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NEWSLETTER

UPDATES:

⇒ 22nd Conference Announcement— August 9-14, 2021

⇒ A call for abstracts for the CAS 22nd Virtual Conference is now open. Please submit your abstracts by January 31, 2021

CONFERENCE THEME:

Science, Technology and Innovation for Sustainable Development in a Greener Caribbean

Contributing Authors to this Newsletter:

- Professor Emeritus Karl Theodore
- Professor Kit Fai Pun
- Professor Neela Badrie
- Professor Raymond Jagessar
- Dr. Roshnie Doon
- Christian Casey-Lee Virgil

INSIDE THIS ISSUE

CLIMATE CHANGE AND ITS IMPACTS IN THE CARIBBEAN: A BRIEF REVIEW

Authors:

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Abstract: *The climate of the Earth is changing. Globally, climate change has been linked to mass coral bleaching, increases in coastal erosion rates and an increase in the frequency of extreme weather events such as hurricanes and flooding. These effects are expected to continue for several decades despite the implementation of aggressive measures to limit anthropogenic activities that contribute to climate change. Severe coastal erosion has been observed in 70% of the beaches in Caribbean islands including Anguilla, Antigua-Barbuda, British Virgin Islands, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines. This article provides a review of the current state of climate change in the Caribbean region.*

1. Introduction

Climate and weather, although often used interchangeably, are distinct from each other, in that climate describes average meteorological conditions and variability over a much longer period and a much wider geographical space. Analysis of meteorological data over a relatively long-time frame of decades to thousands of years is necessary to determine whether there is a long-lasting change in meteorological conditions as opposed to minor short-term weather fluctuations. Climate change can be described as a persistent and distinct change in the trend of shorter-term variabilities.

2. Climate Change and Anthropogenic Activity

The United Nations Framework Convention on Climate Change (UNFCC, 1992) defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." Research conducted by Anderegg et al. (2010) revealed that almost all (97% to 98%) prominent researchers in the climate science community agree that anthropogenic activity is responsible for most of the observed changes in the climate. Anthropogenic contribution to climate change is driven mainly by the excessive release of greenhouse gases (GHGs), such as carbon dioxide and methane, into the atmosphere (Betzold, 2015).

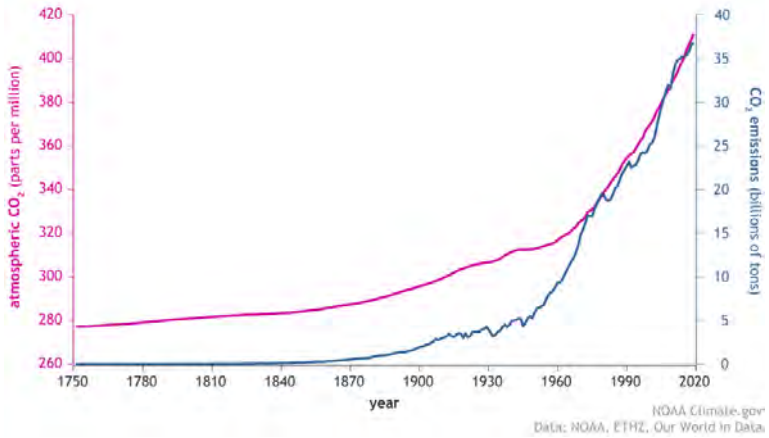
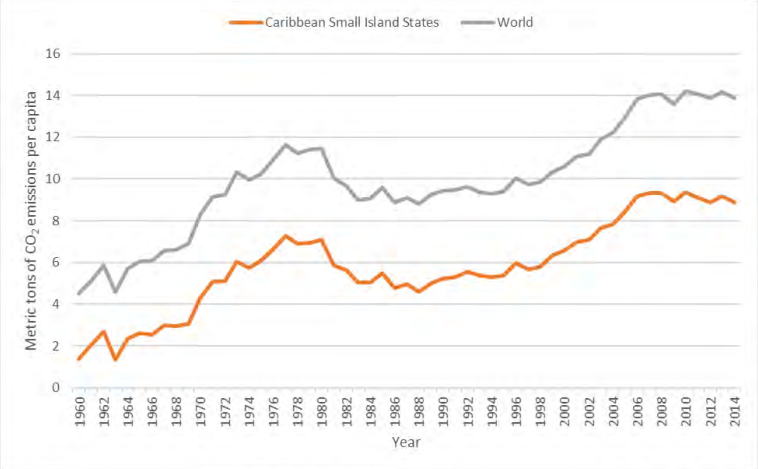


Figure 1: Changes in Atmospheric Carbon Dioxide (CO_2) and Anthropogenic Carbon Dioxide (CO_2) Emissions between 1750 and 2019

2. Current State of Climate Change in the Caribbean region

The Caribbean region together with the Latin America is responsible for approximately 1.8 million of the cumulative 36 million tons of CO-$_2$ released into the atmosphere in 2016 (World Bank, 2020). Although the overall net emissions of greenhouse gases from the Caribbean is insignificant compared to developed nations (Figure 2), the negative impact of climate change is projected to be higher (Betzold, 2015).



* - *Small island states include Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago.*

Figure 2: Caribbean Small Island States* CO_2 emission rates per capita as compared to the World from 1960 to 2014

Although reducing CO_2 emission rates is an important strategy for mitigating the impact of climate change, adaptation is mandatory in the short to medium term because of the long-lasting effects of existing CO_2 levels. Several features of the Caribbean region, including high average temperatures, geographical position along the equator, and general low-lying status, increase the projected negative effects of a changing climate to the vulnerability of many of the islands (Benjamin, 2010).

Moreover, the Caribbean is located in a region that is frequently affected by hurricanes. A growing body of evidence suggests that there is a direct relationship between global warming and an increase in hurricane intensity and frequency. The hurricane season in the Caribbean region typically starts in June and ends in November. Historically, the extreme winds, storm surges and intense rainfall associated with hurricanes during this time have caused a lot of damages to the region (Lin et al. 2012). Damages include the destruction of buildings, roads, utilities, and the exacerbation of coastline erosion.

3. Adaptation Activities and Measures Responding to Climate Change in the Caribbean

Based on a findings of recent study (Virgil, 2020), most of the adaptation activities were reactionary measures occurring in the Agriculture (16.7%) and the Infrastructure and Transportation sector (16.7%) in the Caribbean. Extreme weather events such as droughts, flooding, hurricanes, coastal erosion, and sea level rise (SLR) were the driver of climate change adaptation measures in 33.3% of the articles included in this study. The goal of 38.9% of the adaptation measures in the Caribbean was to prepare, prevent or reduce risk. Adaptation measures such as the rainwater harvesting program in Jamaica achieved multiple objectives. This includes providing water for domestic consumption and supporting the agricultural sector.

4. Closing Remarks

There has been a pressing need to initiate proper adaptation measures that could mitigate the negative effects of climate change impacting the Caribbean. Although adaptation has been occurring, more research and work is required to ensure that countries are fully prepared to meet the challenges associated with projected changes. Priority should be given to conducting research on the effects of climate change and adaptation strategies, as well as to economically important sectors, like the tourism industry. This article serves as a starting point for future research, contributing to the creation of climate change adaptation policies in the Caribbean.

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Authors' Biographical Notes:

Christian Casey-Lee Virgil is an Industrial Engineering doctoral student at the University of the West Indies and a lecturer at the College of Science, Technology and Applied Arts of Trinidad and Tobago. As an educator, he is driven by the philosophy that education is a tool that bestows upon the user the ability to engage and interact with the world in an insightful and fulfilling manner. Mr. Virgil frequently utilises his other skills in graphic designing and videography to enhance the learning experience of his students. His research interests include the impact of climate change, occupational safety and public health on various aspects of organisational practices and performance.

Kit Fai Pun is presently the president of the CAS Trinidad and Tobago Chapter, and Professor of Industrial Engineering of the Faculty of Engineering at The University of the West Indies, St Augustine Campus, Trinidad and Tobago. He is a Registered Professional Engineer in Australia, Europe, Hong Kong, and The Republic of Trinidad and Tobago. His research interests and activities include industrial engineering, engineering management, quality systems, and performance measurement.

CAS Fellow on InterAcademy Partnership (IAP) Biosecurity Working Group

Professor Neela Badrie, Fellow and treasurer on CAS Executive was among the 17 academy-nominated members selected (by review of CVs) from around the world to serve on the Biosecurity Working Group (BWG) of the InterAcademy Partnership (IAP). The IAP Biosecurity Working Group (BWG) was established with members from 6 academies in 2003. The goal of this multi-disciplinary group is to promote responsible/ethical research practices in the biosciences and related fields, to engage with international organizations and conventions by feeding information into their discussions on the latest scientific developments and providing recommendations, and to engage more IAP member academies in the work of the BWG.

She is a professor and researcher at the Faculty of Food and Agriculture the University of the West Indies, St. Augustine campus, Trinidad and Tobago. Her research focuses on food and environmental microbiology, agri-food safety and risk analysis, epidemiology and food-borne diseases, biotechnology, international trade and food legislation, food quality and assurance, food/bio-terrorism/biological threats, food fraud, food science and technology and functional foods, food sanitation and processing. Professor Badrie is also an attorney-at-law having received received her postgraduate diploma in Legal Practice, School of Law, Policing and Forensics, Staffordshire University, UK and Bachelor of Laws, LLB, University of London.

She also serves on the IAP Statements Committee. The aim of this committee is to ensure that the topics and procedures for drafting, endorsing and publishing IAP Statements are followed correctly and to support the IAP Board in the drafting of other declarations.

Professor Badrie has been a fellow of The World Academy of Science (TWAS, Italy) having been nominated in 2011 and has served on several committees.

PREPARING FOR LIFE WITH COVID-19

Author: Professor Emeritus Karl Theodore

Introduction

In the light of the current explosion of Covid-19 cases both in the USA and in Europe, given our links with these two areas of the globe, it will make sense for the Caribbean to brace itself for living with this virus for at least the next year ahead of us. The important point here is to recognize the closeness of the link between the health of the population and the performance of the economic system. It should now be obvious that we will not be able to keep the economy ticking over if we do not have national control of the pandemic. Moreover, since we cannot survive if the economy is shutdown for extended periods, this means that we have to find a way to keep economic activity going, even as the pandemic still has a grip on our lives.

The main implication of the imperative of keeping the economy functioning will be the need to strengthen the health systems of each of our countries to the point where they will each be able to cope with a manageable number of Covid-19 cases. We know that once economic activity is being maintained, people will be needing to be in contact with one another, and this will keep the virus alive in our communities. The requirement will be to keep the number of Covid-19 cases significantly below the level which will overwhelm our health system.

In this context, there are four health system capacities which are usually mentioned in the context of the required resilience of the health system: ***testing***, ***isolation***, ***tracing*** and ***treatment***. It will be important that each of our countries commit to the level of investment required to put the health system in a state of readiness to cope with the number of cases expected, even as we partially open our borders, and as we allow more and more persons to interact with one another.

A Drive for Resilience

As we move in the direction of building the resilience of the health system, to allow the economy to keep functioning, we need to keep in mind that the health system comprises three main stakeholders, each of whom has a very important responsibility. The three stakeholders are first, the ***health planners and managers*** of the health system; second, the ***health providers***; and finally, the ***population***.

The Table below illustrates to division of responsibility.

RESPONSIBILITY FOR HEALTH SYSTEM RESILIENCE

STAKEHOLDERS	**HEALTH SYSTEM RESILIENCE FUNCTIONS**			
	TESTING	*ISOLATION*	*TRACING*	*TREATMENT*
HEALTH PLANNERS AND MANAGERS	√	√	√	
HEALTH PROVIDERS	√			√
POPULATION		√	√	

As the Table indicates, testing, isolation and tracing are the responsibility of the *planners and managers* of the health system. This will involve the adequate provision of facilities and supplies to execute each of these functions, and making arrangements for timely implementation. The Table also shows that *health providers* will be expected to carry out the testing required and to provide the treatment persons will need when admitted to the hospital. This will require the collection and laboratory testing of samples taken, and the provision of the 24-hour care and surveillance Covid-19 patients will need. Finally, the Table shows that the cooperation of *the population* will be needed in carrying out both the isolation and quarantining that will be required, and in providing the information needed to make contact tracing successful.

The truth is that if any of the health system capacities mentioned is not adequately maintained, the risk of the pandemic getting out of hand will be severely heightened. This means that each of the stakeholders has almost equal responsibility for the resilience of the health system, once the pandemic is still with us. Since many of our countries are tourism-based, we will have to put special measures in place to minimize the importation of the virus. In this regard, the cooperation of the population will be paramount.

As far as the investment in the health system requirement is concerned, it is instructive to note that public sector spending on health systems in the Caribbean is less than 4% of GDP in most countries. Since, in any case, this is below the 6% level recommended by the Pan American Health Organization (PAHO), the present suggestion is that **each country should try to respond to Covid-19 by increasing its public sector allocation to health by 1% of its GDP.** This will generally require an increase of close to **3% in the current budget allocation.** Given what is at stake – population health and the continued functioning of the economy – this is a budget increase which should be given the highest priority.

The fact is that for the present year, because of the pandemic, we expect to see declines of 10% or more in the GDP of countries of the region. If our economies are to recover, and to be in a position to service the needs of the population, we will have to find a way to keep avoiding a pandemic explosion in any one of our countries, while we strive to keep economic activity at acceptable levels. Of course, there should be no expectation that the economy would be returning to full throttle within the next two years, but what we have to do is to keep production and consumption at levels consistent with a decent standard of living for the population.

As a practical matter, for the next two years, countries should consider themselves as doing well if they manage to halt the downward slide initiated by the pandemic, and they should see themselves as doing excellently if they could attain growth rate between 1% and 2%.

COVID-19: ORIGIN, EFFECTS ON HUMANITY, PREVENTION AND IN PURSUIT OF A CURE

Professor Raymond Jagessar

University of Guyana

ABSTRACT

Our world is in a chaotic state at the moment. This stems mostly from the current infectious, highly contagious viral disease, COVID-19, and not to mention global warming and its catastrophic effects, intense yearly hurricanes, droughts etc. COVID-19 is caused by severe acute respiratory syndrome coronavirus 2, SARS-COV-2. It was first identified in Wuhan, China in December, 2019 , though there is speculation that it may have originated elsewhere. It has resulted in a current ongoing pandemic. A person infected with the virus can be symptomatic or asymptomatic. Common symptoms include fever, cough, fatigue, shortness of breath, loss of smell and taste, multi organ failure, septic shock. blood clots etc. The virus is spread primarily between people, during close contact via small droplets, produced by coughing, sneezing and talking, touching one own face after contact with a contaminated surface. It's also postulated that its spread may also be airborne, requiring particulate matter in the atmosphere for further transmission. Preventative measures for COVID-19, include frequent handwashing with soap , physical distancing of six feet from others, wearing a suitable mask etc, quarantine for those with symptoms, contact tracing etc. There is no known vaccine or specific antiviral treatment to date. Considering that viruses mutate, it would be best to use and explore drugs combination or herbal mixtures to control and eradicate this disease. A virus is not a bacteria, and so would require herbs that show strong and selective antiviral activity. Over seventy Pharmaceutical research institutions are currently working to find a cure for this disease. This presentation outlines in detail, the origin, effects on humanity, prevention and in pursuit, cure for COVID-19.

Keywords: COVID-19, SARS-COV-2, Wuhan, symptomatic, asymptomatic, pandemic, mutate, eradicate

Note to readers: The full presentation is not included in this newsletter. For additional details please contact the author— raymond.jagessar@uog.edu.gy

The Challenges and Triumphs of Trinidad and Tobago's African Women in STEM

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The underrepresentation of African women in Science Technology Engineering and Mathematics (STEM) fields is a problem which is quite widespread in the United States (US). Here in Trinidad and Tobago the integration of students in STEM fields at the secondary and university level is also an area of interest by both the labour market and the government, based on the rising demand and supply of job seekers in STEM. Such demand, have led to the development of several initiatives by the National Institute of Higher Education, Research, Science and Technology (NIHERST) such as internships (NASA International Internship, National Youth Science Camp (NYSC), and the International Centre for Genetic Engineering and Biotechnology (ICGEB)), and school based interventions (Teach Me, Improving Innovation Capacities in the Caribbean (INVOCAB), Community Design & Innovation (COMDESI), Seismology in Schools, Youth Build, and Micro-science TT). As a result, there is a great emphasis on the participation of students in STEM fields. However, even though there is great interest in STEM, there it is likely that there is an underrepresentation of those holding graduate degrees, i.e., MSc. and PhDs in STEM fields. For this reason, highly educated African women in STEM are most unlikely to hold high positions of leadership within their chosen field, and experience different labour market dynamics to that of men.

Bearing this in mind, there are still several gaps within the literature of African women in STEM fields. Specifically, there is no quantitative study which focuses on the education and labour economic outcomes of African women in STEM for Trinidad and Tobago. In the wider literature while there is a concentration on the experiences of African American women, as they are often categorized as a minority group. In the case of Trinidad and Tobago however, African women are considered a part of the majority group, i.e., a part of the dominant ethnic group. Thus, it would be interesting to learn if the outcomes of both groups of women are the similar, given the reverse ethnicity status of Trinidad and Tobago. In addition, and most importantly, there seems to be no studies in the literature which quantitively examines the earnings, and wage gap of African women in STEM. Faced with such gaps, this study strives to answer two research questions. First, how does the wage return of African Women in STEM change over the period 1991-2015? Second, is there present a multidimensional wage gap based on the skills, age, social class and income group of African women in STEM fields?

Focusing on the ethnographic structure of the sample, this study finds that on average there are less African women in STEM who are married. They earn an average of TT$24.79 per hour, TT$46,091.23 annually. The sample reveals that there are more overeducated (15%), than undereducated (9%),women in STEM. Despite this, these women have an average of 12 years of schooling and an average of 18 years of working experience. This implies that, even though African women in STEM face many issues such as lower income and educational mismatch, they have greater working experience, as they may be entering to positions within the STEM labour market earlier.

The estimation of the quantile regressions (QR), reveals that the returns of this group of women appears to have fallen throughout the wage or labour distribution, with the highest returns being at the lowest deciles , and the lowest returns at the highest deciles. The estimates produced by the Recentred Influence Function (RIF) (Figure 1-Panel A) regression reveals that if the African women in STEM who experience lower returns, were replaced by those with higher returns, then this would lead to a rise in the average returns of 19.6%. Where the inclusion of unconditional partial effect (UPE) covariates would cause a decline in the magnitude of this effect, but her average returns would remain positive and significant. The effect of this shift (Figure 1-Panel B), is positive across the UQR and is greatest amongst low-paid workers, favouring older women who are either married or single, are highly skilled, and is of an upper-middle/middle class, and negative for those with university education.

The main catalyst for such problems originates from the stereotype threat of women, the presence of gender bias, rigorous competitive academic/working environments, poor mentorship, microaggressions, and gender injustices. These matters all have the potential to limit the participation and representation of African women in STEM fields both in academia and the labour market. Bearing in mind the outcome of this study, there are several strategies which one can implement to design effective policies to enhance the representation of African women in STEM in Trinidad and Tobago. This includes the design of programmes at the secondary level which would prepare students to enter STEM careers, by providing them with exposure to the instruction, experiences and supportive relationships in the areas of engineering programming, and digital media concepts, that are needed when entering STEM fields. Further to this, the implementation of STEM fellowships and internships exclusively for African women in STEM post-secondary and undergraduate level, can enable these women to not only harness the much -needed working experience in STEM, but also help them to build their networks.

The building of an effective network would then allow them to be exposed to industry and academic professionals who may be better equipped to guide them in their STEM career. By encouraging the growth of such a network and mentorship, it is likely that more women will be attracted to the STEM field through the supportive nature of the network itself. This counteracts the problem of gender bias in STEM, and is likely to promote gender equality and diversity, and retention of African women in STEM.

Guidelines for the submission of articles

I. Articles should not exceed 1000 words (1 1/2 pages)

II. Images should be submitted as separate files

Articles should be submitted to:

1. pjetoo@gmail.com
2. secretariat@caswi.org

Note: Editors reserve the right to edit the length.