



THE NEXT WAVE

MAGAZINE

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IMPROVING LIVES

Our work is dedicated to creating vibrant and resilient economies in the Caribbean where people are safe, productive, and happy.

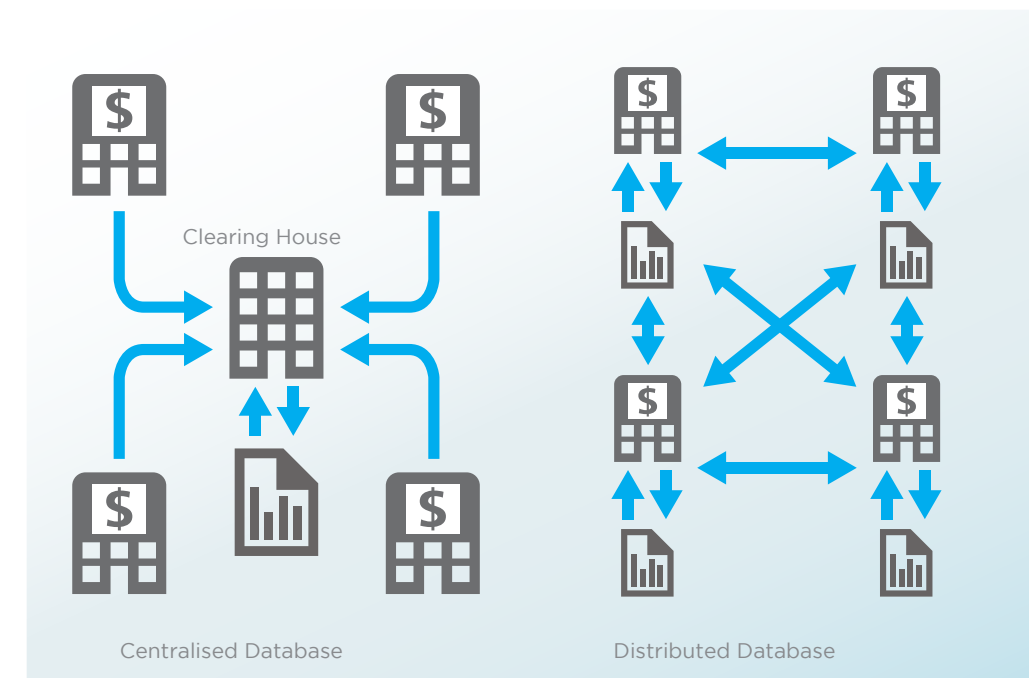


What's Trending?

Photo by Christian Mueller, 2015, Shutterstock

What is blockchain technology?

Blockchain is a distributed ledger technology that evolved from the internet of information and represents a second phase of the internet. Whereas the first era of the internet democratized the exchange of information, blockchain promises to democratize the exchange of real value. Blockchain emerged in late 2008, in the midst of the global financial crisis. Satoshi Nakamoto released a new protocol for a “A Peer-to Peer Electronic Cash System” and created a digital currency or cryptocurrency called Bitcoin based on block chain technology, with the first Bitcoin transaction being realized on January 12, 2009. Cryptocurrencies differ from traditional fiat money in that they are not issued by a national state. They are not stored in a bank vault or a credit recorded in an electronic file somewhere; rather, they consist of a global spreadsheet or ledger of all transactions which leverages the resources of a large peer-to-peer network to review and approve each bitcoin transaction. But blockchain is more than cryptocurrencies, it has applications beyond that. Investors realize its commercial potential and money is entering at a fast pace.



Blockchain has five properties that make it a potentially transformative and disruptive technology:

• Distributed

A protocol establishes a set of rules in the form of distributed mathematical computations that ensures the integrity of the data exchanged among a large number of computing devices without going through a trusted third party. Each blockchain is run on computers provided by volunteers around the world, there is no central database to hack into, corrupt, or shutdown. This means that things of high value—money, stocks, bonds, intellectual property rights from music, art, and even votes—can be stored

and exchanged without an institution or middleman.

• Encrypted

Blockchain uses a two-key authentication system to maintain virtual security.

• Inclusive and transparent

In the case of public blockchain, anyone can view all the transactions that reside on the network so no person or institution can hide a transaction. Since blockchain is open source, anyone can download and use it. Satoshi imagined a world in which any person can interface with the blockchain through a “simplified payment verification mode” that can be used on a mobile device. No documentation or physical presentation of proof is required to be trusted or to gain access.

All you need to know in simple terms

By Mark Wenner

• Immutable

Within minutes all transactions are verified, cleared, and stored in a block that is linked to the preceding block, thereby creating a chain. Each block must refer to the preceding block to be valid. This structure permanently time-stamps and stores exchanges of value, preventing anyone from altering the ledger.

• Historical

Since blockchain is a distributed ledger representing a network consensus of every transaction that has ever occurred, the blockchain must be preserved in its entirety. Storage matters greatly. It allows the provenance of products. For example, art and diamonds could be traced easily.

The value of this new technology is that it allows trusted transactions to occur directly between two or more total strangers, authenticated by mass collaboration on a network of interlinked devices, and motivated by collective self-interest, rather than by profit-driven corporations or governments motivated by maintaining power or who may be interested in surveilling its citizens or stifling dissent. In short, blockchain eliminates middlemen.

These properties allow developers to elaborate applications for a number of different purposes.

Actual and Potential Applications

* Financial Services

Bitcoin is the first and most prominent application of block chain technology as a digital currency

independent of any central authority, transferable electronically, and with very low transaction costs. A stable and widely accepted cryptocurrency stands to revolutionize e-commerce, money transfers, and even letters of credit. Cryptocurrency poses a challenge to traditional banking. Besides Bitcoin there are other cryptocurrencies such as Litecoin, Ethereum, Ripple, Peercoin, and Namecoin. To date, the value of cryptocurrencies has fluctuated widely as they struggle to gain widespread use. Nonetheless, the top ten cryptocurrencies have a market capitalization of US\$98.8 billion as of June 2017; however this amount is still a miniscule value of the total value of financial assets worldwide.

• Retail and Services

Bitcoin can be used in retail and services. Any merchant who accepts digital money as payment can exchange their goods and services. Persons and companies involved in a supply value chain can use private blockchains to reduce

transaction costs in their business relationships and make payments and transfers along the chain as well as pass information in a very transparent manner. For creative artists and craftspersons, using blockchain along with digital media management technologies may allow them to directly market their wares, reduce piracy of electronic media, and assure quick and accurate payments.

• Digital Identity

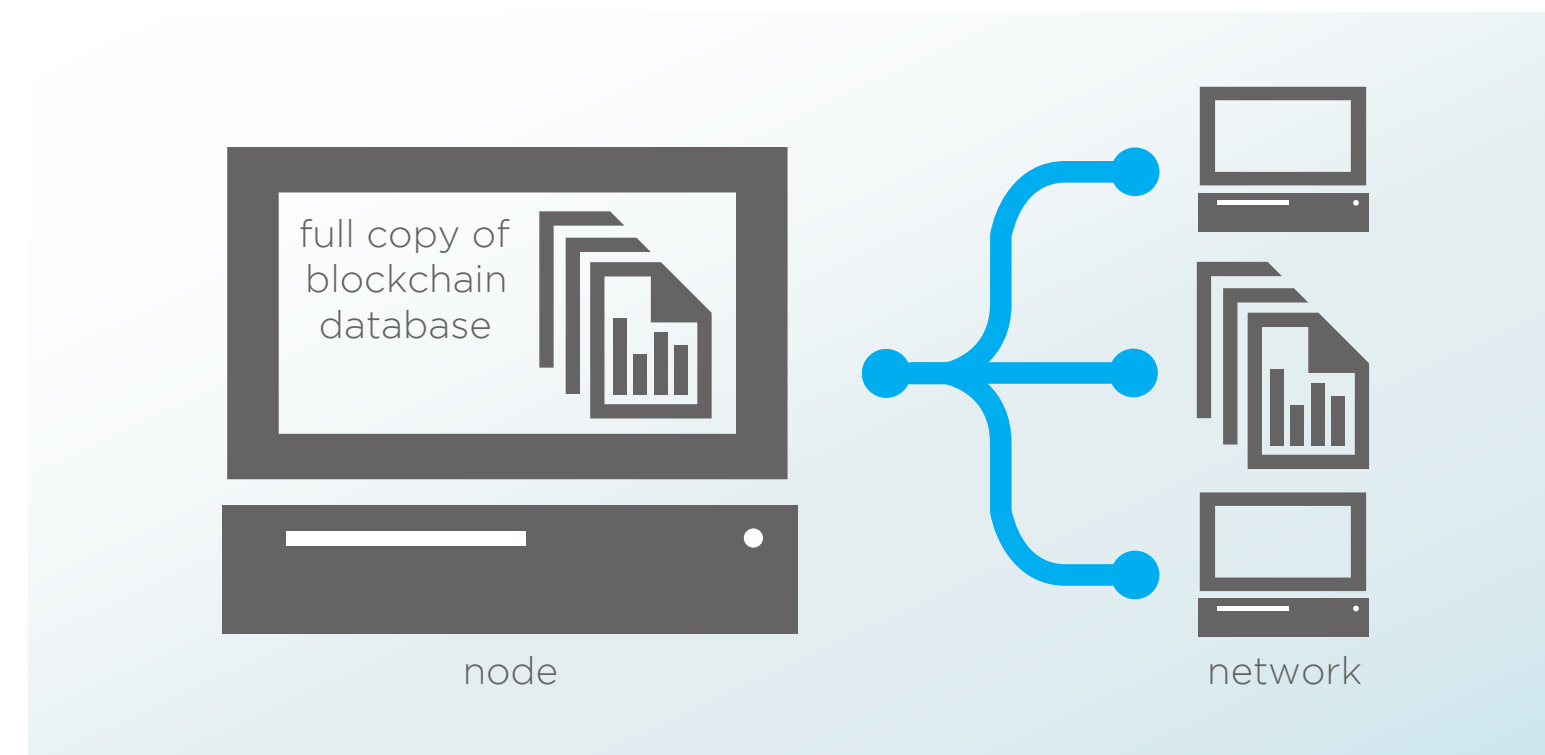
Identity theft is emerging as a bane of the digital age. Currently, taking precautions against identify theft and attempting to restore identity after it has been compromised is an \$18.5 billion annu-

al business and growing yearly according to Distil Networks. Using blockchain technologies would make the tracking and managing of digital identities secure, efficient and low-cost. Identity could be uniquely authenticated in an irrefutable, immutable, and secure manner and would revolutionize online commerce, passports, e-residency, birth certificates, wedding certificates, and work-related or government-issued IDs.

• Digital Voting

Two of the biggest hurdles to electronic poll place machines and online voting are the fear that security can be breached and that votes can be manipulated.

Using blockchain, a voter could verify whether his or her vote was successfully transited and remains anonymous since with distributed ledger technology, it would not be possible to alter a vote once cast. The ability to hold e-voting could help reduce the high rates of non-participation in leading western democracies and reduce travel and wait times for countries with mandatory voting. In weak and factionalized democracies where the temptation to rig votes is high, blockchain would help preserve the sanctity of the vote and decrease fraud, subsequently decreasing disruptions caused by recounts or prolonged protests against voting exercises that are



perceived as tainted.

• Legal Contracting and Notaries

Legally binding programmable digitized contracts can be entered on a blockchain and programmed to release funds using cryptocurrency once terms and conditions are met, reducing the need for lawyers and intermediary organizations such as banks. Notary publics can be replaced by having a digital proof of existence that allows users to upload a file, pay a transaction fee and have cryptographic proof of it included on the bitcoin blockchain. The block timestamp becomes the record's timestamp.

Challenges

Despite the tremendous potential of the technology, however, if governance and stewardship issues are not resolved, the blockchain technology may fail to live up to expectations. The stakeholders in the system are usually innovators, venture capitalists, financial institutions, program and application developers, internet activists, academics, and NGOs. They all have to combine and come to some basic agreement on three levels and create self-policing and self-regulating bodies. Since no state actors are active in this realm, the stakeholders have to collaborate, identify common

interests, and create incentives to act for the communal good. Just as the early internet pioneers rejected hierarchy and acted based on rough consensus and constantly improving the code they wrote, this generation of the internet will need leadership and broad cooperation.

(1) Platform: Standards or protocols are needed to govern scalability (block size versus average bandwidth enjoyed by users), energy consumption, stability (switching from proof of work to proof of stake), and robustness of the network infrastructure in order to assure the long-term success.

(2) Applications: Some oversight is needed to ensure user-friendly interfaces and map a way to increase the pool of skilled developers.

(3) Legal structure for stewardship: The ecosystem needs a governance body to coordinate on matters such as inter-operability, privacy, security, protection of identity, and actions to reduce the amount of legal uncertainty surrounding emergent technologies. They need to spur more investments in research and confront upcoming challenges from legacy operators and hackers that are likely to attempt to exploit open source coding to commit acts of theft, sabotage, fraud, or extortion.



On one hand, premature and heavy handed top down legislation or regulation could stifle the development of the blockchain technology. On the other, a high level of disorganization and anarchy could prevent widespread adoption and deployment of the technology. As an open platform, users can use the technology for nefarious purposes that could be viewed as violating common core values and draw the scrutiny of public authorities. Most recently, the hackers behind WannaCry ransomware that affected 160,000 computers worldwide and caused an estimated \$4 billion in damages, demanded payment via Bitcoin because of the anonymity of the system. Large corporations with vested interest in a closed paradigm and wealthy dictators bent on repression could appropriate applications and networks they control for their own narrow interests. Whether a formal bottom up multistakeholder governance structure will emerge or attempts will be made by state-backed institutions to impose limits, remains to be seen. The blockchain innovation is only eight years old.

Possible Applications in the Caribbean

In the Caribbean, blockchain technology could be applied in the following areas:

(1) Migrant remittances where a reduction in transaction costs could help some of the most remittance-dependent countries such as Jamaica, Haiti, Dominican Republic, and Guyana

(2) International business transfers facilitation, as many of the regional banks face the loss of correspondent banking relationships (de-risking) with major money center banks due to a cost benefit analysis: small market size versus the high costs of compliance associated with anti-money laundering statutes

(3) Voting, especially in jurisdictions with contentious elections such as Haiti where complaints about voter irregularities are common

(4) Smart contracting that could reduce the cost of doing business and revolutionize public sector contract and procurement systems

(5) Digital identities in a region that is a high source of out bound

migration and where the majority of economies are tourist-dependent and receive millions of visitors each year. Better identity verification will facilitate both emigration and immigration.

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Could Digital Transformation Help the Caribbean become More Resilient to Natural Disasters?

By Camila Mejia

Just consider for a second how technology affected our lives in the past two decades. The way we work, the way we interact and communicate, the way we pay bills, the way we access government services, have all been subject to a complete technological overhaul. What if a company or an individual decides not to use the internet, or the e-mail? A famous quote by Leon Meggison might answer this question. “It is not the strongest of the species that survives, nor the most intelligent that survives.”, says the management professor “It is the one that is most adaptable to change”. Digital transformation is and will be the constant in our world. How adaptive we are to these changes as a company, as an individual or as a government, how we manage to leverage digital technology to solve some of the main challenges our society is facing will certainly determine our survival in a digital world.

What is “digital transformation”? Simply put, it is all the changes in a society as a result of the implementation of digital technologies. It is a series of profound technological changes in businesses, processes and activities that have a larger impact on the

way society operates and organizes itself. Digital transformation ultimately implies leveraging technology to improve our current activities, but most importantly to tackle the problems or challenges that we face as a society.

In 2017, the Caribbean was hit by several deadly and destructive hurricanes that left massive devastation in several islands. As this episode proved, natural disasters can result in deaths and cost governments billions of dollars. According to Moody’s Analytics, hurricanes Harvey and Irma combined cost the US and the Caribbean US\$150-200 billion in damages and output lost. As



in the region. The question now



According to Moody’s Analytics, hurricanes Harvey and Irma combined cost the US and the Caribbean

US\$150-200
in damages and output lost. **billion**

a result, improving resilience to natural disasters has become a major concern for governments

is **how can digital transformation help governments in general, and Caribbean governments in**

¹ A tier III data center increases Jamaica’s resilience to natural disasters and climate change as it offers better redundancy in case of emergency. The occurrence of extreme events (in the short-term) or temperature increases (in the long-term) can affect data centers (e.g. causing operational and service disruptions, infrastructure damages, increase in operational costs), thus weakening the sector’s robustness (i.e. its ability to maintain its performance in the face of shocks and fluctuations). Considering the critical role of data centers, these disruptions can have wider effects across multiple sectors, including the loss of information from databases.



particular, become more resilient to natural disasters?

Technology can play a crucial role in the preparedness for natural disasters and the issuing of early warnings. The use of ICT to streamline emergency responses between different territories or government agencies is critical. Several countries have been working to improve this connectivity and integrate the ICT tools used by different government agencies in charge of disaster management. For instance, after the 1999 Marmara Earthquake, Turkey implemented a

National Emergency Management Information System across the entire country. This system, together with an Uninterrupted and Secure Communication System, is designed to provide the authorities with a reliable network during disasters and emergency situations. Similarly, Jamaica is currently upgrading its data center to a Tier III and building a Government network connecting all Government agencies across the country through fiber optics, creating a redundant and reliable connectivity network that will help to improve the Government's response to natural disasters.

A real-time operational picture obtained through different data sources and aimed at making quick decisions in cases of emergency is also an essential aspect of building resilience. Data-driven



digital solutions can help tackle and predict natural disasters. In Tanzania, the Dar Ramani Huria Project (Swahili for "Dar Open Map") improved flood resilience through community mapping. Floods in Tanzania result every year in a large number of deaths and millions of dollars in damages due to lack of planning and informal settlements. The project helps communities map residential areas, roads, streams, floodplains, and other relevant features. This data is then digitized and combined with other data in "InaSAFE", a free software that enables users to run realistic natural disaster scenarios for better planning. This process would bring disaster prevention and response to areas that were previously off the map.

² This activity will be part of the national government network called GovNet. This network is being implemented under three IDB projects: (i) Support to the Public Sector Transformation Program; (ii) Implementation of the National Identification System for Economic Growth; and (iii) Security Strengthening Project.

³ As suggested by the International Telecommunications Union (2014) in "Resilient pathways: the adaptation of the ICT sector to climate change", placing telecommunication cables underground is a critical factor to ensure that telecommunications will be more resilient to all types of extreme weather.

In the aftermath of natural disasters, mobile and digital technologies proved to have a critical role in establishing unique, digital identities. Digital innovation is making registration and identification more efficient, enhancing data sharing across organizations, and helping establish identities that can be verified anytime, anywhere. Citizens who lost their identifying documents in the aftermath of natural disasters may have a hard time crossing international borders, or verifying their eligibility to access a range of services such as cash aid, food or clothing. Also, digital innovation plays a critical role in the identification of fatal victims. Robust digital identity solutions, already implemented in refugee camps around the world, have proven their utility and convenience to support crisis-affected populations. For instance, the United Nations High Commissioner for Refugees in Malaysia has begun issuing photo-ID cards that can be scanned and verified using a free mobile application called "UNHCR VERIFY-MY." In countries like India, the country's identification system Aadhaar facilitates such procedures in the case of natural disasters. Aadhaar collects and stores biometric data and provides proof of electronic identification in a few seconds. Furthermore, after natural disasters or during extreme weather conditions, online services



play a key role in ensuring the continuity of government services and business operations despite the unavailability of physical offices. Estonia, a country well-known for its leadership in the implementation of e-Government, provides 99% of 24/7 online public services. During extreme winters, online services allowed all citizens to have access to government services from the comfort of their own homes. Similarly, during the hurricanes that affected the American state of Florida, the ability to maintain a digital storefront helped business owners to recover faster in the aftermath of these disasters. The continuity of digital services is heavily dependent on adequately planning IT physical infrastructure, such as data centers. In order to avoid the loss of data after a natural disaster and to ensure redundancy, countries may need to build several onshore and offshore data centers or they may otherwise need to use

cloud services.

Lessons from around the world demonstrate the enormous potential that digital transformation has on improving resilience. Regions like the Caribbean, vulnerable to natural disasters, face the challenge of creating an ecosystem that will accelerate digital transformation in order to prevent, mitigate and improve the responsiveness to natural disasters. Countries like Jamaica are moving ahead rapidly by implementing legal frameworks and physical infrastructure to enable digital transformation through projects such as the new National Identification System. Nevertheless, in the quest for resilience, procuring technology is only one part of the equation. Guaranteeing that both government institutions and citizens are fully equipped with the necessary knowledge and skills to leverage digital technology is one of the biggest challenges ahead.



Embracing innovation and change to thrive

By Fernando Pavon

How can innovation be embedded To enhance resilience in the Caribbean?

The Caribbean, a region known for weathering hurricanes, faces challenges beyond natural disasters. With an economic growth that is weak and dependent on only a few sectors— tourism or commodity exports¹ — emphasis needs to be placed on economic and technological changes and how these impact Caribbean nations.

What has history taught us?

Looking at the timeline of the industrial revolutions, what stands out first is the time lapse between

each occurrence. It took almost a century for each of the three industrial revolutions to take place.

The first Industrial Revolution in 1784 brought mechanical production, railroads and steam power.

The second Industrial Revolution in 1874 introduced the first assembly line.

The third industrial revolution in 1969 rolled out automated production, electronics and computers.

As the fourth Industrial Revolution unfolds, one of its greatest challenges is the pace at which these changes are taking place.



First Industrial Revolution

1784

mechanical production, railroads
and steam power to the Second Industrial Revolution

1874

first assembly line and the Third Industrial Revolution

1969

automated production, electronics
and computers)

These technological changes are re-shaping our economies, the way we do our jobs and even the way we interact with each other. This generation lives in a technology-driven world that demands more resilient industries and a more resilient workforce capable of constantly adjusting to changes.

Focusing on economic cycles, in terms of country-level economic growth, the 2007–2009 period was particularly problematic because of the global financial crisis. During this period tourism-dependent Caribbean countries suffered a significant hit, growing at only 0.36 percent and experiencing a negative growth of 0.07 percent during 2010–2013². The impact is reflected on youth unemployment rates. The Bahamas and Barbados for example, demonstrated a significant increase in youth unemployment since 2007³.

How can Caribbean countries become more resilient to face economic shocks? We can look at countries with a long tradition of advanced apprenticeship models, such as Germany, Austria, and Switzerland, that have managed to maintain lower unemployment levels for youth (Lerman, 2015) despite the economic crisis⁴.

¹ "Private Sector Development in the Caribbean", Caribbean Region Quaterly Bulletin, IDB. 2017.

² "Engine of Growth? The Caribbean Private Sector Needs More Than an Oil Change.", Inder Ruprah and Ricardo Sierra, IDB 2016

So how can the region embrace change at a much faster pace?

With technology forcing high speed changes in the world of business, the region has the opportunity to capitalize on the new technology-based jobs and embrace innovation as they invest in skills development systems that are synchronized with businesses. McKinsey Global Institute's latest report, Jobs lost, jobs gained: Workforce transitions in a time of automation shed some interesting findings on what lies ahead of us. Among the most interesting is that "even with automation, the demand for work and workers could increase as economies grow, partly fueled by productivity growth enabled by

technological progress." Several see this technological progress as a "threat" to our jobs, others view these technological advances as a way to improve our lives. History taught us that adapting to changes is what makes our society thrive. Trying to understand how earlier industrial revolutions impacted the workforce will help shed some light on how society changes with the introduction of new technologies. "Before the advent of the Industrial Revolution, most people resided in small, rural communities where their daily existences revolved around farming. Life for the average person was difficult, as incomes

were meager, and malnourishment and disease were common. People produced the bulk of their own food, clothing, furniture and tools. Most manufacturing was done in homes or small, rural shops, using hand tools or simple machines." ⁶ The technological advancements at the time provided a better quality of life, but it also threatened to displace workers. The workforce survived because people were adaptable to change. To smooth the looming workforce transitions with the adoption of technology/automation in the next couple of decades, McKinsey's report recommends scaling and reimagining job retraining and workforce skills development.⁷

MAKING POSSIBLE ... technological advances improve our lives.



³ Caribbean Development Bank. 2015. The Imperative of Youth Employment for Sustainable Development in the Caribbean. CDB.

⁴ "Apprenticeships for the XXI Century: A Model for Latin America and the Caribbean?", Maria Fazio, Raquel Fernández-Coto, Laura Ripani. IDB 2016.

⁵ McKinsey Global Institute. 2017. Jobs lost, jobs gained: Workforce transitions in a time of automation. McKinsey & Company. <https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-the-future-of-work-will-mean-for-jobs-skills-and-wages>.

⁶ History Channel. 2009. Industrial Revolution. A+E Networks. Accessed December 6, 2017. <http://www.history.com/topics/industrial-revolution>.

⁷ McKinsey Global Institute. 2017.

Innovation: Embrace it or brace yourself.

Focusing on technological advancements, in terms of the pace of innovation and how it affects the region, the region should strive to have a pipeline of talent (workforce) that allows for industries to not only adapt, but to innovate. We are currently seeing an increase in innovations and a substantially faster pace of technology adoption.⁸ If we learn from history, it is important to enable our workforce to adapt to changes as industries evolve. We can embrace innovation through skills development by encouraging industries and employers to lead the charge. As firms adopt new technologies to remain competitive in their industries, they must also acquire a “need” to innovate. Beyond giving workers access to a stable career ladder, apprenticeships can represent a tool for countries to “instill skills needed for innovation to take place, for workers to be able to adapt and develop new technologies, and for human capital to be brought closer to firms’ operational needs for increasing productivity and competitiveness”⁹.

In some countries, the adoption of innovation has been completely led by the private sector. In the United Kingdom for example,



some employer-led bodies (Sector Skills Councils) have now been complemented by trailblazer groups of 10 employers in charge of developing standards for specific occupations in an industry¹⁰—to directly shape the skills requirement per industry needs as it evolves. Employers are now at the forefront of the development of apprenticeships and learning, developing people with workplace skills that are relevant to business and industry. In this process, industry innovative practices, new technologies or evolving industry trends (at the global stage) can and should be incorporated to re-shape the skills for these firms to adopt such innovation.

Caribbean nations such as The Bahamas and Jamaica have taken

steps to become more resilient. These nations that are aiming at diversifying the economy and boosting private sector development are focusing on skill development to prepare its workforce for a rapidly changing knowledge economy. The Bahamas is investing in a national apprenticeships program and is championing the establishment of sector skills councils in key strategic sectors. Jamaica is investing in its talent pool to better serve higher value-added options in the global services sector. Such initiatives are important public-private partnerships to develop a pipeline of talent that allows industries to constantly re-invent themselves and expand investments, creating more and better jobs.

⁸ Harvard Business Review, The Pace of technology adoption is speeding up, <https://hbr.org/2013/11/the-pace-of-technology-adoption-is-speeding-up>

⁹ “Apprenticeships for the XXI Century: A model for Latin America and the Caribbean?”, María Fazio, Raquel Fernández-Coto, Laura Ripani. IDB 2016.

¹⁰ Scottish Qualifications Authority, <https://www.sqa.org.uk/sqa/74185.html>

Natural Disasters and Sustainable Development: Facing The Challenges Head On

By Dana Payne and Camilo Pecha

Photo by hbpictures: Abstract motion blurred palm leaves moving in hurricane.

Infographics by Lynn Saghir

A vast and complex range of factors go into building action plans and policies that ensure natural disaster preparedness and mitigation while continuing to make headway with sustainable development. In recent decades, consistent regional efforts have laid the foundation for and continue to shape the region's comprehensive disaster management (CDM) plan. Key actors in the region include the Caribbean Disaster Emergency Management Agency (CDEMA, formerly CDE-RA) whose mandate is aligned with various international conventions, treaties and platforms, Caribbean Agricultural Research and Development Institute (CAR-DI), Caribbean Community Climate Change Centre (CCCC), and Caribbean Public Health Agency (CARPHA).

But recent natural disaster trends, occurrences and predictions are unsettling, with 2017 a record year for natural disaster events, notably Hurricanes Irma and Maria. The more reliable forecasts point to temperatures that are on track to be hotter and climate that will be drier, with a likely increase in the frequency of Category 5 hurricanes. PAHO Health Emergencies, presenting at CDEMA's 10th CDM conference, indicated that:

- “About 20.6% of all disasters that occurred in the world between 2007 and 2016 occurred in the Region of the Americas, with 255,033 deaths, 898,816 injuries and \$470 billion in damages.
- The most common events were related to **water and climate, and in this period**

caused 5.6% of deaths but more than 73% of damage [was] caused by disasters.”

The conference, headlined The Road to Resilience. Checkpoint 2017 – Building Resilience through Partnerships, took place in Nassau, Bahamas, December 4-9, 2017.

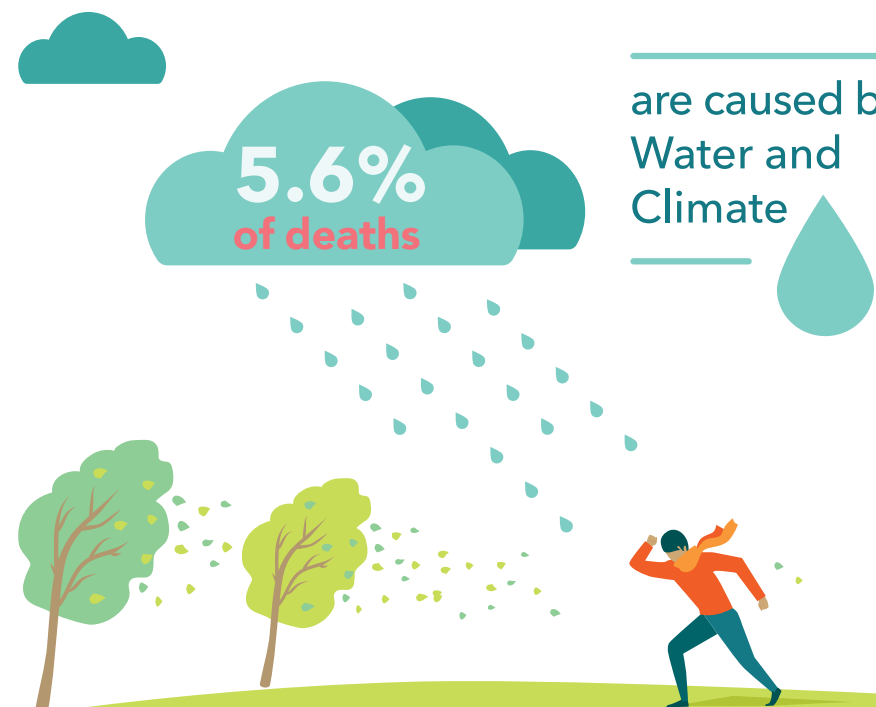
Predictions by the US National Oceanic and Atmospheric Administration's (NOAA) Geophysical Fluid Dynamics Laboratory are that **the intensity of tropical disturbances will increase between two and 11 percent, and the rainfall associated with these events will increase between 10 and 15 percent.**

A core issue for stakeholders is how to prepare for and address the anticipated intensification of these phenomena in comprehensive, unified, and innovative ways, so as to inform new policy-making, and buttress or expand existing policy to respond, mitigate impact, be prepared, and reduce loss.

The Hyogo Framework for Action 2005-2015 is a central component of the international disaster risk reduction agenda. Its objectives remain pertinent today. Among the recommendations for a **Hyogo Framework Post-2015** is that “it should encourage private sector involvement; link academics, science and technology to social demands for sustainability and

are caused by
Water and
Climate

5.6%
of deaths



disaster risk reduction; and recognize the role of women and children in resilience building.”

Ongoing and published research by IDB's Caribbean Department hinges on this recommendation and spans the agriculture, education, health, labour, and private sectors. Published studies consider the effects of weather shocks in two areas.

Research on **early childhood development** analyses the effects that exposure to tropical storms and hurricanes during pregnancy has on children's anthropometric measurements taken within the first five years of life. From a policy perspective, findings suggest harmful effects on birth weight and early physical development due to negative shocks suffered in utero, which have been shown to be correlated, over the long term, with adult productivity. Study estimates reveal that children (boys) will have 2.07 percent lower earnings in adulthood compared to similar children who did not experience these in utero shocks. Results provide additional objective and compelling justification for policies aimed at protecting expectant mothers at risk of suffering environmental shocks. Policy options toward effectively coping with these risks include weather insurance schemes, food security policies, community

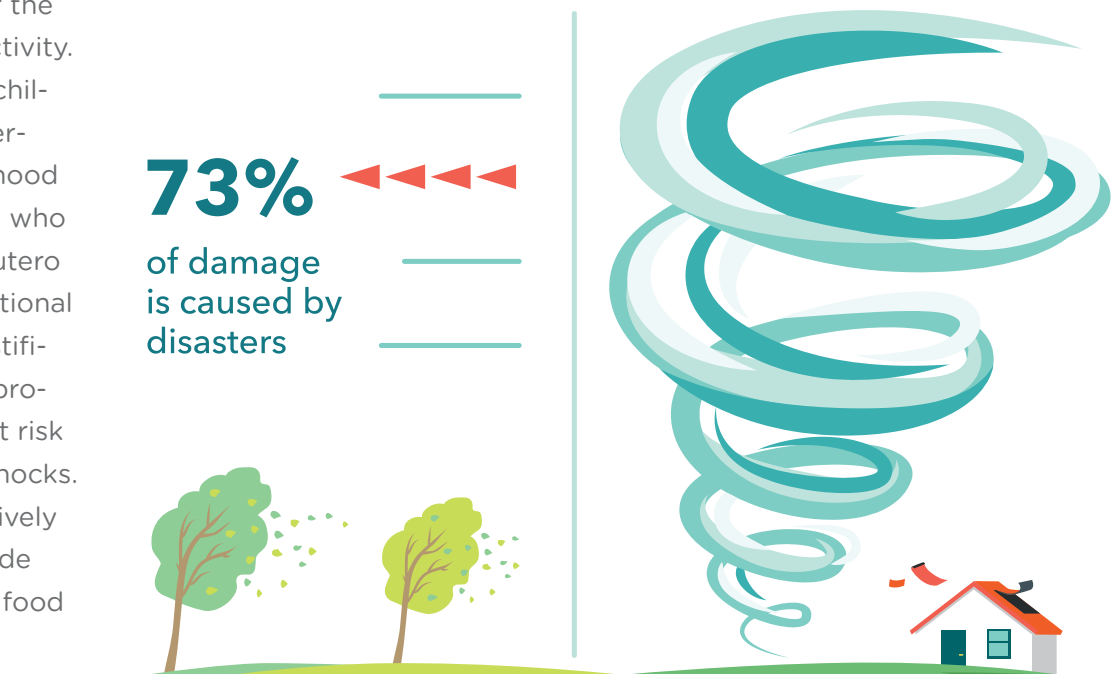
bonding strategies, and initiatives that promote resilience and adaptability to climate change.

Our study on **informality** considers the threat posed by natural disasters in the Caribbean. The likelihood of potentially worse tropical storms due to the increase in sea water temperatures and levels has become the most important long-term threat to socio-economic development in the region. How will society respond under extreme circumstances and what adaptation measures will persons use to cope with associated risks? The findings suggest as much as a **14.5% probability of men shifting to informal employment**, the results of which would further suggest that tropical storms are causing people to shift to the informal sector and that it serves as a smooth consumption measure; furthermore, the find-

ings also show the transition is not endogenous and is not entirely a decision that is up to such individuals – that is, they often have no choice. Informality brings a two-pronged disadvantage: it creates a challenge for income tax collection and reduces contribution to social security systems; it implies lack of access to formal financial mechanisms to offset – and thus increases – vulnerability to negative climatic shocks.

Informality has further implications: there is lack of career formation and reduced likelihood of receiving training in a new firm. With no training, there is no growth in productivity, either for the firm or for the individual. Productivity returns in a lower-skilled individual are low, compared to the hiring costs involved.

73%
of damage
is caused by
disasters



Actions toward potential solutions:

An array of actions could bring incremental success in the search for solutions to build communities resilient to climate change. A deeper pursuit and linking of the two studies' findings to create

an integrated, quality package of different measures could be beneficial. One way to advance this and generate other actions would be collaboration among the Bank's sector units for a multi-tiered discussion focused on pinpointing and defining a few specific steps for long-term ripple impact that would be likely to achieve buy-in from stakeholders.

A detailed impact assessment of the climate change burden on public health in the Caribbean could also be advantageous, as the region faces a growing triple threat of disproportionate non-communicable diseases, endemic infectious diseases, and fragile infrastructure and lack of services almost across the board. Further actions could include conducting a Caribbean road show to bring focused discussion on climate change to a widened audience scope; incorporating the subject matter in Bank programmatic missions; participating in strategic CARICOM conferences in the Caribbean to further sensi-

tize policymakers on the region's vulnerability and the matter's urgency.

Dialogue with the education sector could also bear fruit. Possibilities are to collaborate with private sector firms to design curricula for technical, vocational and compulsory education; engage tertiary-level faculty and students of regional architectural and engineering programmes through fora to brainstorm on innovative disaster-resistant construction techniques and materials, with options suitable both for commercial contractors and hands-on home builders, and explore with faculty the addition or reformulation of curricula for more emphasis on hurricane and natural disaster design. A tertiary-level contest on designing an appropriate replacement material for galvanized zinc sheets, often used for roofing in hands-on building but which become lethal flying debris when lifted off by hurricane winds, could also reap practical, creative results in the not so long term.

A Bahamian blogger, Nicolette Bethel, shares an inspiring blog about constructing for hurricanes in The Bahamas, and suggests both studying and standardizing building techniques, using wood and concrete materials, and incorporating them into engineering programmes, and also certifying contractors already knowledgeable in building for hurricanes so they can share and teach their expertise. The idea is to enter the global hurricane industry and export it globally – which could involve global patenting and marketing of these techniques.

A possible area of pursuit would be making micro credit available for the purchase of home construction materials to persons who certifiably attend training on hurricane-friendly construction. This would involve a grass-roots and population-wide paradigm shift in construction techniques based on weather trends, knowing that portions of the population will build their own homes.

Data availability continues to be a challenge and is a crucial area for further cooperation and improvement. Buy-in by the political economy is a must; CARICOM's blessing would be needed to ensure a natural disaster and sustainable development agenda focus and secure its spot among the region's top priorities.

There is good ground on which to stand firmly, and deep foundations on which to build, going forward. Paired with inspiration and out-of-the-box brainstorming, the first steps toward medium- to long term solutions for resilient societies can begin.

Sources:

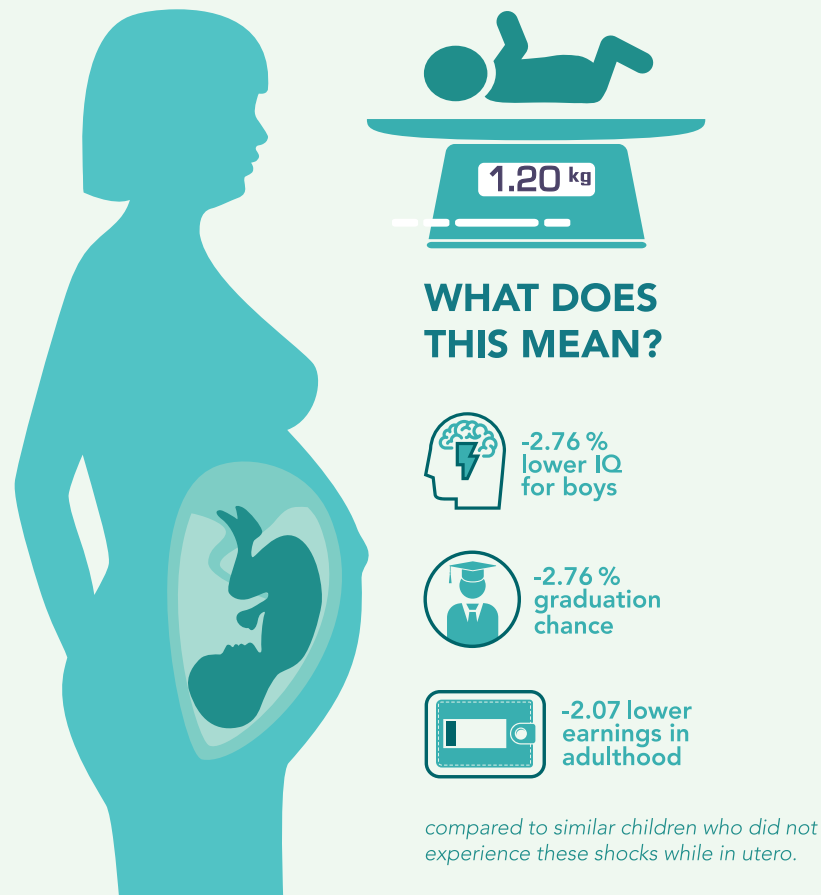
- *The Effects of Weather Shocks on Early Childhood Development. IDB working paper Series No IDB-WP-828 , October 2017*
- *Infographics by Lynn Saghir*
- *Caribbean Disaster Emergency Management Agency*

Sources:

- *Webinar: The effects of tropical storms on early childhood development and labor market dynamics, Caribbean Dev Trends, 2017*
- *The Caribbean's pioneering form of disaster insurance: Too little, but not too late - The economist, 2017*
- *Irma: A meditation on hurricanes and The Bahamas - Nico-bethelblogworld.com, 2017*

DID YOU KNOW?

A pregnant woman who has been exposed to hurricanes is **500% more likely to deliver a child with a low birth weight.**



Infographic by Lynn Saghir



What's Happening

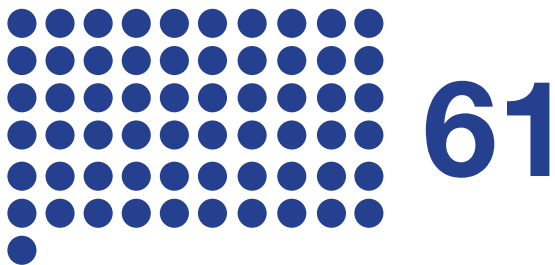
- 01 SG Portfolio and Investment Grant (IGR) Portfolio
- 02 2017 Disbursements
- 03 2018 Indicative Program
- 04 2018 Research Agenda
- 05 2017 Achievements

Sovereign Guaranteed (SG) and Investment Grant (IGR) Portfolio: Total for CCB

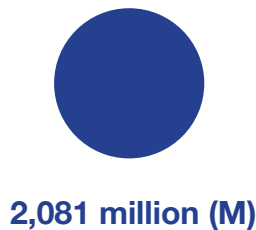
Cut-off date used:
December 31, 2017

1. SG Portfolio

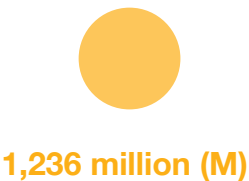
Projects



Volume (by current approved amount)



Undisbursed Balance



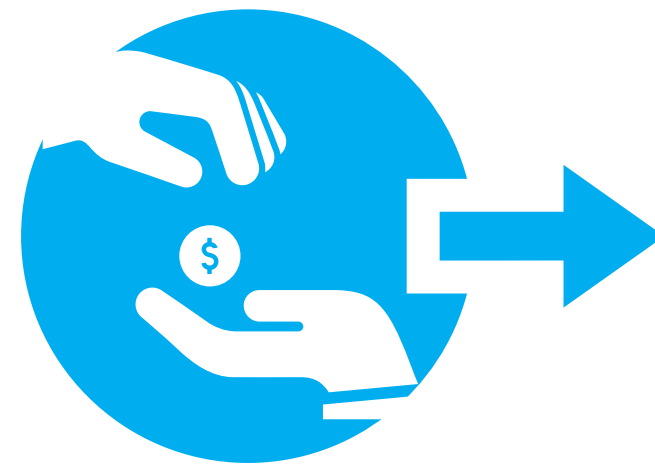
2. SG Portfolio by Lending Instrument

Caribbean Country Department (CCB)	Projects	Current Amount Approved	Current Undisbursed Amount
Investment Loan Operations (INV)	59	1, 923 M	1,093 M
Policy Based Loans (PBL)	2	157.5 M	142.5 M

3. INVESTMENT GRANTS (IGRs)

Row Labels	Count Of Project Numbers	Sum Of Current And Approved Amount	Sum Of Undisbursed Amount
GY	5	45,973,977	23,599,992.94
JA	4	26,805,411	21,647,280.8
SU	1	4,400,000	4,021,419.1
Grand Total	10	77,179,388	49,268,692.84

2018 Indicative Program



2018 Indicative Lending Program Amount

\$ 1,044,800,000

As of November, 2017

INST = INSTRUMENT
INV = INVESTMENT

THE BAHAMAS

Digital Transformation of Government to Strengthen Competitiveness



INST. INV

Contingent Loan for Natural Disaster Emergencies



INST. CON

BARBADOS

Sustainable Energy Investment Program (SMART FUND II)



INST. INV

Contingent Loan for Natural Disaster Emergencies



INST. CON

GUYANA

Establishing an Electronic Single Window for Trade and Investment in Guyana



INST. INV

Improving the Framework for Sustainable Development in Guyana



INST. PBL

Diversification of the Energy Matrix and Energy Security in Guyana



INST. INV

JAMAICA

Health Systems Strengthening Program



INST. INV

Health Systems Strengthening Program



INST. PBP

Financial System Reform Support Programme II



INST. PBP

Skills Development for Global Services in Jamaica



INST. INV

Disaster risk management and climate change adaptation program



INST. PBL

Increasing Agricultural Competitiveness



INST. INV

Contingent Loan for Natural Disaster Emergencies



INST. CON

SURINAME

Sustainable Agricultural Productivity Program



INST. INV

Financing Productive Development for Suriname



INST. INV

Health Services Support Project



INST. INV

Urban Investments for the Resilience of Paramaribo



INST. Grant

TRINIDAD & TOBAGO

The Education Advancement Program



INST. INV

Climate-resilient Coastal Infrastructure and Management Program



INST. INV

Trinidad and Tobago Water Supply Improvement Program



INST. INV

Urban Upgrading and Revitalization Program

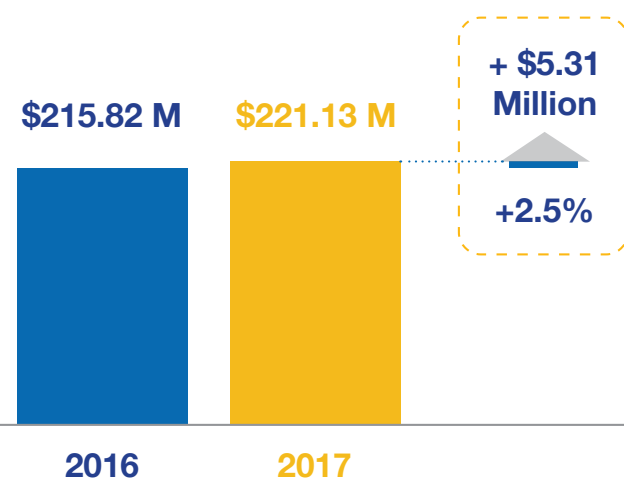


INST. INV

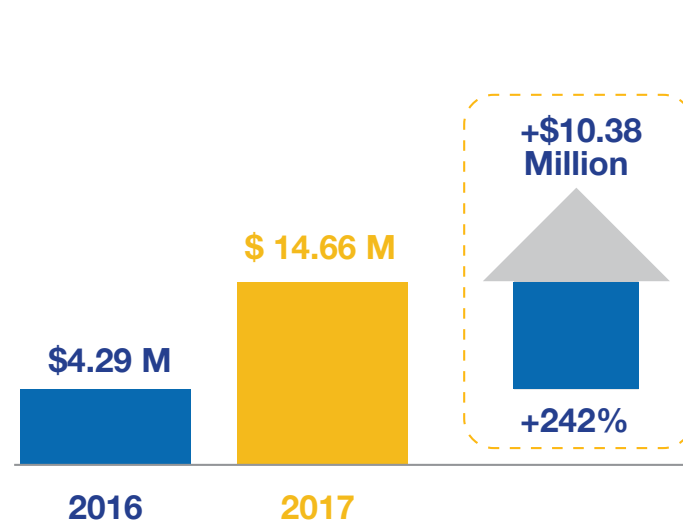
2017 Disbursements

The disbursements below are for 2017 Loans and Investment Grants (IGRs) combined and separate.

Overall increase in disbursement of loans and IGR combined



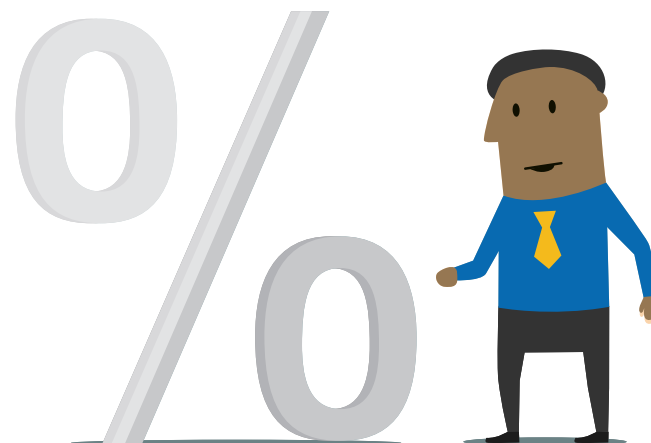
Significant increase in IGR disbursements



Burn Rate: Annual Disbursements vs EULB (Eligible Undisbursed Loan Balance)

A burn rate as calculated indicates the annual pace of disbursements that met the contractual conditions at the beginning of the year.

2017			
SU	45%	20%	22%
BA	30%	25%	13%
JA	22%	41%	27%
BH	18%	36%	19%
TT	14%	22%	39%
GY	-3%	6%	17%
CCB	17%	24%	26%
CAN	21%	21%	26%
CID	34%	30%	26%
CSC	18%	23%	26%
IDB	22%	24%	26%



2018 Research Agenda

1. Institutions in The Caribbean

The book explores the historical development and status of political and economic institutions in the Caribbean. The Caribbean institutional reality is studied vis-à-vis best international practices. The main objective is identifying positive aspects and institutional areas in need of improvement that could facilitate a sustainable development path in The Caribbean.

2. The Multidimensionality of School Output and Preferences for Schools: Evidence from Trinidad and Tobago

Is a school's impact on test scores a good measure of a school's overall benefits for students? Do parents value school impacts on test scores and other outcomes? To answer the first question, we compile a dataset that links secondary school application records from Trinidad and Tobago to examination, police, birth, and tax records. We then estimate the effect of individual schools on exam scores, dropout rates, arrests, teen pregnancy, and labor market participation. We find that schooling output is multidimensional such that some schools improve academic outcomes and some improve nonacademic and social outcomes; these are often not the same schools. To answer the second question, we link these school impacts to parents' ranked lists of schools and employ discrete choice methods to estimate parental preferences. Even though schools that improve academics and those that improve nonacademic outcomes improve labor market outcomes, parents, on average, value schools that improve academic outcomes and have low preferences for schools that improve non-academic outcomes. This suggests that parents incorrectly use test score impacts as a proxy for overall school quality. Also, parents chose high value-added schools conditional on peer quality and average outcomes –suggesting that parents can distinguish causal effects from simple school-level averages. Finally, we will assess whether and how preferences for scholastic outcomes relates to the socio-economic status of parents to explore whether parents choose schools that best match the perceived needs of their children.



School girls, Trinidad and Tobago
Photo by Kamau Joseph

3. Privately Managed Public Secondary Schools, Academic Achievement and Crime in Trinidad and Tobago

The paper exploits secondary school placement rules to estimate the causal effect of private school management on academic outcomes observed at 3, 5 and 7 years of secondary school studies. The paper also estimates the causal effect of private school management on the likelihood of being arrested during and beyond secondary school. The paper uses administrative data covering the entire country from year 2000 until year 2016.

4. Parents Know Best? The Effect of Selective Schools on Test Scores, Educational Attainment, Fertility, and Labor Market Outcomes

As in many national settings, students compete for seats at selective secondary schools. Using data from Barbados, we document that (a) there is considerable agreement among parents and students regarding which are the most desirable schools, and (b) the implied preference ranking of schools had been very stable over time. Next, using a regression discontinuity design, we estimate the causal effects of being admitted to a more-preferred (i.e. more selective) school on a wide range of academic, social and labor market outcomes. While attending a selective school is associated with large improvements in peer quality and other measured school inputs, it is not associated with improved test score performance. However, attending a selective school is associated with increased educational attainment, higher occupational status, and higher wages. We also find improvements in health status for both males and females, and a reduced likelihood of teen pregnancy for females. Our evidence suggests that parents value schools that improve the long-run outcomes of their children in ways that test scores simply do not measure.

5. Tourism and growth in the Caribbean: If Tourism Countries Grow Faster, Shouldn't the Caribbean be Booming?

This paper is centered on three main questions, always controlling for systematic differences between the Caribbean and the rest of the world: (i) Do tourism dependent countries grow more than non-tourism dependent countries? (ii) Is the effect of tourism on growth different for Caribbean countries? (iii) What are possible mechanisms?



Downtown marina of Bridgetown, Barbados
Photo by John Wollwerth



Downtown marina of Bridgetown, Barbados
Photo by John Wollwerth

6. Monetary Policy in the Caribbean: Surprise Vs. New Shocks

This paper explores empirically and theoretically a small open economy model where agents form anticipations about the future based on monetary information. The objective is to separate fluctuations due to monetary news shocks from those due to temporary errors (surprise shocks).

7. De-Risking: Drivers of the Uneven Impact across the Caribbean Region

This paper will seek to build on the work completed by the World Bank (2015) and Wright (2016) by further analyzing the decline in correspondent banking within the Caribbean region. Specifically, the paper will seek to identify some of the drivers of de-risking decision at the regional institution level and also explain why some Caribbean territories have been more negatively impacted than others by de-risking. The paper will also focus on examining the characteristics of certain groups of banks (Class A Banks vs Class B Banks) that may cause them to be viewed as more resilient to Money Launder/Terrorist Financing (ML/TF) risk from the perspective of an international correspondent bank and therefore less susceptible to de-risking.

8. The Economic Impact of a Change in the Electricity Regime: Grenada

The objective of this study is to investigate potential macroeconomic impacts of Grenada's electricity sector reform. To do this, it first develops a framework to conceptualize potential transmission paths of the separate components of the electricity sector reform on Grenada's economy.

9. Caribbean Quarterly Bulletins

The Caribbean Region Quarterly Bulletin provides information and analysis on economic developments in the region. The bulletin serves as a platform to stimulate dialogue and a better understanding of the macroeconomic challenges in the Caribbean. The March and September bulletins explore a special theme in detail and the June and December bulletins provide in-depth analysis of recent economic developments.



Photo by Shutterstock



Photo by Den Rise



Photo by Ssuaphoto



Achievements

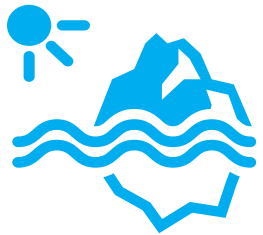
In 2017, we have:



Surpassed disbursement targets by 5% and attained a healthy burn rate.

26% burn rate

Completed all country strategy targets on time.



Positioned the Group as a key leader of **Climate Smart Coalition** (with Virgin, World Bank, CDB, et al)

An indicative lending program for 2018 including:



18 SG loans for **US\$ 569.8 million**



Four Contingent Credit Loans for Natural Disasters for a total of **US\$465 million**



One Investment Grant for **US\$10 million**



Total expected approvals will be



\$1.04 billion

Innovation

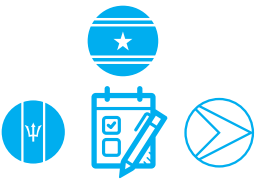


Driving innovation within the Bank with its new mReport, **Adelante design** (its internal collaboration platform), **employee recognition model**, and **strategic management**.



Revamped Pre-AGM format.

Knowledge on development in the Caribbean



Successfully collaborated with authorities on the first nationally representative **comprehensive Surveys of Living Conditions in Barbados and Suriname**; and first nationally representative Labor Force **Survey in Guyana**.



Published unprecedented causal evidence on the effects of climate change on early childhood development and labor markets in Jamaica; and the effects of public health insurance on health status and labor



Prepared cutting-edge analyses of the historical process and current state of political and economic institutions in The Caribbean for a forthcoming book.



Champion of prudent fiscal management through Quarterly Bulletins and a regional fiscal rules workshop in The Bahamas.



Caribbean Dev Trends (www.caribbeandevtrends.com) has more than doubled its engagement metrics (monthly sessions, users and page views).

Transforming our Future

One project at a time



THE **B**AHAMAS



Climate-Resilient Coastal Management and Infrastructure Program

The Bahamas is highly vulnerable to natural hazards, including hurricanes which put at risk both economic activities and associated public infrastructure. These events are usually accompanied by severe coastal erosion and flooding, including in densely populated areas where the buffering effect of coastal habitats has been lost. The Bahamas' vulnerability to natural hazards is likely to worsen with climate change which is projected to exacerbate floods linked to extreme rainfall events, rising sea level and tropical storms. Given its low-lying topography, the country is highly vulnerable to Sea Level Rise (SLR) with impacts likely to include increased coastal flooding and erosion, mangrove retreat and loss of associated ecosystem

services, decreased seagrass bed productivity, and saltwater intrusion into the small lenses of fresh

groundwater which are the source of water for some potable water systems. The Government of The Bahamas (GOBH) has recognized that future growth and diversification of its tourism-dependent economy depend on ecosystem



services, maintaining biodiversity and on enhancing the resilience of economic activities to coastal risks, including climate change. As a result of this, the Bank recently approved a 35 million loan to build resilience to coastal risks (including

those associated with climate change) through innovative capacity building and sustainable



Embracing Technology

coastal protection infrastructure, including natural infrastructure and integrated management of the coast.

In addition to loans, grants and technical expertise, IDB offers numerous trainings and knowledge events each year in The Bahamas, most of which are open to the public. In October, as part of IDB's knowledge and learning initiatives, the Bank funded a delegation from the Bahamian government to tour the Massachusetts Institute of Technology (MIT), with a focus on its Media Lab.

The one-day agenda was filled with presentations from various working groups showcasing technology that would be relevant to

the Bahamian context. Blockchain, mapping of public transit, as well as Code Next left a significant impression. Upon returning home, the Ministers requested that these technologies be showcased to the broader Bahamian public. In response to this positive feedback, Country Office Bahamas is planning an event in early 2018 to do just that. The Bank is also working to bring MIT Lab Researchers to the country to see some of the challenges and projects.



BARBADOS

connecting finance institutions and networks, adaptation and mitigation specialists, finance



ECOMICRO: Green Finance for MSMEs & Low Income Households

In April 2017, the Barbados Country Office started coordinating Eco-Micro, a Technical Cooperation Program for Latin America and the Caribbean, led by the Multilateral Investment Fund (MIF) and co-financed by Global Affairs Canada, the MIF and Nordic Development Fund. EcoMicro supports a robust ecosystem for green finance -

specialists, technology suppliers and development partners globally to develop demand-led, sustainable green finance solutions for MSMEs and low-income households in the face of a changing climate and economic uncertainty. The Global Affairs Canada contribution supports the EcoMicro Caribbean Program, which will provide up to

US\$ 280,000 in grant resources for projects that implement three components: design and implementation of green finance products; analyzing the vulnerability of the finance institutions loan portfolios to climate change; and reducing the environmental impact of the finance institutions. The Caribbean call for proposals is currently open until September 30 for Antigua & Barbuda; Barbados; The Bahamas; Belize; Dominica; Grenada; Guyana; Jamaica; St Kitts & Nevis; St Lucia; St Vincent & the Grenadines; Suriname; and Trinidad & Tobago.

Why Green Finance?

Many Micro, Small and Medium Enterprises (MSMEs) and low-income households in the Caribbean are not able to access funding for Renewable Energy, Energy-Efficient technologies and/or Climate Change Adaptation measures. These technologies could reduce

energy costs, GHG emissions, and improve competitiveness. EcoMicro is building the capacity of the region's finance institutions so that they have the tools and knowledge to develop and offer sustainable financial products to enable MSMEs and low-income households to address climate change.



The IDB has begun a collaboration with the Government of Guyana to support the development of a National Housing and Urban Development Strategy and to strengthen the Central Housing and Planning Authority's (CH&PA) capacity to collect, manage, and analyze territorial information and digital data. This cooperation's focus on data-driven processes will improve the institutional capacity of the CH&PA and Ministry

projects in the country's hinterland. The first round of mapping exercises focused on the villages of Kwatamang and Annai in the Northern Rupununi sub-district of Region 9. To develop more accurate data on these sites, the joint team carried out a drone fly-over to develop high resolution images, which will then be combined with existing maps of housing and infrastructure assets. Through these innovative methods, CH&PA will be able to 'ground-truth' its maps and combine them with other socio-economic information.

Overall, the digitalization and ground-truthing of CH&PA maps will help public officials make better targeted, efficient, and transparent policy decisions about the current management and future development of the housing sites. Given the remoteness of some of the villages, the drone fly-over is an effective way to cover considerable extensions of inhabited land and reach some areas that are hard to access given the growth of rivers during the rainy season.

CH&PA and the IDB will work to combine these maps and datasets with information from other areas, including Georgetown, the capital. Ground imagery has been included in the Mapillary platform (www.mapillary.com/app) and analytical maps are currently being developed using the Carto platforms. See *map on the next page*.

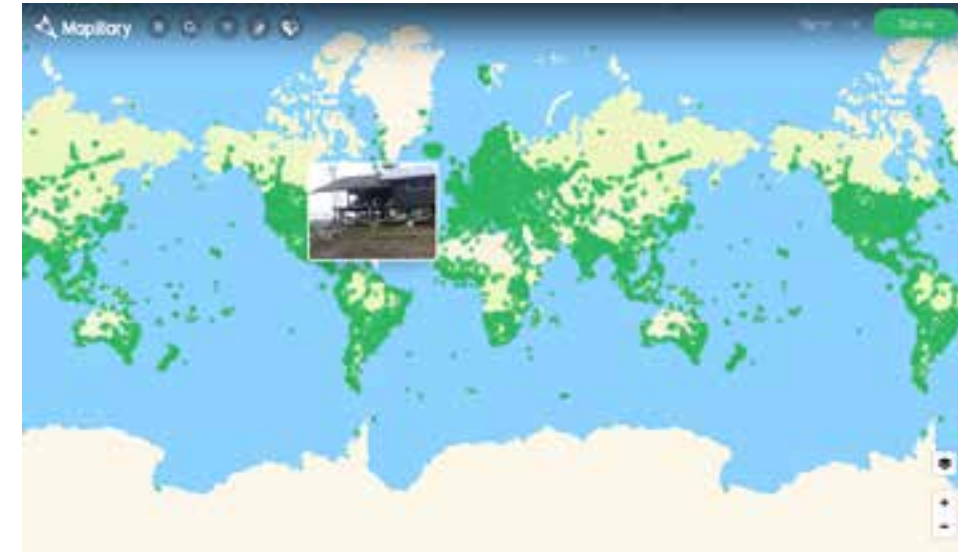


Using Drones to Map Housing Data in Guyana's Hinterland Community

Photo: Members of the IDB Team and the CH&PA as the drone takes off to collect data in Annai - Photo courtesy of IDB country office Guyana.

Guyana does not yet have an integrated territorial/geospatial data management system in the urban development sector and has only partial capabilities to map its housing projects, their territorial context, and their associated infrastructure.

of Communities in the design and implementation of a housing and urban policy; while also facilitating multi-sectoral knowledge and data sharing on housing and urban themes. As part of a first round of activities—which included stakeholder mapping on territorial data, a preliminary assessment of gaps and opportunities with geospatial data management, and fieldwork—CH&PA and the IDB began with the collection and digitalization of geo-spatial data for housing



The team has also begun work to ensure harmonization across datasets, which will become the basis for an open and accessible platform within CH&PA to inform policy decisions.



Jamaica takes important strides to improve energy efficiency

Thirty government-owned buildings will be retrofitted and LED lighting installed in another 50 structures in Jamaica as part of the recently signed Energy Management and Efficiency Program (EMEP). The exciting energy efficiency program will be undertaken in schools, hospitals and

public agencies, and will help cut the government's electricity bill by US\$7 million annually.

The Inter-American Development Bank (IDB) and the Government of Jamaica signed a US\$40 million loan agreement in November to finance the Program.

The EMEP financing will also support energy planning and management and contribute to the Government of Jamaica's comprehensive program of efficiency improvement and energy diversification. The EMEP is an important component of the Jamaican Government's broader efforts to provide high-quality, affordable, environmentally friendly energy and reduce the country's dependence on high-cost imported oil.

Ms. Therese Turner-Jones, General Manager of IDB's Caribbean Country Department, stated at the EMEP signing ceremony, "Today is a great moment, because it not just focuses on energy efficiency and bringing US\$7 million worth of savings to your budget every year because of the retrofits, we see this as just one really small component in terms of what the bigger energy plan and policy is

for the country.”

Another important objective of the energy efficiency program is to make transportation smart and more efficient. Jamaica’s transportation sector consumes 30% of all oil imports and makes a significant contribution to the country’s overall CO2 emissions.

The EMEP loan earmarks US\$3.5

these systems. These measures will reduce congestion, curtail air pollution, save fuel, and ameliorate the low productivity attributable to gridlocked streets.

The US\$40 million loan is being co-financed by the IDB, the Japan International Cooperation Agency (JICA), and the European Union

the importance of this innovative programme, “The Government of Jamaica greatly appreciates the support of all three represented funding partners, the IDB, the Embassy of Japan, and the European Union, in the major areas of infrastructural development, particularly in energy efficiency and renewable energy applications.”

“The finalization of the agreement with the IDB is a strong indicator of the commitment of the Bank to the sustainable economic development of Jamaica. The Government of Jamaica is confident that the mutually beneficial partnership arrangements with the IDB will continue to grow significantly,” Shaw added.

The EMEP loan will produce concrete outcomes that serve to improve lives in Jamaica, which goes to the heart of the IDB’s vision. As the leading development partner in Jamaica for almost 50 years, the IDB is committed to improving lives by creating vibrant sustainable economies where people are safe, productive and happy. The EMEP loan signing is another decisive step towards realizing that vision.

million for the implementation of a universal transport management system (UTMS), which includes telematics to help model, plan, operate and monitor traffic flows along Kingston’s major arteries. The EMEP loan will also fund training and coaching to Jamaica’s National Works Agency staff to operate and maintain

Caribbean Investment Facility (EU-CIF). The IDB is providing the first tranche of US\$15 million, which will be matched by JICA. The EU-CIF is providing US\$10 million in grant funding. At the EMEP signing ceremony, the Honourable Audley Shaw, Jamaica’s Minister of Finance and the Public Service, summarized



functions as the port for cargo ships, the ferry, the weighing and



Preserving Paramaribo’s historical center

Paramaribo, developed during the 16th and 17th centuries along the Suriname River, once had a vibrant historical city center and is still known for its extraordinary mix of cultures, architecture and construction techniques. Since 2002, the historical center of Paramaribo was designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as a World Heritage Site. Due to its location and based on the trade industry, the Waterfront was the most dynamic area of the city during the nineteenth century. Over the years it housed different

administration building of plantation products, white wooden colonial mansions of plantation owners, storehouses, stores, the Central Market for locals, and even a gold field train. Paramaribo experienced gains in cultural diversity, but also losses of its cultural assets during different fire disasters. The greatest fire disaster destroyed over 400 houses in 1821. Although the city recovered quickly, the capital suffered many more fire outbreaks that ravaged parts of the historical center until recently. Now, the historical area lost almost all its trade and residential

functions that gave life to the city. It became an institutional hub accommodating mainly government offices and public services. These public institutions close after 3:00 PM, resulting in a deserted city center afterwards. The World Heritage Site faces new challenges such as traffic jams, inadequate sidewalks, lack of parking spaces, poor road maintenance, disorderly use of public spaces by buses, absence of public space for pedestrians and infrastructure for cyclists, lack of security at night, and poor maintenance of the majority publicly-owned heritage buildings. The area has been undergoing physical, social and economic deterioration, which places high risk on invaluable heritage buildings and on the continuity of the UNESCO World Heritage Site designation. Despite these problems, the concentration of historical and cultural heritage buildings, monuments, and urban sites endows the area with the potential to lead the city’s sustainable development. Also, the historic center presents an important potential for heritage tourism. Tourists can experience here the multicultural, multilingual, multi-religious essence of Suriname.

In January 2017, the Bank approved the Paramaribo Urban Rehabilitation Program, a US\$ 20 million investment loan, which will trigger sustainable revitalization of Paramaribo's historical center by:

- Redeveloping public spaces;
- Rehabilitating and restoring publicly-owned heritage buildings;
- Implementing traffic management and infrastructure solutions to improve urban mobility;
- Designing financial schemes to incentivize participation of the private sector;
- Implementing pilot residential

projects;

- *Implementing the commercial project Employment in the Creative Industries, a recently approved MIF project;*
- *Providing support to the Suriname Built Heritage Foundation as the management agency for the historical center;*
- *Updating, modernizing and developing planning instruments; and,*
- *Designing and implementing a communication plan.*

This Program also focuses on the critical future challenge, climate change. Together with an investment grant under preparation, Ur-

ban Investments for the Resilience of Paramaribo, the Program will protect the World Heritage Site from its vulnerability to flooding due to increased precipitation and storm surge from the Suriname River as climate change will only aggravate the current situation. Historic revitalization interventions such as the presented Program have proven to generate significant economic benefits, together with cultural heritage preservation and social benefits for the local population. We will be experiencing Paramaribo's transformation over the next 5 years!



RINIDAD AND TOBAGO



According to the last Panorama of Food and Nutrition Security in Latin America and the Caribbean report, close to 360 million people (58%) are overweight with the highest rates in The Bahamas (69%), Mexico (64%) and Chile (63%). Trinidad and Tobago is not exempt from this startling trend, which is reflected in the fact that over 50% of its population ages 15 to 64 are overweight and there has been an increase in childhood obesity by 400% over the last ten years.

This has only further contributed to the prevalence of non-communicable diseases (NCDs) which account for 80% of all deaths and have resulted in an annual economic burden of more than US\$1.2 million (4.3% of the country's annual gross domestic product). In response

to this NCDs epidemic, the IDB partnered with the Government of Trinidad and Tobago in 2016 to implement a US\$48.4 million loan, the Health Services Support Program (HSSP).

The primary objective of the HSSP loan is to prevent and control risk factors and non-communicable diseases among adults, and primary and secondary school students.

This will be done by:

- 1) strengthening the delivery of integrated primary care services;
- 2) implementing behavior change programs and policies;
- 3) improving health information management;
- 4) ensuring adequate Human Resources for Health (HRH); and
- 5) enhancing health facilities

investment management through the innovative application and use of information and communication technology (ICT).

As the IDB continues to work closely with the Government to implement this loan, the country's Ministry of Health has been simultaneously embarking on a number of programs, including fitness camps for children and adults, as well as a systematic health initiative throughout all schools in the country. Most importantly, the Ministry launched a 2017-2021 National Strategic Plan for the Prevention and Control of NCDs. Working in tandem with one another, the IDB and the Government aim to reduce the total NCD mortality rate and the overall prevalence of obesity.



BLOG

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Medical Lab Trainee

2017 - All requirements complete



Lab Apprenticeship

Level 3



Lab Apprenticeship

Level 2



Classroom Training

Level 1

Can three global industries make up a world-class workforce?

By Fernando Pavon



The automated verification of qualifications and skills is here!

Can three global industries—Maritime, IT/Telecom, and Medical Services— make up a world-class workforce? Can technology be used to carry out this endeavor?

The Bahamas is embarking upon this ambitious project, connecting Bahamian talent through the national apprenticeship program spearheaded by the Government of The Bahamas with financing and technical support from the Inter-American Development Bank.

By the end of 2019, the national apprenticeship program, will have established three Sector Skills Councils for these industries, through which employers will take an active role in identifying skills needs, setting occupational standards, and defining curricula for training programs.

The question remains, however:

“Once the best people have been trained, how can employers easily find them and verify their skills?”

This is where blockchain technology steps in.



What is Blockchain?

Blockchain is a new digital technology that has been making waves all over the world in recent years. You can think of it as a ledger of transactions that are grouped together in a “block” and then “chained” to the previous block of transactions, and so on, all the way back to the very first block. Blockchains are a powerful innovation in data storage because not only are the transactions unchangeable once they are written to the chain, but a full copy of the entire chain is hosted on “nodes” all around the world.

This means that there is no centralized “honeypot” that a hacker can target to steal the data, edit it, or take it down. If one node goes down, all the other nodes have full copies of the chain and can be used to verify any transac-

tion. Also, blockchain data is not human-readable; what is stored instead is a “digital fingerprint” that can be used to verify a transaction but not decode what it is. Blockchains were first used to record transactions of digital money—cryptocurrency—but since those early days, they have been adapted to transfer any digital asset. These assets include official records such as land titles, government ID’s, health records, academic degrees, and professional certifications. Blockchains are also ideal for supply chain management, tracking shipments of goods—in the case of one recent case study from a global grocery chain, down to each individual mango! —all the way from source to final destination.

The efficiencies and security benefits provided by blockchain technologies are unlike anything the global economy has seen. In other words, if you’re an employer who needs to verify that an applicant has the skills they claim to have, the most secure and easy-to-use proof you can receive is a blockchain certificate.

Blockcerts: Open Blockchain Certificates



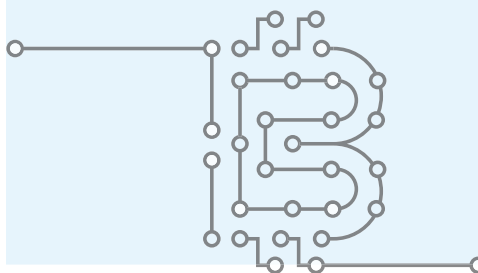
Blockcerts, the first global, open-source format for issuing, receiving, and verifying blockchain certificates, were built for a global workforce that needs to move between jurisdictions and seamlessly prove who they are and what they can do. Developed by the MIT Media Lab and Learning Machine in 2016, its use is free for anyone seeking to build their own software for issuing and verifying blockchain certificates.

How can workers and employers use blockcerts?

Workers:



- “Stack” blockchain certificates: so that over time they add up to higher levels of skill and credentials
- Blockcerts wallet: private portfolio of Blockcerts from multiple sources
- Instant verification: employers can instantly verify that they completed every step of their training program and check the highest level they have achieved so far
- Automated verification workflows: applicants submit Blockcerts, which are then pre-screened based on authenticity and if they meet minimum criteria for a particular position



Employers:



- Employers can also issue Blockcerts
- Employers can revoke Blockcerts or set them to expire

Apprentices in The Bahamas who track their learning and work experience through Blockcerts can present them locally or in any other country, and employers can verify their authenticity with the click of a button.

In short, blockchain certificates open a world of possibilities for today’s employers. They drastically cut down the work and cost involved in verifying identity, skills, and experience, and allow employers to document workforce development for current employees as they open their doors to qualified applicants from any market. In a few years, it will be difficult to imagine a time before blockchain certificates.

TIME FOR RESILIENCE: Announcing the Caribbean Climate-Smart Accelerator

By the Caribbean
Climate-Smart Coalition

Many of us are still reeling from the devastation caused by Hurricanes Irma and Maria. Our Caribbean countries have experienced deep pain; we lost everything – our homes, our livelihoods, but we certainly did not lose our spirit. Too often we treat our problems with a Band-Aid solution hoping that the next hurricane will not hit. But as we know, Band-Aids do not do well with a 200 miles an hour hurricane!

To emerge from this disaster, we need to create a new narrative, a story of hope, resilience and opportunity. Caribbean leaders are working on a bold vision for a new climate-smart future. A group of 12 Caribbean government leaders and over 30 private and public sector partners came together on December 12th, 2017 at President Macron's "One Planet" Summit in Paris to announce the Caribbean Climate-Smart Accelerator.

economies that are fueled by clean energy. It will create a resilient design and a way of life that works with, rather than against, nature.

We need to support this initiative and help make this vision a reality. To do so, we need to change the core of how we approach development; we need to abandon the "development as usual" approach and start thinking differently, fueled by innovation



We can no longer entertain small thinking and solo endeavors. We need to come together and we need to be audacious.

Our vision is not defined by disaster. It is a vision of hope and one that will be a beacon for island nations all over the world. This vision will create thriving

and action rather than by incremental change. We need to break down the artificial barriers we created between the private sector, government and global

institutions so we can truly work together to affect change. We are amazed at the high level of commitment to the Caribbean Climate Smart Accelerator by the many different organizations such as the Inter-American Development Bank, CARICOM, OECS, CDEMA, the World Bank, the Caribbean Development Bank, UNDP, and so many other partners. We've also been heartened to see the enthusiasm from the private sector and



partners like The Nature Conservancy and The Green Climate Fund step up and realise the incredible opportunities the Caribbean holds.



We are amazed at the high level of commitment to the Caribbean Climate Smart Accelerator by the many different organizations such as the **Inter-American Development Bank, CARICOM, OECS, CDEMA, the World Bank, the Caribbean Development Bank, UNDP, and so many other partners.**



The Caribbean can truly be a model for advancing new technologies and approaches to create a smart climate zone that can be replicated around the

world. The Accelerator needs all of your help in order to recruit the best talent and ideas into this initiative. This is our chance to realize a vision that we have had for so many years.

The opportunity for transformation is within reach, but removing the remaining barriers will not happen on its own. We need to disrupt the existing broken systems, and it will not be easy.

We need to change the rules of the game for the Small Island Developing States, to break the shackles of outdated policies that are binding them and not allowing them to build a resilient future for their people.

The audacity of this idea needs a tent, one that is big enough to

hold all of us so we can realize that our global common fate is deeply connected to what is happening in the Caribbean and other small island states like Fiji and Mauritius. Tackling climate change will not only require flying higher, but also learning to fly together and further than ever before.

Visit the Caribbean Climate-Smart Accelerator online:
www.caribbeancoalition.org



An Example of Climate and Energy Resilience for the Caribbean

By Christiaan Gischler

Photography: Christiaan Gishler
Cover by Andrew F. Kazmierski



ST. GEORGES, BERMUDA, MAY 27 – A narrow street and colorful shops are typical of St. George's a popular tourist location on May 27 2016 in Bermuda. Photo by Andrew F. Kazmierski, shutterstock



On my recent trip to Bermuda in November 2017, invited by the government of Bermuda to participate in the Bermuda Energy Summit 2017, I was able to experience first-hand how that island has adapted to withstand the frequent storms, hurricanes and droughts throughout many decades.

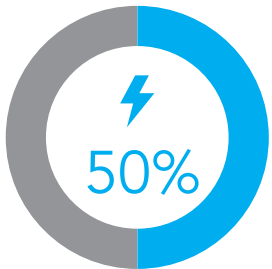
First, as you can see from the photo below, there are no cables; 100% of the transmission cables are underground and 50% of distribution cables are also below earth. BELCO, the electric utility in Bermuda, plans to have the rest of the distribution lines underground in the next years.



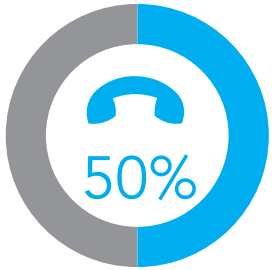
Another important feature is the streetlight poles that are shorter in height than the traditional ones, and are designed to withstand category 5 hurricanes.

Second, the building codes in Bermuda have been adapted to be resilient to climate change. The choices for constructing a house or an apartment are concrete or stone. No wooden construction is allowed. The roof has to be tiled, painted and protected with a characteristic white hard covering that prevents the wind damage as shown in the photos of a church and a shopping mall on the right.

The white roofs of Bermuda are a unique feature of the island, but they also serve another purpose: they collect rain water. Below every house on the island, there is a water tank that needs to be at least 8 times the size of the catching area. Every roof is designed to catch water as shown in the photo below.



Of distribution cables are below earth



Of communication cables are underground

As a result, every house has a fresh water reservoir that averages 25,000 liters. As such, the island does not have, and does not require a potable water network. The water tanks are large enough to accommodate long drought periods, which is another adaptation measure against climate change that saves millions in water supply, avoiding costly solutions such as the generation of potable water through reverse osmosis.



Third, are the measures in the electricity sector. For example, the heavy fuel oil generators are to be elevated over concrete blocks at 4.5m from the ground, to ensure power during floods or sea level rises. Also, solar-distributed generation is encouraged as long

as the solar photovoltaic panels are appropriately anchored on top of the white roofs to avoid being blown away by hurricanes (see photo below).



Power generation with renewable energies and natural gas as a transition fuel towards renewable energies also play a very important role in terms of energy security and resilience. In the same sense, electric mobility is also being promoted in Bermuda and several Caribbean islands, starting with BELCO's fleet as shown in the photo below.

Electric mobility powered by renewable energy is the future for public and private transportation in the Caribbean. This measure



would not only reduce dependency on fossil fuels, but would also allow vehicles to be operational during periods when fuel is not accessible, for example in the aftermath of hurricanes like Irma and María.

Last, Bermuda has taken additional preventive measures: The Bermudians have a command and control center protected from storms and flooding; 24/7 storm monitoring to have enough time to prepare; preparation drills twice a year; specialized personnel training; and last but not least storm proof schools that can operate during and after the hurricanes without experiencing power and water outages.

BERMUDA CAN BE A GREAT EXAMPLE FOR CLIMATE AND ENERGY RESILIENCE FOR THE REST OF THE CARIBBEAN!

The Clean Energy Revolution in the Caribbean

By Vasu Beepath



As far as the evolution of human energy use is concerned, there were gradual shifts rather than sudden transitions. Coal displaced wood and oil displaced coal, economic and technical changes would also ensure



that natural gas and renewable energy will displace oil at a highly predictable rate. The rising demand for cleaner fuels to sustain our rapidly expanding economy is tied with concerns about climate change, and looking 100 years into the future there is a very low possibility that fossil fuels will sustain the world to the same extent as they do now.

The clean energy revolution is particularly important because we must stop the rapid warming of the atmosphere primarily caused by the overuse of fossil fuels and

limit the global temperature rise to 1.5°C or below by 2100. One of the most logical ways to do this and prevent the long-term effects of global warming other than energy efficiency is to reduce the reliance on fossil fuels by shifting a share

of the world's energy supply to renewables. This transition can result in a completely transformed energy foundation that will lower the dependence on fossil fuel use.

A transition into a new energy foundation such as renewable energy presents itself with untapped opportunities in the Latin America and Caribbean region. Notably in the Latin American region, expanding developments in wind and hydro-generation are a key step towards this transition because these countries are mountainous, have large dispersed

water resources and a growing energy demand for their modernising economies. Studies show that no other method of electricity has lower energy costs than hydro-electricity. This renewable energy transition is already well under way in Costa Rica as they have produced 98% of their electricity from mixed renewables since 2015. Also, when looking at the possibility of energy transitions in the Caribbean region, ample sunlight and regular trade winds provide opportunities for renewable energy access. With their compact territories requiring less overall energy for consumption, wind and solar energy can be efficiently generated and tied onto the power grid. Electricity costs are high for these countries as they rely heavily on the importation of fuel with the exception of Trinidad and Tobago, who produces its own. Therefore, by using renewable energy as a share of their primary energy, the fuel import bill can be reduced. This is evident in Barbados which is the Caribbean's solar thermal leader with 80-90 % of residents having domestic rooftop heaters installed.

However, in order for this renewable energy transition to expand in our region we will require a rapid scaling-up of technological innovation for transmission and storage capacity throughout Latin America and the Caribbean. The



NOAA Mauna Loa CO2 record.

introduction of technical fixes and designs for integrating clean energy onto the grid can improve the existing energy structure, reduce the environmental, social, and economic stress brought about by growing energy demands and create a new innovative market that can hold a competitive advantage because of early development. The burning of fossil fuels, its extraction, and conversion has become the single largest cause of human interference contributing to global warming. It depletes natural capital, pollutes, and interferes with the global carbon cycle leading to irreversible impacts on the environment. With our excessive energy consumption, we are returning to the atmosphere and oceans the carbon that was stored in sedimentary rocks over hundreds of millions of years ago. The increased concentration of carbon dioxide that results from

fossil fuel use generates a number of impacts: it accelerates climate change, affects human health, ecosystems, as well as the economic and social performance of millions of people.

Whatever the length of our fossil-fuelled civilisation will be, it will not be able to match the duration of human civilisation because the rate at which we use energy paired with an increasing population surpasses the rate at which we will take to fully transition to clean energy. We do however possess a more powerful technical means to effect faster energy transitions than we did a century ago and our collective persistence and determination can accelerate this inevitable change.

Our human impact on global warming can be changed if we pursue an energy convergence

whereby we reduce energy demand and increase the share of renewables within our primary energy supply. This transition will be a lengthy process to develop, perfect, implement and diffuse such a widespread commercial adoption of renewable energy in our region.

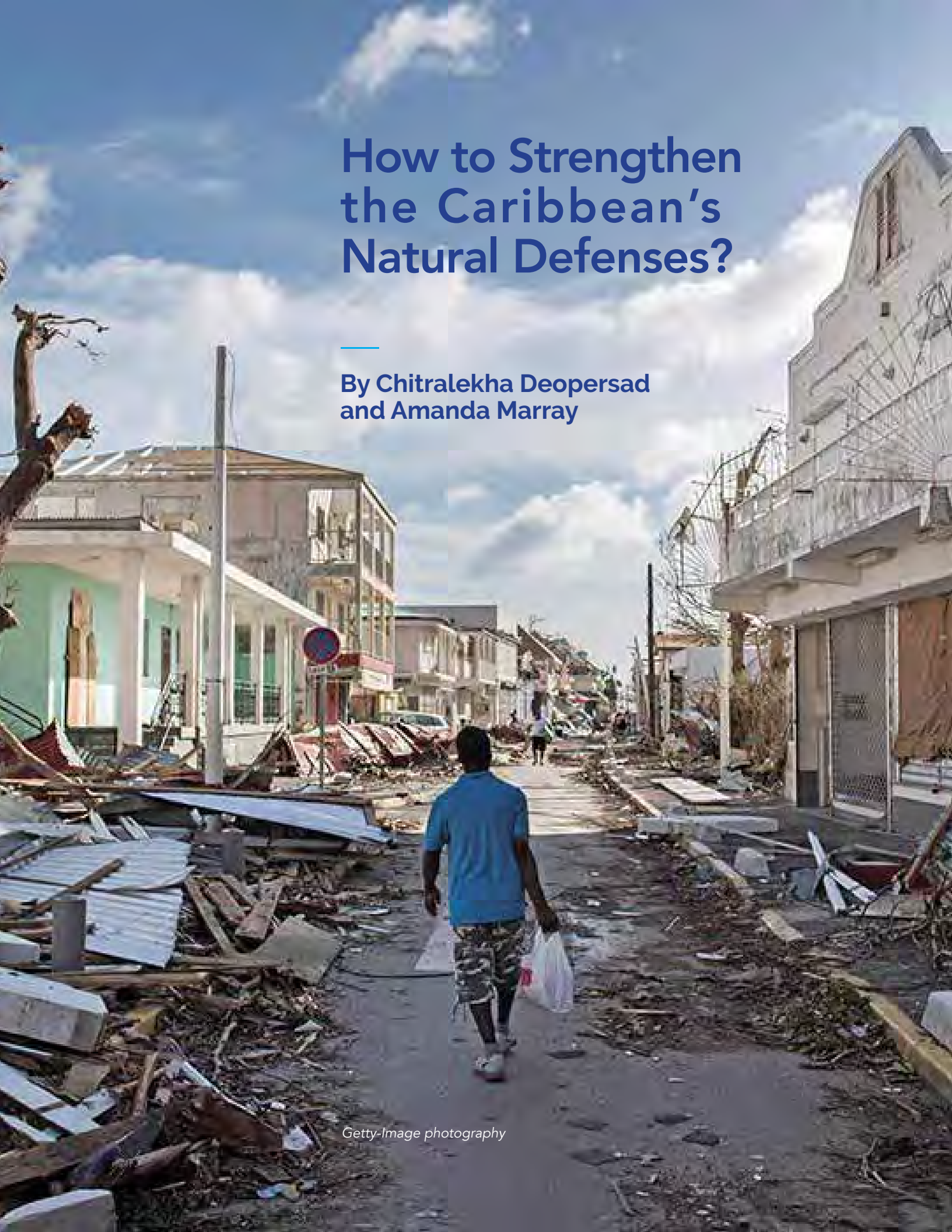
However, it can be realistically achieved through a strong long-term commitment towards continuous technical advances in making renewable energy more efficient, reliable and affordable.

Energy transitions have been among the most important processes of technical evolution and historically it has shown that every one of these transitions has benefitted humanity. The realm of what is possible is always greater than what is imagined because technical innovations, scientific advancement, economic and political actions can reshape human behaviour and ambitions towards unfolding a clean energy future.

Vasu Beepath is a Climate Change Advocate from Trinidad and Tobago and a Member of the Caribbean Youth Environment Network – TT chapter. Her interests are climatic anomalies as well as reading his-

How to Strengthen the Caribbean's Natural Defenses?

By Chitrlekha Deopersad and Amanda Marray



Getty-Image photography

Caribbean Coastal Resilience – How We Can Act to Strengthen the Region's Natural Defenses

The massive damage inflicted on numerous Caribbean states by recent hurricanes such as Matthew, Irma and Maria must capture our attention and prompt all of us toward substantive action:

- We have to recognize the magnitude of the increasing threat of hurricanes to life and property across the Caribbean – none of our island nations is immune to this growing threat.
- For more than fifty years, the IDB has been and will continue to be an active partner of the Caribbean states – given the vast scale of the damage on numerous Caribbean islands inflicted by these hurricanes, the leadership of the IDB understands the urgency of support required.
- As it has done for many years, the IDB stands ready to provide appropriate technical support for the Caribbean recovery and reconstruction efforts.

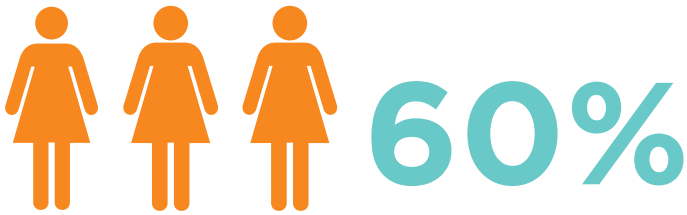
Ask an average person how mangroves influence nearshore inundation and you are likely to receive a mix of quizzical expressions. Then ask how seawalls prevent flooding on

coasts, and a plethora of answers will be offered. Ironically, both questions are equally significant when it comes to coastal resilience. Typically, the first question is less understood due to a lack of understanding of ecosystem services known as Natural Capital.

The Merriam Webster Dictionary defines resilience as an ability to recover from or adjust easily to misfortune or change. Applied to the Caribbean context, resilience is the ability of our coastal zones to recover from immediate short-term shocks such as hurricanes and cope with long-term hazards such as sea level rise. Resilience involves a combination of physical protections and social safeguards that can sustain a long-term defense mechanism for both people and the environment within a rapidly changing planet.

On September 26-27, 2017, representatives from nine Caribbean countries participated in the Caribbean Coastal Resilience Forum (CCRF) in Nassau, The Bahamas, tackling the issue of coastal resilience and the use of Natural Capital as a source of coastal defense and economic sustainability. The dialogue was imperative since 60% of the Caribbean population (over 21 million people) live less than 100 miles from the coast and must depend on a variety of natural infrastructure, not only to buffer against the ravages of the sea, but also provide food and opportunities for employment.

The Caribbean is home to a wide variety of coastal ecosystems (mangroves, coral reefs, seagrass beds, etc.), offering endless possibilities to explore the use of these ecological communities as



of the Caribbean population (over 21 million people) live less than 100 miles from the coast

Caribbean coral reefs are valued at approximately

US\$2 billion

for the

TOURISM



FISHERIES



SHORELINE



protection services they provide.

affordable and low-maintenance coastal protection options. Notably, coastal ecosystems are considered the last line of defense during disaster risk planning and policy development, and are at risk of degradation.

Caribbean coral reefs are valued at approximately US\$2 billion for the tourism, fisheries and shoreline protection services they provide. Coral reefs across the region are on the verge of collapse, with less than 10% of the reef area showing live coral cover. Mangrove forests, which are known to weaken the effects of waves and storm surges, are systematically cleared to make way for shoreline construction.

Several weeks ago, Hurricane Irma inflicted significant damage on the Bahamian island of Bimini. One Bimini resident who experienced heavy flooding in the absence of



adequate mangrove protection stated that, “Mangroves are the island’s only protection against storm surge, and it affects the fish stock.”

To promote and understand the applications of natural infrastructure and preserve ecosystem services, the IDB will host leading scientists, technical experts and policy makers in this two-day forum. Key insights about new technologies, effective frameworks and sustainable coalitions will be discussed to identify practical opportunities and address challenges related to utilizing and conserving Natural Capital on the coastal zone as well as to take action to minimize the real and present danger posed to Caribbean nations by violent hurricanes such as Irma and Maria.

Several CCRF speakers have already provided us with some interesting food for thought:

ON INNOVATION:

“On the marine environment, a vital action for everyone is to reduce the use of single use plastic bottles. Approximately 8 million tonnes of plastic enter the ocean from land every year. At this rate, by 2025 there could be 1 tonne of plastic for every 3 tonnes of fish in the sea. By 2050 plastic could outweigh fish! London UK is aiming to become the first single use plastic bottle free Capital City. San Francisco, USA has already banned their sale.” – Adam Hoksing, CH2M/Halcrow, UK.

On Best Practices:

“Managing coastal resilience in a sustainable manner requires intersectoral collaborations. Understanding other sectors takes time. Invest in this.” – Fokko van der Goot, Boskalis, Netherlands.

On Partnerships:

“Fundación Grupo Puntacana created the Partnership for Ecologically Sustainable Coastal Areas (PESCA), working with diverse governments, universities, non-government organizations, and private sector partners throughout the Caribbean including Dominican Republic, Haiti, Grenada, Florida, Barbados, and Honduras....it has one of the Caribbean’s largest and most successful coral restoration programs.” – Jake Kheel, Punta Cana Group, Dominican Republic.



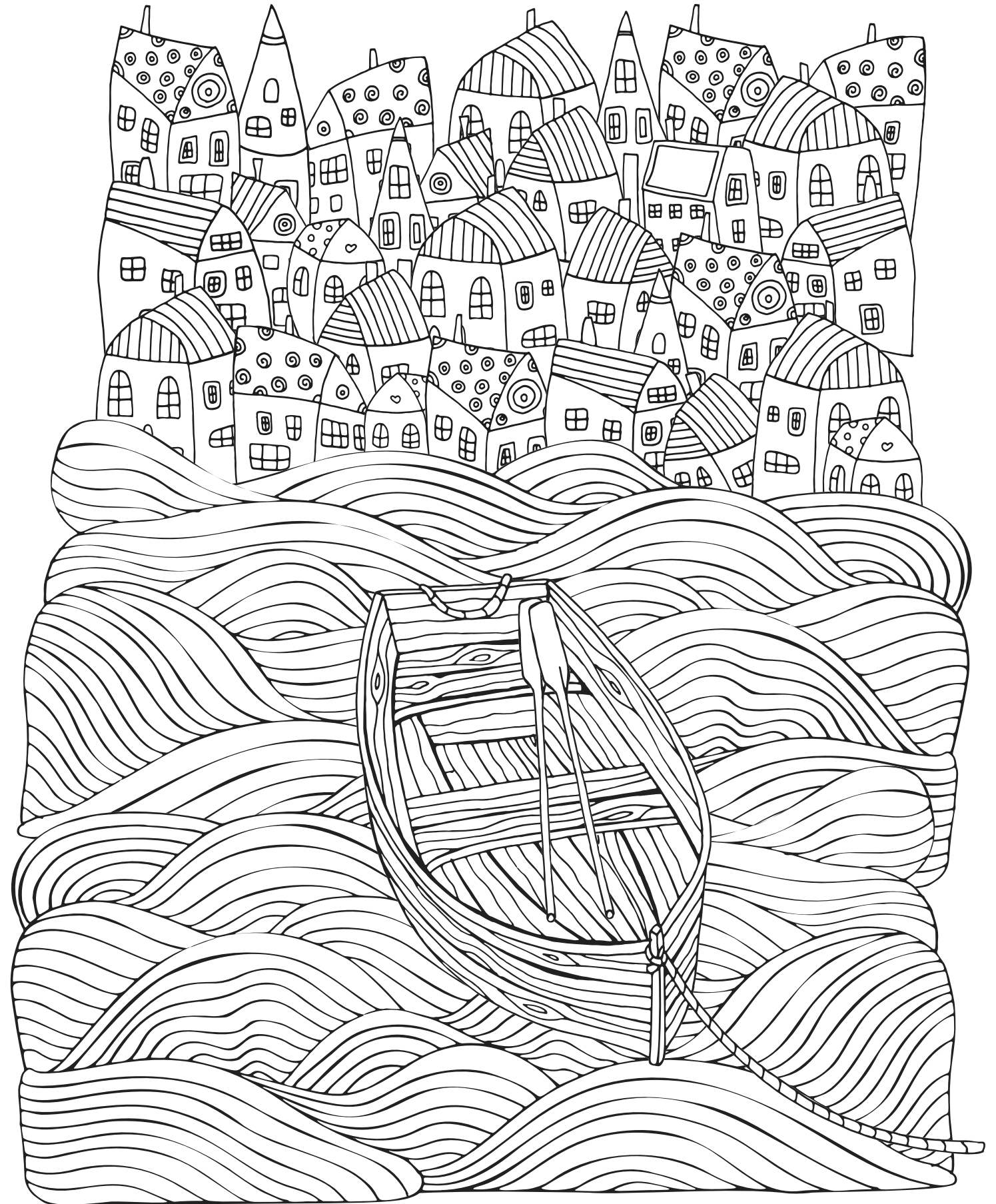
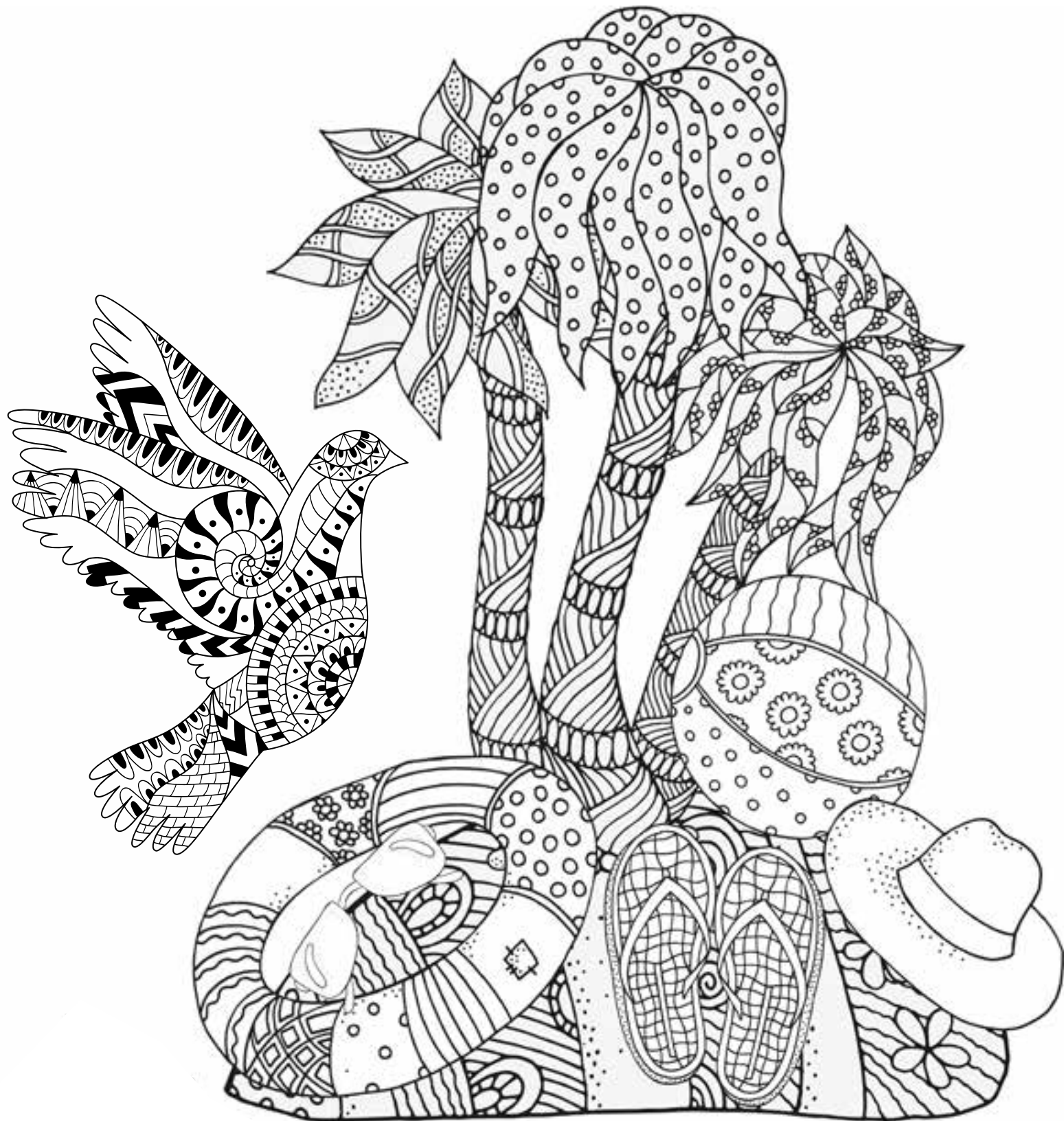
The Caribbean Coastal Resilience Forum was the first of its kind this year. It is intended to cultivate regional goodwill to promote meaningful and decisive action for investing in sustainable Natural Capital and towards strengthening our natural defenses against increasingly frequent and catastrophic storms.

Play!



Add some color to your life
with our stress relief method





Puzzle 1: (Easy, difficulty rating 0.43)

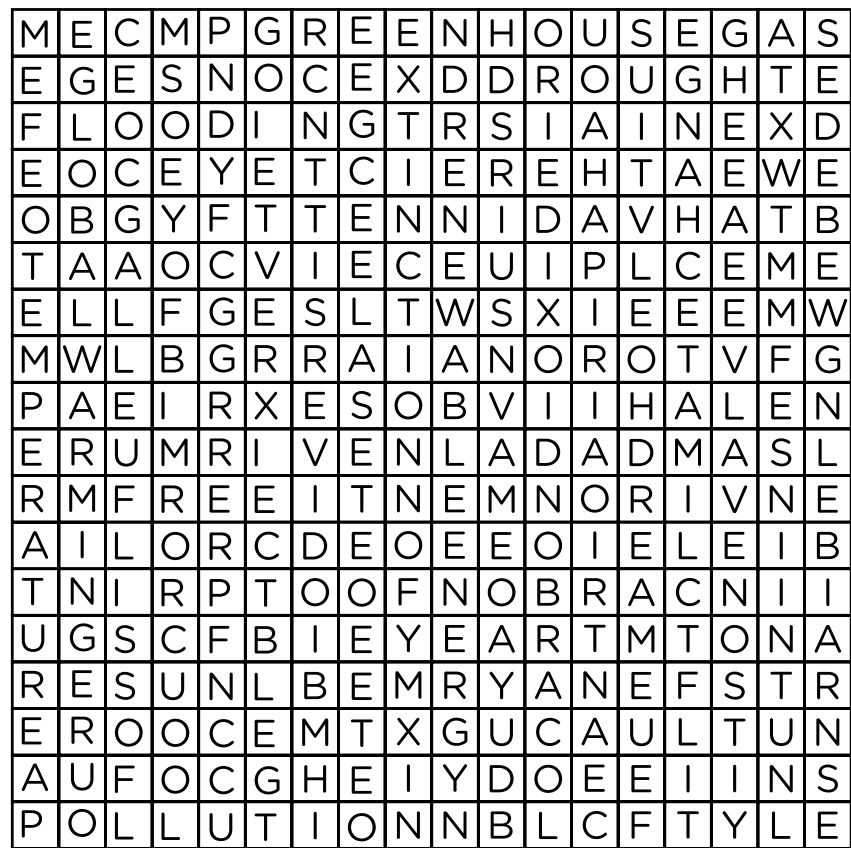
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Puzzle 2: Medium, difficulty rating 0.52

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Fight climate change by searching for the right words!

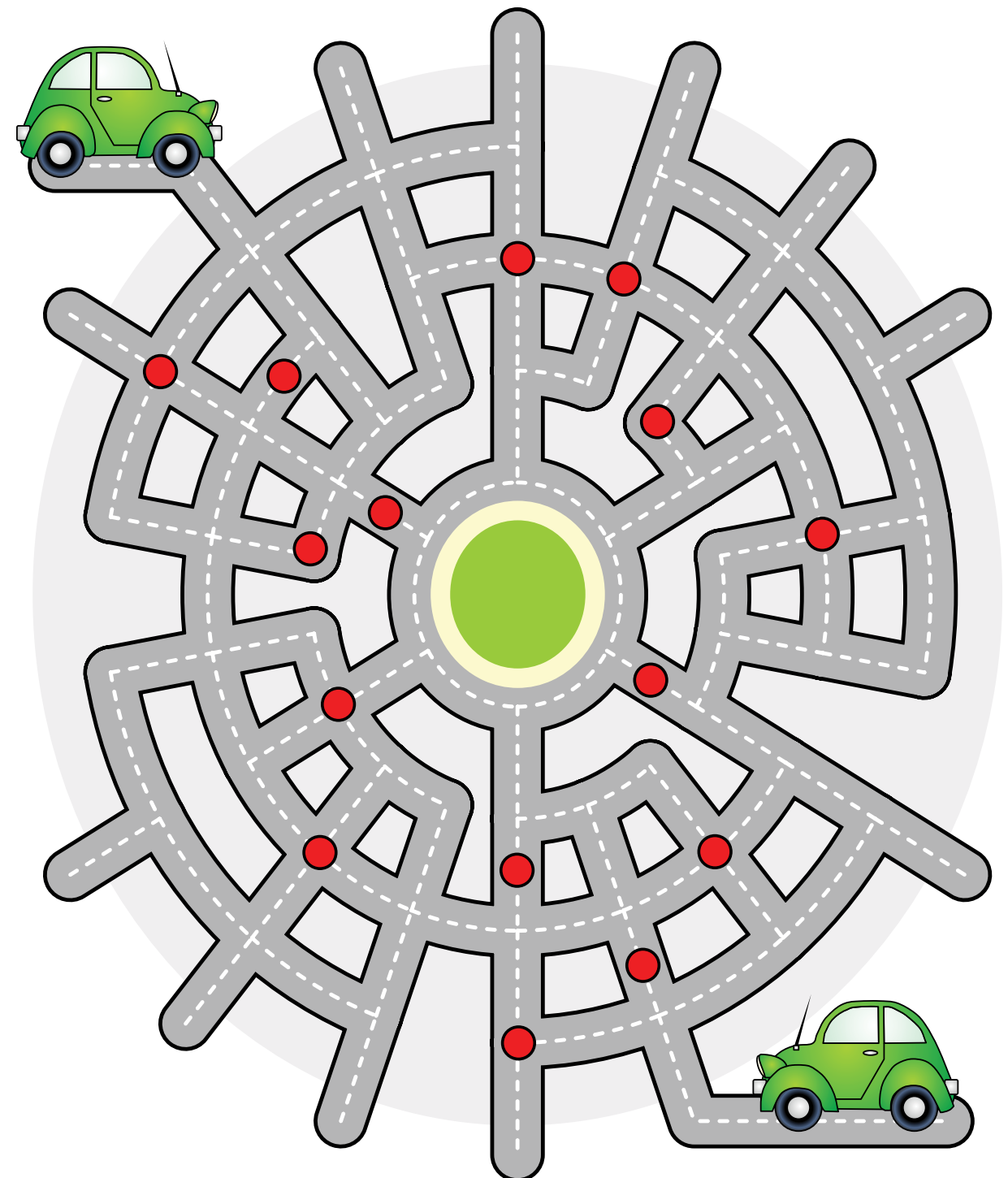


CLIMATECHANGE
FLOODING
DROUGHT
TEMPRATURE
CARBONDIOXIDE
GREEN
GLOBALWARMING
GREENHOUSEGAS
POLLUTION
CARBONFOOTPRINT
SUSTAINABILITY
WEATHER
FOSSILFUEL
BIOFUEL
ENVIORNMENT
RECYCLE
RENEWABLEENERGY
EXTINCTION
METHANE
BIODIVERSITY
SEALEVEL



Help the Green Cars!

Help the cars get to the central place. Avoid
red circles that indicate super high traffic.

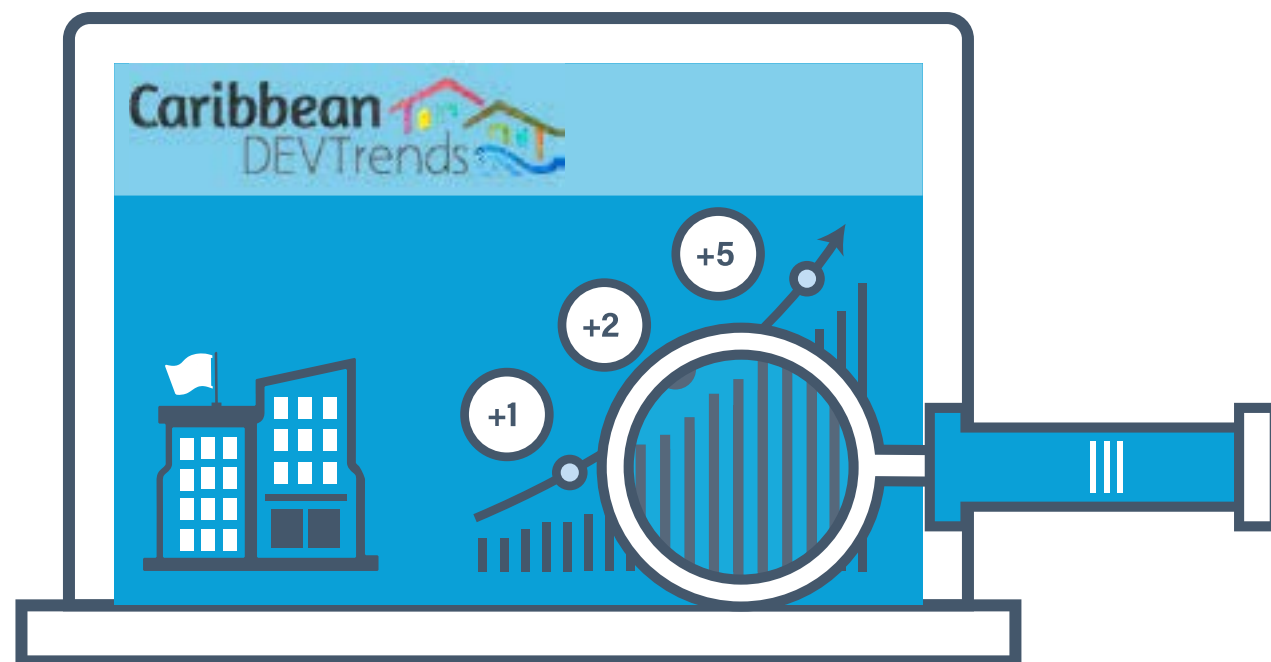


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