COOPERATION BETWEEN THE PUBLIC AND PRIVATE SECTOR FOR CLIMATE ADAPTATION: A CASE STUDY ON FIJI'S SOVEREIGN GREEN BONDS

Executive Summary

Cooperation Between Public and Private Sector for Climate Adaptation: Fiji’s Sovereign Green Bonds Case Study

Climate Challenge

Global warming has dramatically increased the frequency and severity of extreme climate events, causing $417 billion in damages in 2024 alone. Climate adaptation infrastructure requires investments of $140-300 billion annually through 2030, yet public financing reached only $27.5 billion in 2022, creating a critical funding gap.

The Problem with Traditional Financing

Developing nations typically rely on loans from institutions like the World Bank to finance adaptation projects. However, this approach creates significant challenges:

- Loss of Autonomy: Loans impose strict conditionalities that constrain fiscal policies and political independence
- Project Delays: Infrastructure projects face average delays of 42%, with funding releases taking up to 27 months

Why the Private Sector Must Engage

The private sector has compelling financial incentives to invest in climate adaptation:

- Insurance Crisis: Climate-related insured losses reached $140 billion in 2024, forcing insurers to withdraw coverage from high-risk areas or face bankruptcy

- Business Interruption: Extreme events directly disrupt operations and supply chains, causing billions in losses
- Investment Risk: Areas lacking climate resilience lose access to credit and investment capital

The Fiji Model: A Successful Alternative

In 2018, Fiji became the first developing nation to issue Sovereign Green Bonds for climate adaptation, raising 100 million Fijian dollars with strong private sector interest:

Key Projects Financed:

- Rural water supply systems reaching 42,670 people
- 8,049 rainwater harvesting tanks
- Climate-resilient schools serving as community evacuation centers
- 1,200 km of flood-resistant road infrastructure

Success Factors:

- Attractive returns (4-6.3% annually) aligned private profit motives with public adaptation goals
- Strong government-private sector engagement created market confidence
- Projects delivered tangible resilience improvements while generating stable investment returns

Theoretical Framework

The case validates Frans Berkhout's theories on private sector climate adaptation:

- Benefit-Maximizing: Companies invest when adaptation costs are less than potential losses from inaction

- Institutional Support: Governments enable participation through appropriate policies, incentives, and regulatory frameworks

Conclusion

Fiji's Sovereign Green Bonds demonstrate that innovative public-private financing mechanisms can successfully bridge the climate adaptation funding gap. By aligning profit incentives with societal resilience needs, this model offers developing nations an alternative to dependency on international loans while accelerating critical infrastructure development. This approach preserves political autonomy, reduces project delays, and creates sustainable pathways for climate adaptation financing.

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ABSTRACT

The present work aims to analyze how the private sector can become a key actor in climate infrastructure adaptation, exploring the State's need for this sector to be able to adapt its territory, focusing on an analysis directed toward the negative effects of loans from the World Bank to finance adaptive infrastructure projects, generating delays in construction and loss of political autonomy. Subsequently, the effects of a poorly adapted State on private sector activities are analyzed to understand the incentives this sector has to participate in such projects, highlighting impacts on the insurance sector and the costs of interruption of private activities resulting from the impacts of extreme climate events. Finally, a case study on Fiji's Green Bonds is conducted to envision a concrete example of cooperation between the public and private sectors for climate adaptation.

Keywords: Climate adaptation; Private sector; Extreme Climate Events; Global Warming

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> At every decisive moment in our evolution, our species has conquered its place on this planet through adaptation -- learning, innovating, and transforming the very conditions of life. Adaptation has always required the courage to abandon what no longer serves us, while preserving, at the same time, that which defines us.
>
> Ambassador André Aranha Corrêa do Lago, 2025

INTRODUCTION

Currently, global warming is one of the greatest threats to human life on Earth. Due to its continuous and growing effect on all terrestrial ecosystems, extreme climate events are increasing

in quantity and severity around the world. In 2024 alone, 151 extreme climate events were recorded as "unprecedented" (McCabe, 2025), making population contingents and their infrastructures extremely vulnerable to these events, especially regarding their main occurrences such as: severe storms, floods, heat waves, and wildfires. In 2024 alone, a total of USD 417 billion in damages caused by these events was recorded (Gallagher Re, 2025), consequently requiring high levels of investment for the promotion of infrastructures that would increase society's resilience in the face of these growing challenges.

In addition, national States face growing adversity when dealing with the costs of these projects, especially regarding developing States which have large demands and often insufficient resources to respond to them, having to obtain loans from international banks such as the IMF and the World Bank. These loans end up imposing serious limitations on the State — both in terms of its autonomy, as it must comply with specific measures to receive these funds (Herbert et al., 2022), and in terms of critical delays in the delivery of adaptation projects, which expose the population to ongoing distress caused by extreme climate events.

Thus, this article seeks to analyze another financing mechanism for these projects: the private sector, which equally suffers from the effects of these events, especially regarding the higher costs in the insurance sector and in economic losses, resulting from the interference of economic activities. Based on Frans Berkhout's theories to better understand the internal motivations of the private sector in promoting climate adaptations and the role of the public sector in this articulation, plus literature review of the most recent works in this area, as well as the analysis of reports from international organizations, NGOs, governments and companies, this article seeks to analyze how the interaction between the State and the private sector can occur, envisioning the promotion of climate adaptation infrastructure development.

Finally, this study conducts an analysis of the Sovereign Green Bonds launched by Fiji in 2018, to analyze a practical example of how the private sector and the public sector united to foster greater adaptation of the local population, increasing its resilience to extreme climate events.

1. CLIMATE CHANGE AND HOW IT AFFECTs EXTREME CLIMATE EVENTS

Currently, one of the greatest threats to the stability of human life on Earth is the process called global warming. This process denotes the increase in Earth's average temperature due to human activities, mainly those that emit a large amount of greenhouse gases (GHGs). This warming ends up causing an elevation in the frequencies and intensities of extreme climate events, which, in turn, destroy urban infrastructures and global supply chains.

It is extremely important to emphasize at the beginning of this work that throughout Earth's geological periods, there have always been climate changes; they are not a new event. However, the Anthropocene era, which we currently live in, designates a period in which human actions override the forces of nature; therefore, the exacerbation of climate change is caused by human action and no longer by merely geological, cosmic factors, etc. (Ávila, 2020). Among the factors that promote this process are emissions of carbon dioxide (CO2), arising from fossil fuel burning activities and industrial processes (IPCC, 2023). From this, emissions related to these gases have been growing in recent decades; for example, in 2019, 59 gigatons of CO2 equivalent were emitted (sum of various greenhouse gases converted into the same unit of impact) (IPCC, 2023). This number was 12% higher than the value of emissions in 2010 and 54% higher than emissions in 1990 (IPCC, 2023), with the largest contributors to these emissions being the burning of fossil fuels and industrial processes, followed by methane emissions. Thus, even with climate negotiations and technological innovations, emission levels continue to rise; on the other hand, they are rising at a less elevated growth rate of 1.3% per year between 2010-2019, compared to the decade of 2000-2009 when GHG emission rates increased at 2.1% per year (IPCC, 2023). From these elevated emissions, global temperature during the decade of 2011-2020 reached 1.1°C above the pre-industrial period average of 1850-1900 (IPCC, 2025). Additionally, 2024 was the first year to have a global average of more than 1.5°C above the pre-industrial period (World Meteorological Organization, 2025), beginning a new sequence of climate predictions by the World Meteorological Organization (WMO), in which there will be an 80% chance that the next five years will exceed the 2024 climate average.

This elevation of Earth's temperature causes various impacts on the atmosphere, ocean, cryosphere, and biosphere; these impacts end up influencing meteorological systems and causing extreme climate events. This effect can be explained by basic physical considerations as demonstrated by Coumou et al, in which, in an increasingly warm world, this warming causes

greater water evaporation, leading to greater soil dehydration which, in turn, causes greater intensity and duration of droughts. At the same time, warmer air is capable of holding more moisture, as demonstrated by the Clausius-Clapeyron equation, in which for each 1°C increase in air temperature, the maximum water vapor retention capacity increases by approximately 6% to 7% (Coumou et al, 2012), holding more water molecules and thus causing more intense rains and more extreme storms (Coumou et al, 2012).

It is possible to observe the realization of these physical laws in our planet's climate from the World Meteorological Organization (WMO) report in its WMO Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970-2019), which evidences the 5-fold increase in the number of natural disasters caused by extreme climate events in the last 50 years. An example of this increase is floods considered "secular floods" that occurred only once per century and increased from 63% probability of being experienced by a person born in 1990 to 86% by a person born in 2025 (UNDRR, 2025).

To better understand how these extreme climate events are being exacerbated, we can observe tropical cyclones, typhoons, and hurricanes; these in turn did not have their frequencies increased due to planetary warming; however, their intensities suffered the opposite effect, making them more devastating (Poynting, 2024). The increase in the average maximum speed of these cyclones has been growing considerably in recent decades. The possibility of a 120 km/h increase in a cyclone's wind speed in the initial 24-hour period of its existence is 4.9 times higher, taking into account the cyclones that occurred in the time sample of 2001-2020 (modern period) than in the period of 1971-1990 (historical sample) (Garner, 2023). The same is observable in the 36-hour timeframe, in which the probability of winds increasing to 120 km/h is 3.9 times higher in the modern period compared to the historical period (Garner, 2023). In the same oceanic spectrum, another threat related to anthropogenic global temperature increase, the rise in ocean levels, has been threatening human stability. In the period between 1901 and 1971, the sea rose at an average of 1.3 millimeters per year, rising to 1.9 millimeters per year between 1971 and 2006 and to 3.7 millimeters per year between 2006 and 2018 (IPCC, 2023), creating new problems such as increased proliferation of diseases, maritime erosion, salinization of reservoirs and productive lands (Figueiredo Stevenson et al, 2024).

From these data, it is evident that human actions are influencing planetary climate and this, in turn, increases the severity and frequency of extreme climate events and their consequences in cities around the planet. The Intergovernmental Panel on Climate Change demonstrates that the main risks for cities are floods, storm damage, flooding in coastal cities, damage to infrastructures, and damage to key economic sectors. In 2024, 151 extreme climate events were recorded as "unprecedented" (McCabe, 2025). This increase ended up causing increasingly high costs to remedy the destruction from these same events. In 2024, the direct global economic cost associated with extreme climate events was USD 417 billion, according to the Gallagher Re insurance company report, compared to the previous USD 357 billion in 2023, USD 140 billion in 2022, and 116 billion in 2021. In addition to the direct impacts referring to the explicit numbers, there are a series of secondary impacts that end up affecting the functioning of societies such as humanitarian impacts, which can overload regional hospitals, depreciate regional real estate sectors, and affect global production chains (Gallagher Re, 2025) as in 2011 in Thailand when 1000 hard disk drive production factories of companies like Toshiba had to close the factories until the flood passed, having a drop of almost 50% of their production and affecting the global supply chain of these equipment (Coughlin, 2011).

Thus, with the increase of extreme climate events, various sectors are affected, suffering great losses and consequently requiring large amounts to be rebuilt. Furthermore, the consumer market itself is affected; when families are affected by these events, family income decreases, thus decreasing tax collection and general family expenses, forcing governments to borrow more money due to low taxes; consequently, debts become riskier and interest rates rise (UNDRR, 2025), harming all economic sectors of society. Thus, investing in city resilience, including infrastructure adaptation programs and early warning systems contribute to diminishing the financial consequences of extreme climate events by increasing the capacity with which members of a society can respond to such events and return to their daily activities, also known as a populations resilience level, as explained by Brown et al:

> "The capacity of an individual, community or institution to dynamically and effectively respond to shifting climate circumstances while continuing to function at an acceptable level. This definition includes the ability to resist or withstand impacts, as well as the ability to recover and re-organize in order to establish the necessary functionality to prevent catastrophic failure at a minimum and the ability to thrive at best" (Brown et al, 2020, pg 534)

Thus, the next chapters of this work will seek to understand the role that the private sector has in the process of increasing society's resilience in the face of these events, given that most capital is contained in this sector andditionally to the fact that its the sector that most employs the people in the world. Thus, it is necessary to understand two main questions: how and why the state needs the private sector's participation in adaptation efforts, and the impact of these extreme climate events on private operations to further understand how this sector can have the necessary incentives to participate in adaptation mechanisms.

2. THE PRIVATE SECTOR AND THE STATE IN CLIMATE ADAPTATION

As seen in the last chapter, the cost resulting from damages caused by extreme climate events is very high, therefore requiring large investments in global climate adaptation infrastructures to deal with such occurrences. According to the World Bank, the cost for adaptation until 2030 is expected to be between US$140-300 billion per year, and until 2050 between US$280-500 billion (World Bank, 2021). Furthermore, the construction of US$57-95 trillion in new infrastructures until 2030 is also expected, which will also have to become climate-resilient (World Bank, 2021). Contrary to this, the collection of public finances for climate adaptation through negotiations, agreements, and investment rounds reached only US$27.5 billion exclusively for adaptation per year in 2022 (UNEP, 2024), falling far below the level necessary for increasing global resilience to the threat of extreme climate events. Therefore, the cost for such an endeavor is enormous and cannot be obtained solely through the public sector.

Thus, the private sector, as a supplement to limited public resources, is widely recognized as essential to diminish the gap between adaptation finances, especially in developing countries that are more vulnerable to climate risks (World Bank, 2021; Crick et al, 2018; Shaer et Pantakar, 2018). Climate adaptation by the private sector is particularly poorly explored in these countries, where research focused on climate adaptation is mostly focused on residential sectors, creating a large opportuniyy gap, given that the private sector is largely responsible for the growth and development of subsistence activities in these countries (Crick et al, 2018). Africa, for example, has two-thirds of the continent's investments, 90% of its formal and informal jobs, and 80% of its

economic advancement coming from the private sector (Crick et al, 2018). Thus, the private sector has high potential to impact the general resilience of the population of developing countries, given that it is their operational infrastructures that make up a large part of the means that allow the functioning of such States.

However, even being aware of climate risks, the number of companies that end up effectively implementing business strategies with adaptation are still the minority (Crick et al, 2018), and they end up tending to be large corporations in developed countries, mostly in the agriculture, water, and insurance sectors (Crick et al, 2018). Among the difficulties found for greater private sector action in adaptive issues is the apparent lack of direct benefits for these actors, given that adaptation works are, for the most part, public goods, which end up delivering social benefits instead of direct profits for a private investor (Ten Brinke et al, 2022). In this interim, the benefits for adaptation are often intangible and destined for the long term, while their costs are immediate and focused on the short term; therefore, as there is no complete return on investments in adaptation, much less a clear vision of profit potential, adaptation is often seen as incongruent with the profit orientation of the private sector (Ten Brinke et al, 2022).

Within the logic of developing countries, it is important to take into account that much of the literature on this topic focuses on the specific contribution of large companies; however, 90% of companies in these countries are micro, small, and medium enterprises (Schaer et Pantakar, 2018), and these have lower capacities to respond to the effects of extreme climate events as well as in the way they can contribute to climate adaptation initiatives (Schaer et Pantakar, 2018). Therefore, greater research development is needed on the impact and concrete forms of participation of small and medium enterprises for better insertion of these in adaptation efforts in developing countries.

From this apparent contradiction between market logic and the logic of adaptation infrastructures, it is extremely important to analyze the factors discussed in the literature that stimulate private sector participation in adaptive infrastructure works, understanding the bases of how this sector can effectively be engaged in this topic and contribute to States' adaptation plans to, subsequently, analyze them in the case study at the end of this work.

2.1 Risk or Return? The Business Crossroads Facing Climate Adaptation

Author Frans Berkhout determines that to better understand the relationship of the private sector with the climate adaptive issue, we must understand the structure of these companies to subsequently analyze their role in solving this problem. According to Frans, to begin this thinking, we can observe organizations as autonomous actors created to achieve specific goals, whether this goal is to produce a certain amount of food or offer railway transport services.

Thus, when analyzing the question of why companies adapt, the author comes to the conclusion that they do so because these adaptation goals align with the objectives of these organizations. Adaptation, therefore, can be seen as adjustments designed to sustain the capacity of such an organism to achieve a certain objective. The author cites the example of an infrastructure company, which can build coastal assets to carry out higher standard designs in anticipation of higher wind gust speeds during tropical storms. Thus, the company's business model and its performance would be preserved, even with the cost of adaptation.

Frans Berkhout continues his analysis by observing that adaptation can also be a response to the exploration of a possible benefit, not only being intended to maintain a company's operation but also the exploration of opportunities arising from climate changes. Ten Brinke et al contribute to this idea with the concept of "property driver," in which private agents, in this specific study private companies in the Netherlands, demonstrated interest in contributing to adaptation works to promote a higher quality environment for their constructions. In this example, project developers in the Netherlands used trees to increase the resilience of their constructions. These developers went beyond the mandatory adaptation demands of their municipalities to build the brand identity of "living among trees" within their urban developments, creating a way to profit from infrastructures adapted to extreme climate events and, thus, increasing private sector investment in the country's climate adaptation.

Finally, the author determines three approaches to analyze adaptation from the internal organization of companies: the utility-maximizing, behavioral, and institutional. The focus of this work is to analyze business activities mainly from the utility-maximizing approach and, subsequently, the State's impact on encouraging private sector participation from the institutional approach.

The utility-maximizing approach starts from the principle that the application of adaptation is a matter of optimal choices among a group of alternatives that have their known costs and benefits that can be accounted for over time. These choices are made by organizations seeking their own interests, ultimately analyzing whether the cost of making such an effort is less than the cost of not doing it. Thus, most companies will only adapt when they have experienced the effects of climate changes and only then will they adapt to the level necessary to maximize their general utilities for a certain future period relevant to their investments and expected operating periods. Finally, such organizations will choose inaction when it is more economically ideal, while making periodic investments in adaptation when this cost is economically justifiable, given operational uncertainties, with only costs and benefits being relevant for this analysis.

Institutional analysis, in turn, places greater weight on the role of institutions in the development of infrastructure works. Thus, the adaptive capacity of this theory occurs not only from the level of costs and benefits of choosing a certain action but is unlocked and constrained by factors imposed by structuring social, cultural, political, and economic issues. This perspective has greater relevance when dealing with sectors such as water resource management, coastal protection, and flood risk management, specifically where national and regional governments have an important role in defining and enforcing formal and informal rules that govern the operations of organizations. This can be contributed by the ideas of Florence Crick, Kate Gannon, Mamadou Diop, and Mamadou Sow who explain that adaptation to climate issues is not a simple technical matter that can be solved through large infrastructure investments or technology transfers; contrarily, it requires incentive policies and an institutionally appropriate environment that supports individual participants within the private sector.

Thus, a fundamental concern of this analysis is the flexibility offered by institutional actors to private actors through rules that permit effective adaptation responses. Finally, for this analysis, the prevailing factor for the incentive or disincentive of adaptive actions by companies will be carried out by institutional actors in their structures and rule enforcement mechanisms as well as capacity to effectively roll out adaptation projects.

To better understand the costs and benefits considered by companies within the maximizing approach, and the influence of governments from the institutional approach, the following section will focus on losses that states face by not having private sector support in

adaptive infrastructure development and, subsequently, the impact that this poorly adapted State inflicts on business operations.

2.2 Impacts of Extreme Climate Events in a State Deprived of Private Sector Support

National States, especially in developing countries, when seeking to integrate climate adaptation mechanisms into their cities, often do not have the amount to finance large adaptation projects, seeking loans from international banks for financial support (UNCTAD, 2021). According to the Center for Global Development, multilateral banks such as the World Bank, are the largest public source of international adaptation finance for developing countries. In this group, the World Bank plays a major role (51% of total multilateral bank daptation finance). To exemplify this, we can analyze two cases: in Bangladesh, the Coastal Embankment Improvement Project, a project to increase the protected area against storms and floods in plain areas protected by dikes against flooding, and reduce the intrusion of salt water into productive lands, had a cost of $400 million dollars, financed by the World Bank. Of this amount, $375 million was a loan from the International Development Association and $25 million was given as a donation from the multilateral bank's climate resilience pilot program (World Bank, 2013).

Another example is Turkey's Flood and Drought Project, which provides for the construction of infrastructure for flood control, increasing farmers' capacity to monitor droughts and the institutional capacity to deal with these extreme events. To carry out the same, in 2024, the government received a loan of $600 million from the World Bank (World Bank, 2024). With these two examples, we can observe in practice how the State, by itself, struggles to implement adaptation projects, resorting to large banks to finance them through loans. Due to these loans, states end up increasing their external debts and are obliged to comply with measures imposed by creditors. Both issues impact the country and its future capacity to deal with population resilience as well as the countries economy and development policies, further diminishing the capacity to generate resilience on the part of the population.

In a more fiscal analysis, the main negative issue that comes from loans is the imposition of onerous conditionalities and micromanagement by international creditors such as the World Bank and the International Monetary Fund (Christie, 2022). Such conditionalities at best introduce operational frameworks and safeguards to ensure that recipient countries use the capital

received in the best way; however, often, conditionalities generate negativities, from operational inefficiencies to political interference, especially when utilization and implementation policies of the loan are poorly developed and excessively applied (Christie, 2022). Thus, recipient countries end up having their political control over economic reforms and paths to development diminished for the realization of works that seek to improve the efficiency of these countries' infrastructure.

In this context, we can analyze two of the main types of financing offered by the World Bank: Development Policy Financing (DPF) and Investment Project Financing. The first deals with financing for the promotion of countries' development through policy programs and institutional actions (World Bank, 2024), mostly destined for developing countries. The IPF in turn is used in all sectors with a focus on infrastructure projects, human development, and agriculture, focused on the medium to long term (5 to 10 years) (World Bank, 2025). DPFs and IPFs help finance various projects around the world, but also bring with them certain consequences for States that choose them to finance their climate resilience development projects.

In the case of DPFs, one of the biggest criticisms brought by the literature concerns the "prior actions" required by the World Bank before approving loans for requesting countries. A study conducted by the European Network on Debt and Development (Eurodad) reports that 53 DPFs analyzed in 2017, focused on energy sector development, demonstrated an average of 9.6 prior conditionalities per operation. In the same study, it was found that 31.4% of these prior conditions are related to financial public administration, 14.2% related to economic policy, and 14.6% focused on financial sector conditionalities. Furthermore, to request a DPF, the country must be framed in what the World Bank defines as a "sound macroeconomic structure," which follows International Monetary Fund programs, which ends up being jointly involved in the development of fiscal and economic policies linked to the issuance of this type of loan (Brunswijck, 2019). Within these macroeconomic structures necessary for loans, 8.5% of conditions were focused on fiscal austerity policies (Brunswijck, 2019). Certain analyzed conditionalities also had a focus on the reduction of state-owned enterprises, as in the analyzed case of DPFs in Laos, Colombia, and Serbia, where their contracts had specific terms for adaptation in the functioning and hiring of these companies (Brunswijck, 2019).

Regarding IPFs, it is possible to observe various mechanisms that end up delaying the development of these projects and leading to less development of the State's and its population's adaptive capacities. One of the major problems with these investments concerns the long waiting periods for fund release, with an average of 27 months from the moment the bank receives a loan request (Reuters, 2023). This issue was even recognized by the Vice President of Operations, Policy and Country Services at the World Bank, Ed Mountfield, who highlighted "We need to find ways to go faster, both looking at our own red tape and also recognising that often the delays are on the client side." In addition to fund release delays, most projects end up suffering some type of delay in their implementation process.

In a report made by the World Bank itself, analyzing 656 infrastructure projects from 2013-2022, 88% of projects reported delays for contract signing after the process of obtaining companies capable of carrying out the projects; within this group, 28% of projects had a delay of more than 270 days for contract signing. Among the reasons for delay, 53% of contracts reported difficulties within the following three areas: low capacity for obtaining companies, low project management capacity, and low quality of project feasibility reports (World Bank, 2024). In the same report, it is identified that on average 74% of all infrastructure projects made by the World Bank in all regions of the world experienced delivery time delays; among these, the final deadline was on average 42% longer than the original time planned in the contract. It is important to note that these results were calculated within a time period in which the global COVID-19 pandemic occurred, with 175 of the 656 projects analyzed in this study referring to the pandemic period. Therefore, the explicit averages are subject to distortion due to the decrease in services during the pandemic period.

This issue can be exemplified in what is currently happening in Bangladesh, where a project aimed at increasing population resilience through the Resilient Infrastructure for Adaptation and Vulnerability Reduction (RIVER) project was approved in July 2022, in the amount of US$509 million dollars, with the project's start expected in the same year and end planned for 2028 (World Bank, 2022). However, in September 2025, US$438 million was still pending release due to delays in contracting and leadership processes (The Business Standard, 2025). At the same time, it is complementary to this analysis to demonstrate that the lack of stability in World Bank infrastructure projects ended up arousing a questioning of the path

followed by Bangladesh in acquiring international loans for the development of national infrastructure works, as demonstrated in the article "Teesta River Project: Should Bangladesh self-fund" in the Asia Times newspaper. In this article, the author questions the need to depend on external financing for such projects, based on the World Bank's exit from financing the Teesta River Project and Bangladesh's decision to successfully continue financing the project. The author's major criticisms point to self-financing as a way to have full control of the project, implementation, and administration, without depending on foreign interests and influences and developing the local economy by generating several jobs for the local population, thus focusing and adapting the project to local needs. The author recognizes, however, the financial and fiscal problems arising from the local financing decision and points out that bonds issued by the government could be a solution to this issue.

Thus, loans from the World Bank represent various risks for countries seeking to increase their resilience from this institution, ranging from risks of having their power and political independence affected by the "prior actions" needed before acquiring loans from the bank. Added to this issue, IPF projects suffer major delays, both in the company contracting phase, in fund release, and in final work delivery, diminishing countries' resilience, given that many of them urgently need the implementation of projects to deal with extreme climate events. Therefore, to build effective climate resilience, it is necessary to analyze another way in which the State can attract investments, which will be addressed in the next chapters.

2.3 The Drowning of Private Sector Accounts Before a Poorly Adapted State

Regarding the impacts of a poorly adapted State on the private sector, the insurance threat is possibly one of the most concerning for this group. Insurance on a property is a technology that impacts the ability of companies to recover from disasters, affecting not only their own financial stabilities but also the stability of the local and regional economy (Stein et al, 2024). The existence or not of insurance can lead the government to have higher costs when helping a community recover from a disaster, as well as affect the decision of investors and creditors to operate in a certain location (Stein et al, 2024). Thus, to better understand this risk, it is necessary to understand two concepts that relate, according to authors Kate Stein, Wallis Greenslade, and Ed Day: the concept of "risk-based pricing."

According to the authors, the definition of insurance prices for protecting a company is inserted in the logic that insurers charge to insure based on the risk they face in a certain location. With increased risk, insurers increase their costs to keep their operations profitable; therefore, if a certain operation or location becomes too risky, to the point of threatening profitability or the company's own operation, these insurers may stop offering insurance for entire regions. Risk is therefor calculated as the product of three factors: hazard, exposure, and vulnerability. The hazard is the event that could cause a financial impact on a property, such as a hurricane or a fire; exposure would be the intrinsic economic value of the property or its productive capacity, and vulnerability is the susceptibility that a company has to suffer damage arising from some hazard. Therefore, adjustments in these three variables end up impacting the cost of insurance offered for each location.

In this logic, with the increase of extreme climate events, insurance prices related to infrastructure protection increase, and the cost for companies that issue these services also increases. After a decade of favorable conditions in the insurance market, insurance prices began to increase in the early 2020s, with an increase during 2022-2023, influenced by global records in losses related to global catastrophes due to extreme climate events (IMF, 2025). This increase can be observed from the growing losses covered by the insurance sector; according to the Institute for Energy Economics and Financial Analysis (IEEFA), insured losses in 2024 reached US$140 billion, considerably higher than the average of the last 10 years, of US$94 billion, demonstrating the increased cost for insurance companies related to coverage of areas susceptible to extreme climate events.

Therefore, due to the increase of this value, it was possible to observe companies withdrawing their coverage from areas affected by climate disasters, as in Los Angeles, where insurers canceled hundreds of contracts due to increased fire risk in certain regions (Jena et Anand, 2025). The opposite was also observed; several companies that continued to offer insurance in the region, such as Go Insurance Company, 1st Auto & Casualty, and Cameron Mutual Insurance Company, went bankrupt in recent years due to their coverage in areas constantly affected by extreme climate events (Jean et Anand, 2025). Thus, we can analyze that the lack of adaptation creates a double problem: an entire sector is affected (insurance sector), and the rest of a region's economy, consequently, is also unable to restructure itself after the next

impacts of extreme climate events. Furthermore, these regions also lose incentives for investment from other areas of the private sector, as will be seen below.

With the withdrawal of insurance coverage from areas susceptible to extreme climate events and the bankruptcy of companies that were responsible for a certain location, another problem comes to light: the lack of confidence from banks to offer credit to companies operating in these regions (Jean et Anand, 2025). This lack of coverage discourages and often makes economic development impossible in certain regions, potentially leaving entire regions without financing options and incentives for development, making the resilience and capacity for perpetuation of companies in the region much lower, especially in a post-disaster scenario, thus opening the door to major socioeconomic impacts in high-risk areas (UNDRR, 2025).

According to Scholer et Schuermans, most of the insured costs caused by natural disasters come from property damage; however, another risk also presents itself to companies: the loss from interruption of economic activities due to the impacts of extreme climate events. An example is Hurricane Katrina, which caused US$25 billion in insured costs, among which US$6-US$9 billion came from business interruption. Recently, the same was observed in Brazil, which, after a major storm on September 22, ended up leading the Toyota factory, which was severely damaged, to suspend production and postpone the launch of its new Yaris Cross car model (G1, 2025), which are, at the time of writing this work, without a new launch date.

From this scenario, governments began to implement measures that would encourage the private sector to adapt to climate changes through lower insurance premiums when a property adapts to extreme climate events (Stein et al, 2024). In this regard, states are beginning to require insurers to provide discounts proportional to adaptation infrastructures implemented on properties, as observable in law 627.0629 of the state of Florida in the United States, which requires insurers to provide discounts to consumers who install mitigation techniques for preventing damage from storm winds, encouraging the private sector to see a path of cost reduction from climate adaptation.

Finally, with these examples, it is possible to analyze the large costs arising from extreme climate events for the private sector. Both regarding the decrease in insurance sector activity and the consequent inflation in the price or withdrawal of their services, which end up impacting the

investment attraction capacity of other companies that depend on this service. Furthermore, it is also possible to observe that the lack of adaptation also causes major impacts on companies own operations, by causing interruptions in production, generating even more loss and delay in deliveries and launches of new products. Thus, following Frans Berkhout's benefit-maximizing theory, we can observe that companies already feel the cost and impact of extreme climate events on their operations and that therefore, they already have the monetary incentive to choose to start investing in infrastructure adaptation processes so that their own profits are not impacted.

With this in mind, we can move on to the next section of this study, in which an example of private-public sector cooperation to promote greater resilience for the general population will be analyzed. Observing the role of the state, based on the institutional perspective, in regulating, encouraging, and enabling adaptation actions, and the private sector, in turn, in accordance with the benefit-maximizing theory, as an agent interested in investing in climate adaptation infrastructures.

3. CASE STUDY: FIJI AND ITS GREEN BONDS

The Small Island Developing States or (SIDS), is a group that brings together 39 States and 18 associative members of the United Nations regional commission located in the Caribbean, Pacific, Atlantic, Indian Ocean, and South China Sea regions (United Nations, 2025). Together, they gather a total of 65 million people in the sum of their national populations, being equivalent to 1% of the world's population. On one hand, this small group of islands faces unique social, economic, and environmental challenges such as high import and export rates, due to their remote locations, and, due to the size of their territories, they also end up being highly dependent on external markets (United Nations, 2025). Linked to this issue, these countries also end up being really dependent on their ocean, especially considering that on average SIDS exclusive economic zones are 28 times larger than the size of their terrestrial territories (United Nations, 2025). This peculiarity makes them more vulnerable to climate changes impacts on local biodiversity and oceanic ecosystems, especially sea level rise, that represents an existential threat, considering the average size of their territories and that they are completely surrounded by water.

On the other hand, this group of islands also suffers from problems shared with most countries in the world when it comes to extreme climate events. Initially for these islands, as for

other countries, resources for adaptation are often scarce and dependent on external financiers (United Nations, 2022). Often suffering from the same effects discussed in previous paragraphs when dealing with loans from international banks, given that the SIDS group paid US$26.6 billion for external debts during the period 2016-2020 (Eurodad, 2022). During the same period, the island ensemble received only US$1.5 billion in climate financing (Eurodad, 2022), considering that they need approximitly US$5.1 billion per year (Reitmeier et al, 2024), they end up facing the same problem as the rest of the world..

With this in mind, one of these countries decided to develop its own financing strategy for climate adaptations. Fiji, an archipelago located in Oceania, composed of 300 islands, 900,000 inhabitants, and having the city of Suva as its capital, demonstrating how SIDS have the capacity to create new mechanisms to finance their adaptation needs. The Government of Fiji, faced with the financial gap, issued the Fiji Sovereign Green Bond (FSGB) directed towards climate adaptation, becoming the first developing market to accomplish such a feat, acquiring high interest from the private market, receiving more purchase offers than there were available bonds (Fiji, 2019).

This tool was crucial for translating projects focused on climate issues into a profitable investment with stable return for investors, with an interest return of 4% per year for an investment programmed for 5 years and a return of 6.3% per year for an investment programmed for 13 years. In addition to the profit generated by this investment, much of the project was built on the national understanding that investments in adaptive infrastructure prevent exponential future costs, thereby enhancing business resilience and fostering economic growth (Fiji, 2019). Regarding private sector engagement, most of the industry has been heavily affected by recurring cyclones over the years. For instance, in 2016, Cyclone Winston caused damages estimated at US$923 million, equivalent to 31% of Fiji's GDP at the time (Kumar, 2025), leading the sector to recognize the importance and value of investing in adaptation infrastructure

Among the projects financed with the 100 million Fijian dollars raised, we can cite the following projects: Rural Water Supply Programme, which allowed access to clean water and sanitation for a large part of the rural population, impacting 42,670 people. With it, the resilience of the rural population of the islands was increased and high socio-economic impacts were created by preventing the spread of waterborne diseases that became contaminated after extreme

climate events and decreasing the time spent seeking water from more remote sources, allowing the development of more productive activities by the population (Fiji, 2018). Parallel to this project, the Rainwater Harvesting Programme was also developed, in which the government installed 8,049 water tanks to combat the growing irregularity of rainfall patterns, impacting more than 40 thousand people in the country.

Other projects of utmost importance to be cited are the construction and reconstruction of schools, which had previously been destroyed by storms, implementing resilient infrastructure measures in the planning and realization of works, these structures also serve as evacuation centers during disasters, increasing the general population's resilience (Fiji, 2018). Finally, among other implemented projects, it is worth mentioning Emergency Road Works, a project that structured roads and bridges previously destroyed by storms that passed through the country, building drainage infrastructures throughout 1.200km of roads to protect them from the harmful effects of floods and storms.

With these examples, we can observe Fiji's innovative and effective strategy to enhance the population's resilience to extreme climate events. Through initiatives such as the Rural Water Supply Programme, the Rainwater Harvesting Programme, and the school reconstruction project, communities are now better prepared for extreme weather events and have become more resilient as a result. The private sector, through drainage and road reconstruction projects, has also strengthened its operations against climate extremes, contributing to a more stable and resilient national economy.

Thus, this example can be analyzed through Frans Berkhout's theoretical lens, particularly his institutionalist and benefit-maximizing perspective. To initially assess the role of both private and public sector actions in supporting state-led adaptation, we can note the primary reason for the project's success identified by the Reserve Bank of Fiji: the strong link between government and private sector actors. As stated by the Bank:

> "The FSGB was a success due to a combination of factors that have set the foundations for future capital market investments in climate change by not only the Government but large private sector firms as well... Active engagement with investors by the RBF was fundamental in ensuring that the market awareness and interest was generated for every tranche that was issued." (Fiji, 2019).

This demonstrates how companies heightened risk perception regarding climate change and extreme weather events in the country led to their support for government-led adaptation initiatives, particularly after many had experienced direct operational disruptions caused by storms, as was the case for several Fijian firms. Furthermore, this case clearly reflects the institutionalist theory in practice: by creating incentives and fiscal mechanisms, the State enabled private sector participation in local infrastructure adaptation. This tangible collaboration between public and private sectors illustrates how such partnerships can overcome the financial limitations posed by insufficient national and international public funding for climate adaptation — thereby validating Berkhout's theory and highlighting a promising pathway for innovative adaptive financing.

CONCLUSION

This work sought to analyze how the public and private sectors could act jointly to close the financing gap focused on climate adaptation. From the initial observation of the billion-dollar impacts arising from extreme climate events and the amounts necessary for adaptation, we observed how the State does not have the financial capacity to bear the costs of adaptive infrastructures from national public revenues alone, and therefore the need for private sector integration in adaptation efforts.

When analyzing more deeply the options that States initially had to finance large adaptation works through international bodies, such as the World Bank, it was observed how loans arising from this organization cause consequences for state political autonomy, having to adapt to "prior actions" that regulate, depending on the project, fiscal policies, public companies, and forms of development. In addition to these conditions, the government still risks having works delayed regarding input release, company contracting, and final project delivery.

To better understand how the private sector could enter this equation, Frans Berkhout's theory was used to better understand the necessary incentives to effect private sector adherence to this agenda. From the major damages that extreme climate events cause to private sector operations, both regarding the insurance sector issue, which increases the cost of their services,

abandons regions that become excessively dangerous or ends up going bankrupt due to high costs of climate impacts. Added to the costs of economic activity interruptions caused by extreme climate events, it was possible to verify that the private sector has an interest in encouraging climate adaptation infrastructures to protect their own profits, aligning with Frans Berkhout's theory.

Finally, when analyzing Fiji's case and the issuance of its Sovereign Green Bonds, it becomes possible to observe the successful cooperation between the public and private sectors in developing adaptation infrastructure and enhancing the population's resilience. The public sector provided the necessary mechanisms to plan and implement infrastructural projects, while the private sector—aware of the risks of inaction—supported the government and viewed these bonds as an opportunity to profit from the interest generated by the initial investment. This experience represents a successful example of collaboration that fostered a new form of financing for climate adaptation infrastructure, thereby contributing to humanity's collective progress toward a world more resilient to climate change.

BIBLIOGRAPHIC REFERENCES

ÁVILA, Ana. Ana Ávila sobre aquecimento global: "Não posso deixar de tentar divulgar, porque é preciso consciência". Campinas: CBN Campinas -- Radio CBN, 13 mar. 2020. Available at: https://portalcbncampinas.com.br/2020/03/ana-avila/. Accessed on: 8 Nov. 2025.

BERKHOUT, Frans G. H. Adaptation to climate change by organizations. Wiley Interdisciplinary Reviews: Climate Change, v. 3, n. 1, p. 91-106, 2012. DOI: 10.1002/wcc.154.

BROWN, A.; DAYAL, A.; DEL RIO, C. R. From practice to theory: emerging lessons from Asia for building urban climate change resilience. Environment and Urbanization, v. 24, n. 2, p. 531-556, 2012.

BRUNSWIJCK, Gino. Flawed Conditions: the impact of the World Bank's conditionality on developing countries. Brussels: Eurodad -- European Network on Debt and Development, Apr. 2019. Available at: https://www.eurodad.org/flawed_conditions. Accessed on: 8 Nov. 2025.

CHRISTIE, Rebecca. Conditionality in the global financial architecture. In: VINJAMURI, Leslie; MALLOCH-BROWN, Mark; O'NEILL, Jim et al. Building global prosperity: proposals for sustainable growth. Research Paper. London: Royal Institute of International Affairs (Chatham House), Dec. 2022. p. 45-52. Available at: https://doi.org/10.55317/9781784135508. Accessed on: 8 Nov. 2025.

COUGHLIN, Thomas. Flood Waters in Thailand Deepen Crisis at HDD Companies. Forbes, 17 Oct. 2011. Available at: https://www.forbes.com/sites/tomcoughlin/2011/10/17/flood-waters-in-thailand-deepen-crisis-at-hdd-companies/. Accessed on: 29 Sep. 2025.

COUMOU, Dim; RAHMSTORF, Stefan. A decade of weather extremes. Nature Climate Change, v. 2, p. 491-496, 2012. DOI: https://doi.org/10.1038/nclimate1452.

CRICK, F.; ESKANDER, S.; FANKHAUSER, S.; DIOP, M. Enabling private sector adaptation to climate change in sub-Saharan Africa. London: London School of Economics and Political Science -- Grantham Research Institute on Climate Change and the Environment, 2018. Available at: https://eprints.lse.ac.uk/85747/7/Crick_Private%20Sector%20Adaption.pdf. Accessed on: 8 Nov. 2025.

EURODAD. Riders on the storm: how debt and climate change are threatening the future of Small Island Developing States. [S.l.]: Eurodad, 2023. Available at: https://assets.nationbuilder.com/eurodad/pages/3046/attachments/original/1678896832/SIDS-report-ENG.pdf?1678896832=. Accessed on: 8 Nov. 2025.

(Continuing with remaining references...)

FIGUEIREDO STEVENSON, L. G.; PEREIRA da COSTA, F. The climate crisis and sea level rise: Brazil-Tuvalu analysis and opportunities for Brazilian leadership in adaptation and international cooperation -- Policy Brief. Island Innovation, [s.l.], 2023. 18 p. Available at: https://dadosisland.s3.us-east-2.amazonaws.com/main-app/programmes/The-climate-crisis-and-sea-level-rise-Brazil-Tuvalu-analysis-and-opportunities-for-Brazilian-leadership-in-adaptation-and-international-cooperation-Policy-Brief.pdf. Accessed on: 8 Nov. 2025.

FIJI -- MINISTRY OF ECONOMY. The Fiji Sovereign Green Bond: 2019 update. Suva: Ministry of Economy, 2019. Available at: https://fijiclimatechangeportal.gov.fj/publication/the-fiji-sovereign-green-bond-2019-update/. Accessed on: 8 Nov. 2025.

FLORIDA. Legislature. Senate Bill 0627.0629: hurricane insurance provisions. Florida Senate, 2024. Available at: https://www.flsenate.gov/Laws/Statutes/2024/0627.0629. Accessed on: 8 Nov. 2025.

GALLAGHER RE. Natural Catastrophe and Climate Report: Q3 2025. London: Gallagher Re, Oct. 2025. Available at: https://www.ajg.com/gallagherre/-/media/files/gallagher/gallagherre/news-and-insights/2025/natural-catastrophe-and-climate-report-2025.pdf. Accessed on: 8 Nov. 2025.

GARNER, Andra J. Observed increases in North Atlantic tropical cyclone peak intensification rates. Scientific Reports, v. 13, article number 16299, 19 Oct. 2023. Available at: https://www.nature.com/articles/s41598-023-42669-y. Accessed on: 29 Sep. 2025.

HERBERT, Eti Best; OLATEJU, Omolar; ODENIYI. Impact of World Bank Assisted Projects on Poverty Alleviation. [S.l.: s.n., s.d.].

INSTITUTE FOR ENERGY ECONOMICS AND FINANCIAL ANALYSIS. Confronting climate change: rising insurance costs can curb economic growth. Available at: https://ieefa.org/resources/confronting-climate-change-rising-insurance-costs-can-curb-economic-growth. Accessed on: 29 Sep. 2025.

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE. Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report. Geneva: IPCC, 2023. Available at: https://www.ipcc.ch/report/ar6/syr/. Accessed on: 29 Sep. 2025.

INTERNATIONAL MONETARY FUND (IMF). Property Insurance Challenges in the ECCU. In: Eastern Caribbean Currency Union: selected issues. Washington, D.C.: IMF, May 2025. Available at: https://www.imf.org/en/Publications/selected-issues-papers/Issues/2025/05/29/Property-Insurance-Challenges-in-the-ECCU-ECCU-567315. Accessed on: 8 Nov. 2025.

JENA, Labanya Prakash; ANAND, Aayush. Confronting climate change: rising insurance costs can curb economic growth. Institute for Energy Economics & Financial Analysis (IEEFA), 14 Jan. 2025. Available at: https://ieefa.org/resources/confronting-climate-change-rising-insurance-costs-can-curb-economic-growth. Accessed on: 8 Nov. 2025.

KUMAR, Aman. *Cyclone Winston*. Encyclopaedia Britannica. Última atualização 10 nov. 2025. Disponível em: https://www.britannica.com/event/Cyclone-Winston. Acesso em: 11 nov. 2025.

LEE, Nancy; MATTHEWS, Samuel; REID, James. *Do the most climate-vulnerable countries get more adaptation finance from the World Bank?* Blog – Center for Global Development, 10 abr. 2025. Disponível em: https://www.cgdev.org/blog/do-most-climate-vulnerable-countries-get-more-adaptation-finance-world-bank. Acesso em: 11 nov. 2025.

McCABE, Kirsty. State of the Global Climate 2024. MetMatters, Royal Meteorological Society, 19 Mar. 2025. Available at: https://www.rmets.org/metmatters/state-global-climate-2024. Accessed on: 8 Nov. 2025.

MOUNTFIELD, E. World Bank eyes speeding up loan approvals amid bold overhaul. Reuters, London, 2 Nov. 2023. Available at: https://www.reuters.com/world/world-bank-eyes-speeding-up-loan-approvals-amid-bold-overhaul-2023-11-02/. Accessed on: 8 Nov. 2025.

UNITED NATIONS. About Small Island Developing States. New York: UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, [2025]. Available at: https://www.un.org/ohrlls/content/about-small-island-developing-states. Accessed on: 8 Nov. 2025.

POYNTING, Mark. How is climate change affecting hurricanes, typhoons and cyclones? BBC News, 16 Dec. 2024. Available at: https://www.bbc.com/news/world-us-canada-42251921. Accessed on: 29 Sep. 2025.

RAHMAN, M. T. Teesta River Project: should Bangladesh self-fund? Asia Times, 15 Jul. 2024. Available at: https://asiatimes.com/2024/07/teesta-river-project-should-bangladesh-self-fund/. Accessed on: 8 Nov. 2025.

REITMEIER, Lea; DOOKIE, Denyse S. *Small Island Developing States need innovative forms of finance to bridge the devastating 'adaptation gap'.* Grantham Research Institute on Climate Change and the Environment – LSE, 13 dez. 2024. Disponível em: https://www.lse.ac.uk/granthaminstitute/news/small-island-developing-states-need-innovative-forms-of-finance-to-bridge-the-devastating-adaptation-gap/. Acesso em: **11 nov. 2025.**

RESERVE BANK OF FIJI. Fiji Sovereign Green Bond -- Impact Report 2018. Suva: Reserve Bank of Fiji, 2018. Available at: https://www.rbf.gov.fj/wp-content/uploads/2020/03/Fiji-Sovereign-Green-Bond-Impact-Report-2018.pdf. Accessed on: 8 Nov. 2025.

SCHAER, Caroline; PANTAKAR, Archana. Promoting private sector engagement in climate change adaptation and flood resilience: a case study of innovative approaches applied by MSMEs in Mumbai, India. In: ALVES, Fátima; LEAL FILHO, Walter; AZEITEIRO, Ulisses (ed.). Theory and Practice of Climate Adaptation. Cham: Springer, 2018. p. 175-191. Available at: https://www.unepccc.org/publications/promoting-private-sector-engagement-in-climate-change-adaptation-and-flood-resilience-a-case-study-of-innovative-approaches-applied-by-msmes-in-mumbai-india/. Accessed on: 8 Nov. 2025.

SCHOLER, Marie; SCHUERMANS, Pamela. Climate Change Adaptation in Insurance. In: KONDRUP, Claus; MERCOGLIANO, Paola; BOSELLO, Francesco; MYSIAK, Jaroslav; SCOCCIMARRO, Enrico et al. (ed.). Climate Adaptation Modelling. Cham: Springer, 2022. p. 187-194. DOI: 10.1007/978-3-030-86211-4_22.

STEIN, K.; DAY, E.; WALLIS, M. To insure or not to insure, that is the question: why property insurance matters for urban climate resilience, and why some urban areas are becoming "uninsurable" just when we need insurance protection most. Journal of City Climate Policy and Economy, v. 4, n. 1, 2024. DOI: 10.3138/jccpe-2024-0050. Available at: https://utppublishing.com/doi/full/10.3138/jccpe-2024-0050. Accessed on: 8 Nov. 2025.

TALL, Arame; LYNAGH, Sarah; BLANCO VECCHI, Candela; BARDOUILLE, Pepukaye; MONTOYA PINO, Felipe; SHABAHAT, Elham; STENEK, Vladimir; STEWART, Fiona; POWER, Samantha; PALADINES, Cindy; NEVES, Philippe; KERR, Lori. Enabling private investment in climate adaptation & resilience: current status, barriers to investment and blueprint for action. Washington, DC: World Bank Group; Global Facility for Disaster Reduction and Recovery (GFDRR), 2021. 71 p. Available at: https://openknowledge.worldbank.org/. Accessed on: 8 Nov. 2025.

TEN BRINKE, Niek; VINKE-de KRUIJF, Joanne; VOLKER, Leentje; PRINS, Nora. Mainstreaming climate adaptation into urban development projects in the Netherlands: private

sector drivers and municipal policy instruments. Climate Policy, v. 22, n. 9-10, p. 1155-1168, 2022. DOI: 10.1080/14693062.2022.2111293. Available at: https://doi.org/10.1080/14693062.2022.2111293. Accessed on: 8 Nov. 2025.

THE BUSINESS STANDARD. What are the delayed World Bank projects in Bangladesh? Dhaka, 30 Sep. 2025. Available at: https://www.tbsnews.net/economy/billions-stake-bangladesh-what-are-delayed-world-bank-projects-1249536. Accessed on: 8 Nov. 2025.

TOYOTA suspende produção e adia lançamento do Yaris Cross após temporal. G1, 24 Sep. 2025. Available at: https://g1.globo.com/carros/noticia/2025/09/24/toyota-suspende-producao-e-adia-lancamento-do-yaris-cross-apos-temporal.ghtml. Accessed on: 29 Sep. 2025.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT. Climate adaptation: building resilience through structural transformation -- Research Paper No. 2021/23 (SER-RP/2021/23). Geneva: UNCTAD, 2021. Available at: https://unctad.org/system/files/official-document/ser-rp-2021d23_en.pdf. Accessed on: 8 Nov. 2025.

UNITED NATIONS ENVIRONMENT PROGRAMME. Adaptation Gap Report 2024: come hell and high water -- as fires and floods hit the poor hardest, it is time for the world to step up adaptation actions. Nairobi: United Nations Environment Programme, 2024. Available at: https://www.unep.org/resources/adaptation-gap-report-2024. Accessed on: 8 Nov. 2025.

UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION. Global Assessment Report on Disaster Risk Reduction 2025. Geneva: UNDRR, 2025. Available at: https://www.undrr.org/gar/gar2025. Accessed on: 29 Sep. 2025.

UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION (UNDRR). Small Island Developing States (SIDS): gaps, challenges and constraints in means of implementing the Sendai Framework for Disaster Risk Reduction. [S.l.]: UNDRR / United Nations, 2022. Available at: https://sdgs.un.org/sites/default/files/2022-11/SIDS_DRR_Gap_Assessment_Report_MoI.pdf. Accessed on: 8 Nov. 2025.

WORLD BANK. Bangladesh receives $400 million to rehabilitate 600km embankments in coastal districts. Press Release, 1 Oct. 2013. Available at:

https://www.worldbank.org/en/news/press-release/2013/10/01/bangladesh-receives-400-million-to-rehabilitate-600km-embankments-in-coastal-districts. Accessed on: 29 Sep. 2025.

WORLD BANK. Bangladesh Resilient Infrastructure for Adaptation and Vulnerability Reduction Project. Project Appraisal Document, Report n. PAD4103. Washington, DC: World Bank, 25 May 2022. Available at: https://documents1.worldbank.org/curated/en/510101656370254439/pdf/Bangladesh-Resilient-Infrastructure-for-Adaptation-and-Vulnerability-Reduction-Project.pdf. Accessed on: 8 Nov. 2025.

WORLD BANK. Development Policy Financing (DPF). Washington, DC: World Bank, [2025]. Available at: https://www.worldbank.org/en/what-we-do/products-and-services/financing-instruments/development-policy-financing. Accessed on: 8 Nov. 2025.

WORLD BANK. Investment Project Financing (IPF). Washington, DC: World Bank, [2025]. Available at: https://www.worldbank.org/en/what-we-do/products-and-services/financing-instruments/investment-project-financing. Accessed on: 8 Nov. 2025.

WORLD BANK. Fiji -- Critical Bridges Resilience Project (Project ID P180979): Project Information Document / Resettlement Plan / Project documents. Washington, D.C.: World Bank Group, 2024. Available at: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099111524183515769/txt/P18097912e8e89001a58d14ac97837057f.txt. Accessed on: 8 Nov. 2025.

WORLD BANK. World Bank approves $600 million for Türkiye to build resilience against floods and drought. Press Release, 27 Jun. 2024. Available at: https://www.worldbank.org/en/news/press-release/2024/06/27/world-bank-approves-600-million-for-turkiye-to-build-resilience-against-floods-and-drought. Accessed on: 29 Sep. 2025.

WORLD BANK. Türkiye Flood and Drought Management Project: project appraisal document. Report No. PADHI00259. Washington, DC: International Bank for Reconstruction and Development, 5 Jun. 2024. 60 p. Project ID: P179313. Available at: https://documents.worldbank.org/. Accessed on: 8 Nov. 2025.

WORLD METEOROLOGICAL ORGANIZATION. Global climate predictions show temperatures expected to remain at or near record levels for coming 5 years. Media Centre, [s.d.]. Available at: https://wmo.int/news/media-centre/global-climate-predictions-show-temperatures-expected-remain-or-near-record-levels-coming-5-years. Accessed on: 29 Sep. 2025.