https://jurnal-umbuton.ac.id/index.php/Pencerah
https://doi.org/10.35326/pencerah.v8i4.3078

Open Access

SANG PENCERAH
Jurnal Ilmiah Universitas Muhammadiyah Buton

E-ISSN: 2655-2906, P-ISSN: 2460-5697 Volume 10, No 2, Year 2024

Assessment of The Impact Covid-19 on The Environment and Water Resources: A Namibian Perspective

Nwagbara, Victor Uzoma[1*], Iyama, William Azuka[2], Iikela Sioni[3]

[1]Department of Civil and Environmental Engineering, Namibia University of Science and Technology, Namibia
[2]Institute of Geosciences and Environmental Management, Port Harcourt, River State University, Nigeria
[3]Director of Research and Consultancy and Acting Director of CEMCCASD, International University of Management, Namibia

[*]Korespondensi: vnwagbara@nust.na

Article Info

Received 29 January 2023

Approved 16 January 2023

Published 31 May 2024

Keywords: Environment, Covid19, Energy, Waste

Abstrak

The widespread spread of Covid-19 globally has hampered many socio-economic activities and caused many negative impacts on the environment and water resources. Industrial activity came to a halt and this brought the global economy to a halt while water demand and consumption skyrocketed as the UN urged people to wash their hands to fight the COVID19 pandemic. Namibia is no exception in terms of the negative impact of COVID19 on the environment and water resources as it is considered one of the driest countries in Sub-Saharan Africa. This research method uses a persuasive-based qualitative description approach. To facilitate understanding and reading, the research results are described first. The results in the field are that In Namibia, more than 20% of the population, especially those living in rural areas, do not have access to good quality water and do not have a safe sanitation system. The continuation and extension of the nationwide lockdown deepens the recession and indirectly impacts the environment and water bodies.

1. Introduction

Covid-19 pandemic has caused significant impact globally on water bodies, natural and built environment, economic slowdown, and related sociological systems such as policy and governance. Though, human health and environmental systems are the primary and immediate issues to be addressed from local to regional scales which have seen discernible positive impacts due to the reduction of pollutant loading from industries, vehicle emission, and other sources. However, unreliable evidence shows that there is reduction in biochemical oxygen demand (BOD) and coliform levels in rivers, improvement in air quality because of reduction in the loading of nitrous oxide, particulate matter, and other pollutants. This situation is forced to be possible because of extreme measures that have been forced on the society due to the pandemic. This unprecedented situation offers dynamisms on the natural and built environment, and societal systems that may lead to feasible paths for preservation of recovered systems and new recovery pathways through sensible policies and practices.

According to Volkamer *et al*. (2006), anthropogenic activities are the major key drivers of pollution in all sphere of the environment especially the water bodies. Since Government of Namibia (GRN) declared state of emergency (National disaster COVID-19) from 18 March 2020 to 14 July 2020, people's movements have been restricted and industrial activities are closed down for weeks. Therefore, it is expected that pollution loads to the environment and also water consumption gets decreased. As expected, in a matter of days, the water distribution level has drastically dropped. While these improvements in water distribution are temporary, the current level of water distribution and consumption could be much lower than the pre-COVID-19 period.

Pandemics are large-scale outbreaks of infectious disease that can greatly increase indisposition and mortality over a wide geographic area and cause substantial economic, social, and political disruption. Jones *et al.* (2008) and Morse (1995) postulated that the prospect of pandemics has been augmented over the past century because of increased global travel and integration, urbanization, changes in land use, and greater exploitation of the natural environment. There is fear that these may continue and with time it will intensify. According to Smolinsky *et al*. (2003), substantial policy attention has focused on the need to identify and limit emerging outbreaks that might lead to pandemics and to expand and sustain investment to build preparedness and health capacity.

The international community has made progress toward preparing for and mitigating the impacts of pandemics. Many countries devised pandemic plans after the 2003 severe acute respiratory syndrome (SARS) pandemic and growing concerns about the threat posed by Avian influenza (USDHHS, 2005). Delayed reporting of early SARS cases also led the World Health Assembly to update the International Health Regulations (IHR) to compel all World Health Organization member states to meet specific standards for detecting, reporting on, and responding to outbreaks (WHO, 2005). The framework put into place by the updated IHR contributed to a more coordinated global response during the 2009 influenza pandemic (Kartz, 2015). International donors also have begun to invest in improving preparedness through refined standards and funding for building health capacity (Wolicki *et al*., 2016).

In the interest of this chapter, an *epidemic* is the occurrence in a community or region of cases of an illness, which are clearly in excess of normal prospect (Porta, 2014). Similarly, a *pandemic* is "an epidemic occurring over a very wide area, crossing international boundaries, and usually affecting a large number of people

(Porta, 2014). Pandemics are, therefore, identified by their geographic scale rather than the severity of illness. For example, in contrast to annual seasonal influenza epidemics, *pandemic influenza* is defined as "when a new influenza virus emerges and spreads around the world, and most people do not have immunity" (WHO, 2010).

According to Cheval *et al*. (Cheval et al., 2020), six major pandemic and epidemic outbreaks engulfed the planet between 2000 and 2019, such as Severe Acute Respiratory Syndrome (SARS) (2002–2004), H1N1 influenza (2009), Middle East respiratory syndrome (MERS) (2012–2020), the West-African Ebola virus epidemic (2013–2016), the Zika fever (2015–2016) and Avian influenza (2008–2014). However, none of the above viruses achieved the spatial extent and the prevalent impacts like the novel coronavirus (Cheval *et al.,* 2020).

From an ecological perspective, the COVID-19 crisis is fundamentally associated to the relationships between society and ecosphere. According to Andersen *et al*. (2020), the origin in a Wuhan wet market or industrial livestock or other source is not yet fully clarified. It is well known that MERS-CoV, SARS-CoV and SARS-CoV-2 are all animal coronaviruses which infected people and then succeeded to spread in different community at large scale. Around the globe more than 2.7 million people are dying from zoonosis in a year (Grace et al., 2012). The impact is even greater as the zoonosis is also affecting human health, livestock sector and agriculture and usually the poorer human populations are more affected. The Coronavirus crisis is most probably one of the many challenges our society will have to face in the forthcoming decades as an indirect consequence of the impact of climate change on the ecosphere through many mechanisms, including diminishing species habitats Corlett, *et al*. (2020), changing species distributions and an increasing influx of alien invasive species (Duke & Mooney, 1999; Zhang *et al*., 2019). At present, economic development focuses on continuous growth without considering the conservation of natural systems.

The International Monetary Fund (IMF,) has said that the coronavirus pandemic had instigated a global economic downturn the likes of which the world has not experienced since the Great Depression (Rappeport & Smialek, 2020). The European Commission forecasted that the GDP of EU countries will contract by 7.5% in 2020. In response to this, EU embarked upon serious intervention to counter the challenges brought about by the coronavirus. Despite the swift and comprehensive policy response at both EU and national level, the EU economy will experience a recession of historic proportions this year. On the other hand, IMF warned that economies in Asia would see no growth this year, for the first time in 60 years, with the service sector particularly under pressure. National lockdowns across the region meant airlines, factories, shops and restaurants have suffered the greatest economic shocks. Just a day after the IMF warning, official data showed the Chinese economy had contracted in the first quarter – the first time since quarterly records began in 1992. The Gross Domestic Product (GDP) in the world's second largest economy fell 6.8% in January-March year-on-year – more than the 6.5% forecast by analysts and the opposite of the 6% expansion in the fourth quarter of 2019 (Lee, 2019). The Chinese economy is likely to be hit further by reduced global demand for its products due to the effect of the outbreak on economies around the world. China's factory production plunged at the sharpest pace in three decades in the first two months of the year (Lee, 2019).

The country's economic growth is expected to fall to 2.5% this year, which is the slowest in almost 50 years. Approximately, the world-wide economy of about 65% is currently on lockdown. These are some of the global impacts of COVID-19; 1) Disruptions in global supply chains, with significant supply shortages and consequent price hikes, 2) Slowdown in investments and remittances and resulting job losses, 3) Volatility and collapse of stock markets due to uncertainties, 4) Decline in oil demand leading to decrease in oil prices and cut in revenue for oil exporting countries, 5) Decline in tourism and international travel and resulting job losses, 6) Decline in fishing and sea travel and job losses, 7) Unanticipated increase in health expenditure and resulting upsurge in public debt burden, 8) Tighter global financing conditions despite interventions through monetary policy to cut interest rates.

Namibia, similar to other countries in the world had to speedily employ measures such as imposed lock down periods which are essential to protecting the country from irreparable effects of the COVID-19 pandemic. The pandemic has claimed a lot of lives and destroyed livelihoods world over, and in Namibia reports of death due to COVID-19 is gradually increasing. In March 2020, the World Health Organization (WHO) had declared COVID-19 a pandemic, with over 118,000 cases of the coronavirus illness in more than 110 countries and territories around the world and the continuous risk of further spread around the globe (Rappeport & Smialek, 2020; SG Report, 2020). According to the 82nd Situation Report of the WHO, Africa had the lowest confirmed cases of 9,340 and fatalities of 415 in all regions [19]. Nevertheless, these numbers have been steadily increasing. Namibia reported the first case of COVID-19 in March this year. Subsequently, the government of the Republic of Namibia established the National Health Emergency Management Committee on COVID-19. In addition, a State of Emergency was declared March, 2020 and eventually a national lockdown was enforced. After Namibia declared the coronavirus as a state of emergency, the issuance of visas on arrival at the Hosea Kutako International Airport has been suspended and a travel ban of foreign nationals (by air and sea) from affected countries, namely Schengen states, China, Iran, Korea, United Kingdom, United States of America and Japan was imposed.

Namibia continues to confirm additional cases of COVID-19, and this situation is prevalent with rest of the world. The virus is deadly and engulfs healthcare systems of the body. There is no effective treatment and available vaccines for this pandemic virus and it spreads through asymptomatic vectors. As the disease continues to terrorize the whole world, it rips to shreds the gains of the socioeconomics of all nations, thereby exposing and deepening poverty and inequality, as a global depression looms in the midst of this health crisis. Consequently, a lot of pressure will be put on the environment for energy, as a lot of a retreating back to remote areas.

2. Methods

The research conducted seeks to clearly illustrate the Impact Assessment of Covid-19 on the Environment and Water Resources: A Namibian Perspective, with a formula that is not expressed in numbers. Explicitly, the data to be obtained is regarding the Assessment of the Impact of Covid-19 on the Environment and Water Resources: A Namibian Perspective. Therefore, it is more appropriate to explain with words to obtain meaning by connecting the information obtained with the context. This means information obtained from the surrounding environment. The data collection technique used in this research is observation technique. Data analysis is the process of compiling data so that it can be interpreted. Organizing means being able to group into patterns, themes, or categories. The data analysis technique used includes 3 stages, namely data reduction, data presentation and drawing conclusions. The desk research of this study was based upon elaborating the available secondary data from February 27, 2020 to May 25, 2020 which was the peak of the pandemic in Namibia. To facilitate understanding and reading, the research results were described first, followed by the graphical presentation.

3. Findings and Discussions

3.1 Findings

The results of this study are shown in Figures 1, 2, 3, 4 and 5.From statistical analysis and comparing water received (W_R), water distributed (W_D) and water consumed (W_C) in 2017, there were significant differences as f-ratio was 70.55 and p-value less than 0.00001($p<0.10$). This was also corroborated by same significant difference between W_R and Wc (f-ratio of 70.49 at $p<0.10$). Similarly, in 2018 comparing W_R, W_D and W_C and also W_R and W_C; the results were also significant (at both p<0.01, 0.05 and 0.10) where f-ratios were 16195 and 16177 both at $p<0.00001$ respectively. Analysis of W_R / W_C, W_R/W_D and W_C/W_D 2018, showed that there were significant differences at f-ratios of 10871 (p-value <0.00001) and 10886 (p-value < 0.00001). This is same in 2020 showing that water consumption has always been of a regular trend probably due the arid dry nature hence increasing the quest and taste for water round the years irrespective of the COVID-19 pandemic.

The t-analysis for W_D/W_C for 2017, 2018, 2019 and 2020 showed that there was significant difference at 8.3965, 127.1776, 104.28034, 56.42761 ($p<0.00001$). Water balance volume was taken for 172 days from 2017 to 2020 which was the year of the COVID-19 pandemic. Similarly, comparing W_R, W_D and W_C, there was no significant difference as f-statistic was 1524.9352 at p=0 ($p\leq0.10$).

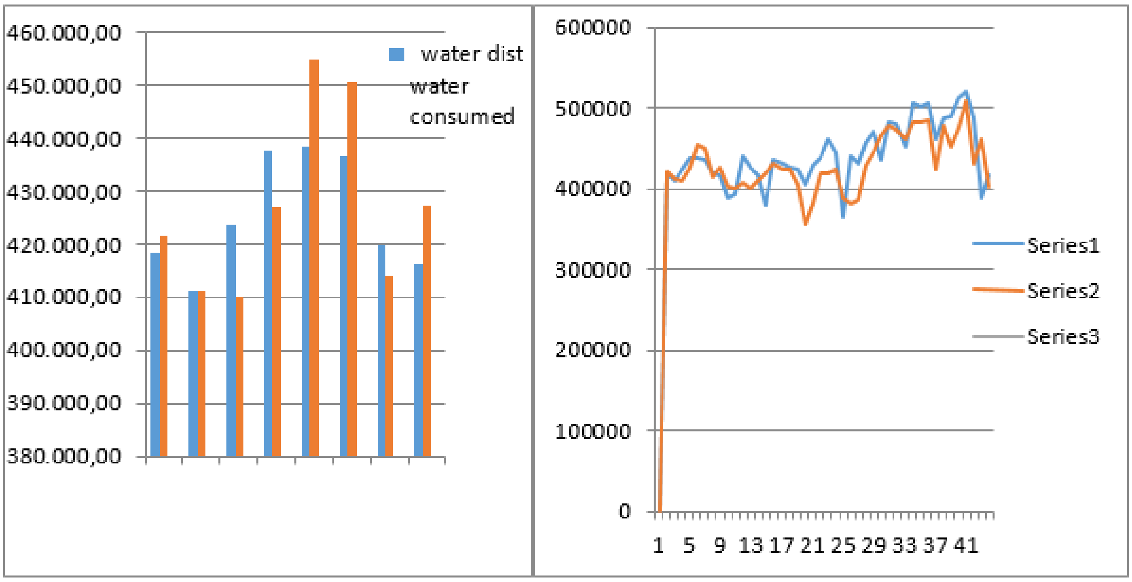

Figure 1: Variation in water received, distributed and consumed in 2017 (Water in m^3)

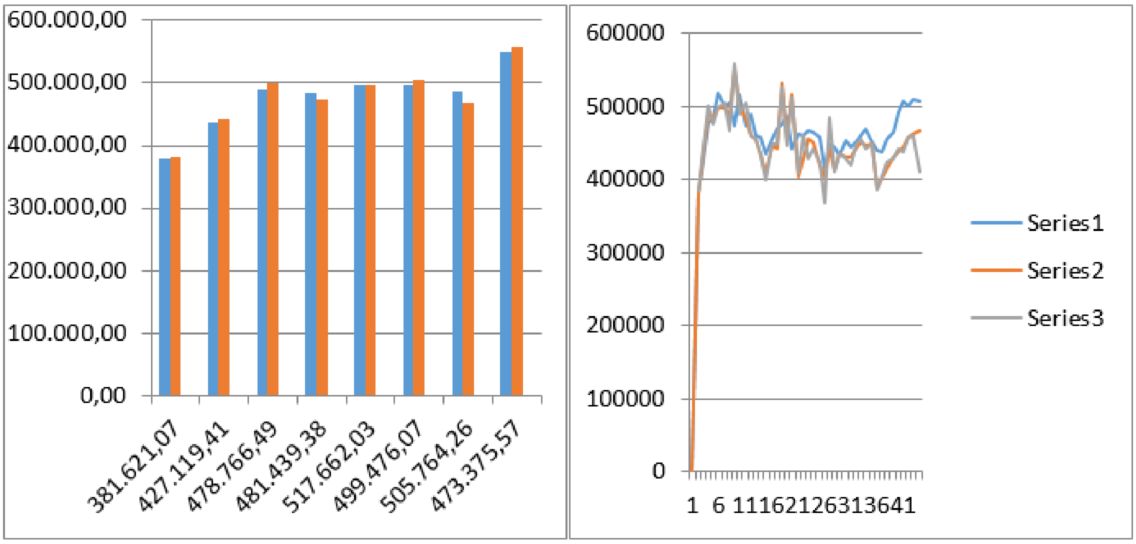

Figure 2: Variation in water received, distributed and consumed in 2018 (Water in m^3)

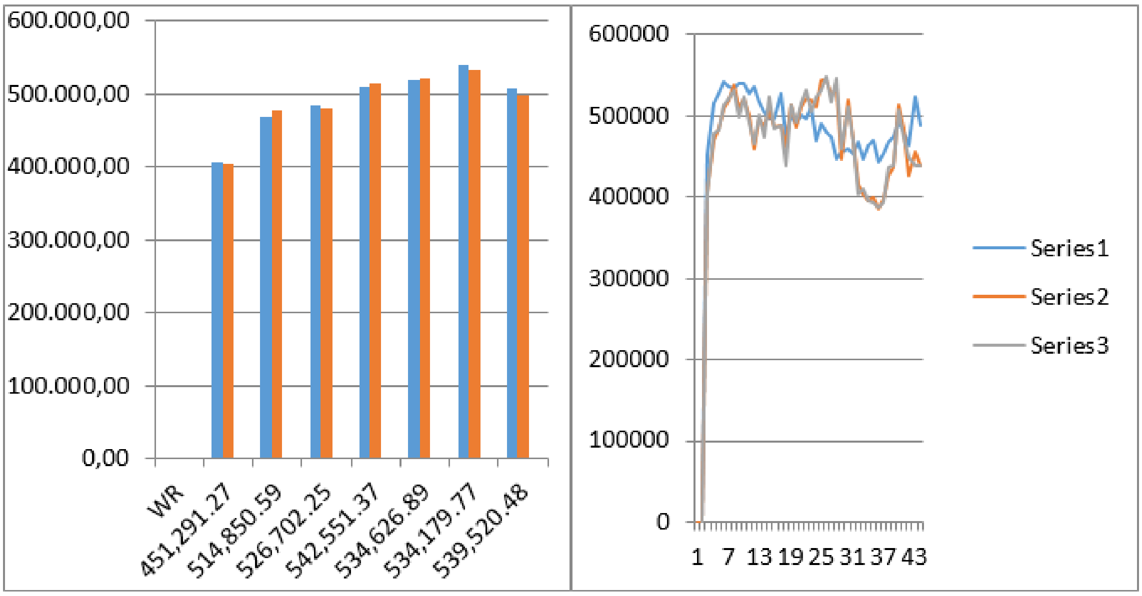

Figure 3: Variation in water received, distributed and consumed in 2019 (Water in m^3)

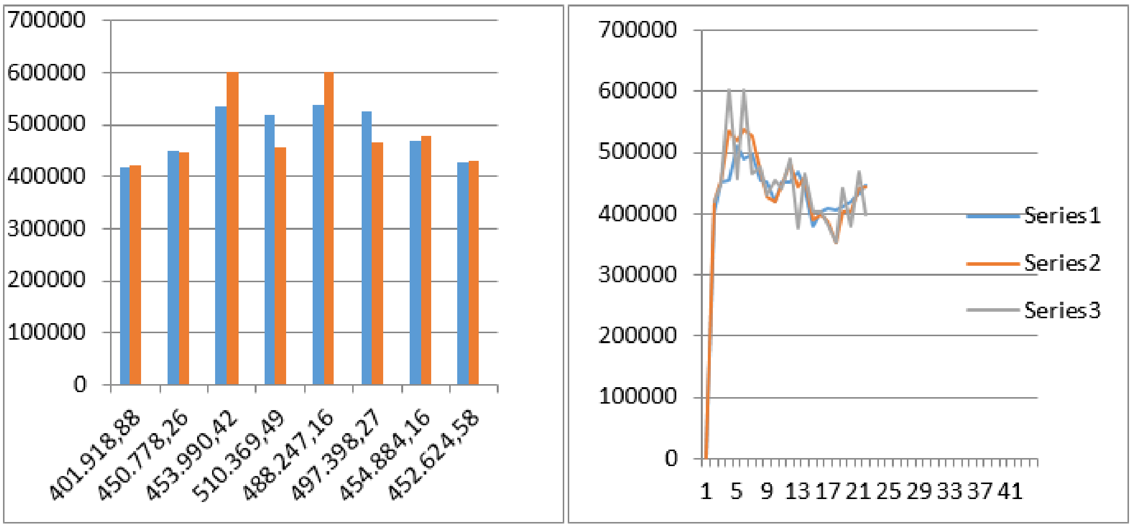

Figure 4: Variation in water received, distributed and consumed in 2020 (Water in m^3)

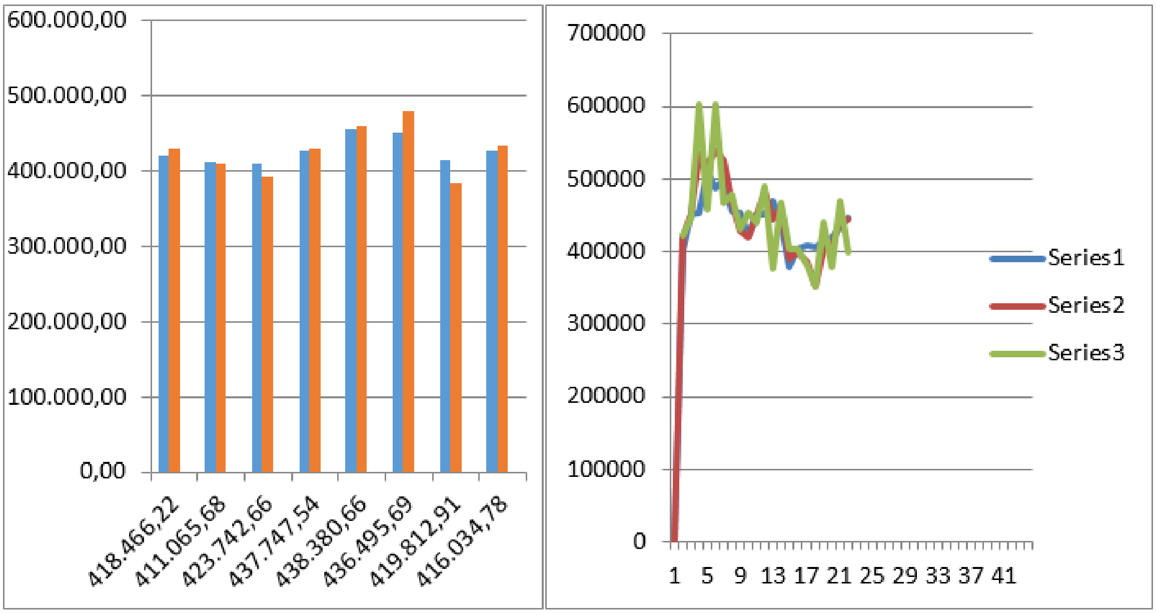

Figure 5: Variation in water received, distributed and consumed from 2017-2020 (Water in m^3)

3.2 Discussions

The water balance and hydro-climatic characteristics, without doubt have significant consequences on planning and development of the urban environment as in the case of the Namibia scenario. In recent years, a lot of water challenges have cropped up in the urban areas due to increasing water demands, which in turn arise out of a rapidly increasing population. This is for example the case in Lagos and Windhoek where precipitation trends have shown a lot of variations and where, as in many other tropical cities, the last two decades have been characterized by persistently dry conditions. In many of these cities' severe hydro-meteorological phenomena related to precipitation and the water balance frequently occur and cause great damage leading to loss of lives and property and causing set- backs in development (Ojo, 1988).

The situation is even worse with the other components of the water balance, on which much less information then for rainfall is available. This is for example the case with evaporation and runoff parameters (Ojo, 1988). There is the Lack of adequate data coupled with challenges such as inadequate financing and low concern for solution to the data problem of precipitation and the water balance in urban areas (Ojo, 1988). This is complimented by the present COVID-19 pandemic which has increased water usage in the world over not just Namibia. Figures 1, 2, 3 and 4 shows the trends in the water received, distributed and consumed in 2017, 2018, 2019, and 2020 while Figure 5 showed that from 2017 to 2020 respectively. These figures are based on annual reports of the water available in Namibia.

The water balance data so provided from 2017 to 2020 is a boost to the elucidation of water supply and development in Namibia during the crest and trough of this ravaging pandemic (See appendix). The prospects of the solution to the myriads of problems of water balance components and the urban hydrological challenges in the tropical cities lies in the ability to have adequate data and use of the data for research and development. It also depends on the realization of the fact that such research must be interdisciplinary, requiring both hydro-meteorological and non-hydro-meteorological factors, and involving various institutions experienced in water policy formulation, planning and management of water (Ojo, 1988). Spatial and temporal patterns of recharge should be taken into consideration in preparing a sustainable groundwater resources management plan for the Namibia drainage basin as if not well done can lead to water scarcity and subsequent thrive of epidemics and pandemics. The paucity of data and limited research capacity in developing countries such as Namibia means that there is a lack of understanding recharge variability for large parts of the developing world. This can be attributed to the complex nature of groundwater resources and its interaction with the ecosystem (Ashaolu *et al*., 2020).

Researchers in Namibia have strived to estimate groundwater recharge of locations and drainage basins across the country using different methods (Van der Merwe *et al*., 2005; Tredoux & Barbour, 2004). This is to avoid the water scarcity problems as water remains one of the most significant resources to man. Owing to the complexities in direct assessment of the water budget, hydrologists and water resources engineers have widely adopted hydrological models to enable its comprehension (Ashaolu, 2017).

4. Conclusion

This study reveals that the COVID-19 pandemic did not really have much impact on water consumption compared to pre-Covid 19 months and years. Despite, Namibia being one of most arid nation in Sub-Saharan Africa, Covid-19 pandemic did not show severe impact on its environment and water resources

References

Andersen, K.G., Rambaut, A., Lipkin,W.I., Holmes, E.C. & Garry, R.F. (2020). *The proximal origin of SARS-CoV-2*. *Nat. Med*. 26, 450–452.

Ashaolu, E. D., Olorunfemi, J.F., PaulIfabiyi, I., Abdollahi, K. & Batelaan, O. (2020). Spatial and temporal recharge estimation of the basement complex in Nigeria, West Africa. *Journal of Hydrology: Regional Studies,* 27 https://doi.org/10.1016/j.ejrh.2019.100658.

Ashaolu, E.D. (2017). Water resources management: a geographer's viewpoint. S.L. Tilakasiri (Ed.), Geography in Development: Issues and Perspectives, Stamford Lake, Pannipitiya, Sri Lanka (151-171).

Cheval, S., Adamescu, C. M., Georgiadis, T., Herrnegger, M., Piticar, A. & Legates, D. R. (2020). Observed and Potential Impacts of the COVID-19 Pandemic on the Environment. *International Journal of Environmental Research and Public Health. MDPI.*

Corlett, R.T., Primack, R.B., Devictor, V., Maas, B., Goswami, V.R., Bates, A.E., Koh, L.P., Regan, T.J., Loyola, R. & Pakeman, R.J. (2020). Impacts of the coronavirus pandemic on biodiversity conservation. *Biol. Conserv.,* 246, 108571. ECA, (2020). *Economic Effects of COVID-19 on Africa*. United Nations, Addis Ababa.

Dukes, J.S. & Mooney, H.A. (1999). Does global change increase the success of biological invaders? *Trends Ecol. Evol.*14, 135–139.

Grace, D., Mutua, F., Ochungo, P., Kruska, R.L., Jones, K., Brierley, L., Lapar, M.L., Said, M.Y., Herrero, M.T. and Phuc, P.M. (2012). *Mapping of Poverty and Likely Zoonoses Hotspots*. ILRI: Nairobi, Kenya.

Jones, K. E., Patel, N. G., Levy, M. A., Storeygard, A. & Balk, D. (2008). Global Trends in Infectious Diseases. *Nature,* 451 (7181), 990–93.

Katz, R. (2009). Use of Revised International Health Regulations during Influenza A (H1N1) Epidemic*, 2015*. *Emerging Infectious Diseases* 15 (8), 1165–70.

Lee, Y. N. (2019). *China says its first-quarter GDP grew by 6.4 percent, topping expectations*. China Economic.

Morse, S. S. (1995). "Factors in the Emergence of Infectious Diseases." *Emerging Infectious Diseases* 1 (1), 7–15.

Ngatjiheue, C. (2020). Government rolls out N$8.1b stimulus. The Namibian Newspaper

Ojo, O. (1988). Recent Trends in Precipitation and the Water Balance of Tropical Cities: the example of Lagos, Nigeria. *Hydrological Processes and Water Management in Urban Areas; Proceedings of the Duisberg Symposium, April 1988*.

Porta, M. (2014). *A Dictionary of Epidemiology*. 6th ed. Oxford: Oxford University Press.

Rappeport, A. & Smialek, J. (2020). *I.M.F. Predicts Worst Downturn since the Great Depression*. https://www.nytimes.com/2020/04/14/us/politics/coronavirus-economy-recession-depression.html.

SG Report (2020). *SG Report" "Shared responsibility, global solidarity: Responding to the socio-economic impacts of COVID-19*".

Smolinsky, M. S., Hamburg, M. A. & Lederberg, J. (2003). *Microbial Threats to Health: Emergence, Detection, and Response*. Washington, DC: National Academies Press.

Tredoux, G., & Barbour, E. A. (2004). "Interpretation of hydrochemical data for waste disposal sites around Windhoek". Volume I: Kupferberg. Report submitted to the City of Windhoek, CBA & CSIR (ENV-S-C 2004-118).

USDHHS (2005). U.S. Department of Health and Human Services, 2005

Van der Merwe, B., Tredoux, G., Johansson, P O., & Jacks, G. (2005). Windhoek Aquifer Joint Venture Consultants. Water quality requirements for artificial recharge of the Windhoek Aquifer. City of Windhoek, Tender No INF 260/2003, Final Report.

Volkamer, R., Jimenez, J.L., San Martini, F., Dzepina, K., Zhang, Q., Salcedo, D., Molina, L.T., Worsnop, D.R. & Molina, M.J., (2006). Secondary organic aerosol formation from anthropogenic air pollution: rapid and higher than expected. *Geophys. Res. Lett*. 33

WHO (2005). World Health Organization). International Health Regulations, Geneva.

WHO (2010). World Health Organization. 2010. "What is a Pandemic?" February 24.http://www.who.int/csr/disease/swineflu/frequently asked_questions/pandemic/en/.

Wolicki, S. B., Nuzzo, J. B., Blazes, D. L., Pitts, D. L. & Iskander J K. (2016). Public Health Surveillance: At the Core of the Global Health Security Agenda. *Health Security*, 14 (3), 185–88.

Zhang, Z., Xu, S., Capinha, C., Weterings, R. & Gao, T. (2019). Using species distribution model to predict the impact of climate change on the potential distribution of Japanese whiting Sillago japonica. *Ecol. Indic.,* 104, 333–340.