interlocutor continued by describing that *“if you are in Kolda, you have space. You can farm and you can eat what you farm. Here you only buy. You can’t grow anything because you can’t have any land. The only farm is near Pikine (in the Dakar region), and people farm there. For them during COVID it was better because they were still farming. Ask him (gesturing to his friend who came to greet him at the fruit stands who lives in Dakar but is from the Kolda region of Senegal). You know, it was hard here. In Guinea, people were able to farm. Here you have to buy everything, and food is very expensive here. It’s more expensive than in Kolda. If you have a farm, you can make a garden. You eat some food from the garden, and you sell what you don’t eat. Here you must buy all your food and it is very expensive”* (Alfa). Building on this point, Moussa continued by describing that *“the culture here in Dakar is difficult too because everyone is on their own. In Guinea, you are all just people. You help each other, you share things. But in Dakar you are on your own.”* (Moussa). It is worth noting that neither of the men were worried about catching COVID. The open conversation regarding their COVID-19 experiences resulted in each of them reflecting on the resulting economic difficulties and the feeling of being alone in Dakar during the COVID-19 pandemic rather than the health risks. This relates to the idea of reciprocity based on dynamic exchanges of goods, labor, ideas, and sentiment which provide the foundation for social

systems (Malinowski 1929; Mauss, 1954c). This experience is not unique to Senegal as literature suggests that worsening economic conditions continue to erode reciprocal relationships amongst the urban poor (González de la Rocha, 2006).

Another interlocutor working primarily in the informal sector in Dakar described, *“You know, here the informal sector is very big. And in the villages one of the biggest impacts was the Lumos shutting down. If you can’t travel and you can’t sell at the market, what are those people supposed to do? They are used to going there to sell their goats for instance and then they buy some rice, oil, and such to bring back to their family” (Ibrahima)*. He compared it to the difficulty for informal workers in Dakar, *“Here the masons had a really difficult time because they work on daily jobs. They come to do their work during the day. Maybe collect five mil¹ for the day, bring their family 3 mil and keep the other 2. But during the restrictions here, what were they supposed to do?” (Ibrahima)*. Again, this interlocutor notes the economic difficulty which is compounded by remittances to family members living in another region of Senegal or in another state which rely on the informal workers in their family for a major part of their livelihoods. *“In terms of trading also it was very hard for the people working at the Lumos, the local weekly market, because they didn’t stay open. They stopped the Lumos, so even the farmers who produce the vegetables and so on, also they just look at their vegetables being destroyed because they don’t have anyone to cut them, to buy them.” (Amadou)*. Porter (2019), which considers bird flu in Vietnam, describes markets as the “meeting grounds for people, poultry, and pathogens” (Porter, 2019, 10).

Although national policies sought to break any relationship between the COVID-19 virus and marketplaces, the policies also succeeded in breaking relationships

between people themselves and their potential for thriving livelihoods which depend on exchange.

One interlocutor working in the formal sector in Dakar noted that *“personally I experienced people who never call me for help saying that, you have to help us because really it’s difficult at our side”* (Amadou). Referring to connections across the country that he had come to know, he was moved by the difficulty that everyone was facing during the pandemic in an unprecedented manner. Thereafter, the exchange may or may not be met with an expectation of exchange later on through a type of social indebtedness in which the support provided by those more fortunate during the pandemic is given with the expectation of later return (Polanyi, 1957, 196; Sahlins, 1977). *“Economically also the price for food stuff at the shop increased. It was difficult to get it from local transport, what we say here the grossiste (French for wholesaler). Meaning the people who keep storage and sell to the shop for ingredients was really difficult. So all the food items and foods goods prices went up”* (Amadou). Relationships of reciprocity are further intertwined in the context of the food crisis in Senegal. The reciprocity of exchange of goods for food stuffs emerges particularly in rural areas where people do not have the ability to store certain food stuffs (Weissner, 1982). Anthropologists since the 1960s have studied this phenomenon in urban settings in particular where the poor use reciprocity to obtain various necessities including loans, childcare, and crisis assistance from accidents, illness and fires (Isbell, 2005; Lobo, 1982; Lomnitz, 1977, 96).

Another interlocutor noted similar observations. They recall, *“I think the economic consequences were critical for most of the Senegalese, and particularly the*

marginalized groups or the poorest of the poor. Those without the set possibility to use savings or whatever. So, they really suffered from the situation. Also, many businesses collapsed. Because of COVID, inflation became higher because all of the supply chain worldwide was impacted by COVID. We were expecting to have relief and then the Ukraine war came with difficulties” (Ousmane). The COVID-19 pandemic and resulting shutdowns of marketplaces took a major toll on the Senegalese population across all regions, having different consequences depending on the area. What is also notable is the impact that Senegalese population experienced immediately from the Ukraine war, which halted the influx of relief efforts from abroad as they were being repurposed for Ukraine.

Some community members spoke about the difference between the impacts of COVID-19 regionally based on the link between urbanization and migration. *One area that was hit very hard was Touba [which] had the highest rate in Senegal. They had the most fatalities. The first cases were in Touba because of the migration. People are traveling from abroad to Touba. Someone infected 14 family members. I think for me, urbanization linked to migrants, you can very clearly see the link between two factors with COVID” (Ousmane).* Touba is a holy city in Senegal and the second most populated city, located approximately 180 m east of Dakar, which was established by Cheikh Ahmadou Bamba Mbacké - the founder of the Mouride religious order. Touba also holds strong political standing as the holy city maintains a stronghold on Senegal’s civil society (Ross, 1995; Ross, 2011). As compared with the urbanized capital and surrounding regions, *“the marginal regions such as Kolda, Tamba, and Kédougou were the last regions to be helped. I think they suffered economically because of the distance*

from Dakar. They were not really able to get the resources from Dakar” (Ousmane).

Ousmane describes his perspective again as a formal sector professional living in Dakar noting one of the major challenges of distant regions from the capital to obtain the COVID-19 response resources.

The COVID-19 pandemic also had a major impact on migrants living abroad as well as their families living in Senegal. As of 2017, annual remittance inflows in Senegal were USD\$ 2,338 million which accounts for 12.8% of the Senegalese economy. One of the government responses to the COVID-19 pandemic was to send money to migrants living abroad. One interlocutor whose son lives abroad in Italy noted that *“Senegal had a really big heart in the beginning. They even supported the migrants. Every Senegalese living abroad received a check of 500 euros through the Senegalese embassy. Also, everyone who was stuck in the airports, you know when they shut down the airport, also they received 500 euros. That was the case of my son who was stuck in Morocco. He spent 3 months stuck in Morocco and he received 500 euros. But I think that the impact was entrenched. Because not only the economic activity in Senegal deteriorated and many people lost income, the migrants who are living abroad were also hit. Some of them lost their jobs and were impacted. So, they were not able to send money to the family, that was also a very big shock in the economy. I think that I also know cases where some migrants asked their family to sell assets they have here and send them money because they lost their job.” (Ousmane).*

Perhaps the government had a “big heart” as this interlocutor suggests. However, the government also has a strong economic motivation to support migrants abroad due to the drastic impact on the economy. Other studies suggest that migration

plays a major role in poverty reduction, particularly through remittances (Shaw, 2001, 74-94). In this way, providing remittances may be a way for the government to exert and increase its global governance power (Diedhiou, 2015; Mouthaan, 2019).

9.8 Restriction of Movement

As the global health crisis unfolded, governments worldwide grappled with the imperative to curb the spread of the virus, leading to various degrees of movement restrictions. Within the Senegalese context, these regional lockdowns not only reshaped the daily lives of individuals but also initiated a profound reevaluation of the delicate balance between public health priorities and the socio-economic well-being of communities.

Government mandated national lockdowns in response to the COVID-19 pandemic in Senegal restricted movement across state borders in and out of Senegal and between regions. When discussing the impact on movement or migration within and across borders, one interlocutor described that *“It really badly impacted the internal and external movement. Because firstly the borders were closed, so no more people were going in and out. Even between regions. It happened that people who were traveling not knowing what to do, they paid maybe 5 times the normal price to get from Dakar to another region...Guess what, by taking the tracks that are transporting fish. You can imagine being inside with fish with that smell. Awww (making a face to express disgust). So people tried several ways to be able to move” (Amadou)*. Amadou’s description of the lengths that people went through in order to be able to travel during the lockdown measures indicates the desperation that people faced during this time.

“People also normally travel together here. We have a transportation system here where people find cars by joining fees. Instead of taking one taxi and paying the money, we call it clando here. Normally you have 4 people inside, but with the restriction it was 3 people plus the driver, so two people behind, and one person in front with the driver. So that increased the payment because where you normally pay 100 cfa, you pay 150 cfa or 200 cfa. So it was really difficult for people...“Also even for public transport. What we call here the tata, the minibus. They also had restrictions in terms of the number of people to transport, wearing masks, and so on” (Amadou). The travel restrictions had multiple micro-impacts on the population of Senegal which restricted people from moving and further created a burden to promote their livelihoods to travel for work or to see family members. Ibrahima noted the impact of the transport restrictions on workers, *“You have the people working in transportation. How are they supposed to get money? They are used to traveling in between regions and taking people around, and then they were completely out of work” (Ibrahima).* The travel restrictions from the COVID-19 pandemic affected the transport workers and community members alike on the national level.

At the onset of the COVID-19 pandemic, the United Nations Economic Commission for Africa (UNECA) in April stated that *“anywhere between 300,000 and 3.3 million African people could lose their lives as a direct result of COVID-19.”* (UNECA, 2020). The organization noted that *“Africa is particularly susceptible because 56 per cent of the urban population is concentrated in overcrowded and poorly serviced slum dwellings (excluding North Africa) and only 34 per cent of the households have access to basic hand washing facilities”* (UNECA, 2020). By March 23, 2020, 45 African

countries had reported at least one laboratory case of COVID-19 (Pearson et al., 2020). Researchers noted that limitations of local surveillance systems, similarities between symptoms of COVID-19 to other common diseases such as the flu, and asymptomatic cases likely contributed to an underestimation of reported cases in low- and middle-income countries (Guan et al., 2020; Wu and McGoogan, 2020; Mizumoto et al., 2020). Interviews revealed that many Senegalese people were fearful of the uncertainty at the beginning of the outbreak as well. *“Initially everybody thought it would be the end of the world for Africa because of COVID. Even the UN General Secretary forecasted millions of deaths at the beginning. To be honest, also at the beginning we were scared. Seeing the impacts of COVID in China and in the [United] States, you think oh this is what is happening in developed countries, so we thought it would be the end of the world for us”* (Ousmane). This discussion suggested that there was an additional fear as people could see the devastating impact of COVID-19 in developed states thinking that the only option would be that it would be even worse in Senegal – perhaps because there were less resources and infrastructure. Perhaps also because of the news outlets suggesting that this would be the case.

From my own experience living in Senegal at the onset of the COVID-19 pandemic outbreak, the fear surrounding the outbreak was evident, particularly as it pertained to tensions between nationals and expatriates. After hearing the national news on the radio that the COVID-19 pandemic was an outsider’s disease, many people with whom I worked and lived over the previous year including my host family began to jokingly question whether I would bring COVID-19 since I was not Senegalese. Children would often cover their mouths when they saw me for the first time.

One interlocutor reflected that *“paradoxically, we noticed that the pandemic was not as serious in terms of incidence as it was supposed to be. This low level of health development system, they handled very well the pandemic in terms of strategy and health provisions. Definitely at the beginning we had some difficulty with the respiratory machines. In the whole country there were only 20 and they were all in the hospital in Dakar. The problem was really managing the complicated cases because we could not handle the influx of serious cases. For the mild cases, they were able to treat them very well. The rate of recovery was very high. Also they had this strategy that was efficient even if very expensive to track and isolate cases”* (Ousmane). It is interesting to note here that despite concerns from the international community, Senegal responded swiftly to the pandemic, and built the capacity to treat severe patients. Furthermore, Senegal’s Institute Pasteur in Dakar was one of only two COVID-19 testing laboratories in Africa (WHO, 2020b).

Another interlocutor noted that the health impacts of COVID-19 in general were much less severe than expected. *“The impact on the economy was much worse than the disease itself. We didn’t have very many deaths which was good. People usually got a little sick like with grippe² but here we have Kinkéliba³ and we put citron⁴ in it, or you put citron in the coffee. And we were fine”* (Ibrahima). This reflection, which was common across other interviews and conversations, suggests that many people thought of COVID-19 as a sort of seasonal flu, which was very common in the population. *“When I used to walk around with masks here, people would say why are you wearing that and laugh saying COVID isn’t real. They said it was created by Macky Sall to steal money. They said it was just grippe (flu)”* (Amadou). This suggests that the lack of trust

in the Senegalese government may have contributed to the pushback against the COVID-19 response efforts, leading to the increased politicalization of the pandemic response in Senegal. Just before I arrived in Senegal in the Spring of 2021, a series of mass protests erupted that March after the arrest of opposition leader Ousmane Sonko over rape allegations. The five-day protests reportedly resulted in the death of 14 people, 12 of which died from gunshots fired by security and defense forces. Sonko denied allegations against him and called for antigovernment protests by arguing that President Macky Sall to arrest him (Al Jazeera, 2021).

In an interview, an interlocutor described the protests from their point of view: *“A political leader was accused of rape [led to] protests and some people died....It was not just political anger, but it was fueled by all of the discontent that people had from the COVID-19 restrictions. The fact that people lost their business, their job, and all that. They used it as a scapegoat to empty their anger on the street. That’s when the government decided to back up. There were set measures for transportation. They had to carry just half of what is allowed in the car. The markets were shut down just one day out of two. So, there were all of those drastic measures”* (Ousmane). As a result of community push-back, the government reduced the strict COVID-19 measures.

Another potential reason why the health impacts of the COVID-19 pandemic were not seen as severe was because of the well-equipped public health response in the country which is active for many other diseases. With regard to One Health and the COVID-19 response, one interlocutor argued that *“Senegal does it really well because we already had community health infrastructure to incorporate the initiative. The public health response is really the foundation of One Health because it all goes back to early*

detection of cases and alerts. It is more efficient at the community level because just the health system oversees identifying cases and responding is going to be very late.” Here it is important to note that it seemed obvious and clear to the interlocutor that a sole response approach to a pandemic outbreak is not sufficient, but rather, prevention and preparedness are imperative. While the interlocutor uses the term One Health synonymously with ideas of community health, indicating that from their perspective, One Health does not only span across species barriers, but can also involve holistic actions within one category such as human health. The interlocutor continues by describing the specifics of the Senegalese public health infrastructure which was mobilized during COVID-19. *“But you know Senegal has C-VAC. The community surveillance in Senegal. There are more than 60,000 in Senegal. So, the infrastructure was already here, it’s just about training them to identify the symptoms of the disease and to set up the system of alert using SMS. I think this is why Senegal did very well. Because the health system was much better than many countries. Even some developed countries” (Ousmane).*

Related conversations with Dakar residents also suggested that the previous experiences of Senegal with Ebola prepared the country to be well-equipped for swift responses. *“You know with Ebola we had one case, and it was from a Guinean man. And you know here the response by the government is always to immediately shut down the borders. When they found out, they separated him and treated him, but it was a good thing that he came to Senegal because you know if he was in Guinea he would have just died” (Ibrahima).*

It is interesting to note here the tension between lack of government trust in the present versus the support for success in infectious disease management in the past. Scholars suggest that the perceived trustworthiness of information sources including the government and international bodies, is a significant determining factor for the level of perceived risk and control over an outbreak (Ning et al., 2020; Siegrist et al., 2014). Therefore, in the case of the COVID-19 pandemic, the lack of trust in government information may have led to a decreased perception of risk by the Senegalese population.

9.9 Motivation and Reactions to the Government Response

The government measures were met with a variety of reactions, but many interlocutors described the lockdown measures which seemingly mirrored those of France as an inappropriate in a Senegalese context. *“I would say that in this pandemic, the poor among us were in the right. Making an assessment from what I see, I think that this time the trend was reversed. Because usually the government knows the situation, but this time I think it was not the case”* (Ousmane). While this interlocutor normally sides with the Senegalese government on major political decisions, they regard the COVID-19 lockdown measures as a mistake.

Sub-Saharan Africa is particularly affected by food insecurity, both before and after the COVID-19 pandemic since 40% of the population lives below the poverty line and 20% of the population is estimated to be undernourished (Beegle and Christiaensen, 2019). In response to the COVID-19 pandemic, the Senegalese government provided emergency food aid. According to the Food and Agriculture Organization of the United Nations (FAO), emergency food aid is the least likely

measure to result in negative consequences (FAO, 2012). Thus, it is regarded as an important approach to improve food security during crisis for the most vulnerable populations, particularly for women and children. In response to the COVID-19 pandemic in Senegal, the government established an emergency food aid program (PDKA) to prevent increased food insecurity among vulnerable groups, which reportedly benefited 1,100,000 households in Senegal (Ndiaye et al., 2022; Diouf et al., 2022; UNSDG, 2021).

However, in Senegal, the approach of the emergency food distribution was widely critiqued by community members. Rather than the dramatic health consequences experienced throughout the West, *“the consequences [in Senegal] were more on the economic and social sides....For the first three months people played the game. But when it started to last, people started to protest because they got tired. They could no longer make it. Despite the fact that the government gave cash to poor households. It was very poorly done. Most of them did not get it in time”* (Ousmane). They also critiqued that *“when you get a bag of rice, or macaroni, or sugar while you need cash. (Laughs apologetically) it doesn’t help. So, they really tried to alleviate the shock, but the immense drastic measures made it unbearable, so they started to violate the measure, they started to protest, to be very vocal, and even to be violent against health workers or security forces. And that played a big role in the big turmoil that happened”* (Ousmane). Ndiaye et al, (2022) argued that the food kit delivered to households had a negative effect on the quality of the diet due to the lack of diversity and nutritional value. Despite this conclusion, they suggest that other non-perishable foods could be included in the kit such as dried fruits, vegetables, and fish.

Some of the societal disagreement with government decisions emerged when lockdown measures were altered in the midst of the pandemic. The World Bank simulations suggest that learning-adjusted years of schooling could decrease from 4.9 years to 4.5 years on average in sub-Saharan Africa as a result of the time children spent away from school (Filmer et al., 2020). The shutdown of schools had a major impact worldwide, but particularly in Senegal since the lack of technology prevented sustained smart schooling which occurred in the West. The government announced that the annual school examinations were canceled on June 1st, 2020, and then were announced to reopen on June 2nd. Eventually, the reopening of schools was authorized on June 25th, 2020. One interlocutor described the societal impact of the shutdowns: *“At the school level, people, the students got late in terms of the exams and so on because they stopped the process for 2 months. They tried the virtual courses delivering, but it was challenging for the rural areas, so it was very challenging. They tried to do something, but I don’t know if really it was successful or not. It was really difficult. Really too much”* (Amadou). Regional displacement measures for teachers were lifted on June 4th, resulting in their return to work and likely causing a surge in COVID-19 cases (Ridde et al., 2022).

Community suffering in Senegal during the pandemic relates to African Historian Ngalamulume’s analysis of the impact of cholera epidemics on the dimensions of inequality in Saint-Louis, Senegal (Ngalamulume, 2021, 160). Ngalamulume concluded the majority of victims of the epidemics were the working class and urban poor residents who did not have access to fresh water. Much the same during the COVID-19 pandemic, the working class and urban poor may have suffered disproportionately from

the COVID-19 pandemic – often as victims of economic hardship from mandated responses rather than from the disease itself.

9.10 Vaccine Hesitancy in Senegal

One survey suggested that vaccine refusal in Senegal was “related to living in large cities, having a poor attitude toward the vaccine, thinking that the vaccine would not help protect them from the virus, thinking that the vaccine could endanger their health, trusting opinions of people who were important to them, and lacking information from health professionals” (Ba et al., 2022). Interviews with community members in June 2021 suggested that vaccine hesitancy was strong over one year after the onset of the pandemic. *“For the last few months, we had 0, 1, 2, 3 [cases], but the cases are increasing now. Now it is up to 10. Despite that, we are still 1,003,000 vaccinated. I think that there are still a lot of people who don’t believe about the vaccine” (Ousmane).*

When asked about the reasoning behind vaccine hesitancy in Senegal, community responses were mixed, referencing a variety of geopolitical factors. *“I think that it goes beyond the government. People now have access to social media to know what is happening worldwide. They talk to their family members living abroad. So, the skepticism is mostly nurtured by that. In the beginning, people felt that we were getting the second-level vaccine. Not the best vaccine. Because we received AstraZeneca. India got the best vaccine, Pfizer, Moderna, and all that, and Senegal had the second zone of vaccine. So that explained the attitude against the vaccine...There were women who received AstraZeneca who were experiencing symptoms of pregnancy as a result of the vaccine” (Ousmane).* Describing AstraZeneca as being given to the “second zone” of the world suggests that there are countries which are prioritized over others in

terms of receiving the best vaccine. This brings up multiple questions: Who decides how vaccines are distributed? What does it mean to be a first or second zone for vaccines?

The issues of vaccines in Senegal relates to the work of *Echenberg (2003)* on the Bubonic Plague and the politics of public health in colonial Senegal. In his analysis, Echenberg notes the ways in which inequality in social, economic, and political processes were exasperated by the plague as European lives and livelihoods were prioritized over those of the Senegalese.

Many African countries faced a challenge to procure COVID-19 vaccines without the means to rapidly produce them internally. This included Senegal despite having one of two facilities for vaccine production in the African continent. As a low-income country, Senegal was eligible to receive 1.3 million doses of COVID-19 vaccines for free from the WHO COVAX program (Peyton, 2021). However, this promise was insufficient considering that the Senegalese population is 16 million people. In attendance of the vaccine distribution through the African Union and WHO, Senegal received 200,000 doses (for 100,000 people) from Chinese company Sinopharm vaccine. There was also expressed hesitancy from this vaccine from community members: *"Now we have the vaccine and migrants can also access it, but many people don't trust the vaccine. Some people say the Chinese vaccine is trying to sterilize the Africans and reduce the population here"* (Ibrahima).

Vaccine hesitancy in Senegal also emerged as a result of the rapid emergence of the vaccine. *"Changing scientific protocol is hard to accept by scientists. If you set a protocol saying that a vaccine needs to go through these stages, and it takes at least these number of years, and then a new protocol comes out that says, oh no, it's*

possible that you can reduce the time. You can do it in 9 months...(laughs nervously) it's really scary, and also hard to understand. So that paradigm shift and slash of protocol creates a challenge for the people who say that it needs to still go through the steps in order to be validated" (Ousmane). This idea ties back to the politicalization of pandemic risk and risk perception. Research suggests that vaccine hesitancy in Senegal was tied to living in large cities, having a poor attitude toward the vaccine, thinking that the vaccine would not help protect them from the virus, thinking that the vaccine could endanger their health, trusting opinions of people who were important to them, and lacking information from health professionals (Ba et al., 2022).

9.11 Interlude: Motorcycle Ride

The motorcycle driver in Kedougou weaved through the cars, buses, and other motorcycles on the road. He had immigrated to Senegal from Guinea 10 years ago after attempting to migrate to Italy but getting imprisoned and sent back. Compared with life in Guinea, he noted that the life in Senegal is not as nice, and the weather is unbearably hot in Senegal, but the economy is far better, so he stays there to send money back to his family.

We passed the regional hospital where vibrant murals were drawn on the sides of the wall with familiar health-related images: Signs encouraging community efforts to eradicate malaria, a father taking his ill child to the health post, and a mother exclusively breastfeeding for six months, etc. A new mural had been painted with the words COVID in big bold letters and the images of a woman wearing a mask had covered old, faded images the wall. The driver noted that he didn't think COVID-19 really existed. He

recalled that there haven't been any masks since the first few weeks of the pandemic, and by that time everything is back to normal in the daily life.

COVID-19 brought divergent experiences for people around the world. While the pandemic has brought immense hardship and loss to many communities globally, it is clear that not everyone has been affected in the same way. For the motorcycle driver from Guinea, the pandemic seemed like a distant concern compared to the everyday challenges he faced in his adopted home of Senegal. His perception of COVID-19, shaped by his own lived experiences and the information available to him, starkly contrasted with the scenes depicted on the mural at the regional hospital. This encounter served as a poignant reminder of the complexities and disparities that exist within our interconnected world, where individuals navigate their realities amidst a backdrop of global events.



Figure 9.12: Public Health mural on malaria prevention in Kédougou, Senegal 2021



Figure 9.13: Photo of public health mural on COVID-19 in Kédougou, Senegal 2021



Figure 9.14: Public Health mural on health hut in Kédougou, Senegal 2021

9.12 Health Services in Senegal

The lockdown measures drastically impacted the health services worldwide, including an increase in morbidity and mortality due to Sars-Cov-2 infection (Romero-

Rodríguez et al., 2023). Conversations both in Dakar and in rural regions in Kédougou and Kolda supported these studies.

A Dakar local suggested that *“those needing other health services...were really impacted. Even the health post staff. They talked about it saying that at one time, people were scared of seeking care for other diseases because they were scared about the fact that people might say that they have COVID. So they had themselves. They had their disease. It impacted a lot”* (Amadou). This suggests that patients often did not seek care for fear of stigma or being quarantined for having COVID-19. The hesitation of some Senegalese people to go to the hospital for other maladies during the COVID-19 pandemic may result from trauma of the Ebola outbreak in which many people fled affected zones while others were taken from their families to be quarantined (Onyekuru et al., 2023).

Not only were some Senegalese hesitant to seek medical care for fear of stigma or quarantine, many were also restricted from attending the services because of the lockdown measures themselves. Regarding the *“impact on the other health services, even here people are saying that most of the people who died, they are not really directly infected by the coronavirus, but indirectly. Meaning that they cannot go to health facilities if there is an emergency at night for example because of the restriction. Even it happens sometimes that people go outside and were helped by a police person if they know that it was a health emergency. But some people can't because the area where they are is really difficult to get out from and find the health facilities. Especially for transport because if you do not have your own car, it will be really difficult to be*

transported by taxis because at 7 or 8 they stop. Unless you know someone who has a taxi, you cannot go out because it is really difficult to do” (Amadou).

This description suggests that there was a larger impact on health facilities in rural areas since there were less means to travel to the hospital after curfew unless there was someone nearby with a car or taxi. In rural areas on Kolda and Kédougou, conversations suggested that they were able to use motorcycles to move to the hospital, but it was more difficult due to the restrictions.

With regards more specifically to the impact of the COVID-19 pandemic on health outcomes, one interlocutor described that *“for taking care of other diseases, it was difficult because people were mostly focused on COVID” (Amadou)*. Taking the example of nutrition, they explained that there was *“an increase in malnourishment in some areas because there was no more gathering of people for growth monitoring, no more gathering people for field activities on the side because all the focus was on COVID-related things” (Amadou)*. Furthermore, *“in terms of nutrition [COVID-19] had an impact because people were not working, [and] not having money to buy necessary food for the families. So it was very hard” (Amadou)*. Diets in Senegalese households experienced negative changes in the number of meals (59.8%), the quantity of meals (69.7%) and the quality of meals (75.7%) (Diouf et al., 2022). Government responses to the food crisis will be discussed later in this chapter.

When asked about the impacts on infectious diseases with particular reference to malaria, they responded that *“Many gains made in malaria were lost, [and] malaria was also very hit by COVID. They were more hit in the south” (Ousmane)*. The greater impact on malaria in the south is due to the fact that malaria cases are far higher in the

southern regions of the country and the transition of the terrain from the Sahel desert in the north to the tropical climate in the south.

Another interlocutor who had done explained that the government reported *“an increase in cases. Even kind of a coming back of diseases that they said were pre-eliminated. Like measles, like leprosy in some areas, and even TB because people were not going for screening, for testing...For example, in the Kaolack area, if I am not mistaken, they reported at least 4 cases of TB...If they had a disease, they would try just the traditional healing without knowing that there is a need to go to the hospital.”*

(Amadou). Amadou’s conclusion suggests not only that there was reduced access to care as a result of the COVID-19 pandemic, but also that it reversed national progress on the eradication of other diseases such as TB. People may have sought hospital care for TB cases primarily due to a lack of knowledge of the disease since it was very uncommon in the population until the onset of the COVID-19 pandemic. Similarly, reduced access to health services during the Ebola outbreaks in West Africa led to an increase in major endemic diseases including malaria, HIV/AIDS, and tuberculosis (Parpia et al., 2016).

One study modelling disruption in breastfeeding practices predicted the reduction in breastfeeding prevalence due to limitations in the provision and use of health services and disruptions to the enabling environment (Busch-Hallen et al., 2020). Maternal and child health were also severely impacted by COVID-19. One interlocutor described that the Senegalese government *“did a survey on maternal child health. The impacts are foreseeable. People could not access the hospital because of fear of contamination. The focus was on COVID. People who had non communicable diseases like cancer*

who had to miss their medical appointments were [also] hit very hard because of the stopping of their treatment” (Ousmane). Additional research on the impact of the COVID-19 pandemic on maternal and child health services access in Mozambique demonstrated negative collateral effects of government restrictions on maternal and child healthcare services (das Neves Martins Pires et al., 2021).

9.13 Interlude: Overnight Travel from Dakar to Kédougou in May 2022

By the spring of 2022, Senegalese society had returned to regular movements after months without restrictions. While Sars-CoV-2 cases were still being recorded in the country, the containment measures were no longer enforced.

There was a makeshift bus station in Dakar servicing buses from the capital city to Kédougou over a 14-hour journey. It was a Friday afternoon, and the call to prayer could be heard throughout the city as men and women began to gather near the mosque. Passengers weaved through the crowded street, calmly and slowly dragging their bags toward the bus. Some stopped in the shade of a tire shop to escape the beating sun while waiting for prayer time to come to a close and for the people to file out of the mosques and return home for lunch.

Passengers handed their tickets to the bus driver and negotiated for the price of their bags until both parties were satisfied. They walked to our assigned seats and got settled for the 14-hour overnight journey ahead. At each stop, women and men came on board entering one door and mechanically exiting out the other selling clothes, fruit, nuts, or cookies. Passengers and salespeople alike laughed and made jokes with one another as they negotiated the price.



Figure 9.15: Overnight bus preparing to carry passengers from Dakar to Kédougou over 14 hours, 2021

As the bus journeyed through the city center of Kédougou, Senegal, passengers shared snacks and conversation, seemingly unaffected by the looming threat of COVID-19. The fussy baby, seeking stimulation, was passed from one passenger to another,

temporarily easing her restlessness. Amidst this communal atmosphere, where masks were absent and interactions were unrestricted, it felt as though the pandemic had never existed.

Upon arrival at our destination, the city center of Kédougou bustled with activity as passengers retrieved their belongings from the bus roof. Awakening to the morning sun, members of the village went about their daily routines, fetching water from the communal well and greeting each other with familiar smiles. Breakfast stands sold freshly cooked onion omelet sandwiches.

Kédougou had returned to its familiar rhythm, seemingly unaffected by the challenges posed by COVID-19. The simplicity of daily rituals and the warmth of human connection served as a poignant reminder of the resilience of communities in navigating uncertain times.

9.14 Social Impacts of the COVID-19 Lockdown Measures

The state of emergency was declared by the government of Senegal on March 30, 2020, which banned religious gatherings, closed schools and universities, and imposed a curfew between 22:00 and 06:00 (Diongue and Diallo, 2020). While these measures were attempts to stop the spread of the virus, they had widespread repercussions on the typically lively and social Senegalese society.

Approximately 94% of the Senegalese population is Muslim (Kettani, 2010). Whether in Dakar or Kolda, gathering for the five daily prayers is a major part of Senegalese society. It is common to see people walking with prayer mats or taking a small break in the busy day at prayer time. As a result, the lockdown measures had major impacts on Senegalese social and religious life.

One interlocutor described that *“on the social side also there were some drastic consequences for people’s lives. I think it was the first time that Senegalese experienced living between 4 walls because we really had to stay at home. That was really something new. Because most people just come back home to sleep and eat. So that was something new. Even changing our interactions. Greetings you could no longer do. You could no longer sit with people having tea or organize social events”* (Ousmane). Greetings in Senegalese culture are incredibly important, characterized by a handshake and proceeding exchanges of cordial questions regarding another person’s overall well-being. It may begin with a greeting according to the time of day, followed by questioning of the state of the other person’s family members, work, and health.

“You couldn’t go to the mosque. That was horrible. I stayed myself more than a year without going to the mosque. More than a year. As somebody who used to go three or four times a day. I stayed a full year without going to the mosque. It really changed the Senegalese life.” (Ousmane). Restricted religious gatherings had major impacts on the Senegalese economy. For example, *“the Touba Maga – because those big events are also big economic entries for the government...For example, just Touba, they say that the whole event, the money spent there is around 300 billion CFA. It’s a lot of money. And the government is taking taxes from there. There are other organizations that also see their beneficiaries increase and so on. All those things had stopped at the time. So, it was really a strong negative impact in terms of economy”* (Amadou).

“And sometimes the change came from some religious people who were really reluctant to stop especially going to the mosque to pray because it is mandatory for the

Muslim faith. Even if in some cases it says you can adapt, but you know for some people who really like going to the mosque, some people really reject that and...challenged the government by going to the mosque even when some of them were called by the police. They had to hear from them and do some kind of follow-up to a decision. So that creates social tension” (Amadou). Societal tensions caused by the lockdown measures resulted in part due to individuals suffering from a major change in their religious practices. This also created resounding tensions between Senegalese community members and government officials.

The stay-at-home measures were significant throughout the population as were reported to have significant impacts on domestic violence. *“Even socially, people seemed to be saying that domestic violence was kind of raised at that time because people are all the time together, so each of us, your negative sides start being known or start to emerge because you’re not used to sitting down all day. Sometimes you are nervous, you are annoyed.”* Women and girls were particularly affected by the COVID-19 pandemic. Access to sexual and reproductive health became more difficult during the pandemic. The financial uncertainty and tensions due to confinement and curfew resulted in particular vulnerability of women to domestic violence and other forms of gender-based violence (CECI, 2020).

9.15 Recommendations for Improvement for the Senegalese COVID-19 response

The COVID-19 pandemic in Senegal resulted in numerous consequences ranging from health, economic, and political impacts. Looking to the future, some interlocutors described their perspective on how to improve pandemic preparedness, prevention, and response (PPR) in the future for Senegal:

“I think that there are still some unsolved questions about COVID. Despite the reality, the impact, that’s still quite limited. People are questioning the vaccine. There are still people questioning many things about the disease. Even if COVID was solved tomorrow these questions need to be answered. Because if it comes back again, we are going to have the same issues.” (Ousmane).

“I think it is time for the scientific community to work hard to answer those questions. They need to make people agree that this is a serious disease. This is not something that is fake or was produced by Bill Gates or otherwise... Those questions need to be answered. There are still some unresolved questions.” (Ousmane).

Me: What approach do you think would make people listen?

“Science is based on data. And data means research...I think now is really the time to do research to make people understand” (Ousmane). While one obstacle is to obtain researchers with the correct tools, contexts for suggestions, and ideas regarding the controversial nature of the pandemic response, it is important to question *“who is going to do the research? There is a lack of confidence in international institutions. So, I think there should be collaborative research including skeptics. There are skeptics at the high level. Instead of having each category and then having people who say, no I don’t want to use that. But if they are able to set up teams including people from both sides then I think the research would be better” (Ousmane).* This idea is interesting to consider in Senegal and worldwide. Skepticism, vaccine hesitancy, and differing opinions as to the best approach to pandemic PPR was a primary topic discussed on a global basis and is not unique to Senegal. In the future it may be useful to consider and

make available research which comes from a variety of institutions with a variety of viewpoints in order to produce the richest information possible.

9.16 Conclusion

This chapter analyzed the COVID-19 response efforts in the case study country of Senegal. Considering Senegal within the global response efforts to pandemic risk situated within the global health finance ecosystem allows it to be deconstructed to better understand the context for the impact of government and international response efforts from which it emerged and those which will be reproduced in the future.

The discussion delved into multifaceted dimensions of the COVID-19 pandemic's impact on Senegal, spanning from government responses and movement restrictions to vaccine hesitancy, health services, and social dynamics. The analysis has considered the interplay between international influences, government actions, and community experiences during this unprecedented global health crisis.

Government responses, influenced by international actors such as France and implemented through collaborations with entities like the World Bank, showcased both strengths and shortcomings. While the stringent measures aimed at curbing the spread of the virus, such as regional lockdowns, resonated with global public health strategies, they also elicited tensions, particularly in terms of their socio-economic repercussions. The discernible influence of external actors and the critique of government actions underscored the delicate balance between global health imperatives and the socio-economic well-being of the Senegalese populace.

The emergency of vaccine hesitancy in Senegal illuminated the complexities of public perceptions and trust dynamics, revealing how historical distrust in government

actions could manifest as reluctance towards vaccination efforts. The analysis further underscored the importance of transparent communication and community engagement in fostering widespread acceptance of crucial vaccination initiatives.

The pandemic also illuminated the strain and adaptability of Senegal's healthcare infrastructure during the pandemic. Insights into challenges faced by health services in balancing pandemic response and routine healthcare underscored the need for resilient and adaptive healthcare systems capable of addressing evolving public health crises. Furthermore, the pandemic's ripple effects also spanned beyond the healthcare realm, unveiling the disruptions caused by the closure of religious gatherings and the alarming increase in domestic violence. These social dimensions highlighted the intricate intersections between public health crises and the broader socio-cultural fabric of Senegalese communities.

This chapter has shown that despite having knowledge from previous outbreaks, international influence and lack of consideration for community perspectives resulted in pushback and disagreements as to government responses to the outbreak. This research suggests that it is imperative to consider community perspectives when generating country-level solutions for pandemic risk futures.

Chapter 10: Conclusion

The onset of the COVID-19 pandemic revealed shortfalls in the international community to prepare, prevent, and respond to infectious disease risks.

This dissertation evaluated the efficacy of the first ‘pandemic bonds’ developed by the WBG, as they were used to respond to the novel COVID-19 pandemic on both an international level and through a specific case study in Senegal. The goal of this approach is to explore the financialization of pandemic risk in the global development sphere. Analysis for this topic features three major themes: (1) The types of knowledge and values materialize at the interface of decision-making amongst World Bank officials, investors, partner organizations, government officials, health care workers, and community members to identify the primary project objectives, approaches, and target populations; (2) The way in which PEF shaped the role of financial mechanisms in infectious disease management; and (3) The implications of the pandemic response approach of PEF to generate solutions for pandemic risk futures.

These topics were explored in the context of contemporary neoliberal governance and capitalist structures which are increasingly experimenting with the use of “innovative finance” to address global health problems. Through the use of global governance, global health security, and historical methodologies, this study incorporated a literature review of the history of PEF, an analysis of pandemic risk finance, multi-sited ethnographic fieldwork through participant observation, interviews, and financial analysis at the World Bank headquarters in Washington, D.C., USA;

Dakar, Senegal; and community-based research in the Kédougou and Kolda regions of Senegal.

This study considered the specific case study of innovative financial technologies developed by the IDA, the IBRD and the WBG which provide relevant insight into pandemic risk reduction, prevention, and response. This dissertation considered the ways in which different approaches to health may inform the future of innovative finance for generating holistic, preventive approaches to infectious disease outbreaks.

While major global health and financial institutions emphasize the importance of using economic tools for pandemic prevention and response investments, my research examined the ways that economic knowledge is valued across the spectrum of actors involved in World Bank efforts, i.e. the World Bank, investors, partner organizations, local governments, health care workers, and communities. Best practices at the World Bank headquarters differ across global practices as well as departments in terms of priority issues and analytical approach. In Senegal, the Bank's operational practices for pandemic risk are impacted by government priorities, national and international policy, geography, and cultural realities. As a result, knowledge is entangled with multispecies bodies and geopolitical histories as international development agencies seek to address pandemic risk in Senegalese bodies.

The significant findings of this doctoral thesis carry substantial implications for the broader landscape of global health governance, pandemic risk management, and the role of financial instruments in shaping responses to infectious disease outbreaks. Firstly, the deconstruction of the World Bank PEF as part of the knowledge production

infrastructure underscores the critical need for robust information infrastructures and reliable data models in the realm of pandemic risk governance. The vulnerabilities revealed in the use of unreliable data, as exemplified by PEF's reliance on flawed metadata sets, call for a reassessment of the data-driven foundations underpinning global health financing mechanisms.

Secondly, the examination of financialization through pandemic bonds unravels the complex dynamics between public health goals and profit-driven motives. The financialization of pandemic risk, as exemplified by PEF, highlights the challenges of balancing the need for effective solutions with the pursuit of financial gain. This prompts a broader question about the ethical considerations and economic incentives governing financial instruments designed to address global health crises.

The tensions surrounding pandemic prevention, preparedness, and response at the World Bank reveal the competing priorities among various sectoral actors. The clash between human-centric and more-than-human approaches, influenced by global health financing landscapes, underscores the need for a holistic and interdisciplinary approach to pandemic risk governance. This tension opens the door to exploring the feasibility and effectiveness of integrated strategies that bridge the gaps between human health, agriculture, and environmental concerns.

The case study on Senegal further emphasizes the importance of community perspectives in shaping effective responses to pandemics. The pushback and disagreements within the Senegalese context highlight the necessity of involving local communities in the decision-making processes for developing country-level solutions. This insight prompts critical questions about the inclusivity and participatory nature of

global health policies and interventions, urging further exploration into models that prioritize community engagement and empowerment.

Moving forward, the next set of questions should delve into refining the frameworks for pandemic risk governance, focusing on improving data reliability, recalibrating economic incentives within financial mechanisms, and fostering interdisciplinary collaboration. Additionally, exploring the potential for community-driven solutions and assessing the broader implications of financialization on ethical considerations in global health governance would contribute to advancing the field.

This dissertation was conducted during the years immediately following the onset of the COVID-19 pandemic (2020-2024), with a primary focus on the comprehensive analysis of the World Bank's PEF and its responses to the pandemic in IDA-eligible countries spanning from 2017 to 2021. In the dynamic landscape that unfolded during the course of this research, numerous proposals have been introduced, advocating for innovative strategies aimed at enhancing preparedness and response financing on a global scale. Notably, a significant development in this trajectory has been the establishment of the World Bank's Pandemic Fund, officially launched in September 2022 as a strategic successor to PEF.

The Pandemic Fund distinguishes itself from its predecessor, PEF, by explicitly addressing key critiques through its strategic goals. This includes a commitment to attract high-impact projects, placing a strong emphasis on beneficiary ownership, catalyzing additional external financing, incentivizing country-level prioritization in pandemic prevention, preparedness, and response (PPR), and fostering cooperation and coordination among diverse partners (The Pandemic Fund, 2024). The shift in

focus from response financing to a more holistic approach encompassing prevention and preparedness signifies a pivotal transformation in the global health financing landscape.

While this dissertation examined and critiqued the responses of PEF to the COVID-19 pandemic, it is evident that further research is necessary to thoroughly investigate the progress and future trajectory of pandemic risk finance at the World Bank, particularly in the context of the evolving Pandemic Fund. Scholars, global health experts, and political scientists have initiated analyses to comprehend the improvements introduced by the Pandemic Fund in contrast to PEF. However, initial critiques have surfaced, indicating potential shortcomings in effectively supporting response efforts. Notably, there is a growing recognition that although strengthening preparedness capacities is essential for multifaceted reasons, it would be naïve to assume that it alone would eliminate outbreaks and negate the need for dedicated response financing.

Therefore, moving forward, future research should aim to provide a more in-depth understanding of the Pandemic Fund's efficacy, exploring its successes and challenges in balancing the dual goals of pandemic prevention and effective response financing. The recognition of the critical importance of both aspects prompts a call for a more comprehensive approach, ensuring that the financial mechanisms developed are not only robust in preventing outbreaks but also capable of facilitating swift and efficient responses. This necessitates a close and strategic linkage between response financing and existing health security frameworks and instruments, offering a potential avenue for further exploration and refinement in the realm of global health governance.

In conclusion, this doctoral thesis has undertaken a comprehensive examination of the World Bank's PEF and its responses to the COVID-19 pandemic in IDA-eligible countries from 2017 to 2021. The analysis traversed multiple dimensions, including the knowledge production infrastructure, financialization of pandemic risk, tensions within pandemic prevention and response approaches, and the case study of Senegal within the global health finance ecosystem. As we reflect on the findings, it becomes apparent that PEF, designed as a financial mechanism to address pandemic risks, is embedded in a complex web of global health finance dynamics, data reliability challenges, and diverse perspectives on effective pandemic risk governance. The insights gained from scrutinizing PEF's limitations and successes pave the way for future research endeavors, particularly in the evolving landscape of pandemic risk finance. The emergence of the World Bank's Pandemic Fund and its ambitious goals in prevention, preparedness, and response financing introduces a new chapter in this narrative, urging scholars and policymakers to delve deeper into its efficacy, impact, and potential shortcomings. By navigating the evolving field of global health governance, this research calls for a continued commitment to resilient, inclusive, and community-centric approaches, ensuring that financial mechanisms not only prevent but also respond effectively to the multifaceted challenges posed by infectious disease outbreaks.

Annex

FORM A: Cash Window Application Form

1. Date of submission:		
2. Requestor:		Government of
Name, title and designation of authorized representative:		
Contact details:		
3. Details of the disease outbreak		
Filovirus: Ebola __ Marburg __ Other (specify): __		
Coronavirus: MERS __ SARS __ Other (specify): __		
Lassa Fever __	Rift Valley Fever __	Crimean Congo Hemorrhagic Fever __
Nipah Virus __	Chikungunya __	Zika __ Smallpox __
Equine encephalitis virus __	Hanta virus __	West Nile virus __ Monkeypox __
Other (specify):		
Outbreak start date:		
Outbreak size (as of submission date)	Number of laboratory-confirmed cases: _____	
	Number of clinically suspected cases: _____	
	Number of confirmed deaths (if any): _____	
Record of laboratory-confirmed and clinically suspected weekly case numbers for a minimum of 4 weeks prior to the date of application (attach and specify a link (url) to publicly-available source of this information):		
Evidence for human-to-human transmission, if available (attach and if relevant specify link(s) (url) to source(s) of this information):		
4. Amount requested (US\$): (Inclusive of all RA Agency Fees)		
5. Outbreak Response Plan ¹⁶ (please attach – check if complete): __		
Is the outbreak response plan approved by WHO?	Yes/No __	
6. Expected implementation timeline:		

¹⁶ The Outbreak Response Plan does not have to be for the PEF-funded activities alone; PEF funds may be used to finance all or part of a national/regional response plan.

Figure A.1: Request for Funds Application from the Pandemic Emergency Financing Facility (World Bank, 2018b)

FORM B: Insurance Window Application Form | Country Implementation Modality
For Country-led interventions (where an MDB provides implementation support and supervision over the implementation of activities)

1. Date of submission:		
2. Requestor: Government of		
Name, title and designation of authorized representative:		
Contact details:		
3. Details of the disease outbreak		
Filovirus: Ebola __ Marburg __ Other (specify): __		
Coronavirus: MERS __ SARS __ Other (specify): __		
Lassa Fever __	Rift Valley Fever __	Crimean Congo Hemorrhagic Fever __
Outbreak start date:		
Outbreak size (as of submission date)	Number of laboratory-confirmed cases: ____	
	Number of confirmed deaths: ____	
Outbreak growth (please attach or provide link(s) (url) to record of daily/weekly cases):		
4. Amount of Country Allocation Ceiling being requested (inclusive of all Responding Agency Fees):		US\$: ____
Portion of Country Allocation Ceiling to be allocated to the country under the Country Implementation Modality:	____%	US\$: ____
Portion of Country Allocation Ceiling to be allocated to Responding Agencies/RIM (under Responding Agency Implementation Modality): ¹⁸	____%	US\$: ____
5. Outbreak Response Plan ¹⁹ (please attach – check if complete): ____		
6. Expected implementation timeline:		

¹⁸ Please refer to Table 5 of the Operations Manual for guidance on distribution between the country and the Responding Agency(ies)

¹⁹ The Outbreak Response Plan does not have to be for the PEF funded activities alone. The PEF funds may be used to finance all or any part of a national/regional response plan to the outbreak.

Figure A.2: Insurance Window Application Form for Country-led Interventions from the Pandemic Emergency Financing Facility (World Bank, 2018b)

7. Designated Responding Agency/CIM (name of MDB) that will supervise implementation of activities led by the country under the Country Implementation Modality:	
World Bank: ¹⁷	___
8. If the country wishes to designate a portion of its Cash Window allocation to a Responding Agency, please indicate:	
Name(s):	
Percentage of allocation:	
Evidence of agreement with the designated Responding Agency (attach): ___	
9. Risk Assessment appended (prepared or endorsed by WHO):	
	Yes/No ___

Figure A.3: Insurance Window Application Form for Country-led Interventions from the Pandemic Emergency Financing Facility cont. (World Bank, 2018b)

FORM C: Insurance Window Application Form | Responding Agency Implementation

Modality

For Regional and Global Interventions

1. Date of submission:		
2. Requestor (Responding Agency):		
Name, title and designation of authorized representative:		
Contact details:		
3. Details of the disease outbreak		
Filovirus:	Ebola Marburg	Other (specify): _____
Coronavirus:	MERS SARS	Other (specify): _____
Lassa Fever	Rift Valley Fever	Crimean Congo Hemorrhagic Fever _____
Outbreak start date:		
Outbreak (size as of submission date)	Number of laboratory-confirmed cases: _____	
	Number of confirmed deaths: _____	
Outbreak growth (please attach or provide link(s) (url) to record of daily/weekly cases):		
4. Geographic focus (i.e. names of countries included in the intervention):		- - -
5. Amount requested (inclusive of Agency Fees):		US\$ _____
6. Outbreak Response Plan ²¹ (please attach – check if complete): _____		
7. Expected implementation timeline:		
8. Risk Assessment appended (prepared or endorsed by WHO):		YES/NO

²¹ The Outbreak Response Plan does not have to be for the PEF funded activities alone. The PEF funds may be used to finance all or any part of a national/regional response plan to the outbreak.

Figure A.4: Insurance Window Application Form for Regional and Global Interventions from the Pandemic Emergency Financing Facility (World Bank, 2018b)

FORM D: Insurance Window Application Form | Responding Agency Implementation Modality

For Interventions on behalf of a Fragile State

1. Date of submission:		
2. Requestor (Responding Agency):		
Name, title and designation of authorized representative:		
Contact details:		
3. Details of the disease outbreak		
Filovirus:	Ebola Marburg	Other (specify): _____
Coronavirus:	MERS SARS	Other (specify): _____
Lassa Fever	Rift Valley Fever	Crimean Congo Hemorrhagic Fever
Outbreak start date:		
Outbreak size (as of submission date)	Number of laboratory-confirmed cases: _____	
	Number of confirmed deaths: _____	
Outbreak growth (please attach or provide link(s) (url) to record of daily/weekly cases):		
4. Name of country for which Request for Funds is submitted:		
5. Amount requested (inclusive of Agency Fees):		US\$ _____
6. Outbreak Response Plan ²² (please attach – check if complete): _____		
7. Expected implementation timeline:		
8. Risk Assessment appended (prepared or endorsed by WHO):		YES/NO

²² The Outbreak Response Plan does not have to be for the PEF funded activities alone. The PEF funds may be used to finance all or any part of a national/regional response plan to the outbreak.

Figure A.5: Insurance Window Application Form for Interventions on Behalf of a Fragile State from the Pandemic Emergency Financing Facility (World Bank, 2018b)

References

- Aarestrup, F.M., Bonten, M., Koopmans, M., 2021. Pandemics– One Health preparedness for the next. *The Lancet Regional Health – Europe* 9. <https://doi.org/10.1016/j.lanepe.2021.100210>
- Abadia, C.E., Oviedo, D.G., 2009. Bureaucratic Itineraries in Colombia. A theoretical and methodological tool to assess managed-care health care systems. *Soc Sci Med* 68, 1153–1160. <https://doi.org/10.1016/j.socscimed.2008.12.049>
- Abadía-Barrero, C.E., Bugbee, M., 2019. Primary Health Care for Universal Health Coverage? Contributions for a Critical Anthropological Agenda. *Medical Anthropology* 38, 427–435. <https://doi.org/10.1080/01459740.2019.1620744>
- Abernethy, N.F., Carroll, L.N., 2016. Effective public health data visualization, in: *Disease Surveillance*. CRC Press.
- Abouharb, M.R., Cingranelli, D., 2007. *Human Rights and Structural Adjustment*. Cambridge University Press.
- Acayan, E., 2020. *Advance Universal Health Coverage: Multi-Donor Trust Fund for Integrating Externally Financed Health Programs*. World Bank.
- Adams, V., 2016. *Metrics: What Counts in Global Health*. Duke University Press. <https://doi.org/10.1215/9780822374480>
- African Development Bank, Asian Development Bank, Department for International Development, United Kingdom, Directorate-General for Development, European Commission, Federal Ministry for Economic Cooperation and Development, Germany, Ministry of Foreign Affairs - Development Cooperation, The Netherlands, Organization for Economic Cooperation and Development, United Nations Development Programme, United Nations Environment

Programme, The World Bank, 2003. Poverty and Climate Change Reducing the Vulnerability of the Poor through Adaptation. African Development Bank.

AfricaNews, 2023. Senegal blocks opposition demo over missing Covid funds [WWW Document].

Africanews. URL <https://www.africanews.com/2023/01/05/senegal-blocks-opposition-demo-over-missing-covid-funds/> (accessed 5.6.24).

Agamben, G., 1998. Homo Sacer: Sovereign Power and Bare Life. Stanford University Press, Stanford.

Ahangar, A., Ahmadi, A.M., Mozayani, A.H.M., Dizaji, S.F., 2018. Why Are Risk-Pooling and Risk-Sharing Arrangements Necessary for Financing Healthcare and Improving Health Outcomes in Low and Lower Middle-Income Countries. *Health* 10, 122–131.

<https://doi.org/10.4236/health.2018.101010>

Ajuwon, B.I., Roper, K., Richardson, A., Lidbury, B.A., 2021. One Health Approach: A Data-Driven Priority for Mitigating Outbreaks of Emerging and Re-Emerging Zoonotic Infectious Diseases. *Trop Med Infect Dis* 7, 4. <https://doi.org/10.3390/tropicalmed7010004>

Al Jazeera, 2023. Protests erupt after allegations of Senegalese leader's detention [WWW Document].

Al Jazeera. URL <https://www.aljazeera.com/news/2023/5/30/protests-erupt-after-allegations-of-senegalese-leaders-detention> (accessed 5.6.24).

Al Jazeera, 2021. Senegal's Sall calls for calm; opposition leader urges protests. Al Jazeera.

Alcazar, J., Leyton-Ortega, V., Perdomo-Ortiz, A., 2020. Classical versus quantum models in machine learning: insights from a finance application. *Mach. Learn.: Sci. Technol.* 1, 035003.

<https://doi.org/10.1088/2632-2153/ab9009>

- Ali, K., Mujahid-Mukhtar, E., 2003. Gender Exploitation: from Structural Adjustment Policies to Poverty Reduction Strategies [with Comments]. *The Pakistan Development Review* 42, 669–694.
- Allan, K., 2005. *Explorations in Classical Sociological Theory: Seeing the Social World*. Pine Forge Press.
- Allen, T., Murray, K.A., Zambrana-Torrelío, C., Morse, S.S., Rondinini, C., Di Marco, M., Breit, N., Olival, K.J., Daszak, P., 2017. Global hotspots and correlates of emerging zoonotic diseases. *Nat Commun* 8, 1124. <https://doi.org/10.1038/s41467-017-00923-8>
- Altman, L.K., 2009. Is This a Pandemic? Define ‘Pandemic.’ *The New York Times*.
- Anand, S., Hanson, K., 1997. Disability-adjusted life years: a critical review. *J Health Econ* 16, 685–702. [https://doi.org/10.1016/s0167-6296\(97\)00005-2](https://doi.org/10.1016/s0167-6296(97)00005-2)
- Anderson, A., 2006. Exorcism And Conversion To African Pentecostalism. *Exchange* 35, 116–133. <https://doi.org/10.1163/157254306776066960>
- Andiman, W.A., 2018. *Animals Viruses and Humans, A Narrow Divide: How Lethal Zoonotic Viruses Spill Over and Threaten Us*. Paul Dry Books.
- Antipova, T., 2020. Coronavirus Pandemic as Black Swan Event. *Integrated Science in Digital Age* 2020 136, 356–366. https://doi.org/10.1007/978-3-030-49264-9_32
- Antoine-Moussiaux, N., Janssens de Bisthoven, L., Leyens, S., Assmuth, T., Keune, H., Jakob, Z., Hugé, J., Vanhove, M.P.M., 2019. The good, the bad and the ugly: framing debates on nature in a One Health community. *Sustain Sci* 14, 1729–1738. <https://doi.org/10.1007/s11625-019-00674-z>
- Appel, H., 2014. Finance, Figuration, and the Alternative Banking Group of Occupy Wall Street. *Signs: Journal of Women in Culture and Society* 40, 53–58. <https://doi.org/10.1086/676893>

- Arnesen, T., Nord, E., 1999. The value of DALY life: problems with ethics and validity of disability adjusted life years. *BMJ* 319, 1423–1425. <https://doi.org/10.1136/bmj.319.7222.1423>
- Arnold, D., 1993. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India*. University of California Press.
- Arrighi, G., 1999. *Chaos and Governance in the Modern World System*. U of Minnesota Press.
- Arrow, K.J., 1974. *The Limits of Organization*. W. W. Norton & Company.
- Artemis, 2016. AIR selected for World Bank pandemic facility, enhances risk model - Artemis.bm [WWW Document]. Artemis.bm - The Catastrophe Bond, Insurance Linked Securities & Investment, Reinsurance Capital, Alternative Risk Transfer and Weather Risk Management site. URL <https://www.artemis.bm/news/air-selected-for-world-bank-pandemic-facility-enhances-risk-model/> (accessed 4.23.24).
- Artika, I.M., Dewi, Y.P., Nainggolan, I.M., Siregar, J.E., Antonjaya, U., 2022. Real-Time Polymerase Chain Reaction: Current Techniques, Applications, and Role in COVID-19 Diagnosis. *Genes (Basel)* 13, 2387. <https://doi.org/10.3390/genes13122387>
- Australian Government, 2012. Australian Multilateral Assessment World Bank. Australian Aid.
- Azevedo, M.J., 2017. The State of Health System(s) in Africa: Challenges and Opportunities. *Historical Perspectives on the State of Health and Health Systems in Africa, Volume II* 1–73. https://doi.org/10.1007/978-3-319-32564-4_1
- Ba, M.F., Faye, A., Kane, B., Diallo, A.I., Junot, A., Gaye, I., Bonnet, E., Ridde, V., 2022. Factors associated with COVID-19 vaccine hesitancy in Senegal: A mixed study. *Hum Vaccin Immunother* 18, 2060020. <https://doi.org/10.1080/21645515.2022.2060020>
- Baker, R.E., Mahmud, A.S., Miller, I.F., Rajeev, M., Rasambainarivo, F., Rice, B.L., Takahashi, S., Tatem, A.J., Wagner, C.E., Wang, L.-F., Wesolowski, A., Metcalf, C.J.E., 2022. Infectious

disease in an era of global change. *Nat Rev Microbiol* 20, 193–205.

<https://doi.org/10.1038/s41579-021-00639-z>

Balde, R., Evenyo, E., 2021. Informal Workers in Senegal, Mali, and Burkina Faso Have Been Hit Harder by COVID-19. United Nations University.

Bandola-Gill, J., Grek, S., Tichenor, M., 2022. Harmonising Global Public Policy: Producing Global Standards, Local Data and Statistical Capacity Development, in: Bandola-Gill, J., Grek, S., Tichenor, M. (Eds.), *Governing the Sustainable Development Goals: Quantification in Global Public Policy*, Sustainable Development Goals Series. Springer International Publishing, Cham, pp. 41–67. https://doi.org/10.1007/978-3-031-03938-6_3

Barman, E., 2015. Of Principle and Principal: Value Plurality in the Market of Impact Investing. *Valuation Studies* 3, 9–44. <https://doi.org/10.3384/VS.2001-5592.15319>

Bärnighausen, T., Bloom, E., Cafiero-Fonseca, E.T., O'Brien, J.C., Rabin, T.L., Salomon, J.A., 2023. Pandemic Emergency Financing Facility: A breakthrough for global health security. *The Lancet* 402, 886.889.

Barth, F., 1999. Boundaries and connections, in: *Signifying Identities*. Routledge.

Beaudevin, C., Gaudillière, J.-P., Gradmann, C., 2023. The local roots of ‘health for all’: Primary health care in practices, 1950s–2000s. *Social Science & Medicine, Health for all? Past, Presents and Futures of Universal Health Care and Universal Health Coverage* 319, 115321. <https://doi.org/10.1016/j.socscimed.2022.115321>

Beck, N., 1992. *Shifting gears thriving in the new economy* /Nuala Beck, Harper Perennial ed. ed. HarperCollins, Toronto, ON.

Beck, T., Fuchs, M.J., Uy, M., 2009. *Finance in Africa - Achievements and Challenges*.

- Beckmann, J., Czudaj, R.L., 2022. Exchange rate expectation, abnormal returns, and the COVID-19 pandemic. *Journal of Economic Behavior & Organization* 196, 1–25.
<https://doi.org/10.1016/j.jebo.2022.02.002>
- Beegle, K., Christiaensen, L., 2019. *Accelerating Poverty Reduction in Africa*. Washington, DC: World Bank. <https://doi.org/10.1596/978-1-4648-1232-3>
- Beigbeder, Y., 2001. *New Challenges for UNICEF Children, Women and Human Rights*. Palgrave Macmillan, London.
- Benoit, J.-P., Dubra, J., Romagnoli, G., 2019. *Belief Elicitation When More Than Money Matters*.
<https://doi.org/10.2139/ssrn.3437038>
- Berg, F., Fabisik, K., Sautner, Z., 2021. Is History Repeating Itself? The (Un)Predictable Past of ESG Ratings. <https://doi.org/10.2139/ssrn.3722087>
- Berkowitz, B., Galocha, A., 2021. What is Brood X? When do cicadas come out in 2021? Answering your buggiest questions. *Washington Post*.
- Berman, P., Ahuja, R., Tandon, A., Sparkes, S., Gottret, P., 2010. *Government Health Financing in India: Challenges in Achieving Ambitious Goals (Working paper)*. The World Bank, Washington, D.C. <https://doi.org/10.11588/xarep.00003872>
- Bernal, O., Hudon, M., Ledru, F.-X., 2021. Are impact and financial returns mutually exclusive? Evidence from publicly-listed impact investments. *The Quarterly Review of Economics and Finance* 81, 93–112. <https://doi.org/10.1016/j.qref.2021.04.010>
- Bernal-Delgado, E., Garcia-Armesto, S., Oliva, J., Sanchez Martinez, F.I., Repullo, J.R., Penabaz-Cano, L.M., Ridao-Lopez, M., Hernandez-Quevedo, C., 2018. Spain: Health System Review. *Health Syst Transit* 20, 1–179.

- Bernet, P., Gumus, G., Vishwasrao, S., 2020. Maternal Mortality and Public Health Programs: Evidence from Florida. *Milbank Q* 98, 150–171. <https://doi.org/10.1111/1468-0009.12442>
- Bernstein, A.S., Ando, A.W., Loch-Temzelides, T., Vale, M.M., Li, B.V., Li, H., Busch, J., Chapman, C.A., Kinnaird, M., Nowak, K., Castro, M.C., Zambrana-Torrel, C., Ahumada, J.A., Xiao, L., Roehrdanz, P., Kaufman, L., Hannah, L., Daszak, P., Pimm, S.L., Dobson, A.P., 2022. The costs and benefits of primary prevention of zoonotic pandemics. *Sci Adv* 8, eabl4183. <https://doi.org/10.1126/sciadv.abl4183>
- Bertelsen, S., 2003. Construction as a Complex System. Proceedings for the 11th Annual Conference of the International Group for Lean Construction.
- Birkmann, J., n.d. Chapter 8: Poverty, Livelihoods and Sustainable Development [WWW Document]. URL <https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-8/> (accessed 4.23.24).
- Birn, A.-E., Nervi, L., Siqueira, E., 2016. Neoliberalism Redux: The Global Health Policy Agenda and the Politics of Cooptation in Latin America and Beyond. *Development and Change* 47, 734–759. <https://doi.org/10.1111/dech.12247>
- Biruk, C., 2018. *Cooking Data: Culture and Politics in an African Research World*. Duke University Press.
- Biswas, S., 2022. Why India’s real Covid toll may never be known. BBC News.
- Blake, T., n.d. COVID-19: Make it the Last Pandemic.
- Blong, R., 2021. Four Global Catastrophic Risks – A Personal View. *Frontiers in Earth Science* 9.
- Blunt, G.D., 2022. The Gates Foundation, global health and domination: a republican critique of transnational philanthropy. *International Affairs* 98, 2039–2056. <https://doi.org/10.1093/ia/iia022>
- Boffo, R., Patalano, R., 2020. *ESG Investing: Practices, Progress and Challenges*. OECD, Paris.

- Boholm, A., 2015. *Anthropology and Risk*. Routledge.
- Bokaie, S., Daneshi, S., Bahonar, A., Haghdoost, A., Barfar, E., Patrick Moran, D., 2024. Estimating the disability adjusted life years associated with COVID-19 in Iran for the first 2 years of the pandemic. *Front Public Health* 11, 1303549. <https://doi.org/10.3389/fpubh.2023.1303549>
- Botzen, W.J.W., Deschenes, O., Sanders, M., 2019. The Economic Impacts of Natural Disasters: A Review of Models and Empirical Studies. *Review of Environmental Economics and Policy* 13, 167–188. <https://doi.org/10.1093/reep/rez004>
- Bouderhem, R., 2022. Access to COVID-19 Vaccines: A New Global Approach. *Vaccines* 10, 1795. <https://doi.org/10.3390/vaccines10111795>
- Boudiaf, I.A., Frieden, I., Scheicher, M., 2024. The Market Liquidity of Interest Rate Swaps. *SSRN Journal*. <https://doi.org/10.2139/ssrn.4745740>
- Bowker, G.C., Star, S.L., 2000. *Sorting Things Out: Classification and Its Consequences*. <https://doi.org/10.7551/mitpress/6352.001.0001>
- Braun, A., 2016. Pricing in the Primary Market for Cat Bonds: New Empirical Evidence. *Journal of Risk and Insurance* 83, 811–847. <https://doi.org/10.1111/jori.12067>
- Braun, A., Müller, K., Schmeiser, H., 2013. What Drives Insurers' Demand for Cat Bond Investments? Evidence from a Pan-European Survey. *Geneva Pap Risk Insur Issues Pract* 38, 580–611. <https://doi.org/10.1057/gpp.2012.51>
- Braun, J. von, 2008. Food and financial crises: Implications for agriculture and the poor. *Intl Food Policy Res Inst*.
- Briggs, C.L., 2005. Communicability, Racial Discourse, and Disease. *Annual Review of Anthropology* 34, 269–291. <https://doi.org/10.1146/annurev.anthro.34.081804.120618>

- Brim, B., Wenham, C., 2019. Pandemic Emergency Financing Facility: struggling to deliver on its innovative promise. *BMJ* 367, 15719. <https://doi.org/10.1136/bmj.15719>
- Brisbois, B.W., Reschny, J., Fyfe, T.M., Harder, H.G., Parkes, M.W., Allison, S., Buse, C.G., Fumerton, R., Oke, B., 2019. Mapping research on resource extraction and health: A scoping review. *The Extractive Industries and Society* 6, 250–259. <https://doi.org/10.1016/j.exis.2018.10.017>
- Brower, J., Chalk, P., 2003. *The Global Threat of New and Reemerging Infectious Diseases: Reconciling U.S. National Security and Public Health Policy*. Rand Corporation.
- Brown, G.W., Rhodes, N., Tacheva, B., Loewenson, R., Shahid, M., Poitier, F., 2023. Challenges in international health financing and implications for the new pandemic fund. *Globalization and Health* 19, 97. <https://doi.org/10.1186/s12992-023-00999-6>
- Bucchi, M., Saracino, B., 2016. “Visual Science Literacy”: Images and Public Understanding of Science in the Digital Age. *Science Communication* 38, 812–819. <https://doi.org/10.1177/1075547016677833>
- Buck, D., Dixon, A., 2013. *Improving The Allocation Of Health Resources In England* [WWW Document]. The King’s Fund. URL <https://www.kingsfund.org.uk/insight-and-analysis/reports/improving-allocation-health-resources-england> (accessed 4.23.24).
- Burns, K.E.A., Duffett, M., Kho, M.E., Meade, M.O., Adhikari, N.K.J., Sinuff, T., Cook, D.J., ACCADEMY Group, 2008. A guide for the design and conduct of self-administered surveys of clinicians. *CMAJ* 179, 245–252. <https://doi.org/10.1503/cmaj.080372>
- Burrell, C.J., Howard, C.R., Murphy, F.A., 2017. *Emerging Virus Diseases*. Fenner and White’s *Medical Virology* 217–225. <https://doi.org/10.1016/B978-0-12-375156-0.00015-1>

- Busch-Hallen, J., Walters, D., Rowe, S., Chowdhury, A., Arabi, M., 2020. Impact of COVID-19 on maternal and child health. *The Lancet Global Health* 8, e1257. [https://doi.org/10.1016/S2214-109X\(20\)30327-2](https://doi.org/10.1016/S2214-109X(20)30327-2)
- Cabalion, S., Farag, E.A.B.A., Keck, F., Abdelahdi, O., Al-Romaihi, H., 2018. Middle East respiratory syndrome coronavirus and human-camel relationships in Qatar. *Medicine Anthropology Theory* 5. <https://doi.org/10.17157/mat.5.3.377>
- Caduff, C., 2014. On the Verge of Death: Visions of Biological Vulnerability. *Annual Review of Anthropology* 43, 105–121. <https://doi.org/10.1146/annurev-anthro-102313-030341>
- Calvet, L., Gianfrate, G., Uppal, R., 2022. The finance of climate change. *Journal of Corporate Finance* 73, 102162. <https://doi.org/10.1016/j.jcorpfin.2022.102162>
- Cameron, E., Nuzzo, J., Bell, J., Nalabandian, M., O'Brien, J., League, A., Ravi, S., Meyer, D., Snyder, M., Mullen, L., Warmbrod, L., 2019. Global Health Security Index Building Collective Action and Accountability. Nuclear Threat Initiative, Center for Health Security, Johns Hopkins Bloomberg School of Public Health.
- Cantor, M., 2020. Moral hazard in health insurance revisited. *The American Economic Review* 110, 1027–1064.
- Care, A.G.D. of H. and A., 2022. CDNA Series of National Guidelines (SoNGs) [WWW Document]. Australian Government Department of Health and Aged Care. URL <https://www.health.gov.au/resources/collections/cdna-series-of-national-guidelines-songs> (accessed 5.24.23).
- Carroll, T., Walford, A., Walton, S., 2020. Lineages and Advancements in Material Culture Studies: Perspectives from UCL Anthropology, 1st ed. Routledge, London. <https://doi.org/10.4324/9781003085867>

- Carter, B.J., Jafry, M.Z., Siddiqi, A.D., Rogova, A., Liaw, W., Reitzel, L.R., 2024. 3.04 - Incorporation of social determinants of health into health care practice: A strategy to address health disparities, in: Ramos, K.S. (Ed.), *Comprehensive Precision Medicine (First Edition)*. Elsevier, Oxford, pp. 363–382. <https://doi.org/10.1016/B978-0-12-824010-6.00016-2>
- Cassini, A., Colzani, E., Pini, A., Mangen, M.-J.J., Plass, D., McDonald, S.A., Maringhini, G., Lier, A. van, Haagsma, J.A., Havelaar, A.H., Kramarz, P., Kretzschmar, M.E., Consortium, on behalf of the Bc., 2018. Impact of infectious diseases on population health using incidence-based disability-adjusted life years (DALYs): results from the Burden of Communicable Diseases in Europe study, European Union and European Economic Area countries, 2009 to 2013. *Eurosurveillance* 23, 17. <https://doi.org/10.2807/1560-7917.ES.2018.23.16.17-00454>
- CCRIF, 2023. Home | CCRIF SPC [WWW Document]. URL https://www.ccrif.org/?language_content_entity=en (accessed 5.23.24).
- CDC, 2024. One Health | CDC [WWW Document]. URL <https://www.cdc.gov/onehealth/index.html> (accessed 4.18.24).
- CDC, 2023. History of Ebola Disease Outbreaks [WWW Document]. URL <https://www.cdc.gov/vhf/ebola/history/chronology.html> (accessed 4.23.24).
- CECI, 2020. Women unite against COVID-19 in Senegal - Senegal. ReliefWeb.
- Chala, B., Hamde, F., 2021. Emerging and Re-emerging Vector-Borne Infectious Diseases and the Challenges for Control: A Review. *Front Public Health* 9, 715759. <https://doi.org/10.3389/fpubh.2021.715759>
- Chan, M., Kazatchkine, M., Lob-Levyt, J., Obaid, T., Schweizer, J., Sidibe, M., Veneman, A., Yamada, T., 2010. Meeting the Demand for Results and Accountability: A Call for Action on

Health Data from Eight Global Health Agencies. PLoS Med 7, e1000223.

<https://doi.org/10.1371/journal.pmed.1000223>

Chang, A.Y., Cowling, K., Micah, A.E., Chapin, A., Chen, C.S., Ikilezi, G., Sadat, N., Tsakalos, G., Wu, J., Younker, T., Zhao, Y., Zlavog, B.S., Abbafati, C., Ahmed, A.E., Alam, K., Alipour, V., Aljunid, S.M., Almalki, M.J., Alvis-Guzman, N., Ammar, W., Andrei, C.L., Anjomshoa, M., Antonio, C.A.T., Arabloo, J., Aremu, O., Ausloos, M., Avila-Burgos, L., Awasthi, A., Ayanore, M.A., Azari, S., Azzopardi-Muscat, N., Bagherzadeh, M., Bärnighausen, T.W., Baune, B.T., Bayati, M., Belay, Y.B., Belay, Y.A., Belete, H., Berbada, D.A., Berman, A.E., Beuran, M., Bijani, A., Busse, R., Cahuana-Hurtado, L., Cámara, L.A., Catalá-López, F., Chauhan, B.G., Constantin, M.-M., Crowe, C.S., Cucu, A., Dalal, K., De Neve, J.-W., Deiparine, S., Demeke, F.M., Do, H.P., Dubey, M., El Tantawi, M., Eskandarieh, S., Esmaeili, R., Fakhar, M., Fazaeli, A.A., Fischer, F., Foigt, N.A., Fukumoto, T., Fullman, N., Galan, A., Gamkrelidze, A., Gezae, K.E., Ghajar, A., Ghashghaee, A., Goginashvili, K., Haakenstad, A., Haghparast Bidgoli, H., Hamidi, S., Harb, H.L., Hasanpoor, E., Hassen, H.Y., Hay, S.I., Hendrie, D., Henok, A., Heredia-Pi, I., Herteliu, C., Hoang, C.L., Hole, M.K., Homaie Rad, E., Hossain, N., Hosseinzadeh, M., Hostiuc, S., Ilesanmi, O.S., Irvani, S.S.N., Jakovljevic, M., Jalali, A., James, S.L., Jonas, J.B., Jürisson, M., Kadel, R., Karami Matin, B., Kasaeian, A., Kasaye, H.K., Kassaw, M.W., Kazemi Karyani, A., Khabiri, R., Khan, J., Khan, M.N., Khang, Y.-H., Kisa, A., Kissimova-Skarbek, K., Kohler, S., Koyanagi, A., Krohn, K.J., Leung, R., Lim, L.-L., Lorkowski, S., Majeed, A., Malekzadeh, R., Mansourian, M., Mantovani, L.G., Massenburg, B.B., McKee, M., Mehta, V., Meretoja, A., Meretoja, T.J., Milevska Kostova, N., Miller, T.R., Mirrakhimov, E.M., Mohajer, B., Mohammad Darwesh, A., Mohammed, S., Mohebi, F., Mokdad, A.H., Morrison, S.D., Mousavi, S.M., Muthupandian, S., Nagarajan, A.J., Nangia, V.,

Negoi, I., Nguyen, C.T., Nguyen, H.L.T., Nguyen, S.H., Nosratnejad, S., Oladimeji, O., Olgiati, S., Olusanya, J.O., Onwujekwe, O.E., Otstavnov, S.S., Pana, A., Pereira, D.M., Piroozi, B., Prada, S.I., Qorbani, M., Rabiee, M., Rabiee, N., Rafiei, A., Rahim, F., Rahimi-Movaghar, V., Ram, U., Ranabhat, C.L., Ranta, A., Rawaf, D.L., Rawaf, S., Rezaei, S., Roro, E.M., Rostami, A., Rubino, S., Salahshoor, M., Samy, A.M., Sanabria, J., Santos, J.V., Santric Milicevic, M.M., Sao Jose, B.P., Savic, M., Schwendicke, F., Sepanlou, S.G., Sepehrimanesh, M., Sheikh, A., Shrimel, M.G., Sisay, S., Soltani, S., Soofi, M., Soofi, M., Srinivasan, V., Tabarés-Seisdedos, R., Torre, A., Tovani-Palone, M.R., Tran, B.X., Tran, K.B., Undurraga, E.A., Valdez, P.R., van Boven, J.F.M., Vargas, V., Veisani, Y., Violante, F.S., Vladimirov, S.K., Vlassov, V., Vollmer, S., Vu, G.T., Wolfe, C.D.A., Yonemoto, N., Younis, M.Z., Yousefifard, M., Zaman, S.B., Zangeneh, A., Zegeye, E.A., Ziapour, A., Chew, A., Murray, C.J.L., Dieleman, J.L., 2019. Past, present, and future of global health financing: a review of development assistance, government, out-of-pocket, and other private spending on health for 195 countries, 1995–2050. *The Lancet* 393, 2233–2260. [https://doi.org/10.1016/S0140-6736\(19\)30841-4](https://doi.org/10.1016/S0140-6736(19)30841-4)

Chapman, A.R., Peters, A.R., Lavery, J.V., Jallah, M., 2020. Decolonizing global health: If not now, when? *The American Journal of Tropical Medicine and Hygiene* 103, 1012–1013.

Charbonnier, P., Salmon, G., Skafish, P., 2016. *Comparative Metaphysics: Ontology After Anthropology*. Rowman & Littlefield.

Charmes, J., 2000. *The Contribution of Informal Sector to GDP in Developing Countries : Assessment, Estimates, Methods, Orientations for the Future*.

Chatham House, 2022. *The challenge of securing long-term funding for global health priorities*. Chatham House.

- Chaudhry, R., Dranitsaris, G., Mubashir, T., Bartoszko, J., Riazi, S., 2020. A country level analysis measuring the impact of government actions, country preparedness and socioeconomic factors on COVID-19 mortality and related health outcomes. *EClinicalMedicine* 25, 100464.
<https://doi.org/10.1016/j.eclinm.2020.100464>
- Chen, S., Harrison, R., 2020. Beyond profit vs. purpose: Transactional-relational practices in impact investing. *Journal of Business Venturing Insights* 14. <https://doi.org/10.1016/j.jbvi.2020.e00182>
- Christopher, M.M., 2015. One health, one literature: Weaving together veterinary and medical research. *Science Translational Medicine* 7, 303fs36-303fs36.
<https://doi.org/10.1126/scitranslmed.aab0215>
- Cios, K.J., Pedrycz, W., Swiniarski, R.W., 1998. Data Mining and Knowledge Discovery, in: Cios, K.J., Pedrycz, W., Swiniarski, R.W. (Eds.), *Data Mining Methods for Knowledge Discovery*, The Springer International Series in Engineering and Computer Science. Springer US, Boston, MA, pp. 1–26. https://doi.org/10.1007/978-1-4615-5589-6_1
- Clark, A., Chalmers, D., 1998. The Extended Mind. *Analysis* 58, 7–19.
- Clinton, C., Sridhar, D.L., 2017. *Governing Global Health: Who Runs the World and Why?* Oxford University Press.
- Closser, S., Mendenhall, E., Brown, P., Neill, R., Justice, J., 2022. The anthropology of health systems: A history and review. *Social Science & Medicine, Health systems performance or performing health systems? Anthropological engagement with health systems research* 300, 114314. <https://doi.org/10.1016/j.socscimed.2021.114314>
- Collaborators, G. 2015 Daly. and H., 2016. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a

systematic analysis for the Global Burden of Disease Study 2015. *Lancet* (London, England) 388, 1603. [https://doi.org/10.1016/S0140-6736\(16\)31460-X](https://doi.org/10.1016/S0140-6736(16)31460-X)

Collier, N., Kawazoe, A., Jin, L., Shigematsu, M., Dien, D., Barrero, R.A., Takeuchi, K., Kawtrakul, A., 2006. A multilingual ontology for infectious disease surveillance: rationale, design and challenges. *Lang Resources & Evaluation* 40, 405–413. <https://doi.org/10.1007/s10579-007-9019-7>

Columbia, 2020. The Kind of Outbreak Scientists Saw Coming | Columbia Public Health [WWW Document]. Columbia University Mailman School of Public Health. URL <https://www.publichealth.columbia.edu/news/kind-outbreak-our-scientists-knew-would-happen> (accessed 4.23.24).

Contini, C., Di Nuzzo, M., Barp, N., Bonazza, A., De Giorgio, R., Tognon, M., Rubino, S., 2020. The novel zoonotic COVID-19 pandemic: An expected global health concern. *J Infect Dev Ctries* 14, 254–264. <https://doi.org/10.3855/jidc.12671>

Cooper, R.N., Houghton, J.T., McCarthy, J.J., Metz, B., 2002. Climate Change 2001: The Scientific Basis. *Foreign Affairs* 81, 208. <https://doi.org/10.2307/20033020>

Corbo, V., Fischer, S., 1995. Chapter 44 Structural adjustment, stabilization and policy reform: Domestic and international finance, in: *Handbook of Development Economics*. Elsevier, pp. 2845–2924. [https://doi.org/10.1016/S1573-4471\(95\)30021-X](https://doi.org/10.1016/S1573-4471(95)30021-X)

Cordilha, A.C., 2022. Financialisation and Public Health Systems: a new concept to examine ongoing reforms. *Économie et institutions*. <https://doi.org/10.4000/ei.7418>

Coronaviridae Study Group of the International Committee on Taxonomy of Viruses, 2020. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat Microbiol* 5, 536–544. <https://doi.org/10.1038/s41564-020-0695-z>

- Costanza, R., Mageau, M., 1999. What is a healthy ecosystem? *Aquatic Ecology* 33, 105–115.
<https://doi.org/10.1023/A:1009930313242>
- Craddock, S., Hinchliffe, S., 2015. One world, one health? Social science engagements with the one health agenda. *Social Science & Medicine* 129, 1–4.
<https://doi.org/10.1016/j.socscimed.2014.11.016>
- Craig, D.A., Porter, D., 2006. *Development Beyond Neoliberalism?: Governance, Poverty Reduction and Political Economy*. Routledge.
- Crane, J.T., Andia, J.F., Correa, A., Castillo, C., Muzzio, D., 2021. Decolonizing global health: A new anthropology of the current global health landscape. *Anthropology Today* 37, 6–11.
- Crosby, S., Dieleman, J., Kiernan, S., Bollyky, T., 2020. All Bets Are Off for Measuring Pandemic Preparedness | Think Global Health [WWW Document]. Council on Foreign Relations. URL <https://www.thinkglobalhealth.org/article/all-bets-are-measuring-pandemic-preparedness> (accessed 5.24.23).
- Cubas, D., Gunasekera, R., Humbert, T., 2020. *Disaster Risk Finance for Adaptive Social Protection*. International Bank for Reconstruction and Development.
- Cubides, J.-C., Jorgensen, N., Peiter, P.C., 2022. Time, space and health: using the life history calendar methodology applied to mobility in a medical-humanitarian organisation. *Global Health Action* 15, 2128281. <https://doi.org/10.1080/16549716.2022.2128281>
- Cummins, J.D., Mahul, O., 2009. *Catastrophe Risk Financing in Developing Countries: Principles for Public Intervention*. World Bank Publications.
- Daipha, P., 2015. From Bricolage to Collage: The Making of Decisions at a Weather Forecast Office. *Sociological Forum* 30, 787–808.

- Dao, A., Nichter, M., 2016. The Social Life of Health Insurance in Low- to Middle-income Countries: An Anthropological Research Agenda. *Medical Anthropology Quarterly* 30, 122–143.
<https://doi.org/10.1111/maq.12191>
- das Neves Martins Pires, P.H., Macaringue, C., Abdirazak, A., Mucifo, J.R., Mupueleque, M.A., Zakus, D., Siemens, R., Belo, C.F., 2021a. Covid-19 pandemic impact on maternal and child health services access in Nampula, Mozambique: a mixed methods research. *BMC Health Serv Res* 21, 860. <https://doi.org/10.1186/s12913-021-06878-3>
- Dash, S., Shakyawar, S.K., Sharma, M., Kaushik, S., 2019. Big data in healthcare: management, analysis and future prospects. *Journal of Big Data* 6, 54. <https://doi.org/10.1186/s40537-019-0217-0>
- D'Avella, N., 2014. Ecologies of Investment: Crisis Histories and Brick Futures in Argentina. *Cultural Anthropology* 29. <https://doi.org/10.14506/cuan29.1.10>
- Davey, R., 2024. Debt. *Cambridge Encyclopedia of Anthropology*.
- David, P.-M., Le Dévédec, N., Alary, A., 2021. Pandemics in the age of the Anthropocene: Is 'planetary health' the answer? *Global Public Health* 16, 1141–1154.
<https://doi.org/10.1080/17441692.2021.1893372>
- Davis, G.F., Kim, S., 2015a. Financialization of the Economy. *Annual Review of Sociology* 41, 203–221. <https://doi.org/10.1146/annurev-soc-073014-112402>
- de Bettignies, J.-E., Ross, T.W., 2004. The Economics of Public-Private Partnerships. *Canadian Public Policy / Analyse de Politiques* 30, 135–154. <https://doi.org/10.2307/3552389>
- de Goede, M., n.d. *Virtue, Fortune and Faith: A Genealogy of Finance*.
- DeSerpa, A.C., 1971. A Theory of the Economics of Time. *The Economic Journal* 81, 828–846.
<https://doi.org/10.2307/2230320>

Destoumieux-Garzón, D., Mavingui, P., Boetsch, G., Boissier, J., Darriet, F., Duboz, P., Fritsch, C., Giraudoux, P., Le Roux, F., Morand, S., Paillard, C., Pontier, D., Sueur, C., Voituron, Y., 2018. The One Health Concept: 10 Years Old and a Long Road Ahead. *Frontiers in Veterinary Science* 5.

DFCII, 2023. IDA20 Mid-Term Review: Implementation Update and Issues for Discussion (“Omnibus Paper”). Development Finance Corporate IDA & IBRD.

Di Muzio, T., H. Robbins, R., 2016. *Debt as Power*. Manchester University Press.

<https://doi.org/10.7765/9781526101013>

Dia, N., Lakh, N.A., Diagne, M.M., Mbaye, K.D., Taieb, F., Fall, N.M., Barry, M.A., Ka, D., Fall, A., Diallo, V.M.P.C., Faye, Oumar, Jallow, M.M., Dieng, I., Ndiaye, M., Diop, M., Bousso, A., loucoubar, C., Ndiaye, M.K.N., Peyreffite, C., Fortes, L., Sall, A.A., Faye, Ousmane, Seydi, M., 2020. COVID-19 Outbreak, Senegal, 2020. *Emerg Infect Dis* 26, 2771–2773.

<https://doi.org/10.3201/eid2611.202615>

Diagana, O., Belete, N., Ringold, D., Arulpragasam, J., Bossuroy, T., 2021. Third Additional Financing for Senegal Safety Net Project (P173344) (No. PAD3725). World Bank.

Diagana, O., Belete, N., Ringold, D., Bodewig, C., Bossuroy, T., 2022. Senegal Adaptive Safety Net Project (No. PAD4836). World Bank.

Diagana, O., Belete, N., Ringold, D., Sorgho, G., Karamoko, D., Dieng, M., 2021. Additional Financing for the Senegal COVID-19 Response Project. World Bank.

Diarra, M., Barry, A., Dia, N., Diop, Mamadou, Sonko, I., Sagne, S., Sarr, F.D., Talla, C., Tall, A., Faye, J., Diop, B., Diagne, C.T., Gaye, A., Diallo, A., Mbaye, R., Cisse, M., Taieb, F., Faye, Oumar, Lakhe, N.A., Samba, B.P., Diallo, K., Fall, N.M., Badiane, A.S., Fortes, L., Diop, Moustapha, Thioub, D., Ly, A.B., Faye, Ousmane, Seydi, M., Bousso, A., Sall, A.A., Loucoubar,

- C., Officers, S.D.M., 2022a. First wave COVID-19 pandemic in Senegal: Epidemiological and clinical characteristics. PLoS ONE 17. <https://doi.org/10.1371/journal.pone.0274783>
- Diedhiou, A., 2015. Remittances, Transnational Dairas and Governance in Senegal. International Migration 53, 171–186. <https://doi.org/10.1111/j.1468-2435.2010.00669.x>
- Dietz, S., Bowen, A., Dixon, C., Gradwell, P., 2016. ‘Climate value at risk’ of global financial assets. Nature Clim Change 6, 676–679. <https://doi.org/10.1038/nclimate2972>
- Diongue, K., Diallo, M.A., 2020. COVID-19 during malaria transmission season in Africa and why we should be prepared: An example from Senegal. Afr J Lab Med 9, 1332. <https://doi.org/10.4102/ajlm.v9i1.1332>
- Diouf, A., Ndiaye, M.F., Faye, C., 2022. Emergency food aid and household food security during COVID-19: Evidence from a field survey in Senegal. African Development Review 34, 556–569. <https://doi.org/10.1111/1467-8268.12675>
- Diouf, I., Bousso, A., Sonko, I., 2020. Gestion de la pandémie COVID-19 au Sénégal. Médecine de Catastrophe - Urgences Collectives, Pandémie Covid 19 – Epidémies et pandémies 4, 217–222. <https://doi.org/10.1016/j.pxur.2020.08.009>
- Dobson, A.P., Pimm, S.L., Hannah, L., Kaufman, L., Ahumada, J.A., Ando, A.W., Bernstein, A., Busch, J., Daszak, P., Engelmann, J., Kinnaird, M.F., Li, B.V., Loch-Temzelides, T., Lovejoy, T., Nowak, K., Roehrdanz, P.R., Vale, M.M., 2020a. Ecology and economics for pandemic prevention. Science 369, 379–381. <https://doi.org/10.1126/science.abc3189>
- Doughnut Economics Action Lab, 2020. What is the Doughnut? | DEAL [WWW Document]. URL <https://doughnuteconomics.org/tools/what-is-the-doughnut> (accessed 5.6.24).
- Douglas, M., Wildavsky, A., 1983. Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers.

- Douglas-Jones, R., Walford, A., Seaver, N., 2021. Introduction: Towards an anthropology of data. *Journal of the Royal Anthropological Institute* 27, 9–25. <https://doi.org/10.1111/1467-9655.13477>
- Drees, L., Luetkemeier, R., Kerber, H., 2021. Necessary or oversimplification? On the strengths and limitations of current assessments to integrate social dimensions in planetary boundaries. *Ecological Indicators* 129, 108009. <https://doi.org/10.1016/j.ecolind.2021.108009>
- Drobetz, W., Schröder, H., Tegtmeier, L., 2020. The role of catastrophe bonds in an international multi-asset portfolio: Diversifier, hedge, or safe haven? *Finance Research Letters* 33, 101198. <https://doi.org/10.1016/j.frl.2019.05.016>
- Dumit, J., 2012. *Drugs for Life: How Pharmaceutical Companies Define Our Health*. Duke University Press.
- Durkheim, E., 1972. *Emile Durkheim: Selected Writings*. Cambridge University Press.
- Echenberg, M., 2003. ‘The dog that did not bark’: Memory and the 1918 influenza epidemic in Senegal 1, in: *The Spanish Influenza Pandemic of 1918-1919*. Routledge.
- Edwards, P.N., 2010. *A vast machine: computer models, climate data, and the politics of global warming*. MIT Press, Cambridge, Mass.
- Edwards, P.N., Mayernik, M.S., Batcheller, A.L., Bowker, G.C., Borgman, C.L., 2011. *Science friction: Data, metadata, and collaboration on JSTOR*. Sage Publications. <https://doi.org/10.1177/0306312711413314>
- Egan, E., n.d. Climate change may make pandemics like COVID-19 much more common [WWW Document]. ABC News. URL <https://abcnews.go.com/Health/climate-change-make-pandemics-covid-19-common/story?id=89586958> (accessed 5.23.24).

- Eggleton, S., Gürses, Ö., 2023. Reinsuring pandemics: the role of government and public–private partnerships between reinsurers and governments. *Geneva Pap Risk Insur Issues Pract* 1–25. <https://doi.org/10.1057/s41288-023-00290-0>
- eHealth Network, 2020. Mobile applications to support contact tracing in the EU’s fight against COVID-19 Common EU Toolbox for Member States. eHealth Network, Brussels.
- Elbe, S., 2008. Risking Lives: AIDS, Security and Three Concepts of Risk. *Security Dialogue* 39, 177–198. <https://doi.org/10.1177/0967010608088774>
- Elmahdawy, M., Elsis, G.H., Carapinha, J., Lamorde, M., Habib, A., Agyie-Baffour, P., Soualmi, R., Ragab, S., Udezi, A.W., Usifoh, C., Usifoh, S., 2017. Ebola Virus Epidemic in West Africa: Global Health Economic Challenges, Lessons Learned, and Policy Recommendations. *Value in Health Regional Issues* 13, 67–70. <https://doi.org/10.1016/j.vhri.2017.08.003>
- Elmer, P., Zhang, E., Marino, M., Richter, P., n.d. *Innovative Finance: Putting your money to (decent) work*.
- Enahoro, D., Mason-D’Croz, D., Mul, M., Rich, K.M., Robinson, T.P., Thornton, P., Staal, S.S., 2019. Supporting sustainable expansion of livestock production in South Asia and Sub-Saharan Africa: Scenario analysis of investment options. *Global Food Security* 20, 114–121. <https://doi.org/10.1016/j.gfs.2019.01.001>
- Erikson, S., 2025. *Investable!: When Pandemic Risk Meets Speculative Finance A Cautionary Tale*. MIT Press.
- Erikson, S., 2019. Global health futures? *Medicine Anthropology Theory* 6. <https://doi.org/10.17157/mat.6.3.664>
- Erikson, S.L., 2015. Secrets from Whom? *Current Anthropology* 56, S306–S316. <https://doi.org/10.1086/683271>

- Erikson, S.L., 2012. Global Health Business: The Production and Performativity of Statistics in Sierra Leone and Germany. *Medical Anthropology* 31, 367–384.
<https://doi.org/10.1080/01459740.2011.621908>
- Erikson, S.L., Johnson, L., 2020. Will financial innovation transform pandemic response? *Lancet Infect Dis* 20, 529–530. [https://doi.org/10.1016/S1473-3099\(20\)30150-X](https://doi.org/10.1016/S1473-3099(20)30150-X)
- Esbin, M.N., Whitney, O.N., Chong, S., Maurer, A., Darzacq, X., Tjian, R., 2020. Overcoming the bottleneck to widespread testing: a rapid review of nucleic acid testing approaches for COVID-19 detection. *RNA* 26, 771–783. <https://doi.org/10.1261/rna.076232.120>
- European Commission, 2024. Health and demography [WWW Document]. European Commission. URL https://international-partnerships.ec.europa.eu/policies/human-development/health-and-demography_en (accessed 5.6.24).
- Evans, D.B., Etienne, C., 2010. Health systems financing and the path to universal coverage. *Bulletin of the World Health Organization* 402–403.
- Ewald, F., 1991. Insurance and Risk, in: *The Foucault Effect*. Graham Burchell, Chicago, p. 14.
- Fabreau, G.E., Minty, E.P., Southern, D.A., Quan, H., Ghali, W.A., 2023. A Meta-Data Manifesto: The Need for Global Health Meta-Data. *Int J Popul Data Sci* 3, 436.
<https://doi.org/10.23889/ijpds.v3i1.436>
- Faghmous, J.H., Kumar, V., 2014. A Big Data Guide to Understanding Climate Change: The Case for Theory-Guided Data Science. *Big Data* 2, 155–163. <https://doi.org/10.1089/big.2014.0026>
- Fan, S., Guan, J., Cao, L., Wang, M., Zhao, H., Chen, L., Yan, L., 2021. Psychological effects caused by COVID-19 pandemic on pregnant women: A systematic review with meta-analysis. *Asian J Psychiatr* 56, 102533. <https://doi.org/10.1016/j.ajp.2020.102533>
- Fantom, N.J., Serajuddin, U., 2016. *The World Bank’s Classification of Countries by Income*.

- FAO, 2012. Food aid in emergency response. Food and Agricultural Organization.
- FAO, OIE, WHO, 2008. Contributing to One World, One Health [WWW Document]. URL <https://www.fao.org/3/aj137e/aj137e00.htm> (accessed 4.18.24).
- Farmer, P., 2020. Fevers, Feuds, and Diamonds: Ebola and the Ravages of History. Farrar, Straus and Giroux.
- Farmer, P., 2004. Pathologies of Power: Health, Human Rights, and the New War on the Poor. University of California Press.
- Fassin, D., 2007. Humanitarianism as a Politics of Life. *Public Culture* 19, 499–520. <https://doi.org/10.1215/08992363-2007-007>
- Faust, C.L., McCallum, H.I., Bloomfield, L.S.P., Gottdenker, N.L., Gillespie, T.R., Torney, C.J., Dobson, A.P., Plowright, R.K., 2018. Pathogen spillover during land conversion. *Ecology Letters* 21, 471–483. <https://doi.org/10.1111/ele.12904>
- Fehr, K., Chennell, J., 2011. The fundamentals of insurance-linked securities. *Swiss Re*.
- Feierman, S., Janzen, J.M., 1992. The Social Basis of Health and Healing in Africa. University of California Press.
- Fernandes, G., Sridhar, D., 2017. World Bank and the Global Financing Facility. *BMJ* 358, j3395. <https://doi.org/10.1136/bmj.j3395>
- Fèvre, E.M., Bronsvoort, B.M. de C., Hamilton, K.A., Cleaveland, S., 2006. Animal movements and the spread of infectious diseases. *Trends Microbiol* 14, 125–131. <https://doi.org/10.1016/j.tim.2006.01.004>
- Fidelity, 2024. What Is Portfolio Diversification? - Fidelity [WWW Document]. URL <https://www.fidelity.com/learning-center/investment-products/mutual-funds/diversification> (accessed 4.20.24).

- Field, C.B., Barros, V., Stocker, T.F., Dahe, Q. (Eds.), 2012. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change*, 1st ed. Cambridge University Press.
<https://doi.org/10.1017/CBO9781139177245>
- Filmer, D., Rogers, H., Angrist, N., Sabarwal, S., 2020. Learning-adjusted years of schooling (LAYS): Defining a new macro measure of education. *Economics of Education Review* 77, 101971. <https://doi.org/10.1016/j.econedurev.2020.101971>
- Fine, G.A., 2010. *Authors of the Storm: Meteorologists and the Culture of Prediction*. University of Chicago Press, Chicago, IL.
- Foley, E.E., 2009. *Your Pocket Is What Cures You: The Politics of Health in Senegal*. Rutgers University Press.
- Foucault, M., 2004. *Naissance de la Biopolitique Cours au Collège de France, 1978-1979* [WWW Document]. URL <https://philpapers.org/rec/FOUNDL-3> (accessed 10.17.23).
- Fourcade, M., 2011. Cents and Sensibility: Economic Valuation and the Nature of “Nature.” *American Journal of Sociology* 116, 1721–1777. <https://doi.org/10.1086/659640>
- Frankel, R., Kothari, S.P., Weber, J., 2006. Determinants of the informativeness of analyst research. *Journal of Accounting and Economics* 41, 29–54. <https://doi.org/10.1016/j.jacceco.2005.10.004>
- Frederiksen, T., 2024. Subjectivity and space on extractive frontiers: Materiality, accumulation and politics. *Geoforum* 148, 103915. <https://doi.org/10.1016/j.geoforum.2023.103915>
- Frediani, A.A., 2007. Amartya Sen, the World Bank, and the Redress of Urban Poverty: A Brazilian Case Study. *Journal of Human Development* 8, 133–152.
<https://doi.org/10.1080/14649880601101473>

- Froot, K.A., 2001. The market for catastrophe risk: A clinical examination. *Journal of Financial Economics* 60, 529–571.
- Fuller, C.J., Mauss, M., Halls, W.D., 1992. The Gift: The Form and Reason for Exchange in Archaic Societies. *Man* 27, 431. <https://doi.org/10.2307/2804090>
- Fung, A., Graham, M., Weil, D., 2007. *Full Disclosure: The Perils and Promise of Transparency*. Cambridge University Press.
- Galaitzi, S.E., Cegan, J.C., Volk, K., Joyner, M., Trump, B.D., Linkov, I., 2021. The challenges of data usage for the United States' COVID-19 response. *Int J Inf Manage* 59, 102352. <https://doi.org/10.1016/j.ijinfomgt.2021.102352>
- Gentilini, U., Almenfi, M., Orton, I., Dale, P., 2020. *Social Protection and Jobs Responses to COVID-19: A Real-Time Review of Country Measures*. World Bank, Washington, DC. <https://doi.org/10.1596/33635>
- Germain, N., Herwegh, S., Hatzfeld, A.-S., Bocket, L., Prévost, B., Danzé, P.-M., Marchetti, P., 2021. Retrospective study of COVID-19 seroprevalence among tissue donors at the onset of the outbreak before implementation of strict lockdown measures in France. *Cell Tissue Bank* 22, 511–518. <https://doi.org/10.1007/s10561-021-09901-3>
- GFDRR, 2020. *Disaster Recovery Framework Guide*. World Bank.
- Ghanem, H., Belete, N., Dar, A., Sorgho, G., Juquois, M., Mercereau, L., 2020. *Senegal Health & Nutrition Financing Project (P129472) (No. ICR00005034)*. World Bank.
- Ghanem, H., Carrett, J.-C., Evans, T.G., Haque, T., Samaha, H.N., 2019. *Democratic Republic of Congo AF III Health System Strengthening for Better Maternal and Child Health Results*. World Bank.
- GHS Index, 2021. *Senegal. GHS Index*.

- Gibbons, C.L., Mangen, M.-J.J., Plass, D., Havelaar, A.H., Brooke, R.J., Kramarz, P., Peterson, K.L., Stuurman, A.L., Cassini, A., Fèvre, E.M., Kretzschmar, M.E., 2014. Measuring underreporting and under-ascertainment in infectious disease datasets: a comparison of methods. *BMC Public Health* 14, 147. <https://doi.org/10.1186/1471-2458-14-147>
- Gibbs, E.P.J., 2014. The evolution of One Health: a decade of progress and challenges for the future. *Veterinary Record* 174, 85–91. <https://doi.org/10.1136/vr.g143>
- Gimbel, S., Chilundo, B., Kenworthy, N., Inguane, C., Citrin, D., Chapman, R., Sherr, K., Pfeiffer, J., 2018. Donor data vacuuming. *Medicine Anthropology Theory* 5. <https://doi.org/10.17157/mat.5.2.537>
- Giovanella, L., Mendoza-Ruiz, A., Pilar, A. de C.A., Rosa, M.C. da, Martins, G.B., Santos, I.S., Silva, D.B., Vieira, J.M. de L., Castro, V.C.G. de, Silva, P.O. da, Machado, C.V., 2018. Universal health system and universal health coverage: assumptions and strategies. *Cien Saude Colet* 23, 1763–1776. <https://doi.org/10.1590/1413-81232018236.05562018>
- Girard, M.P., Tam, J.S., Assossou, O.M., Kieny, M.P., 2010. The 2009 A (H1N1) influenza virus pandemic: A review. *Vaccine* 28, 4895–4902. <https://doi.org/10.1016/j.vaccine.2010.05.031>
- Gitelman, L., 2013. *Raw Data Is an Oxymoron*. MIT Press. <https://doi.org/10.7551/mitpress/9302.001.0001>
- Gning, L., Ndour, C., Tchuenche, J.M., 2022. Modeling COVID-19 daily cases in Senegal using a generalized Waring regression model. *Physica A: Statistical Mechanics and its Applications* 597, 127245. <https://doi.org/10.1016/j.physa.2022.127245>
- Gollock, A., 2021. DETERMINANTS DE LA SATISFACTION DES USAGERS DES ÉTABLISSEMENTS DE SANTÉ AU SÉNÉGAL. *ROASEG* 14. <https://doi.org/10.1654/roaseg.v14i02.6>

- González de la Rocha, M., 2020. Of Morals and Markets: Social Exchange and Poverty in Contemporary Urban Mexico. *The ANNALS of the American Academy of Political and Social Science* 689, 26–45. <https://doi.org/10.1177/0002716220916700>
- González de la Rocha, M., 2006. Procesos domésticos y vulnerabilidad : perspectivas antropológicas de los hogares con Oportunidades / Coord. e introd. de M. González de la Rocha.
- Gostin, L.O., Friedman, E.A., 2015. A retrospective and prospective analysis of the west African Ebola virus disease epidemic: robust national health systems at the foundation and an empowered WHO at the apex. *The Lancet* 385, 1902–1909. [https://doi.org/10.1016/S0140-6736\(15\)60644-4](https://doi.org/10.1016/S0140-6736(15)60644-4)
- Gostin, L.O., Friedman, E.A., Hossain, S., Mukherjee, J., Zia-Zarifi, S., Clinton, C., Rugege, U., Buss, P., Were, M., Dhai, A., 2023. Human rights and the COVID-19 pandemic: a retrospective and prospective analysis. *The Lancet* 401, 154–168. [https://doi.org/10.1016/S0140-6736\(22\)01278-8](https://doi.org/10.1016/S0140-6736(22)01278-8)
- Gouvernement du Sénégal, 2019. Couverture Maladie Universelle (CMU) [WWW Document]. URL <https://www.sec.gouv.sn/programmes-speciaux/couverture-maladie-universelle-cmu> (accessed 4.18.24).
- GPMB, 2023. GPMB Monitoring Framework for Preparedness Technical Framework and Methodology. Global Preparedness Monitoring Board.
- Graeber, D., 2012. Debt: the first 5,000 years. Melville House, Brooklyn, NY.
- Graham, D.A., 2014. Rumsfeld’s Knowns and Unknowns: The Intellectual History of a Quip [WWW Document]. *The Atlantic*. URL <https://www.theatlantic.com/politics/archive/2014/03/rumsfelds-knowns-and-unknowns-the-intellectual-history-of-a-quip/359719/> (accessed 5.24.23).
- Greenwood, S., n.d. Disaster Risk Finance for Agriculture.

- Gründl, H., Guxha, D., Kartasheva, A., Schmeiser, H., 2021. Insurability of pandemic risks. *Journal of Risk and Insurance* 88, 863–902. <https://doi.org/10.1111/jori.12368>
- Guan, W., Ni, Z., Hu, Yu, Liang, W., Ou, C., He, J., Liu, L., Shan, H., Lei, C., Hui, D.S.C., Du, B., Li, L., Zeng, G., Yuen, K.-Y., Chen, R., Tang, C., Wang, T., Chen, P., Xiang, J., Li, S., Wang, Jin-lin, Liang, Z., Peng, Y., Wei, L., Liu, Y., Hu, Ya-hua, Peng, P., Wang, Jian-ming, Liu, J., Chen, Z., Li, G., Zheng, Z., Qiu, S., Luo, J., Ye, C., Zhu, S., Zhong, N., 2020. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med* NEJMoa2002032. <https://doi.org/10.1056/NEJMoa2002032>
- Guetiya Wadoum, R.E., Sevalie, S., Minutolo, A., Clarke, A., Russo, G., Colizzi, V., Mattei, M., Montesano, C., 2021. The 2018–2020 Ebola Outbreak in the Democratic Republic of Congo: A Better Response Had Been Achieved Through Inter-State Coordination in Africa. *Risk Manag Healthc Policy* 14, 4923–4930. <https://doi.org/10.2147/RMHP.S327616>
- Gupta, A., Richter, R., Shah, J., 2017. Non-biomedical conceptions of health in India: Perspectives from alādī, in: *Sickness and Wealth: The Corporate Assault on Global Health*. Haymarket Books, pp. 155–180.
- Gupta, S., Gupta, N., Yadav, P., Patil, D., 2021. Ebola virus outbreak preparedness plan for developing Nations: Lessons learnt from affected countries. *Journal of Infection and Public Health* 14, 293–305. <https://doi.org/10.1016/j.jiph.2020.12.030>
- Gupta, T., Panzardi, R., 2008. *The Role of E-Government in Building Democratic Governance (with a special focus on Latin America)*. The World Bank.
- Gupta, V., Kraemer, J.D., Katz, R., Jha, A.K., Kerry, V.B., Sane, J., Ollgren, J., Salminen, M.O., n.d. Analysis of results from the Joint External Evaluation: examining its strength and assessing for

trends among participating countries. *J Glob Health* 8, 020416.

<https://doi.org/10.7189/jogh.08.020416>

Gürkan, C., 2018. Foucault, Public Finance, and Neoliberal Governmentality: A Critical Sociological Analysis. *Yönetim ve Ekonomi Dergisi* 25, 677–694. <https://doi.org/10.18657/yonveek.449581>

Guyer, J.I., 2016. *Legacies, Logics, Logistics: Essays in the Anthropology of the Platform Economy*. University of Chicago Press.

Guyer, J.I., 2004. *Marginal Gains: Monetary Transactions in Atlantic Africa*. University of Chicago Press.

Haider, N., Yavlinsky, A., Chang, Y.-M., Hasan, M.N., Benfield, C., Osman, A.Y., Uddin, Md.J., Dar, O., Ntoumi, F., Zumla, A., Kock, R., 2020. The Global Health Security index and Joint External Evaluation score for health preparedness are not correlated with countries' COVID-19 detection response time and mortality outcome. *Epidemiol Infect* 148, e210.

<https://doi.org/10.1017/S0950268820002046>

Hann, C., 2015. The heart of reciprocity. *Journal of Ethnographic Theory* 5, 179–203.

Hansen, K., 2016a. From crisis to clarity: Getting a handle on global pandemics. *World Bank Blogs*. URL <https://blogs.worldbank.org/en/health/crisis-clarity-getting-handle-global-pandemics> (accessed 4.18.24).

Haraway, D.J., 2016. *Staying with the Trouble: Making Kin in the Chthulucene, Experimental Futures: Technological Lives, Scientific Arts, Anthropological Voices*. Duke University Press, Durham, NC.

Haraway, D.J., 2013. *When Species Meet*. U of Minnesota Press.

Hardin, G., 1968. The Tragedy of the Commons. *Science* 162, 1243–1248.

Hart, K., 1986. Heads or Tails? Two Sides of the Coin. *Man* 21, 637–656.

<https://doi.org/10.2307/2802901>

Hart, K., 1973. Informal Income Opportunities and Urban Employment in Ghana. *The Journal of Modern African Studies* 11, 61–89.

Hart, K., Ortiz, H., 2014. The Anthropology of Money and Finance: Between Ethnography and World History. *Annual Review of Anthropology* 43, 465–482. <https://doi.org/10.1146/annurev-anthro-102313-025814>

Harvey, D., 2005. *Spaces of Neoliberalization: Towards a Theory of Uneven Geographical Development*. Franz Steiner Verlag.

Hastrup, K., 1992. Out of Anthropology: The Anthropologist as an Object of Dramatic Representation. *Cultural Anthropology* 7, 327–345.

<https://doi.org/10.1525/can.1992.7.3.02a00030>

Hatefi, A., Marten, R., Smith, R.D., 2020. Global-scale action in health: a common language is a critical starting point to bolster global health financing. *Health Policy and Planning* 35, 1133–1136. <https://doi.org/10.1093/heapol/czaa090>

Hatfield-Dodds, S., Nelson, R., Cook, D.C. (Eds.), 2007. *Adaptive Governance: An Introduction and Implications for Public Policy*, Conference Paper. <https://doi.org/10.22004/ag.econ.10440>

He, J., He, L., Zhou, W., Nie, X., He, M., 2020. Discrimination and Social Exclusion in the Outbreak of COVID-19. *Int J Environ Res Public Health* 17, 2933. <https://doi.org/10.3390/ijerph17082933>

He, Q., Faure, M., Liu, C., 2023. The possibilities and limits of insurance as governance in insuring pandemics. *Geneva Pap Risk Insur Issues Pract*. <https://doi.org/10.1057/s41288-023-00291-z>

- Herd, G., 2009. 1. Introduction: Moral Panics, Sexual Rights, and Cultural Anger, in: 1. Introduction: Moral Panics, Sexual Rights, and Cultural Anger. New York University Press, pp. 1–46.
<https://doi.org/10.18574/nyu/9780814790847.003.0004>
- Hewlett, B.S., Hewlett, B.L., 2008. Ebola, Culture and Politics: The Anthropology of an Emerging Disease. Cengage Learning.
- Heymann, D.L., Chen, L., Takemi, K., Fidler, D.P., Tappero, J.W., Thomas, M.J., Kenyon, T.A., Frieden, T.R., Yach, D., Nishtar, S., Kalache, A., Olliaro, P.L., Horby, P., Torreele, E., Gostin, L.O., Ndomondo-Sigonda, M., Carpenter, D., Rushton, S., Lillywhite, L., Devkota, B., Koser, K., Yates, R., Dhillon, R.S., Rannan-Eliya, R.P., 2015. Global health security: the wider lessons from the west African Ebola virus disease epidemic. *Lancet* 385, 1884–1901.
[https://doi.org/10.1016/S0140-6736\(15\)60858-3](https://doi.org/10.1016/S0140-6736(15)60858-3)
- Heymann, D.L., Shindo, N., WHO Scientific and Technical Advisory Group for Infectious Hazards, 2020. COVID-19: what is next for public health? *Lancet* 395, 542–545.
[https://doi.org/10.1016/S0140-6736\(20\)30374-3](https://doi.org/10.1016/S0140-6736(20)30374-3)
- Hinchliffe, S., Jackson, M.A., Wyatt, K., Barlow, A.E., Barreto, M., Clare, L., Depledge, M.H., Durie, R., Fleming, L.E., Groom, N., Morrissey, K., Salisbury, L., Thomas, F., 2018. Healthy publics: enabling cultures and environments for health. *Palgrave Commun* 4, 57.
<https://doi.org/10.1057/s41599-018-0113-9>
- Ho, C., 2009. The relationship between knowledge management enablers and performance. *Industrial Management & Data Systems* 109, 98–117. <https://doi.org/10.1108/02635570910926618>
- Ho, K., 2015. Finance, Anthropology of, in: *International Encyclopedia of the Social & Behavioral Sciences: Second Edition*. Elsevier Inc., pp. 171–176. <https://doi.org/10.1016/B978-0-08-097086-8.12194-4>

- Hoeyer, K., 2023. Data Paradoxes: The Politics of Intensified Data Sourcing in Contemporary Healthcare. The MIT Press. <https://doi.org/10.7551/mitpress/14926.001.0001>
- Holliday, S., Remizova, I., Stewart, F., 2021. The Insurance Sector’s Contribution to the Sustainable Development Goals (SDGs).
- Hoppe, T., 2018. “Spanish Flu”: When Infectious Disease Names Blur Origins and Stigmatize Those Infected. *Am J Public Health* 108, 1462–1464. <https://doi.org/10.2105/AJPH.2018.304645>
- Hughes-McLure, S., 2022. Follow the money [WWW Document]. URL <https://journals.sagepub.com/doi/10.1177/0308518X221103267?icid=int.sj-full-text.citing-articles.22> (accessed 4.18.24).
- Hullman, J., Diakopoulos, N., 2011. Visualization Rhetoric: Framing Effects in Narrative Visualization. *IEEE Transactions on Visualization and Computer Graphics* 17, 2231–2240. <https://doi.org/10.1109/TVCG.2011.255>
- Hunter, B., Shaffer, J., 2021. Human capital, risk and the World Bank’s reintermediation in global development. *Third World Quarterly* 43, 1–20. <https://doi.org/10.1080/01436597.2021.1953980>
- IDA, 2022. Building Back Better from the Crisis: Toward a Green, Resilient and Inclusive Future. IDA.
- Igoe, M., 2019. World Bank pandemic facility “an embarrassing mistake,” says former chief economist [WWW Document]. Devex. URL <https://www.devex.com/news/sponsored/world-bank-pandemic-facility-an-embarrassing-mistake-says-former-chief-economist-94697> (accessed 4.24.24).
- IMF, 2016. Poverty Reduction Strategy Papers (PRSP) - All Documents - Sorted By Country Name [WWW Document]. URL <https://www.imf.org/external/np/prsp/prsp.aspx> (accessed 4.18.24).

Institute of Medicine (US) Forum on Microbial Threats, 2009. Infectious Disease Emergence: Past, Present, and Future, in: Microbial Evolution and Co-Adaptation: A Tribute to the Life and Scientific Legacies of Joshua Lederberg: Workshop Summary. National Academies Press (US).

International Labour Organization, 2024. World employment and social outlook: Trends 2024. ILO, Geneva. <https://doi.org/10.54394/HQAE1085>

International Monetary Fund, 2017. The Role of the Fund in Governance Issues – Review of the Guidance Note – Preliminary Considerations – Background Notes. Policy Papers 2017. <https://doi.org/10.5089/9781498346481.007.A001>

International Monetary Fund. Strategy, P., Department, R., Dept, I.M.F.W.H., Dept, I.M.F.A. and P., 2019. IMF Policy Paper: Building Resilience in Developing Countries Vulnerable to Large Natural Disasters. Policy Papers 2019. <https://doi.org/10.5089/9781498321020.007.A001>

International Trade Administration, 2023. Senegal - Country Commercial Guide [WWW Document]. URL <https://www.trade.gov/country-commercial-guides/senegal-agricultural-sector> (accessed 5.6.24).

International Working Group on Financing Preparedness, 2017. From Panic and Neglect to Investing in Health Security: Financing Pandemic Preparedness at a National Level. World Bank, Washington, DC. <https://doi.org/10.1596/26761>

Iriart, C., Elías Merhy, E., Waitzkin, H., 2001. Managed care in Latin America: the new common sense in health policy reform. Social Science & Medicine, Comparative Studies of Competition Policy 52, 1243–1253. [https://doi.org/10.1016/S0277-9536\(00\)00243-4](https://doi.org/10.1016/S0277-9536(00)00243-4)

Isbell, B.J., 2005. To Defend Ourselves, Ecology & Ritual in an Andean Village.

Jacques, O., Noël, A., 2022. The politics of public health investments. Social Science & Medicine 309, 115272. <https://doi.org/10.1016/j.socscimed.2022.115272>

- Jafarey, V.A., n.d. 5 Structural Adjustment and the Role of the IMF, in: Structural Adjustment and Macroeconomic Policy Issues. International Monetary Fund.
- James, D., 2021. Life and debt: A view from the south. *Economy and Society* 50, 36–56.
<https://doi.org/10.1080/03085147.2021.1841930>
- Jamison, D.T., Breman, J.G., Measham, A.R., Alleyne, G., Claeson, M., Evans, D.B., Jha, P., Mills, A., Musgrove, P., 2006. Disease Control Priorities in Developing Countries. World Bank Publications.
- Jamison, D.T., Summers, L.H., Alleyne, G., Arrow, K.J., Berkley, S., Binagwaho, A., Bustreo, F., Evans, D., Feachem, R.G.A., Frenk, J., Ghosh, G., Goldie, S.J., Guo, Y., Gupta, S., Horton, R., Kruk, M.E., Mahmoud, A., Mohohlo, L.K., Ncube, M., Pablos-Mendez, A., Reddy, K.S., Saxenian, H., Soucat, A., Ulltveit-Moe, K.H., Yamey, G., 2013. Global health 2035: a world converging within a generation. *The Lancet* 382, 1898–1955. [https://doi.org/10.1016/S0140-6736\(13\)62105-4](https://doi.org/10.1016/S0140-6736(13)62105-4)
- Janssen, M., van der Voort, H., 2020b. Agile and adaptive governance in crisis response: Lessons from the COVID-19 pandemic. *International Journal of Information Management, Impact of COVID-19 Pandemic on Information Management Research and Practice: Editorial Perspectives* 55, 102180. <https://doi.org/10.1016/j.ijinfomgt.2020.102180>
- Janzen, H.H., 2011. What place for livestock on a re-greening earth? *Animal Feed Science and Technology, Special Issue: Greenhouse Gases in Animal Agriculture - Finding a Balance between Food and Emissions* 166–167, 783–796.
<https://doi.org/10.1016/j.anifeedsci.2011.04.055>
- Jaramillo, C.F., Kerf, M., Wellenstein, A., Sislen, D., Baca, A., Saenz, M.L.E., 2020. Implementation Completion and Results Report TFA0564 and TFA5343 on Grants. World Bank.

- Jean, T., 2020. Black Lives Matter: Police Brutality in the Era of COVID-19. Population Health Research Brief Series.
- Jha, P., Deshmukh, Y., Tumbe, C., Suraweera, W., Bhowmick, A., Sharma, S., Novosad, P., Fu, S.H., Newcombe, L., Gelband, H., Brown, P., n.d. COVID mortality in India: National survey data and health facility deaths. *Science* 375, 667–671. <https://doi.org/10.1126/science.abm5154>
- Johns Hopkins University, 2023. COVID-19 Dashboard [WWW Document]. URL <https://gisanddata.maps.arcgis.com/apps/dashboards/bda7594740fd40299423467b48e9ecf6> (accessed 4.18.24).
- Johns Hopkins University of Medicine, 2023. Senegal - COVID-19 Overview - Johns Hopkins [WWW Document]. Johns Hopkins Coronavirus Resource Center. URL <https://coronavirus.jhu.edu/region/senegal> (accessed 5.6.24).
- Johnson, S.G.B., Bilovich, A., Tuckett, D., 2023. Conviction Narrative Theory: A theory of choice under radical uncertainty. *Behavioral and Brain Sciences* 46, e82. <https://doi.org/10.1017/S0140525X22001157>
- Jomo, K.S., Chowdhury, A., 2019. World Bank Financializing Development. *Development* 62, 147–153. <https://doi.org/10.1057/s41301-019-00206-3>
- Jonas, O., 2019c. Pandemic bonds: designed to fail in Ebola. *Nature* 572, 285. <https://doi.org/10.1038/d41586-019-02415-9>
- Jonas, O., 2013. *Pandemic Risk*. World Bank, Washington, D.C.
- Jonas, O., Warford, L., 2014. *Global Program for Avian Influenza Control and Human Pandemic Preparedness and Response : Project Accomplishments*.

- Jones, K.E., Patel, N.G., Levy, M.A., Storeygard, A., Balk, D., Gittleman, J.L., Daszak, P., 2008. Global trends in emerging infectious diseases. *Nature* 451, 990–993. <https://doi.org/10.1038/nature06536>
- Kahneman, D., Tversky, A., 1979. Prospect Theory: An Analysis of Decision under Risk. *Econometrica* 47, 263–291. <https://doi.org/10.2307/1914185>
- Kamenshchikova, A., Wolffs, P.F.G., Hoebe, C.J.P.A., Horstman, K., 2021. Anthropocentric framings of One Health: an analysis of international antimicrobial resistance policy documents. *Critical Public Health* 31, 306–315. <https://doi.org/10.1080/09581596.2019.1684442>
- Kamensky, J.M., Morales, A., 2006. Competition, Choice, and Incentives in Government Programs. Rowman & Littlefield Publishers.
- Kapur, P.D., Ishan, n.d. Towards a Market Economy: Structures of Governance [WWW Document]. IMF. URL <https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Towards-a-Market-Economy-Structures-of-Governance-2103> (accessed 4.18.24).
- Keck, F., Lynteris, C., 2018. Zoonosis. *MAT* 5. <https://doi.org/10.17157/mat.5.3.372>
- Keck, M.E., Sikkink, K., 2014. Activists beyond Borders: Advocacy Networks in International Politics. Cornell University Press.
- Kelly, A.H., Keck, F., Lynteris, C. (Eds.), 2019. The Anthropology of Epidemics. Taylor & Francis. <https://doi.org/10.4324/9780429461897>
- Kelly, J.A., 2011. State Healthcare and Yanomami Transformations: A Symmetrical Ethnography. University of Arizona Press.
- Kelly, T.R., Machalaba, C., Karesh, W.B., Crook, P.Z., Gilardi, K., Nziza, J., Uhart, M.M., Robles, E.A., Saylor, K., Joly, D.O., Monagin, C., Mangombo, P.M., Kingebeni, P.M., Kazwala, R., Wolking, D., Smith, W., Mazet, J.A.K., PREDICT Consortium, 2020. Implementing One Health

- approaches to confront emerging and re-emerging zoonotic disease threats: lessons from PREDICT. *One Health Outlook* 2, 1. <https://doi.org/10.1186/s42522-019-0007-9>
- Kennedy, H., Hill, R.L., Aiello, G., Allen, W., 2016. The work that visualisation conventions do. *Information, Communication & Society* 19, 715–735. <https://doi.org/10.1080/1369118X.2016.1153126>
- Keogh-Brown, M.R., Wren-Lewis, S., Edmunds, W.J., Beutels, P., Smith, R.D., 2010. The possible macroeconomic impact on the UK of an influenza pandemic. *Health Econ* 19, 1345–1360. <https://doi.org/10.1002/hec.1554>
- Keramarou, M., Evans, M.R., 2012. Completeness of infectious disease notification in the United Kingdom: A systematic review. *J Infect* 64, 555–564. <https://doi.org/10.1016/j.jinf.2012.03.005>
- Kettani, H., 2010. Muslim Population in Africa: 1950 – 2020. *IJESD* 136–142. <https://doi.org/10.7763/IJESD.2010.V1.27>
- Keynes, J.M., 1936. The Supply of Gold. *The Economic Journal* 46, 412–418. <https://doi.org/10.2307/2224879>
- Kickbusch, I., Ganten, D., Galvão, L.A., 2019. Why decolonization in health is essential for achieving the Sustainable Development Goals. *The BMJ Opinion*.
- King, L.J., Marano, N.N., Hughes, J.M., 2004. New partnerships between animal health services and public health agencies: -EN- -FR- -ES-. *Rev. Sci. Tech. OIE* 23, 717–726. <https://doi.org/10.20506/rst.23.2.1507>
- Kingori, P., 2013. Experiencing everyday ethics in context: Frontline data collectors perspectives and practices of bioethics. *Soc Sci Med* 98, 361–370. <https://doi.org/10.1016/j.socscimed.2013.10.013>

- Kingori, P., Gerrets, R., 2016. Morals, morale and motivations in data fabrication: Medical research fieldworkers views and practices in two Sub-Saharan African contexts. *Social Science & Medicine* 166, 150–159. <https://doi.org/10.1016/j.socscimed.2016.08.019>
- Kirksey, S.E., Helmreich, S., 2010. The Emergence of Multispecies Ethnography. *Cultural Anthropology* 25, 545–576. <https://doi.org/10.1111/j.1548-1360.2010.01069.x>
- Klein, N., 2007. *The Shock Doctrine: The rise of disaster capitalism*, The Shock Doctrine: The rise of disaster capitalism. Metropolitan Books/Henry Holt and Company, New York, NY, US.
- Kleinman, A., Eisenberg, L., Good, B., 1978. Culture, illness, and care: clinical lessons from anthropologic and cross-cultural research. *Ann Intern Med* 88, 251–258. <https://doi.org/10.7326/0003-4819-88-2-251>
- Klinke, A., Renn, O., 2002. A new approach to risk evaluation and management: risk-based, precaution-based, and discourse-based strategies. *Risk Anal* 22, 1071–1094. <https://doi.org/10.1111/1539-6924.00274>
- Korevaar, D.A., Toubiana, J., Chalumeau, M., McInnes, M.D.F., Cohen, J.F., 2021. Evaluating tests for diagnosing COVID-19 in the absence of a reliable reference standard: pitfalls and potential solutions. *Journal of Clinical Epidemiology* 138, 182–188. <https://doi.org/10.1016/j.jclinepi.2021.07.021>
- Kothari, V., 2006. *Securitization: The Financial Instrument of the Future*. John Wiley & Sons.
- Kramarz, T., Momani, B., 2013. The World Bank as Knowledge Bank: Analyzing the Limits of a Legitimate Global Knowledge Actor. *Review of Policy Research* 30, 409–431. <https://doi.org/10.1111/ropr.12028>

- Krech, R., Kickbusch, I., Franz, C., Wells, N., 2018. Banking for health: the role of financial sector actors in investing in global health. *BMJ Global Health* 3, e000597.
<https://doi.org/10.1136/bmjgh-2017-000597>
- Krieger, N., 2020. ENOUGH: COVID-19, Structural Racism, Police Brutality, Plutocracy, Climate Change—and Time for Health Justice, Democratic Governance, and an Equitable, Sustainable Future. *Am J Public Health* 110, 1620–1623. <https://doi.org/10.2105/AJPH.2020.305886>
- Labonté, R., Stuckler, D., 2016. The rise of neoliberalism: how bad economics imperils health and what to do about it. *Journal of Epidemiology and Community Health* (1979-) 70, 312–318.
- Lainé, N., 2018. Elephant tuberculosis as a reverse zoonosis. *Medicine Anthropology Theory* 5.
<https://doi.org/10.17157/mat.5.3.379>
- Lakoff, A., 2017. Unprepared: Global Health in a Time of Emergency.
- Lakoff, A., bio, 2010. Two Regimes of Global Health. *Humanity: An International Journal of Human Rights, Humanitarianism, and Development* 1, 59–79. <https://doi.org/10.1353/hum.2010.0001>
- Lakoff, A., Collier, S.J. (Eds.), 2008. *Biosecurity Interventions: Global Health and Security in Question*. Columbia University Press.
- Laurell, A.C., Arellano, O.L., 1996. Market Commodities and Poor Relief: The World Bank Proposal for Health. *Int J Health Serv* 26, 1–18. <https://doi.org/10.2190/PBX9-N89E-4QFE-046V>
- Lavell, A., Oppenheimer, M., Diop, C., Hess, J., Lempert, R., Li, J., Muir-Wood, R., Myeong, S., Moser, S., Takeuchi, K., Cardona, O.-D., Hallegatte, S., Lemos, M., Little, C., Lotsch, A., Weber, E., 2012. Climate Change: New Dimensions in Disaster Risk, Exposure, Vulnerability, and Resilience, in: Field, C.B., Barros, V., Stocker, T.F., Dahe, Q. (Eds.), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. Cambridge University Press, pp. 25–64. <https://doi.org/10.1017/CBO9781139177245.004>

- Lavigne Delville, P., Schlimmer, S., 2021. Saisir l'action publique en Afrique à travers les instruments. *Avant-propos: Revue internationale de politique comparée* Vol. 27, 9–32. <https://doi.org/10.3917/ripc.272.0009>
- Lazzarato, M., 2009. Neoliberalism in Action: Inequality, Insecurity and the Reconstitution of the Social. *Theory, Culture & Society* 26, 109–133. <https://doi.org/10.1177/0263276409350283>
- Leach, M., Scoones, I., 2013. The social and political lives of zoonotic disease models: Narratives, science and policy. *Social Science & Medicine* 88, 10–17. <https://doi.org/10.1016/j.socscimed.2013.03.017>
- Lee, K., Kamradt-Scott, A., 2014. The multiple meanings of global health governance: a call for conceptual clarity. *Globalization and Health* 10, 28. <https://doi.org/10.1186/1744-8603-10-28>
- Leroy, E.M., Epelboin, A., Mondonge, V., Pourrut, X., Gonzalez, J.-P., Muyembe-Tamfum, J.-J., Formenty, P., 2009. Human Ebola Outbreak Resulting from Direct Exposure to Fruit Bats in Luebo, Democratic Republic of Congo, 2007. *Vector-Borne and Zoonotic Diseases* 9, 723–728. <https://doi.org/10.1089/vbz.2008.0167>
- Levy-Bruhl, L., 1923. *Primitive mentality*. Macmillan.
- Li, L., Novillo-Ortiz, D., Azzopardi-Muscat, N., Kostkova, P., 2021. Digital Data Sources and Their Impact on People's Health: A Systematic Review of Systematic Reviews. *Front Public Health* 9, 645260. <https://doi.org/10.3389/fpubh.2021.645260>
- Liang, S.T., Liang, L.T., Rosen, J.M., 2021. COVID-19: a comparison to the 1918 influenza and how we can defeat it. *Postgrad Med J* 97, 273–274. <https://doi.org/10.1136/postgradmedj-2020-139070>
- Lin, K.-H., Neely, M.T., 2020. *Divested: Inequality in Financialized America*. Oxford University Press.

- Lindenbaum, S., 2001. Kuru, Prions, and Human Affairs: Thinking About Epidemics. *Annual Review of Anthropology* 30, 363–385. <https://doi.org/10.1146/annurev.anthro.30.1.363>
- Litsios, D.S., 2015. On the Origin of Primary Health Care, in: *Health For All: The Journey of Universal Health Coverage*. Orient Blackswan.
- Lloyd-Smith, J.O., George, D., Pepin, K.M., Pitzer, V.E., Pulliam, J.R.C., Dobson, A.P., Hudson, P.J., Grenfell, B.T., 2009. Epidemic Dynamics at the Human-Animal Interface. *Science* 326, 1362–1367. <https://doi.org/10.1126/science.1177345>
- Lobo, S., 1982. *A House of My Own: Social Organization in the Squatter Settlements of Lima, Peru*. University of Arizona Press.
- Lock, M.M., Nguyen, V.-K., 2018. *An Anthropology of Biomedicine*. John Wiley & Sons.
- Lomnitz, L.A., 1977. 5 - Family and Kinship, in: Lomnitz, L.A. (Ed.), *Networks and Marginality*. Academic Press, pp. 93–130. <https://doi.org/10.1016/B978-0-12-456450-3.50011-3>
- Long, K., 2013. AIR Worldwide Releases Global Pandemic Flu Model [WWW Document]. URL <https://www.verisk.com/company/newsroom/archive/air-worldwide-releases-global-pandemic-flu-model/> (accessed 4.23.24).
- Loo, A., 2024. Black Swan Event [WWW Document]. Corporate Finance Institute. URL <https://corporatefinanceinstitute.com/resources/economics/black-swan-event/> (accessed 4.22.24).
- Lopez, A.D., Mathers, C.D., 2006. Measuring the global burden of disease and epidemiological transitions: 2002–2030. *Annals of Tropical Medicine & Parasitology* 100, 481–499. <https://doi.org/10.1179/136485906X97417>
- Lorente, J.A., Nin, N., Villa, P., Vasco, D., Miguel-Coello, A.B., Rodriguez, I., Herrero, R., Peñuelas, O., Ruiz-Cabello, J., Izquierdo-Garcia, J.L., 2021. Metabolomic differences between COVID-19

and H1N1 influenza induced ARDS. *Critical Care* 25, 390. <https://doi.org/10.1186/s13054-021-03810-3>

Losurdo, P., Paiano, L., Samardzic, N., Germani, P., Bernardi, L., Borelli, M., Pozzetto, B., de Manzini, N., Bortul, M., 2020. Impact of lockdown for SARS-CoV-2 (COVID-19) on surgical site infection rates: a monocentric observational cohort study. *Updates Surg* 72, 1263–1271. <https://doi.org/10.1007/s13304-020-00884-6>

Luhmann, N., 1995. *Social Systems*. Stanford University Press, Stanford.

Lunstrum, E., Ahuja, N., Braun, B., Collard, R., Lopez, P.J., Wong, R.W.Y., 2021. More-Than-Human and Deeply Human Perspectives on COVID-19. *Antipode* 53, 1503–1525. <https://doi.org/10.1111/anti.12730>

Lynteris, C., 2016. *Ethnographic Plague: Configuring Disease on the Chinese-Russian Frontier*. Springer.

Lyon, D., n.d. *Surveillance as Social Sorting: Privacy, Risk, and Digital Discrimination*.

Maanen, J.V., 1988. *Tales of the Field: On Writing Ethnography*. University of Chicago Press.

Mackay, K., 2010. *Conceptual Framework for Monitoring and Evaluation*.

MacKenzie, D., 2008. *Material Markets: How Economic Agents are Constructed*. OUP Oxford.

Mackenzie, J.S., Jeggo, M., 2019. The One Health Approach—Why Is It So Important? *Trop Med Infect Dis* 4, 88. <https://doi.org/10.3390/tropicalmed4020088>

Mackeviciute, R., Martinaitis, Ž., Lipparini, F., Scheck, B.C., Styczynska, I., n.d. *Social Impact Investment. Best Practices and Recommendations for the Next Generation*.

Madhav, N., Oppenheim, B., Gallivan, M., Mulembakani, P., Rubin, E., Wolfe, N., 2017. *Pandemics: Risks, Impacts, and Mitigation*, in: Jamison, D.T., Gelband, H., Horton, S., Jha, P., Laxminarayan, R., Mock, C.N., Nugent, R. (Eds.), *Disease Control Priorities: Improving Health*

and Reducing Poverty. The International Bank for Reconstruction and Development / The World Bank, Washington (DC).

Mahajan, M., 2021. Casualties of preparedness: the Global Health Security Index and COVID-19. *International Journal of Law in Context* 17, 204–214.

<https://doi.org/10.1017/S1744552321000288>

Malinowski, B., 1929. Practical Anthropology. *Africa* 2, 22–38. <https://doi.org/10.2307/1155162>

Malvey, D., Fottler, M.D., 2006. The Retail Revolution in Health Care: Who Will Win and Who Will Lose? *Health Care Management Review* 31, 168.

Manderson, L., Levine, S., 2020. COVID-19, Risk, Fear, and Fall-out. *Medical Anthropology* 39, 367–370. <https://doi.org/10.1080/01459740.2020.1746301>

Mangen, M.-J.J., Plass, D., Havelaar, A.H., Gibbons, C.L., Cassini, A., Mühlberger, N., Lier, A. van, Haagsma, J.A., Brooke, R.J., Lai, T., Waure, C. de, Kramarz, P., Kretzschmar, M.E.E., Consortium, on behalf of the Bc., 2013a. The Pathogen- and Incidence-Based DALY Approach: An Appropriated Methodology for Estimating the Burden of Infectious Diseases. *PLOS ONE* 8, e79740. <https://doi.org/10.1371/journal.pone.0079740>

Marani, M., Katul, G.G., Pan, W.K., Parolari, A.J., 2021. Intensity and frequency of extreme novel epidemics. *Proc Natl Acad Sci U S A* 118, e2105482118.

<https://doi.org/10.1073/pnas.2105482118>

Marcella, M., Wang, D., Dodov, B., 2020. Managing U.S. Flood Risk: Part I, Modeling Hurricane-Induced Precipitation. *AIR Currents* 2020.

Marmot, M., Friel, S., Bell, R., Houweling, T.A., Taylor, S., 2008. Closing the gap in a generation: health equity through action on the social determinants of health. *The Lancet* 372, 1661–1669.

[https://doi.org/10.1016/S0140-6736\(08\)61690-6](https://doi.org/10.1016/S0140-6736(08)61690-6)

- Martin, N., n.d. Creating opportunities for people's well-being and economic growth.
- Marx, K., Engels, F., Marx, K., 1987. Karl Marx: 1857-61, Collected works. Lawrence & Wishart, London.
- Masanza, M.M., Nqobile, N., Mukanga, D., Gitta, S.N., 2010. Laboratory capacity building for the International Health Regulations (IHR[2005]) in resource-poor countries: the experience of the African Field Epidemiology Network (AFENET). BMC Public Health 10, S8.
<https://doi.org/10.1186/1471-2458-10-S1-S8>
- Masters, R., Anwar, E., Collins, B., Cookson, R., Capewell, S., 2017. Return on investment of public health interventions: a systematic review. J Epidemiol Community Health.
<https://doi.org/10.1136/jech-2016-208141>
- Mathauer, I., Vinyals Torres, L., Kutzin, J., Jakab, M., Hanson, K., 2020. Pooling financial resources for universal health coverage: options for reform. Bull World Health Organ 98, 132–139.
<https://doi.org/10.2471/BLT.19.234153>
- Mathers, C.D., Loncar, D., 2006. Projections of Global Mortality and Burden of Disease from 2002 to 2030. PLOS Medicine 3, e442. <https://doi.org/10.1371/journal.pmed.0030442>
- Maurer, B., 2011. Mutual Life, Limited: Islamic Banking, Alternative Currencies, Lateral Reason, in: Mutual Life, Limited. Princeton University Press. <https://doi.org/10.1515/9781400840717>
- Mauss, M., 1954. The Gift forms and functions of exchange in archaic societies. Free Press, Glencoe, IL.
- Mawdsley, E., Taggart, J., 2022. Rethinking d/Development. Progress in Human Geography 46, 3–20.
<https://doi.org/10.1177/03091325211053115>

- Mays, G.P., Smith, S.A., 2011. Evidence links increases in public health spending to declines in preventable deaths. *Health Aff (Millwood)* 30, 1585–1593.
<https://doi.org/10.1377/hlthaff.2011.0196>
- McClellan, M., Kent, J., Beales, S.J., Cohen, S.I.A., Macdonnell, M., Thoumi, A., Abdulmalik, M., Darzi, A., 2014. Accountable Care Around The World: A Framework To Guide Reform Strategies. *Health Affairs* 33, 1507–1515. <https://doi.org/10.1377/hlthaff.2014.0373>
- McCloskey, B., Dar, O., Zumla, A., Heymann, D.L., 2014. Emerging infectious diseases and pandemic potential: status quo and reducing risk of global spread. *The Lancet Infectious Diseases* 14, 1001–1010. [https://doi.org/10.1016/S1473-3099\(14\)70846-1](https://doi.org/10.1016/S1473-3099(14)70846-1)
- McDonald, S.A., Haagsma, J.A., Cassini, A., Devleeschauwer, B., 2020. Adjusting for comorbidity in incidence-based DALY calculations: an individual-based modeling approach. *BMC Med Res Methodol* 20, 100. <https://doi.org/10.1186/s12874-020-00987-z>
- McInnes, C., Rushton, S., 2010. HIV, AIDS and Security: Where Are We Now? *International Affairs (Royal Institute of International Affairs 1944-)* 86, 225–245.
- McKibbin, W., Fernando, R., 2023. The global economic impacts of the COVID-19 pandemic. *Economic Modelling* 129, 106551. <https://doi.org/10.1016/j.econmod.2023.106551>
- McNeill, D., n.d. *Fetishism and the Theory of Value*.
- McVeigh, K., 2020. World Bank’s \$500m pandemic scheme accused of “waiting for people to die.” *The Guardian*.
- Meadows, A.J., Oppenheim, B., Guerrero, J., Ash, B., Badker, R., Lam, C.K., Pardee, C., Ngoon, C., Savage, P.T., Sridharan, V., Madhav, N.K., Stephenson, N., 2022a. Infectious Disease Underreporting Is Predicted by Country-Level Preparedness, Politics, and Pathogen Severity. *Health Secur* 20, 331–338. <https://doi.org/10.1089/hs.2021.0197>

- Measure Evaluation, 2018. Strengthening Multisectoral Community Event-Based Surveillance of Zoonotic Diseases in Senegal. Measure Evaluation, Chapel Hill.
- Medicare, 2024. Parts of Medicare | Medicare [WWW Document]. URL <https://www.medicare.gov/basics/get-started-with-medicare/medicare-basics/parts-of-medicare> (accessed 4.29.24).
- Mehta, L., 2005. Commentary: The World Bank and Its Emerging Knowledge Empire. Human Organization 60, 189–196. <https://doi.org/10.17730/humo.60.2.cl4dw5yv0gv7867c>
- Meier, G.M., Stiglitz, J.E., 2001. Frontiers of Development Economics: The Future in Perspective. World Bank Publications.
- Meyerowitz, E.A., Richterman, A., Gandhi, R.T., Sax, P.E., 2021. Transmission of SARS-CoV-2: A Review of Viral, Host, and Environmental Factors. Ann Intern Med 174, 69–79. <https://doi.org/10.7326/M20-5008>
- Miffre, J., 2016. Long-short commodity investing: A review of the literature. Journal of Commodity Markets 1, 3–13. <https://doi.org/10.1016/j.jcomm.2016.01.001>
- Milanovic, B., 2021. globalinequality: Beware of mashup indexes: how epidemic predictors got it all wrong. globalinequality. URL <https://glineq.blogspot.com/2021/01/beware-of-mashup-indexes-how-epidemic.html> (accessed 5.24.23).
- Miller, J.M., 2023. Do COVID-19 Conspiracy Theory Beliefs Form a Monological Belief System? Can J Polit Sci 1–8. <https://doi.org/10.1017/S0008423920000517>
- Minard, C.S.L., 2009. Valuing entrepreneurship in the informal economy in Senegal. Social Enterprise Journal 5, 186–209. <https://doi.org/10.1108/17508610911004304>
- Mitra, A.K., Mawson, A.R., 2017. Neglected Tropical Diseases: Epidemiology and Global Burden. Trop Med Infect Dis 2, 36. <https://doi.org/10.3390/tropicalmed2030036>

- Mizumoto, K., Chowell, G., 2020. Estimating Risk for Death from Coronavirus Disease, China, January–February 2020. *Emerg Infect Dis* 26, 1251–1256.
<https://doi.org/10.3201/eid2606.200233>
- Molina, R.L., Palazuelos, D., 2014. Navigating and Circumventing a Fragmented Health System: The Patient’s Pathway in the Sierra Madre Region of Chiapas, Mexico. *Medical Anthropology Quarterly* 28, 23–43. <https://doi.org/10.1111/maq.12071>
- Monmonier, M., 2018. *How to Lie with Maps*. University of Chicago Press.
- Monneret, G., de Marignan, D., Coudereau, R., Bernet, C., Ader, F., Frobort, E., Gossez, M., Viel, S., Venet, F., Wallet, F., 2020. Immune monitoring of interleukin-7 compassionate use in a critically ill COVID-19 patient. *Cell Mol Immunol* 17, 1001–1003. <https://doi.org/10.1038/s41423-020-0516-6>
- Moon, S., 2019. Power in global governance: an expanded typology from global health. *Globalization and Health* 15, 74. <https://doi.org/10.1186/s12992-019-0515-5>
- Moon, S., Sridhar, D., Pate, M.A., Jha, A.K., Clinton, C., Delaunay, S., Edwin, V., Fallah, M., Fidler, D.P., Garrett, L., Goosby, E., Gostin, L.O., Heymann, D.L., Lee, K., Leung, G.M., Morrison, J.S., Saavedra, J., Tanner, M., Leigh, J.A., Hawkins, B., Woskie, L.R., Piot, P., 2015. Will Ebola change the game? Ten essential reforms before the next pandemic. The report of the Harvard-LSHTM Independent Panel on the Global Response to Ebola. *The Lancet* 386, 2204–2221.
[https://doi.org/10.1016/S0140-6736\(15\)00946-0](https://doi.org/10.1016/S0140-6736(15)00946-0)
- Moore, J.L., Rocklin, T.R., 1998. The Distribution of Distributed Cognition: Multiple Interpretations and Uses. *Educational Psychology Review* 10, 97–113.
<https://doi.org/10.1023/A:1022862215910>

- Morens, D.M., Fauci, A.S., 2020. Emerging Pandemic Diseases: How We Got to COVID-19. *Cell* 182, 1077–1092. <https://doi.org/10.1016/j.cell.2020.08.021>
- Morens, D.M., Folkers, G.K., Fauci, A.S., 2009. What Is a Pandemic? *The Journal of Infectious Diseases* 200, 1018–1021. <https://doi.org/10.1086/644537>
- Morens, D.M., Folkers, G.K., Fauci, A.S., 2004. The challenge of emerging and re-emerging infectious diseases. *Nature* 430, 242–249. <https://doi.org/10.1038/nature02759>
- Morris, S., 2023. Development finance cooperation amidst great power competition: what role for the World Bank? *Oxford Review of Economic Policy* 39, 379–388. <https://doi.org/10.1093/oxrep/grad006>
- Morse, S.S., Mazet, J.A., Woolhouse, M., Parrish, C.R., Carroll, D., Karesh, W.B., Zambrana-Torrel, C., Lipkin, W.I., Daszak, P., 2012. Prediction and prevention of the next pandemic zoonosis. *The Lancet* 380, 1956–1965. [https://doi.org/10.1016/S0140-6736\(12\)61684-5](https://doi.org/10.1016/S0140-6736(12)61684-5)
- Mosley, P., Harrigan, J., Toye, J.F.J., 1995. *Aid and Power: The World Bank and Policy-based Lending*. Psychology Press.
- Mouthaan, M., 2019. Unpacking domestic preferences in the policy-‘receiving’ state: the EU’s migration cooperation with Senegal and Ghana. *CMS* 7, 35. <https://doi.org/10.1186/s40878-019-0141-7>
- Mulligan, J., Castañeda, H., 2017. *Unequal Coverage: The Experience of Health Care Reform in the United States*. NYU Press. <https://doi.org/10.18574/nyu/9781479897001.001.0001>
- Muniesa, F., Millo, Y., Callon, M., 2007. An Introduction to Market Devices. *The Sociological Review* 55, 1–12. <https://doi.org/10.1111/j.1467-954X.2007.00727.x>
- Munster, V.J., Bausch, D.G., de Wit, E., Fischer, R., Kobinger, G., Muñoz-Fontela, C., Olson, S.H., Seifert, S.N., Sprecher, A., Ntoumi, F., Massaquoi, M., Mombouli, J.-V., 2018. Outbreaks in a

Rapidly Changing Central Africa — Lessons from Ebola. *New England Journal of Medicine* 379, 1198–1201. <https://doi.org/10.1056/NEJMp1807691>

Musoke, D., Atusingwize, E., Namata, C., Ndejjo, R., Wanyenze, R.K., Kanya, M.R., 2023a.

Integrated malaria prevention in low and middle-income countries: a systematic review.

Musoke, D., Nalinya, S., Lubega, G.B., Deane, K., Ekirapa-Kiracho, E., McCoy, D., 2023b. The effects of COVID-19 lockdown measures on health and healthcare services in Uganda. *PLOS Glob Public Health* 3, e0001494. <https://doi.org/10.1371/journal.pgph.0001494>

Nash, K., Trott, V., Allen, W., 2022. The politics of data visualisation and policy making [WWW Document]. URL <https://journals.sagepub.com/doi/10.1177/13548565221079156> (accessed 4.23.24).

Nash, L., 2007. *Inescapable Ecologies: A History of Environment, Disease, and Knowledge*.

Inescapable Ecologies: A History of Environment, Disease and Knowledge.

Nashwan, A.J., Ahmed, S.H., Shaikh, T.G., Waseem, S., 2023. Impact of natural disasters on health disparities in low- to middle-income countries. *Discov Health Systems* 2, 23.

<https://doi.org/10.1007/s44250-023-00038-6>

Nations Online, 2021. Political Map of Senegal - Nations Online Project [WWW Document]. URL <https://www.nationsonline.org/oneworld/map/senegal-map.htm> (accessed 5.6.24).

Navarro, V., 2004. The World Health Situation. *Int J Health Serv* 34, 1–10.

<https://doi.org/10.2190/4HMT-KDKH-18E7-2XBE>

Ndiaye, M., Diouf, A., Faye, C., 2022. Emergency food aid and household food security during COVID-19: Evidence from a field survey in Senegal. *African Development Review* 34.

<https://doi.org/10.1111/1467-8268.12675>

- Ndiaye, M.F., 2021. COVID-19 and its Impact on Senegal's Macroeconomic Structure [WWW Document]. SAIIA. URL <https://saiia.org.za/research/covid-19-and-its-impact-on-senegals-macroeconomic-structure/> (accessed 5.14.24).
- Ndumu, D., Zecchin, B., Fusaro, A., Arinaitwe, E., Erechu, R., Kidega, E., Kayiwa, J., Muwanga, E., Kirumira, M., Kirembe, G., Lutwama, J., Monne, I., 2018. Highly pathogenic avian influenza H5N8 Clade 2.3.4.4B virus in Uganda, 2017. *Infect Genet Evol* 66, 269–271.
<https://doi.org/10.1016/j.meegid.2018.10.010>
- Nelson, D.M., 2015. *Who Counts?: The Mathematics of Death and Life after Genocide*. Duke University Press, Durham, NC.
- Neu, D., Ocampo Gomez, E., Graham, C., Heincke, M., 2006. “Informing” technologies and the World Bank. *Accounting, Organizations and Society* 31, 635–662.
<https://doi.org/10.1016/j.aos.2005.07.002>
- Ng, N.Y., Ruger, J.P., 2011. Global Health Governance at a Crossroads. *Glob Health Gov* 3, 1–37.
- Ngalamulume, K., 2021. “Pestilential Emanations”, Medical Knowledge, and Stigmatisation in Saint-Louis, Senegal, 1854-1920. *eTropic: electronic journal of studies in the Tropics* 20, 226–246.
<https://doi.org/10.25120/etropic.20.1.2021.3792>
- Nichter, Mark, Nichter, Mimi, 1996. *Anthropology and International Health: Asian Case Studies*. Psychology Press.
- Nilsson, J. (Ed.), 2013. *Foucault, biopolitics, and governmentality*, Södertörn philosophical studies. Södertörn Univ, Huddinge.
- Ning, L., Niu, J., Bi, X., Yang, C., Liu, Z., Wu, Q., Ning, N., Liang, L., Liu, A., Hao, Y., Gao, L., Liu, C., 2020. The impacts of knowledge, risk perception, emotion and information on citizens'

- protective behaviors during the outbreak of COVID-19: a cross-sectional study in China. *BMC Public Health* 20, 1751. <https://doi.org/10.1186/s12889-020-09892-y>
- OECD, 2024. *Fostering Catastrophe Bond Markets in Asia and the Pacific*. Organisation for Economic Co-operation and Development, Paris.
- OECD, 2020. *The territorial impact of COVID-19: Managing the crisis across levels of government* [WWW Document]. OECD. URL <https://www.oecd.org/coronavirus/policy-responses/the-territorial-impact-of-covid-19-managing-the-crisis-across-levels-of-government-d3e314e1/> (accessed 5.8.24).
- OECD, 2015. *Disaster Risk Financing: A global survey of practices and challenges*. OECD. <https://doi.org/10.1787/9789264234246-en>
- Ola, O., Sedig, K., 2016. Beyond simple charts: Design of visualizations for big health data. *Online J Public Health Inform* 8, e195. <https://doi.org/10.5210/ojphi.v8i3.7100>
- Oliver, T.R., 2006. The Politics of Public Health Policy. *Annual Review of Public Health* 27, 195–233. <https://doi.org/10.1146/annurev.publhealth.25.101802.123126>
- One Health Commission, 2024. *What is One Health?* - One Health Commission [WWW Document]. URL https://www.onehealthcommission.org/en/why_one_health/what_is_one_health/ (accessed 4.18.24).
- One World - One Health, 2021. *The Manhattan Principles* [WWW Document]. One World - One Health. URL <https://oneworldonehealth.wcs.org/About-Us/Mission/The-Manhattan-Principles.aspx> (accessed 4.18.24).
- Onyekuru, N.A., Ihemezie, E.J., Ezea, C.P., Apeh, C.C., Onyekuru, B.O., 2023. Impacts of Ebola disease outbreak in West Africa: Implications for government and public health preparedness and lessons from COVID-19. *Sci Afr* 19, e01513. <https://doi.org/10.1016/j.sciaf.2022.e01513>

- Oppenheim, B., Guerrero, J., Euren, J., Bosa, H.K., Agyarko, R.K.D., Bah, A., Maeda, J., Kakunze, A., Muruta, A., Makumbi, I., Béavogui, M., 2020. Quantifying preparedness for emerging infectious diseases: A new methodology to assess health security at the subnational level in African countries. *International Journal of Infectious Diseases* 101, 266.
<https://doi.org/10.1016/j.ijid.2020.09.700>
- Ortiz, H., 2017. A political anthropology of finance: Profits, states, and cultures in cross-border investment in Shanghai. *HAU: Journal of Ethnographic Theory* 7, 325–345.
<https://doi.org/10.14318/hau7.3.018>
- Ortiz, H., 2013. Financial value. *HAU: Journal of Ethnographic Theory*.
<https://doi.org/10.14318/hau3.1.005>
- Osei-Kyei, R., Chan, A.P.C., 2017. Factors attracting private sector investments in public–private partnerships in developing countries: A survey of international experts. *Journal of Financial Management of Property and Construction* 22, 92–111. <https://doi.org/10.1108/JFMPC-06-2016-0026>
- Ostherr, K., 2005. *Cinematic Prophylaxis: Globalization and Contagion in the Discourse of World Health*. Duke University Press. <https://doi.org/10.1215/9780822387381>
- Ostrom, E., 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.
- Pandemic Fund, 2024. *Pandemic Fund Draft Strategic Plan (2024-2029)*. The Pandemic Fund.
- Pandey, A.V., Manivannan, A., Nov, O., Satterthwaite, M., Bertini, E., 2014. The Persuasive Power of Data Visualization. *IEEE Transactions on Visualization and Computer Graphics* 20, 2211–2220. <https://doi.org/10.1109/TVCG.2014.2346419>

- PARIS21, 2022. The PARIS21 Partner Report on Support to Statistics 2022: A Wake-Up Call to Finance Better Data | en | OECD. OECD Publishing.
- Park, S., Bekemeier, B., Flaxman, A.D., 2021. Understanding data use and preference of data visualization for public health professionals: A qualitative study. *Public Health Nursing* 38, 531–541. <https://doi.org/10.1111/phn.12863>
- Parker, R., Aggleton, P., Attawell, K., Pulerwitz, J., Brown, L., 2002. HIV/AIDS-related stigma and discrimination: A conceptual framework and an agenda for action. *HIV and AIDS*. <https://doi.org/10.31899/hiv2002.1010>
- Parpia, A.S., Ndeffo-Mbah, M.L., Wenzel, N.S., Galvani, A.P., 2016. Effects of Response to 2014–2015 Ebola Outbreak on Deaths from Malaria, HIV/AIDS, and Tuberculosis, West Africa. *Emerg Infect Dis* 22, 433–441. <https://doi.org/10.3201/eid2203.150977>
- Partridge, D., 2008. We Were Dancing in the Club, Not on the Berlin Wall: Black Bodies, Street Bureaucrats, and Exclusionary Incorporation into the New Europe. *Cultural Anthropology* 23, 660–687. <https://doi.org/10.1111/j.1548-1360.2008.00022.x>
- Patel, R., Narayan, D., Schafft, K., Rademacher, A., Koch-Schulte, S., 2000. Voices of the poor : can anyone hear us ?
- Patterson, K.D., Baroch, J.A., 2021. An analysis of moral hazard in global health security financing. *Global Public Health* 16, 835–849.
- Paul, E., Ndiaye, Y., Sall, F.L., Fecher, F., Porignon, D., 2020. An assessment of the core capacities of the Senegalese health system to deliver Universal Health Coverage. *Health Policy Open* 1, 100012. <https://doi.org/10.1016/j.hpopen.2020.100012>
- Peacock, V., Bruun, M.K., Dungey, C.E., Shapiro, M., 2023. Surveillance. *Cambridge Encyclopedia of Anthropology*.

- Pearce, K., 2020. Excess deaths show the true impact of COVID-19 in the U.S. [WWW Document]. The Hub. URL <https://hub.jhu.edu/2020/09/01/comorbidities-and-coronavirus-deaths-cdc/> (accessed 4.23.24).
- Pearson, C.A., Schalkwyk, C.V., Foss, A.M., O'Reilly, K.M., Team, S.M. and A.R., Group, C.C.-19 working, Pulliam, J.R., 2020. Projected early spread of COVID-19 in Africa through 1 June 2020. *Eurosurveillance* 25. <https://doi.org/10.2807/1560-7917.ES.2020.25.18.2000543>
- Pertwee, E., Simas, C., Larson, H.J., 2022. An epidemic of uncertainty: rumors, conspiracy theories and vaccine hesitancy. *Nat Med* 28, 456–459. <https://doi.org/10.1038/s41591-022-01728-z>
- Peyton, N., 2021. Senegal begins vaccinating against coronavirus with doses from China. Reuters.
- Pierre, J., 2020. The Racial Vernaculars of Development: A View from West Africa. *American Anthropologist* 122, 86–98. <https://doi.org/10.1111/aman.13352>
- Pierre-Louis, A.M., El-Saharty, S., Stanciole, A., Jonas, O., Pascual, F.B., Oelrichs, R., Lorenzo, M.M., Villafana, T., Lavadenz, F., Rock, M., 2012. Connecting Sectors and Systems for Health Results. World Bank. <https://doi.org/10.1596/26806>
- Pigg, S.L., 2013. On sitting and doing: ethnography as action in global health. *Soc Sci Med* 99, 127–134. <https://doi.org/10.1016/j.socscimed.2013.07.018>
- Piketty, T., 2014. Capital in the Twenty-First Century, in: Capital in the Twenty-First Century. Harvard University Press. <https://doi.org/10.4159/9780674369542>
- Piret, J., Boivin, G., 2021. Pandemics Throughout History. *Front Microbiol* 11, 631736. <https://doi.org/10.3389/fmicb.2020.631736>
- Polacek, A., 2018. Catastrophe Bonds: A Primer and Retrospective - Federal Reserve Bank of Chicago. Federal Reserve Bank of Chicago.
- Polanyi, K., 1957. The Great Transformation. Beacon Press.

- Poleykett, B., 2018. Ethnohistory and the Dead: Cultures of Colonial Epidemiology. *Medical Anthropology* 37, 472–485. <https://doi.org/10.1080/01459740.2018.1453507>
- Porter, N., 2019. *Viral Economies: Bird Flu Experiments in Vietnam*. University of Chicago Press.
- Portes, A., Schauffler, R., 1993. Competing Perspectives on the Latin American Informal Sector. *Population and Development Review* 19, 33–60. <https://doi.org/10.2307/2938384>
- Povinelli, E.A., 2011. Economies of Abandonment: Social Belonging and Endurance in Late Liberalism, in: *Economies of Abandonment*. Duke University Press. <https://doi.org/10.1515/9780822394570>
- Prabhu, M., Gergen, J., n.d. History's Seven Deadliest Plagues [WWW Document]. URL <https://www.gavi.org/vaccineswork/historys-seven-deadliest-plagues> (accessed 4.23.24).
- Prata, J.C., Ribeiro, A.I., Rocha-Santos, T., 2022. Chapter 1 - An introduction to the concept of One Health, in: Prata, J.C., Ribeiro, A.I., Rocha-Santos, T. (Eds.), *One Health*. Academic Press, pp. 1–31. <https://doi.org/10.1016/B978-0-12-822794-7.00004-6>
- Preda, A., 2009. *Framing Finance: The Boundaries of Markets and Modern Capitalism*. University of Chicago Press.
- Pritchard, A., 2021. DC deals with a massive cicada invasion for the first time in 17 years [WWW Document]. *The Eagle*. URL <https://www.theeagleonline.com/article/2021/06/dc-deals-with-a-massive-cicada-invasion-for-the-first-time-in-17-years> (accessed 6.28.23).
- Puig de la Bellacasa, M., 2017. *Matters of care: speculative ethics in more than human worlds, Posthumanities*. University of Minnesota Press, Minneapolis.
- Putner, A., 2016. Mind the gap - time to call time on indemnity? | Airmic [WWW Document]. URL <https://www.airmic.com/news/mind-gap-time-call-time-indemnity> (accessed 6.12.23).

Quammen, D., 2020. From Spillover to Pandemic. *Substantia* 930–930.

<https://doi.org/10.13128/Substantia-930>

Radcliffe-Brown, A.R., 1940. On Social Structure. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 70, 1–12. <https://doi.org/10.2307/2844197>

Rahmandad, H., Lim, T.Y., Sterman, J., 2021. Behavioral Dynamics of COVID-19: Estimating Under-Reporting, Multiple Waves, and Adherence Fatigue Across 92 Nations.

<https://doi.org/10.2139/ssrn.3635047>

Rajan, R.G., Zingales, L., 2003. The great reversals: the politics of financial development in the twentieth century. *Journal of Financial Economics*, Tuck Symposium on Corporate Governance 69, 5–50. [https://doi.org/10.1016/S0304-405X\(03\)00125-9](https://doi.org/10.1016/S0304-405X(03)00125-9)

Rajan, R.G., Zingales, L., 2001. The Influence of the Financial Revolution on the Nature of Firms. *American Economic Review* 91, 206–211. <https://doi.org/10.1257/aer.91.2.206>

Raworth, K., 2017. *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*. Chelsea Green Publishing.

Raworth, K., 2013. Exploring Doughnut Economics [WWW Document]. URL

<https://www.kateraworth.com/doughnut/> (accessed 5.6.24).

Rechel, B., McKee, M., 2007. The effects of dictatorship on health: the case of Turkmenistan. *BMC Med* 5, 21. <https://doi.org/10.1186/1741-7015-5-21>

République du Sénégal, 2021. Rapport Public des Activites du Comite de Suivi de la mise on Oeuvre des Operations du Fonds de Riposite et de Solidarite Contre les Effets de la COVID-19 (Force COVID-19). Présidence de la République, Dakar.

République du Sénégal, 2020. MINISTÈRE DE LA SANTÉ ET DE L'ACTION SOCIALE [WWW Document]. URL <https://www.sante.gouv.sn/> (accessed 5.6.24).

- Rich, C., Bobenrieth, E., Potter, B., Carlisle, H., Williams, P., Richards, A., Ackerman, R., 1997. The Political Economy of International Environmental Cooperation. Institute on Global Conflict and Cooperation, University of California, Institute on Global Conflict and Cooperation, Working Paper Series.
- Richter, A., Wilson, T.C., 2020. Covid-19: implications for insurer risk management and the insurability of pandemic risk. *Geneva Risk Insur Rev* 45, 171–199.
<https://doi.org/10.1057/s10713-020-00054-z>
- Ridde, V., Caffin, J.-H., Hane, F., 2024. External influences over Senegalese health financing policy: delaying universal health coverage? *Health Policy and Planning* 39, 80–83.
<https://doi.org/10.1093/heapol/czad108>
- Ridde, V., Faye, A., 2022. Policy response to COVID-19 in Senegal: power, politics, and the choice of policy instruments. *Policy Design and Practice* 5, 326–345.
<https://doi.org/10.1080/25741292.2022.2068400>
- Ridde, V., Kane, B., Gaye, I., Ba, M.F., Diallo, A., Bonnet, E., Traoré, Z., Faye, A., 2022. Acceptability of government measures against COVID-19 pandemic in Senegal: A mixed methods study. *PLOS Global Public Health* 2, e0000041.
<https://doi.org/10.1371/journal.pgph.0000041>
- Riles, A., 2011. Collateral Knowledge: Legal Reasoning in the Global Financial Markets, in: Collateral Knowledge. University of Chicago Press. <https://doi.org/10.7208/9780226719344>
- RIVM, 2023. National Institute for Public Health and the Environment [WWW Document]. URL <https://www.rivm.nl/en> (accessed 4.23.24).
- Robbins, R.H., 2018. An anthropological contribution to rethinking the relationship between money, debt, and economic growth. *Focaal* 2018, 99–120. <https://doi.org/10.3167/fcl.2018.810108>

- Robins, S., 2006. From “Rights” to “Ritual”: AIDS Activism in South Africa. *American Anthropologist* 108, 312–323. <https://doi.org/10.1525/aa.2006.108.2.312>
- Robinson, L.A., Hammitt, J.K., Chang, A.Y., Resch, S., 2017. Understanding and improving the one and three times GDP per capita cost-effectiveness thresholds. *Health Policy Plan* 32, 141–145. <https://doi.org/10.1093/heapol/czw096>
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F.S., Lambin, E., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., de Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, V.J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J., 2009. Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* 14.
- Romero-Rodríguez, E., Perula-de-Torres, L.Á., González-Lama, J., Castro-Jiménez, R.Á., Jiménez-García, C., Priego-Pérez, C., Vélez-Santamaría, R., Simón-Vicente, L., González-Santos, J., González-Bernal, J.J., 2023. Long COVID Symptomatology and Associated Factors in Primary Care Patients: The EPICOVID-AP21 Study. *Healthcare* 11, 218. <https://doi.org/10.3390/healthcare11020218>
- Rose, D.A., 2008. 4. How did the smallpox vaccination program come about?: Tracing the emergence of recent smallpox vaccination thinking, in: 4. How Did the Smallpox Vaccination Program Come about?: Tracing the Emergence of Recent Smallpox Vaccination Thinking. Columbia University Press, pp. 89–120. <https://doi.org/10.7312/lako14606-004>
- Rose, N., Miller, P., 1992. Political Power beyond the State: Problematics of Government. *The British Journal of Sociology* 43, 173–205. <https://doi.org/10.2307/591464>

- Rosenberg, C.E., Golden, J.L., 1992. Framing Disease: Studies in Cultural History. Rutgers University Press.
- Ross, E., 2011. Globalising Touba: Expatriate Disciples in the World City Network. *Urban Studies* 48, 2929–2952.
- Ross, E., 1995. Touba: A Spiritual Metropolis in the Modern World. *Canadian Journal of African Studies / Revue Canadienne des Études Africaines* 29, 222–259. <https://doi.org/10.2307/485240>
- Røste, O.B., 2021. Risks and Uncertainty, in: Røste, O.B. (Ed.), *Norway's Sovereign Wealth Fund: Sustainable Investment of Natural Resource Revenues*. Springer International Publishing, Cham, pp. 163–207. https://doi.org/10.1007/978-3-030-74107-5_6
- Rousseau, J.-J., 2008. *Discourse on Political Economy and The Social Contract*. Oxford University Press.
- Ruger, J.P., 2005. The changing role of the World Bank in global health. *Am J Public Health* 95, 60–70. <https://doi.org/10.2105/AJPH.2004.042002>
- Russo, G., Xu, L., McIsaac, M., Matsika-Claquin, M.D., Dhillon, I., McPake, B., Campbell, J., 2019. Health workers' strikes in low-income countries: the available evidence. *Bull World Health Organ* 97, 460-467H. <https://doi.org/10.2471/BLT.18.225755>
- Sachs, J., 2012. Achieving universal health coverage in low-income settings. *The Lancet* 380, 944–947. [https://doi.org/10.1016/S0140-6736\(12\)61149-0](https://doi.org/10.1016/S0140-6736(12)61149-0)
- Sahlins, M., 2011. What kinship is (part one). *Journal of the Royal Anthropological Institute* 17, 2–19. <https://doi.org/10.1111/j.1467-9655.2010.01666.x>
- Saied, A.A., Metwally, A.A., Dhawan, M., Choudhary, O.P., Aiash, H., 2022. Strengthening vaccines and medicines manufacturing capabilities in Africa: challenges and perspectives. *EMBO Mol Med* 14, e16287. <https://doi.org/10.15252/emmm.202216287>

- Saifer, A., Dacin, T., 2021. Data and Organization Studies: Aesthetics, emotions, discourse and our everyday encounters with data. *Sage Journals* 43. <https://doi.org/10.1177/01708406211006250>
- Salama, P., McIsaac, M., Campbell, J., 2019. Health workers' strikes: a plea for multisectoral action. *Bull World Health Organ* 97, 443-443A. <https://doi.org/10.2471/BLT.19.238279>
- Sandler, T., Arce M., D.G., 2002. A conceptual framework for understanding global and transnational public goods for health. *Fiscal Studies* 23, 195–222. <https://doi.org/10.1111/j.1475-5890.2002.tb00059.x>
- Schmiege, D., Perez Arredondo, A.M., Ntajal, J., Minetto Gellert Paris, J., Savi, M.K., Patel, K., Yasobant, S., Falkenberg, T., 2020. One Health in the context of coronavirus outbreaks: A systematic literature review. *One Health* 10, 100170. <https://doi.org/10.1016/j.onehlt.2020.100170>
- Schöchlin, A., 2002. Where's the Cat Going? Some Observations on Catastrophe Bonds. *Journal of Applied Corporate Finance* 14, 100–107. <https://doi.org/10.1111/j.1745-6622.2002.tb00453.x>
- Schoepf, B.G., 2001. International AIDS Research in Anthropology: Taking a Critical Perspective on the Crisis. *Annual Review of Anthropology* 30, 335–361. <https://doi.org/10.1146/annurev.anthro.30.1.335>
- Seck, F., 2018. Goorgoorlou, the neoliberal homo senegalensis: comics and economics in postcolonial Senegal. *Journal of African Cultural Studies* 30, 263–278. <https://doi.org/10.1080/13696815.2017.1323628>
- Seck, O., Loko Roka, J., Ndiaye, M., Namageyo-Funa, A., Abdoulaye, S., Mangane, A., Dieye, N.L., Ndoye, B., Diop, B., Ting, J., Pasi, O., 2023. SARS-CoV-2 case detection using community event-based surveillance system—February–September 2020: lessons learned from Senegal. *BMJ Glob Health* 8, e012300. <https://doi.org/10.1136/bmjgh-2023-012300>

- Shah, A., 2007. Third World Debt Undermines Development [WWW Document]. Global Issues. URL <https://www.globalissues.org/issue/28/third-world-debt-undermines-development> (accessed 4.18.24).
- Shaw, M., 2001. Regional traffick. African Security Review 10, 74–94. <https://doi.org/10.1080/10246029.2001.9627954>
- Short, K.R., Kedzierska, K., van de Sandt, C.E., 2018. Back to the Future: Lessons Learned From the 1918 Influenza Pandemic. Frontiers in Cellular and Infection Microbiology 8.
- Siegrist, M., Zingg, A., 2014. The Role of Public Trust During Pandemics. European Psychologist 19, 23–32. <https://doi.org/10.1027/1016-9040/a000169>
- Sikkema, R.S., Koopmans, M.P.G., 2021. Preparing for Emerging Zoonotic Viruses. Encyclopedia of Virology 256–266. <https://doi.org/10.1016/B978-0-12-814515-9.00150-8>
- Sirleaf, E.J., Clark, H., 2021. Report of the Independent Panel for Pandemic Preparedness and Response: making COVID-19 the last pandemic. The Lancet 398, 101–103. [https://doi.org/10.1016/S0140-6736\(21\)01095-3](https://doi.org/10.1016/S0140-6736(21)01095-3)
- Smith, A., 2018. The Wealth of Nations. CreateSpace Independent Publishing Platform.
- Smith, L.T., 2019. Decolonizing methodologies: Research and Indigenous peoples. Zed Books Ltd.
- Smith, R.D., 2006. Responding to global infectious disease outbreaks: Lessons from SARS on the role of risk perception, communication and management. Soc Sci Med 63, 3113–3123. <https://doi.org/10.1016/j.socscimed.2006.08.004>
- Smith, V.L., 1998. The Two Faces of Adam Smith. Southern Economic Journal 65, 1–19. <https://doi.org/10.1002/j.2325-8012.1998.tb00125.x>

- Soucat, A., Dale, E., Mathauer, I., Kutzin, J., 2017. Pay-for-Performance Debate: Not Seeing the Forest for the Trees. *Health Syst Reform* 3, 74–79.
<https://doi.org/10.1080/23288604.2017.1302902>
- Souleles, D., 2019. The distribution of ignorance on financial markets. *Economy and Society* 48, 510–531. <https://doi.org/10.1080/03085147.2019.1678263>
- Sparr, P., 1994. *Mortgaging Women’s Lives: Feminist Critiques of Structural Adjustment*. Palgrave Macmillan.
- Sridhar, D., Batniji, R., 2008. Misfinancing global health: a case for transparency in disbursements and decision making. *The Lancet* 372, 1185–1191. [https://doi.org/10.1016/S0140-6736\(08\)61485-3](https://doi.org/10.1016/S0140-6736(08)61485-3)
- Sridhar, D., Winters, J., Strong, E., 2017. World Bank’s financing, priorities, and lending structures for global health. *BMJ* 358, j3339. <https://doi.org/10.1136/bmj.j3339>
- SSA, SSA/DCCOMM, 2023. Medicare. SSA.
- Stein, F., Sridhar, D., 2018. The financialisation of global health. *Wellcome Open Res* 3, 17.
<https://doi.org/10.12688/wellcomeopenres.13885.1>
- Stein, F., Sridhar, D., 2017. Health as a “global public good”: creating a market for pandemic risk. *BMJ* 358, j3397. <https://doi.org/10.1136/bmj.j3397>
- Stern, N., Stiglitz, J.E., 2023. Climate change and growth. *Industrial and Corporate Change* 32, 277–303. <https://doi.org/10.1093/icc/dtad008>
- Stewart, F., Wang, M., 2005. Do PRSPs empower poor countries and disempower the World Bank, or is it the other way round?, in: *Globalization and the Nation State*. Routledge.
- Stiglitz, J.E., 2002. Information and the Change in the Paradigm in Economics. *American Economic Review* 92, 460–501. <https://doi.org/10.1257/00028280260136363>

Stoecklin, S.B., Rolland, P., Silue, Y., Mailles, A., Campese, C., Simondon, A., Mechain, M.,
Meurice, L., Nguyen, M., Bassi, C., Yamani, E., Behillil, S., Ismael, S., Nguyen, D., Malvy, D.,
Lescure, F.X., Georges, S., Lazarus, C., Tabai, A., Stempfelet, M., Enouf, V., Coignard, B.,
Levy-Bruhl, D., Team, I., 2020. First cases of coronavirus disease 2019 (COVID-19) in France:
surveillance, investigations and control measures, January 2020. *Eurosurveillance* 25, 2000094.
<https://doi.org/10.2807/1560-7917.ES.2020.25.6.2000094>

Stone, H., Bailey, E., Wurie, H., Leather, A.J.M., Davies, J.I., Bolkan, H.A., Sevalie, S., Youkee, D.,
Parmar, D., 2024. A qualitative study examining the health system's response to COVID-19 in
Sierra Leone. *PLOS ONE* 19, e0294391. <https://doi.org/10.1371/journal.pone.0294391>

Stoop, N., Desbureaux, S., Kaota, A., Lunanga, E., Verpoorten, M., 2021. Covid-19 vs. Ebola: Impact
on households and small businesses in North Kivu, Democratic Republic of Congo. *World
Development* 140, 105352. <https://doi.org/10.1016/j.worlddev.2020.105352>

Stopper, M., Kossik, A., Gastermann, B., 2016. Development of a Sustainability Model for
Manufacturing SMEs based on the Innovative Doughnut Economics Framework. Hong Kong.

Strathern, M., 2004. *Partial Connections*. Rowman Altamira.

Strathern, M., 2000. *Audit Cultures: Anthropological Studies in Accountability, Ethics and the
Academy*.

Stuart, J., 2016. The Cicada in China - National Museum of Asian Art [WWW Document].
Smithsonian. URL <https://asia.si.edu/whats-on/blog/posts/the-cicada-in-china/> (accessed
6.28.23).

Subramanian, S.M., Pisupati, B., Vereinte Nationen (Eds.), 2010. *Traditional knowledge in policy and
practice: approaches to development and human well-being*. United Nations University Press,
Tokyo.

- Suh, S., 2021. *Dying to Count: Post-Abortion Care and Global Reproductive Health Politics in Senegal*. Rutgers University Press.
- Summers, L.H., Pritchett, L.H., 1993. The Structural-Adjustment Debate on JSTOR. *The American Economic Review*, Papers and Proceedings of the Hundred and Fifth Annual Meeting of the American Economic Association 83, 383–389.
- Swiss Re, 2011. The fundamentals of insurance-linked securities. Swiss Re.
- Taherdoost, H., 2021. Data Collection Methods and Tools for Research; A Step-by-Step Guide to Choose Data Collection Technique for Academic and Business Research Projects. *International Journal of Academic Research in Management (IJARM)* 10, 10–38.
- Talbot, T., Dercon, S., Barder, O., 2017. *Payouts for Perils: How Insurance Can Radically Improve Emergency Aid*. Center for Global Development.
- Taleb, N.N., 2010. *The Black Swan: Second Edition: The Impact of the Highly Improbable Fragility*". Random House Publishing Group.
- Taleb, N.N., 2008. *The Black Swan: The Impact of the Highly Improbable*, 1st ed. Random House, London.
- Taleb, N.N., 2007. 'The Black Swan: The Impact of the Highly Improbable.' *The New York Times*.
- Taubenberger, J.K., Morens, D.M., 2010. Influenza: The Once and Future Pandemic. *Public Health Rep* 125, 16–26.
- Taubenberger, J.K., Morens, D.M., 2009. Pandemic influenza--including a risk assessment of H5N1. *Rev Sci Tech* 28, 187–202. <https://doi.org/10.20506/rst.28.1.1879>
- Thapaliya, K., Marshall-Gradisnik, S., Barth, M., Eaton-Fitch, N., Barnden, L., 2023. Brainstem volume changes in myalgic encephalomyelitis/chronic fatigue syndrome and long COVID patients. *Frontiers in Neuroscience* 17.

- The Lancet, 2024. Global incidence, prevalence, years lived with disability (YLDs), disability-adjusted life-years (DALYs), and healthy life expectancy (HALE) for 371 diseases and injuries in 204 countries and territories and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021 - The Lancet. *The Lancet* 403, 2133–2161.
- Thomson, M., Kentikelenis, A., Stubbs, T., 2017. Structural adjustment programmes adversely affect vulnerable populations: a systematic-narrative review of their effect on child and maternal health. *Public Health Reviews* 38, 13. <https://doi.org/10.1186/s40985-017-0059-2>
- Tichenor, M., 2020. Essential universal health coverage needs local capacity development. *The Lancet Global Health* 8, e748–e749. [https://doi.org/10.1016/S2214-109X\(20\)30224-2](https://doi.org/10.1016/S2214-109X(20)30224-2)
- Tichenor, M., Winters, J., Storeng, K.T., Bump, J., Gaudillière, J.-P., Gorsky, M., Hellowell, M., Kadama, P., Kenny, K., Shawar, Y.R., Songane, F., Walker, A., Whitacre, R., Asthana, S., Fernandes, G., Stein, F., Sridhar, D., 2021a. Interrogating the World Bank’s role in global health knowledge production, governance, and finance. *Global Health* 17, 110. <https://doi.org/10.1186/s12992-021-00761-w>
- Tilley, C., 2011. Materializing identities: an introduction. *Journal of Material Culture* 16, 347–357. <https://doi.org/10.1177/1359183511424835>
- Timmis, K., Brüssow, H., 2020. The COVID-19 pandemic: some lessons learned about crisis preparedness and management, and the need for international benchmarking to reduce deficits. *Environ Microbiol* 22, 1986–1996. <https://doi.org/10.1111/1462-2920.15029>
- Tobin, J., 1983. Keynes’ Policies in Theory and Practice. *Challenge* 26, 5–11.
- Towghi, F., 2018. Haunting Expectations of Hospital Births Challenged by Traditional Midwives. *Medical Anthropology* 37, 674–687. <https://doi.org/10.1080/01459740.2018.1520709>

- Tozier de la Poterie, A.S., Jjemba, W.E., Singh, R., Coughlan de Perez, E., Costella, C.V., Arrighi, J., 2018. Understanding the use of 2015–2016 El Niño forecasts in shaping early humanitarian action in Eastern and Southern Africa. *International Journal of Disaster Risk Reduction, Communicating High Impact Weather: Improving warnings and decision making processes* 30, 81–94. <https://doi.org/10.1016/j.ijdrr.2018.02.025>
- Tsing, A., 2015. *The mushroom at the end of the world: On the possibility of life in capitalist ruins*. Princeton University Press.
- Tuckett, D., Nikolic, M., 2017. The role of conviction and narrative in decision-making under radical uncertainty. *Theory & Psychology* 27, 501–523. <https://doi.org/10.1177/0959354317713158>
- Tufte, E.R., 1985. THE VISUAL DISPLAY OF QUANTITATIVE INFORMATION. *The Journal for Healthcare Quality (JHQ)* 7, 15.
- Undurraga, E.A., Halasa, Y.A., Shepard, D.S., 2013. Use of Expansion Factors to Estimate the Burden of Dengue in Southeast Asia: A Systematic Analysis. *PLOS Neglected Tropical Diseases* 7, e2056. <https://doi.org/10.1371/journal.pntd.0002056>
- UNDRR, 2009. Disaster risk [WWW Document]. URL <http://www.undrr.org/terminology/disaster-risk> (accessed 5.30.24).
- UNFCCC, 2023. Introduction to Climate Finance [WWW Document]. URL <https://unfccc.int/topics/introduction-to-climate-finance> (accessed 4.19.24).
- UNFCCC, 2013. Cancun Adaptation Framework. UNFCCC.
- UNFPA, 2024. World Population Dashboard -Senegal [WWW Document]. URL <https://www.unfpa.org/data/world-population/SN> (accessed 5.13.24).
- United Nation, 2012. Adopting Consensus Text, General Assembly Encourages Member States to Plan, Pursue Transition of National Health Care Systems towards Universal Coverage | Meetings

Coverage and Press Releases [WWW Document]. URL

<https://press.un.org/en/2012/ga11326.doc.htm> (accessed 4.22.24).

United Nations, 2020a. United Nations Development Assistance Framework for the Immediate Socio-economic Response to COVID-19: Contextualization in Senegal. Dakar, Senegal.

United Nations, 2020b. COVID-19 in Africa: protecting lives and economies. UNECA, Addis Ababa.

United Nations, 2013. Meetings Coverage and Press Releases | Meetings Coverage and Press Releases

[WWW Document]. URL https://press.un.org/en/content/general-assembly/meetings-coverage?_gl=1%2A1af6hbr%2A_ga%2AMTAzOTcyNDQwNS4xNjkxNzY1NTc2%2A_ga_TK9BQL5X7Z%2AMTY5Mzk1NDEzMi4zOC4xLjE2OTM5NTU3NDcuMC4wLjA.&page=311

(accessed 5.6.24).

United Nations, 2012. Adopting Consensus Text, General Assembly Encourages Member States to Plan, Pursue Transition of National Health Care Systems towards Universal Coverage | Meetings Coverage and Press Releases [WWW Document]. URL

<https://press.un.org/en/2012/ga11326.doc.htm> (accessed 5.6.24).

Vahedi, L., McNelly, S., Lukow, N., Fonseca, A.C., Erskine, D., Poulton, C., Stark, L., Seff, I., 2023.

“The pandemic only gave visibility to what is invisible”: a qualitative analysis of structural violence during COVID-19 and impacts on gender-based violence in Brazil. BMC Public Health

23, 1854. <https://doi.org/10.1186/s12889-023-16675-8>

van de Pas, R., 2023. One Health: What’s the Problem? Development 66, 191–198.

<https://doi.org/10.1057/s41301-023-00398-9>

van Hoyweghen, K., Fabry, A., Feyaerts, H., Wade, I., Maertens, M., 2021. Resilience of global and local value chains to the Covid-19 pandemic: Survey evidence from vegetable value chains in Senegal. Agric Econ 52, 423–440. <https://doi.org/10.1111/agec.12627>

- van Roode, T., Pauly, B.M., Marcellus, L., Strosher, H.W., Shahram, S., Dang, P., Kent, A., MacDonald, M., 2020. Values are not enough: qualitative study identifying critical elements for prioritization of health equity in health systems. *International Journal for Equity in Health* 19, 162. <https://doi.org/10.1186/s12939-020-01276-3>
- van Woerden, W.F., van de Pas, R., Curtain, J., 2023. Post-growth economics: a must for planetary health justice. *Globalization and Health* 19, 55. <https://doi.org/10.1186/s12992-023-00957-2>
- Vaughan, M., 1991. *Curing Their Ills: Colonial Power and African Illness*. Stanford University Press.
- Verisk, 2021. Framework Modeling Weather Climate Extremes [WWW Document]. Verisk. URL <https://www.air-worldwide.com/blog/posts/2021/7/new-framework-for-modeling-weather-and-climate-extremes/> (accessed 4.23.24).
- Verisk, 2016. AIR Worldwide Expands Its Global Pandemic Model [WWW Document]. URL <https://www.verisk.com/company/newsroom/air-worldwide-expands-its-global-pandemic-model/> (accessed 4.23.24).
- Vestergaard, J., Wade, R.H., 2013. Protecting Power: How Western States Retain The Dominant Voice in The World Bank's Governance. *World Development* 46, 153–164. <https://doi.org/10.1016/j.worlddev.2013.01.031>
- Vipond, R., 2023. Leaving prison, resettling and returning, in: *A Guide to Prisons and Penal Policy*. Policy Press, pp. 109–126.
- Viveiros de Castro, E., 2004. Perspectival Anthropology and the Method of Controlled Equivocation. *Tipiti: Journal of the Society for the Anthropology of Lowland South America* 2.
- Viviani, J.-L., Maurel, C., 2019. Performance of impact investing: A value creation approach. *Research in International Business and Finance* 47, 31–39. <https://doi.org/10.1016/j.ribaf.2018.01.001>

- Vries, W.D., Johnston, R., Lufumpa, C., Vandemoortele, J., Young, S., Simonpiétri, A., Hammond, B., Edmunds, R., Croft, T., 2004. The Marrakech action plan for statistics : better data for better results - an action plan for improving development statistics.
- Vujicic, M., Weber, S.E., Nikolic, I.A., Atun, R., Kumar, R., 2012. An analysis of GAVI, the Global Fund and World Bank support for human resources for health in developing countries. *Health Policy Plan* 27, 649–657. <https://doi.org/10.1093/heapol/czs012>
- Wagner-Pacifici, R., 2000. *Theorizing the Standoff: Contingency in Action*. Cambridge University Press.
- Wahlund, M., Hansen, T., 2022. Exploring alternative economic pathways: a comparison of foundational economy and Doughnut economics. *Sustainability: Science, Practice and Policy* 18, 171–186. <https://doi.org/10.1080/15487733.2022.2030280>
- Waltner-Toews, D., Kay, J.J., Lister, N.-M.E., 2008. *The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability*. Columbia University Press.
- Warner, T., 2022. The Labor of the Living Dead. *Journal of African Cultural Studies* 34, 387–403. <https://doi.org/10.1080/13696815.2022.2130188>
- Warren, K.S., 1988. The evolution of selective primary health care. *Social Science & Medicine* 26, 891–898. [https://doi.org/10.1016/0277-9536\(88\)90407-8](https://doi.org/10.1016/0277-9536(88)90407-8)
- Weber, M., 2003. *The Protestant Ethic and the Spirit of Capitalism*. Dover Pubns, Mineola, N.Y.
- Wedgwood, R., Wedgwood, R., 2017. *The Value of Rationality*. Oxford University Press, Oxford, New York.
- Weiss, T.G., 2000. Governance, Good Governance and Global Governance: Conceptual and Actual Challenges. *Third World Quarterly* 21, 795–814.
- Wennerlind, C., 2011. *Casualties of Credit*. Harvard University Press.

- Westfall, C., 2020. Pandemics And The Failure of Finance. Risk Market News. URL <https://riskmarketnews.substack.com/p/pandemics-and-the-failure-of-finance> (accessed 12.7.23).
- White, S.A., Blake, D., Koch, A., Goring, K., Tumuluru, K., Radko, A., Pal, R., 2022. The G7 takes on climate change: Are catastrophe bonds an answer? [WWW Document]. URL <https://www.milliman.com/en/insight/meeting-the-g7-commitment-to-disaster-financing-with-catastrophe-bonds> (accessed 6.22.23).
- WHO, 2024. Neglected tropical diseases [WWW Document]. URL <https://www.who.int/news-room/questions-and-answers/item/neglected-tropical-diseases> (accessed 4.18.24).
- WHO, 2023a. Country Disease Outlook Senegal. WHO African Region.
- WHO, 2023b. Joint External Evaluation (JEE). WHO.
- WHO, 2023c. One Health. WHO.
- WHO, 2023d. Universal health coverage (UHC) [WWW Document]. URL [https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)) (accessed 5.6.24).
- WHO, 2022. 14.9 million excess deaths associated with the COVID-19 pandemic in 2020 and 2021 [WWW Document]. URL <https://www.who.int/news/item/05-05-2022-14.9-million-excess-deaths-were-associated-with-the-covid-19-pandemic-in-2020-and-2021> (accessed 4.23.24).
- WHO, 2021. Tripartite and UNEP support OHHLEP’s definition of “One Health” [WWW Document]. URL <https://www.who.int/news/item/01-12-2021-tripartite-and-unep-support-ohhlep-s-definition-of-one-health> (accessed 5.14.24).
- WHO, 2020a. Archived: WHO Timeline - COVID-19 [WWW Document]. URL <https://www.who.int/news/item/27-04-2020-who-timeline---covid-19> (accessed 4.18.24).

- WHO, 2020b. Enhancing diagnosis to beat COVID-19 in Senegal [WWW Document]. WHO | Regional Office for Africa. URL <https://www.afro.who.int/news/enhancing-diagnosis-beat-covid-19-senegal-0> (accessed 5.30.24).
- WHO, 2020c. Impact of COVID-19 on people’s livelihoods, their health and our food systems [WWW Document]. URL <https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-food-systems> (accessed 5.30.24).
- WHO, 2018. Ebola outbreak in DRC ends: WHO calls for international efforts to stop other deadly outbreaks in the country. World Health Organization, Kinshasa.
- WHO, 2017. Joint External Evaluation of IHR Core Capacities of the Republic of Senegal. WHO, Geneva.
- Wiegratz, J., 2010. Fake capitalism? The dynamics of neoliberal moral restructuring and pseudo-development: the case of Uganda. *Review of African Political Economy* 37, 123–137.
- Wiessner, P., 1982. Risk, reciprocity and social influences on Kung San economics. *Unknown Journal* 61–84.
- Wilkinson, A., Parker, M., Martineau, F., Leach, M., 2017. Engaging “communities”: anthropological insights from the West African Ebola epidemic. *Philos Trans R Soc Lond B Biol Sci* 372, 20160305. <https://doi.org/10.1098/rstb.2016.0305>
- Williams, B.A., Jones, C.H., Welch, V., True, J.M., 2023. Outlook of pandemic preparedness in a post-COVID-19 world. *npj Vaccines* 8, 1–12. <https://doi.org/10.1038/s41541-023-00773-0>
- Williams, C.C., Round, J., Rodgers, P., 2007. Beyond the formal/informal economy binary hierarchy. *International Journal of Social Economics* 34, 402–414. <https://doi.org/10.1108/03068290710751812>

- Winters, J., Sridhar, D., 2017. Earmarking for global health: benefits and perils of the World Bank's trust fund model. *BMJ* 358, j3394. <https://doi.org/10.1136/bmj.j3394>
- Winters, J.K., 2020. Constructing success in global health: the World Bank and the Onchocerciasis Control Programme in West Africa. <https://doi.org/10.7488/era/562>
- Wirth, J., Haraway, D., 2008. Review of *When Species Meet*, Haraway Donna. *Environmental Philosophy* 5, 165–170.
- Wise, M., Nutbeam, D., 2007. Enabling health systems transformation: what progress has been made in re-orienting health services? *Promot Educ Suppl* 2, 23–27.
<https://doi.org/10.1177/10253823070140020801x>
- WOAH, 2023. 2023 Revised Budget. World Organization for Animal Health, Paris.
- Wolfram, L., 2021. Enhancing financial protection against catastrophe risks: the role of catastrophe.
- Wong, S.C.Y., Kwong, R.T.-S., Wu, T.C., Chan, J.W.M., Chu, M.Y., Lee, S.Y., Wong, H.Y., Lung, D.C., 2020. Risk of nosocomial transmission of coronavirus disease 2019: an experience in a general ward setting in Hong Kong. *J Hosp Infect* 105, 119–127.
<https://doi.org/10.1016/j.jhin.2020.03.036>
- Wood, A., 2023. Patronage, partnership, voluntarism: Community-based health insurance and the improvisation of universal health coverage in Senegal. *Social Science & Medicine, Health for all? Pasts, Presents and Futures of Universal Health Care and Universal Health Coverage* 319, 115491. <https://doi.org/10.1016/j.socscimed.2022.115491>
- Woodhouse, S., Ayers, S., Field, A.P., 2015. The relationship between adult attachment style and post-traumatic stress symptoms: A meta-analysis. *J Anxiety Disord* 35, 103–117.
<https://doi.org/10.1016/j.janxdis.2015.07.002>

Woolhouse, M., Scott, F., Hudson, Z., Howey, R., Chase-Topping, M., 2012. Human viruses: discovery and emergence. *Philosophical Transactions of the Royal Society B: Biological Sciences* 367, 2864–2871. <https://doi.org/10.1098/rstb.2011.0354>

World Bank, 2024a. Bretton Woods Conference. World Bank.

World Bank, 2024b. Capital at Risk Notes [WWW Document]. World Bank. URL <https://treasury.worldbank.org/en/about/unit/treasury/ibrd/ibrd-capital-at-risk-notes> (accessed 4.18.24).

World Bank, 2024c. Development Policy Financing (DPF) [WWW Document]. World Bank. URL <https://www.worldbank.org/en/what-we-do/products-and-services/financing-instruments/development-policy-financing> (accessed 5.30.24).

World Bank, 2024d. Development Projects : Senegal COVID-19 Response Project - P173838 [WWW Document]. World Bank. URL <https://projects.worldbank.org/en/projects-operations/project-detail/P173838> (accessed 5.13.24).

World Bank, 2024e. International Bank for Reconstruction and Development [WWW Document]. World Bank. URL <https://www.worldbank.org/en/who-we-are/ibrd> (accessed 5.8.24).

World Bank, 2024f. Senegal Overview [WWW Document]. World Bank. URL <https://www.worldbank.org/en/country/senegal/overview> (accessed 5.13.24).

World Bank, 2023a. 2022 Annual Report. World Bank.

World Bank, 2023b. Health, Nutrition and Population [WWW Document]. URL <https://ieg.worldbankgroup.org/topic/health-nutrition-and-population> (accessed 4.22.24).

World Bank, 2023c. Improving Health Resilience through Pandemic Response: Lessons from COVID-19 in Eastern Caribbean Countries [WWW Document]. World Bank. URL

<https://www.worldbank.org/en/news/feature/2023/06/09/improving-health-resilience-through-pandemic-response-lessons-from-covid-19-in-eastern-caribbean-countries> (accessed 4.29.24).

World Bank, 2023d. Partnering with the World Bank through Trust Funds and Umbrella 2.0 Programs. World Bank Group, Washington, DC.

World Bank, 2023e. World Bank Group's Operational Response to COVID-19 (coronavirus) – Projects List. World Bank.

World Bank, 2023f. The World Bank Group's Support to Countries during the COVID-19 Crisis. World Bank.

World Bank, 2023g. Universal Health Coverage Overview. World Bank.

World Bank, 2022a. Building Back Better from the Crisis: Toward a Green, Resilient and Inclusive Future. The World Bank.

World Bank, 2022b. World Bank Approves \$18 Million Additional Financing to Strengthen Disease Surveillance and Epidemic Preparedness in West Africa [WWW Document]. World Bank. URL <https://www.worldbank.org/en/news/feature/2022/12/08/world-bank-approves-18-million-additional-financing-to-strengthen-disease-surveillance-and-epidemic-preparedness-in-west> (accessed 5.8.24).

World Bank, 2021a. Annual Report 2021 From Crisis to Green, Inclusive, and Resilient Recovery. World Bank.

World Bank, 2021b. Fact Sheet: Pandemic Emergency Financing Facility.

World Bank, 2021c. Global Debt Issuance Facility for issues of Notes with maturities of one day or longer. World Bank.

World Bank, 2021d. Pandemic Emergency Financing Facility (PEF) Country Allocations. World Bank.

World Bank, 2021e. World Bank financing helps to support Senegal in the fight against COVID-19.

World Bank.

World Bank, 2020a. Fact Sheet: Pandemic Emergency Financing Facility [WWW Document]. World

Bank. URL <https://www.worldbank.org/en/topic/pandemics/brief/fact-sheet-pandemic-emergency-financing-facility> (accessed 5.8.24).

World Bank, 2020b. PEF Allocates US\$195 Million to More than 60 Low-Income Countries to Fight

COVID-19 [WWW Document]. URL <https://www.worldbank.org/en/news/press-release/2020/04/27/pef-allocates-us195-million-to-more-than-60-low-income-countries-to-fight-covid-19> (accessed 4.18.24).

World Bank, 2020c. Senegal COVID-19 Response Project (P173838) (No. PIDISDSA29090). The

World Bank.

World Bank, 2020d. World Bank Approves \$12 Billion for COVID-19 Vaccines [WWW Document].

World Bank. URL <https://www.worldbank.org/en/news/press-release/2020/10/13/world-bank-approves-12-billion-for-covid-19-vaccines> (accessed 4.18.24).

World Bank, 2020e. World Bank Approves \$20 Million for Senegal to Fight COVID-19 [WWW

Document]. World Bank. URL <https://www.worldbank.org/en/news/press-release/2020/04/02/world-bank-approves-20-million-for-senegal-to-fight-covid-19> (accessed

5.15.24).

World Bank, 2020f. World Bank Group Launches First Operations for COVID-19 (Coronavirus)

Emergency Health Support, Strengthening Developing Country Responses. World Bank

World Bank, 2019a. Lessons Learned in Financing Rapid Response to Recent Epidemics in West and

Central Africa.

World Bank, 2019b. The Pandemic Emergency Financing Facility Operational Brief for Eligible Countries. World Bank.

World Bank, 2018a. One Health Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface. The World Bank, Washington, D.C.

World Bank, 2018b. Operations Manual Pandemic Emergency Financing Facility. World Bank.

World Bank, 2017. Pandemic Emergency Financing Facility (PEF): Proposed Financing from IDA. World Bank.

World Bank, 2016a. Pandemic Emergency Financing Facility - Global Pandemic Response through a Financial Intermediary Fund. World Bank.

World Bank, 2016b. World Bank Group Launches Groundbreaking Financing Facility to Protect Poorest Countries against Pandemics. World Bank, Sendai, Japan.

World Bank, 2016c. Africa - Regional Disease Surveillance Systems Enhancement (REDISSE) Project (Text/HTML). World Bank.

World Bank, 2011. Climate Risk and Adaptation Country Profile. World Bank.

World Bank, 1992. Governance and development, 1. print. ed, A World Bank publication. The International Bank for Reconstruction and Development, Washington, DC.

World Bank, WHO, 2017. Pandemic Emergency Financing Facility (PEF) Framework. World Bank.

World Economic Forum, 2020. How doughnuts could guide the post-COVID-19 recovery [WWW Document]. World Economic Forum. URL <https://www.weforum.org/agenda/2020/05/doughnut-model-amsterdam-coronavirus-recovery/> (accessed 4.18.24).

World Meteorological Organization, 2020. Climate Metadata [WWW Document]. URL <https://community.wmo.int/en/climate-metadata> (accessed 4.19.24).

Wu, J., Zhang, C., Chen, Y., 2022. Analysis of risk correlations among stock markets during the COVID-19 pandemic. *International Review of Financial Analysis* 83, 102220.

<https://doi.org/10.1016/j.irfa.2022.102220>

Wu, S., Neill, R., De Foo, C., Chua, A.Q., Jung, A.-S., Haldane, V., Abdalla, S.M., Guan, W., Singh, S., Nordström, A., Legido-Quigley, H., 2021. Aggressive containment, suppression, and mitigation of covid-19: lessons learnt from eight countries. *BMJ* 375, e067508.

<https://doi.org/10.1136/bmj-2021-067508>

Wu, Z., McGoogan, J.M., 2020. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA* 323, 1239–1242.

<https://doi.org/10.1001/jama.2020.2648>

Wunsch, G., Gourbin, C., 2018. Mortality, morbidity and health in developed societies: a review of data sources. *Genus* 74, 2. <https://doi.org/10.1186/s41118-018-0027-9>

Wutich, A., Brewis, A., 2014. Food, Water, and Scarcity: Toward a Broader Anthropology of Resource Insecurity. *Current Anthropology* 55, 444–468. <https://doi.org/10.1086/677311>

Wyckoff, M.H., Singletary, E.M., Soar, J., Olasveengen, T.M., Greif, R., Liley, H.G., Zideman, D., Bhanji, F., Andersen, L.W., Avis, S.R., Aziz, K., Bendall, J.C., Berry, D.C., Borra, V., Böttiger, B.W., Bradley, R., Bray, J.E., Breckwoldt, J., Carlson, J.N., Cassan, P., Castrén, M., Chang, W.-T., Charlton, N.P., Cheng, A., Chung, S.P., Considine, J., Costa-Nobre, D.T., Couper, K., Dainty, K.N., Davis, P.G., de Almeida, M.F., de Caen, A.R., de Paiva, E.F., Deakin, C.D., Djärv, T., Douma, M.J., Drennan, I.R., Duff, J.P., Eastwood, K.J., El-Naggar, W., Epstein, J.L., Escalante, R., Fabres, J.G., Fawke, J., Finn, J.C., Foglia, E.E., Folke, F., Freeman, K., Gilfoyle, E., Goolsby, C.A., Grove, A., Guinsburg, R., Hatanaka, T., Hazinski, M.F., Heriot, G.S., Hirsch,

K.G., Holmberg, M.J., Hosono, S., Hsieh, M.-J., Hung, K.K.C., Hsu, C.H., Ikeyama, T., Isayama, T., Kapadia, V.S., Kawakami, M.D., Kim, H.-S., Kloeck, D.A., Kudenchuk, P.J., Lagina, A.T., Lauridsen, K.G., Lavonas, E.J., Lockey, A.S., Malta Hansen, C., Markenson, D., Matsuyama, T., McKinlay, C.J.D., Mehrabian, A., Merchant, R.M., Meyran, D., Morley, P.T., Morrison, L.J., Nation, K.J., Nemeth, M., Neumar, R.W., Nicholson, T., Niermeyer, S., Nikolaou, N., Nishiyama, C., O’Neil, B.J., Orkin, A.M., Osemeke, O., Parr, M.J., Patocka, C., Pellegrino, J.L., Perkins, G.D., Perlman, J.M., Rabi, Y., Reynolds, J.C., Ristagno, G., Roehr, C.C., Sakamoto, T., Sandroni, C., Sawyer, T., Schmolzer, G.M., Schnaubelt, S., Semeraro, F., Skrifvars, M.B., Smith, C.M., Smyth, M.A., Soll, R.F., Sugiura, T., Taylor-Phillips, S., Trevisanuto, D., Vaillancourt, C., Wang, T.-L., Weiner, G.M., Welsford, M., Wigginton, J., Wyllie, J.P., Yeung, J., Nolan, J.P., Berg, K.M., Abelairas-Gómez, C., Barcala-Furelos, R., Beerman, S.B., Bierens, J., Cacciola, S., Cellini, J., Claesson, A., Court, R., D’Arrigo, S., De Brier, N., Dunne, C.L., Elsenja, H.E., Johnson, S., Kleven, G., Maconochie, I., Mecrow, T., Morgan, P., Otto, Q., Palmieri, T.L., Parnia, S., Pawar, R., Pereira, J., Rudd, S., Scapigliati, A., Schmidt, A., Seesink, J., Sempsrott, J.R., Szpilman, D., Warner, D.S., Webber, J.B., West, R.L., 2022. 2021 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations: Summary From the Basic Life Support; Advanced Life Support; Neonatal Life Support; Education, Implementation, and Teams; First Aid Task Forces; and the COVID-19 Working Group. *Circulation* 145, e645–e721. <https://doi.org/10.1161/CIR.0000000000001017>

Wynn, A., Moore, K.M., 2012. Integration of Primary Health Care and Public Health During a Public Health Emergency. *Am J Public Health* 102, e9–e12. <https://doi.org/10.2105/AJPH.2012.300957>

- Xiong, C., Shapiro, J., Hullman, J., Franconeri, S., 2020. Illusion of Causality in Visualized Data. *IEEE Transactions on Visualization and Computer Graphics* 26, 853–862.
<https://doi.org/10.1109/TVCG.2019.2934399>
- Xu, M., Benn, C., Reid-Henry, S., Brown, T., Zhou, S., Yang, J., Chen, Y., Wang, Z., 2023. Rethinking international financing for health to better respond to future pandemics. *BMJ Glob Health* 8, e012988. <https://doi.org/10.1136/bmjgh-2023-012988>
- Yamin, A.E., Kavanagh, M.M., Miller, F.J., Abou-Samra, R., Anderson, E.D., Muthuswamy, V., Bicchieri, C., 2022. Decolonizing health policy: From paternalism to equity. *Health Policy and Planning* 37, 1–7.
- Yeh, K.B., Adams, M., Stamper, P.D., Dasgupta, D., Hewson, R., Buck, C.D., Richards, A.L., Hay, J., 2016. National Laboratory Planning: Developing Sustainable Biocontainment Laboratories in Limited Resource Areas. *Health Security* 14, 323–330. <https://doi.org/10.1089/hs.2015.0079>
- Zalewski, D.A., Whalen, C.J., 2010. Financialization and Income Inequality: A Post Keynesian Institutional Analysis. *Journal of Economic Issues* 44, 757–777.
- Zaloom, C., 2006. *Out of the Pits: Traders and Technology from Chicago to London*. University of Chicago Press.
- Zhang, Y., Chen, J., Zhang, C., Chen, L., 2021. Senegal Health System Analysis and Its Implications to Global Health Cooperation. <https://doi.org/10.21203/rs.3.rs-585164/v1>
- Zheng, X., Mamon, R., 2023. Assessment of a pandemic emergency financing facility. *Progress in Disaster Science* 18, 100281. <https://doi.org/10.1016/j.pdisas.2023.100281>
- Zhu, J., 2020. *Review of the World Bank Pandemic Emergency Financing Facility (PEF) Pandemic Bond with Reform Proposals*. London School of Economics.