

Climate change, institutional quality and SDGs: A narrative review with a focus on Yemen.

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ARTICLE INFO

Article history:

Received 29 September 2021

Accepted 29 November 2021

Published 31 January 2022

Keywords:

Climate change

Institutional quality

SDGs

Middle East

Conflict

Yemen

DOI:

10.24191/jeeir.v10i1.16489

ABSTRACT

The purpose of this paper is to undertake a narrative review on climate change, institutional quality, and SDGs within the context of Yemen. The methodology is a broad study of past and recent academic works related to the topic's keywords. In essence, a narrative review has been undertaken to incorporate the three interlacing issues; climate change, institutional quality, and SDG in the context of Yemen. The present research work reinforces the evidence that climate change effects are particularly more catastrophic in regions already under political, socio-economic, and cultural pressures. Eventually, the attainment of SDGs become increasingly challenging in contexts with intense climate variability and native disturbances. Besides, the lack of quality institutions and strong governance put in peril the stability of the country, thereby making it more prone to conflicts. This eventually leads to the formation of a vicious circle where low institutional quality fecund more conflicts, which in turn further destabilizes state institutions. Overall, climate change is making matters worse for countries like Yemen, and hence this study provides an insight into the Yemenite society and economy. Since this is a narrative review with an interpretive approach, further studies should aim to engage in more econometric analysis covering the interference relationships between climate change, institutional quality, and SDGs, especially in countries facing the turmoils of war and conflict.

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1. Introduction

1.1 Background

The video of Tuvalu's (a small independent island nation in the South Pacific) foreign Minister giving his speech at COP26 with knees in the water went viral on social media last year. Yet, it sends a strong wake-up call to the world that extreme climate variability across different parts of the globe, is having a serious and adverse permanent incidence on the most vulnerable communities. Climate change is an inherent predisposition of nature in its innate characteristic of variability, but human-induced activities (anthropogenic) have exacerbated this effect and consequently dramatized the consequences all around the world, especially in regions most underdeveloped or already facing other challenges such as corruption, civil unrest, conflicts, malnutrition and poor educational systems. Climate change is a multi-faceted and complex phenomenon with effects as diverse as internationally widespread. For this reason, food, water, health, ecosystem, human habitat and infrastructure have been identified as the most vulnerable sectors under climate attack (Fawzy et al., 2020). Within a similar perspective, Ray et al., (2019) maintain in their study that future climatic conditions are expected to decrease crop yields and it has been equally concluded that climate change has already taken a heavy toll on global food production. Climate change is undoubtedly a global burden, but its impacts are unequal and the most affected are the developing countries and SIDS (Small Island Developing States), which in reality contribute the least to global warming and greenhouse gas emissions. In fact, climate change is known to reduce access to drinking water, decrease food security, and to have adverse health effects (Islam & Winkel, 2017) which deepen social inequality and prolong the damages of climate change in the most impoverished societies.

To this effect, countries around the world have reunited forces under the Sustainable Development Goals (hereafter SDGs) following the expiring of the timeline for the Millennium Development Goals (hereafter MDGs) in 2015, which had previously engineered global efforts towards the attainment of vital social goals for the period 2000-2015. The SDGs as pioneered by the UN 2030 Agenda, are fundamentally different from the MDGs agenda and encourage greater dynamism in respect to the present and future global challenges which are more relevant and pressing in the post-2015 era. According to Fukuda-Parr, (2016), the SDG programmes incorporate ending poverty as a core objective, but the 17 goals and 169 targets set out a broader agenda that includes environmental, social, and economic sustainability. All in all, the SDG programmes are viewed as more transformative and comprehensive to respond to sustainability challenges, while departing from the "North-South divide" geopolitics where all countries, whether rich or poor are called upon to show responsibility towards universal sustainability goals.

Besides, the SDGs are based on an inclusive goal-setting approach without harsh and fast rules which are not legally binding, and eventually views no countries as "developed" in terms of sustainability achievement, and all nations across continents are considered as "developing" since sustainability is above all is a journey towards the right balance between economic, social and environmental objectives. The SDGs are expected to guide governments as they work to address some of the most pressing challenges facing humanity (Nilsson, 2017), and these goals are considered as an "indivisible package" which must be integrated mutually, although some potential trade-offs or conflicts are inevitable, yet they all aim to achieve economic progress for all while safeguarding natures' prized and ephemeral resources. The nexus between climate change and SDGs is a truism. In fact, these universal goals endorse concerted efforts towards sustainable energy usage, promotion of life below water and on land, encouraging access to clean water and sanitation, responsible production and consumption, and of course through the climate action SDG 13 itself, they all advocate more efficient and effective use of natural resources and searching for other environment-friendly raw materials and production processes.

1.2 Research motivations

On one hand, climate change is making matters worse for Least Developing Countries (LDCs) and developing countries to implement and attain the SDGs, especially the war-afflicted regions. On the other hand, the success in achieving the SDGs, the implementation of right policies, the enforcement of laws and regulations and the driving of national agendas depend largely on the quality of institutions whose main objective is to progress all these national economic, political, social and environmental reforms. The achievement of the SDGs necessitates the contributions of effective government institutions and proactive contributions of other institutional stakeholders (Mombeuil, 2020) and this fundamental condition is embedded in the SDG 16; “Peace, Justice and Strong institutions” and SDG 17; “Partnerships for the goals”, which both signal the need for proper institutional mechanisms to spearhead the different targets. The need for high-quality institutions in the attainment of sustainability goals were highlighted in the recent studies of Azam et al., (2021), Adams et al., (2019) and Nguyen., (2021) amongst many others within the institutional quality literature. Overall environmental sustainability is improved under good institutions; in particular, rule of law, government effectiveness, control of corruption, and regulatory quality (Nguyen., 2021). This is a fact since better institutions are less likely to be corrupt and hence maintain law and order while reducing chances for opportunistic behaviours to divert funds away from the financing of the SDGs.

At the same time, high quality institutions support governance, control and accountability which keep track of progress in the achievement of SDGs and eventually improve trust in public officials. It should also be noted that Nguyen., (2021) mentions that some studies have shown opposite results where good quality institutions have been found to increase CO₂ emissions due to the high level of economic activity generated. Such results are similar to those which found that a certain level of corruption is beneficial for economic development since it helps to “facilitate” economic activities, which is known as the “greasing-the-wheel” hypothesis [see Venard., (2013) for further reading]. In any case, the critical significance of high-quality institutions in the attainment of the SDGs is unquestionable based on evidence which is strongly grounded in empiricism and in practice as well. At the same time, severe climate variability is known to provoke more tensions and unrest in countries already battling civil crises, and eventually, state institutions fail to strive in such conditions. Therefore, the relationships between climate change, institutional quality and, peace and justice as embodied by SDG 16 is worth exploring.

1.3 Research gap and contributions

This study aims to explore the connectivity between climate change, institutional quality and SDGs in Yemen. The latter has been chosen as case study since over the recent years it has remained a focal point in the Middle East crisis and is recognised as a hotspot for climate change while experiencing a chronic downfall of state institutions during those precarious times. Moreover, the present discussion builds itself on the two recent studies of: Gaghman, (2020); *The Importance of Good Governance on Achieving Sustainable Development Case Study: Yemen* and that of Agnello and Ramanujam, (2020); *Recalibration of the sustainable development agenda: Insights from the conflict in Yemen*. While Gaghman, (2020) emphasizes the need for better institutions for the promotion of the SDG agenda, Agnello and Ramanujam (2020) investigated the impact of conflicts on SDG attainment success in the context of Yemen, as an FCAS (Fragile and Conflict-Affected State). Therefore, to add more understanding of the situation in Yemen, the element of climate change was added in the current paper. Besides, the contextual nature of this study provides a focalized and comprehensive interaction between climate change, institutional quality and SDG, which altogether are amongst the most boiling topics in present times while having important implications within international debates and discourses on peace, proxy wars, diplomacy and international relations. Generally, climate change, institutional quality, and SDGs are difficult to capture on their own, but hopefully, if they are embedded within a case study, they can be better grasped. Overall, the present paper is timely and seeks to underpin the broad literature on climate change.

This paper undertakes a desk research methodology, which uses a narrative review approach through a broad perusal of past and present studies to build a comprehensive overview of the interactions between climate change, institutional quality and SDGs within the Yemenite context. The conceptual framework guiding the research throughout is shown in Figure 1. Therefore, on one side the discussions will seek to link the effects of climate change on the SDG agenda, and concomitantly the nexus between climate change, institutional quality and conflicts (represented by SDG 16) will be elaborated.

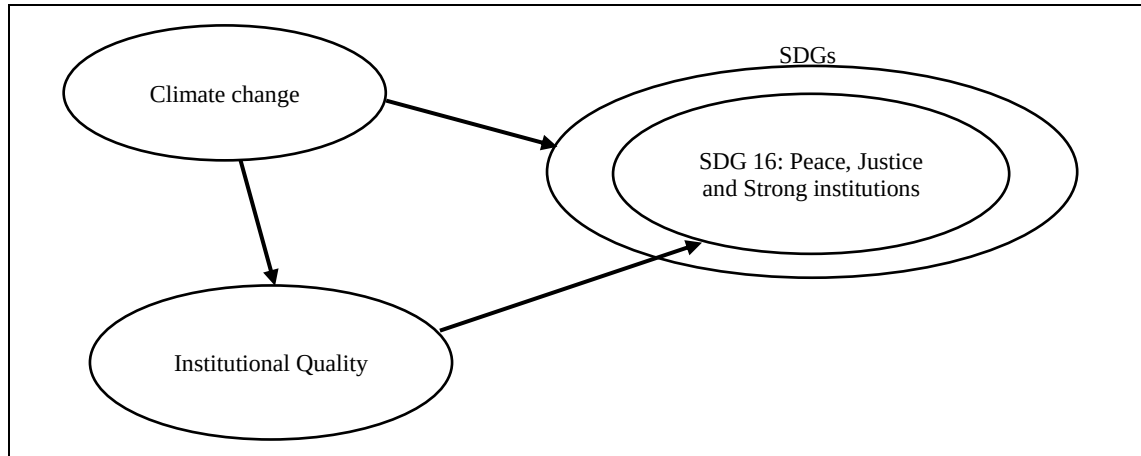


Fig. 1. Conceptual Framework. (Source: The author.)

2. Yemen: An overview of a fragile and fragmented state

Yemen has a long withstanding history of political, social and religious turbulences and turmoils in wars with the Romans, Ethiopians, Iranian, Ottoman Turks, Portuguese, Britons, Egyptians, Saudis, etc. (Mokhtari Hashi & Shams, 2017). This tempestuous and chaotic background of the country has fueled enormous disturbances and transnational interferences within the Arab region for decades [see Dostal, (2021) for a detailed longitudinal study of Yemen between 1990 to 2020]. Present day Yemen is a result of the merging of previously two Yemenite states; the northern Yemen Arab Republic (YAR) and the southern People's Democratic Republic of Yemen (PDRY) in 1990. However, merging the tribal-dominated northern and state-party-dominated southern regimes meant increasing the number of factions competing for access to state resources (Dostal, 2021).

At the same time, the vast demographic disproportion between the Northern region which has a population three times higher than the southern region meant that the latter has been historically ousted from national politics and faced relegation. For this reason, Yemen is undoubtedly one of the most diverse and disparate states within the Muslim world with deeply rooted differences in religion, politics, societal and economic progress, and geography. In fact, due to the existence of a diverse composition of religions and sects, including Muslims (Shiite, Sunni, Sufi, Alawites, and Wahhabism), Christians (Assyrians, Orthodox, and Protestants) and Jews (Zaidon & Jafarian, 2018) it has been considerably challenging to bring peace, order and stability in the country.

On one hand, Yemen's cultural tribal lifestyle makes it a "simply-structured country", but on the other hand, this very tribalist and sectarian regime have largely impeded governments to lay the foundations for stable governance. Zaidon and Jafarian, (2018) mention that Yemen suffers from three main gaps namely: religious, political and social which are embedded within the social fabric of the country. Yemen is a Muslim-majority country and although Islam is a unified religion with distinct and well-established creeds, centuries of history have separated it into a multitude of groups and sects. There are many Islamic sects with the Yemenite religious landscape, notably: the Shiite which include the Zaidiyyah, Ismailia, Asna Ashri and among the Sunnis there are the Hanbali, Shafi'i, Salafi and Hanafi. According to Mokhtari Hashi and Shams, (2017), there are about 700 small or large tribes in Yemen, which more than 400 of them are Zaydis living in mountainous areas of the northern parts of the country.

Eventually, this creates a large social disparity between the regions in the impassable North full of mountains and the South which is smooth (Zaidon and Jafarian, 2018). Coupled with that, Islamism in Yemen cascades into five different groups: the Jihadists, the Zaydis, the Muslim Brotherhood political party (Ikhwaanul Muslimeen), Salafism and Sufism. Such a boiling cauldron of religious factions creates escalating conflicts, making Yemen a highly religiously perturbed country. The involvement of a multitude of state and non-state parties in the civil war, the interferences of regional and international parties and the multifaceted fluid relations that the factions share, make the conflict immensely complex and has been described as a "web of relationships".

The various parties to the conflict include the Hadi Government backed by Saudi Arabia and recognised internationally as the officialized government, the Houthi rebels, the General People's Congress Party (led by supporters of late President Saleh), Saudi Arabia, the UAE, Iran, the US and militant Islamist groups such as AQAP (Al Qaeda in the Arabian Peninsula) and the Riyadh-based Islah movement. Yemen is a country that has rarely experienced national serenity and stability, and conflicts between different religious groups across North and South regions had been frequent since the 1990 unification. However, matters worsened following the Arab spring in 2011, where revolutionist movements spread throughout the country and the populace manifested for the removal of President Saleh's government, where subsequently vice president Mansour Hadi was given authority with the support of the GCC (Gulf Cooperation Council) upon the National Dialogue Conference (NDC) agreement which was meant to bring concerned parties to the decision table and prepare critical institutional reforms by the transitional government.

However, despite the fact that civil society, the youth, women, and tribes were involved in the process, only their elites really participated (Kleemann, 2019). Eventually, the Houthis overturned the Hadi government and the reformist plans of the GCC were annihilated, thereby increasing the intensity of the armed conflicts in Yemen.

Generally speaking, the Yemenite upheaval stems from the binary collision of two major parties namely the Hadi government supported by Saudi Arabia on one side and the Houthis supposedly backed by Iran on the other. Nonetheless, the nature of the conflict as lengthily discussed in the work of Kleemann, (2019) and Albasoos and Al Hinai, (2020) is not exactly what is portrayed in the international policy discourse or the media, which focuses intensively on the Sunni-Shia confrontation with Saudi Arabia and Iran on the opposing sides. In fact, Albasoos and Al Hinai, (2020) argue that the religious sects in Yemen have minor differences that are not enough to ignite a war of this size. Instead, it comes to pure and hard tribalism which is motivated by the fundamental notion of survival and resource amalgamation, denoted by the highland tribes who come from resource-poor areas fighting mid and lowland tribes for their natural resource (Albasoos & Al Hinai, 2020).

Added to that, Yemen's history is plagued by elitism, cronyism, high levels of corruption, and hostile tribalist culture which have resulted in a lethal environment, obstructing the economic and social progress of its citizens. As a matter of fact, even before the outbreak of the recent civil war, Yemen was infamously known as one of the poorest states in the Arab world owing to the plundering of natural resources, mismanagement of revenues generated from oil, weak institutions and poor governance have all contributed in the loot of national wealth to the ultimate benefit of those in power. Such a disregard towards the Yemenite population has over the years halted the development of the countryside, pushed people towards the darkest pit of poverty, increased aggressivity towards those in authority and eventually forced the youths to join the militias as a means to livelihood. Ultimately, the accumulated grievances, economic marginalization of the past, and the debacle to bring unity have become today's toxic blend of why the Yemenite civil unrest remains unresolved.

While Saudi Arabia and Iran continue to battle over regional supremacy, with the US primarily concerned over the free movement across Bab al Mandeb (a strategic strait connecting the Red Sea and the Gulf of Aden), and the domestic militant groups fight over resources [for further reading see: *The Main Factors of Yemeni Conflict: An Analysis* by Al-Tamimi & Venkatesha, (2021)], the greatest loss in undoubtedly borne by the population on a national scale. With close to 80% of Yemen's population of nearly 30 million needing some form of assistance (Congressional Research Service, 2021), the humanitarian crisis in Yemen is one of the worst in the world. According to the World Food Programme, as of October 2021, 20.7 million people need humanitarian assistance, 16.2 million people face food insecurity, 47, 000 people face famine and 4 million people have been internally displacement –all as a result of the war. Expectedly, the COVID 19 pandemic is slashing Yemen brutally given its desperate lack of adequate medical and health facilities, continuous displacement of people and unsanitary shanty dwellings aid in the propagation of the virus. Yemen is not only battling COVID-19 amid a catastrophic war, but also has to deal with other diseases such as cholera, diphtheria and measles (Alsabri et al., 2021).

3. Elaborating the conceptual framework and discussion

3.1 Climate change: An impediment to the achievement of SDGs in Yemen

Climate change and its harrowing consequences across the world remain an undisputed reality, to which there is absolutely no denial. As it is well recognised amongst climatologists and policymakers, the effects of climate change are asymmetrically distributed throughout the globe. Hence, some regions stand at the forefront of global warming and lay bare to these extreme variations in climate. In fact, the Middle East is forecasted to be hotter, drier and less predictable according to climate models (Bayram & Öztürk, 2021) where countries with pre-existing environmental pressures are expected to be the most at risk. One such country is Yemen, which is already one of the least developed countries in the world and considered to be the driest and the poorest country in the Middle East (Al-Akel., 2020).

Climate change in itself is a consequential challenge for every country, but on its own it is posing as a significant exacerbator to more damages along with economic, social, and environmental perspectives in already frail and heavily fractionalized states. The past and recent conflicts in Yemen largely arose due to political, religious, and ethnic tensions with compounded effects related to climate change serving as a catalyst to more upheavals. The present-day scenario in Yemen mirrors the years of political negligence, corruption, mismanagement of agrarian and pastoral lands, increased pumping of aquifers to the point of depleting the natural boreholes, and an inability to diversify the economy – which has altogether adversely affected the robustness of the state and its population to effectively and efficiently address the climatic threats they are facing. Indeed, climate change has the capacity to induce further obstructions in the ability of highly unstable countries like Yemen to meet their SDGs ambitions, through various channels either directly or indirectly.

In fact, the SDGs are highly inter-connected which amplifies the impacts of climate change through the “domino effect”. This section elaborates on the connectivity between climate change and Yemens’ SDG goals and targets, and the discussions depend primarily on the availability of data. Only SDGs providing enough substance for elaboration with respect to climate change within scholarly works were considered.

SDG 1: Ending poverty

The role of climate change in the surging poverty levels, more so in the bottom-tier of the most impoverished societies of the developing world, is well documented in the literature governing humanities and the environment. For Leichenko & Silva, (2014), the bridge that passes climate change effects on to the poor individuals, include primarily the fact that the poor depend heavily on climate-sensitive means of livelihood and are more likely to live in areas subject to climate hazards. Indeed, it is evident that climate change severely menaces the stability of agriculture-based economies, such as Yemen where about 90% of the country’s water is used in agriculture (Lackner, 2020), and the latter further highlights that, droughts and flash floods have significantly increased in frequency and intensity over the last decades.

Various climatic scenarios predict different outcomes for Yemen’s agricultural sector, but nevertheless, yields for wheat, maize, and vegetables are expected to fall in most agro-ecological zones (Wiebelt., 2013) which in turn tend to lower household incomes especially in rural areas where almost three quarters of the Yemenite population live. Consequently, with dwindling revenues, poverty levels are anticipated to soar in the most poverty-stricken areas. Climate variability is deepening the poverty trap, eventually making the challenge towards poverty eradication even more daunting for Yemen, since the latter’s poverty intensity is high, at 50.0% for acute poverty and 56.2% for poverty (ESCWA, 2018). Besides, poverty in Yemen is an old foe because it is estimated to have increased since 2014 by 32 percentage points to approximately 81 percent in 2017 (World Bank, 2017). In fact, back in 2009, desertification was already responsible for the loss of vast areas of cultivable land in Yemen, leaving only a meagre 3% of arable land and the agricultural sector supported 53% of employment while making 20% of the country’s GDP (Noaman., 2009).

Even today, the context is not very much different at all since the Yemenite economy is substantially crop-based, and the vulnerabilities of the poor have enlarged under the prevailing setting of war and conflict.

SDG 2: Hunger and food security

All dimensions of food security; availability, access, utilisation, and stability are vulnerable to climate change (IIED, 2015). Households in Yemen are vulnerable to shocks such as food price surges and climate variability (Wiebelt., 2013). In fact, according to the Global Hunger Index 2021, Yemen is ranked as the 115th country in the list of 116 countries considered, with a score at 45.1 under the alarming category and this trend has been continuously rising since the year 2000. Climate change is aggravating the woes of Yemenis in terms of food availability and the impact is more severe on children, infants, and adolescents where about 3.3 million children and pregnant women are acutely malnourished, including 462,000 children under 5 suffering from severe acute malnutrition (Centre for International Development Issues., 2017).

As explained by Lackner, (2020), climate change-induced droughts and floods affect the less wealthy households and rural area residents in manifold ways, primarily through diminished incomes from crop sales, and their feeble modest dwellings cannot resist strong winds thereby destroying food stocks, eventually engendering widespread famine. Moreover, the lowest income groups ultimately fail to move to safer regions due to lack of financial means while being physically incapacitated owing to years of malnourishment, which prevent them from settling in safer and more food-secured regions. Since Yemen is a country whose economic foothold lies principally in agrarian activities and subsistence agriculture, the

incidence of dry spells and desiccation on pastoral yields could lead to crop failure, starvation, and famine. Droughts and floods would further hamper the ability of countries to import sufficient quantities of food demanded by the population (UNDP, 2010).

Thus, the food security situation in Yemen might be critically troubled in the following years especially since Yemen is a net importer of many food commodities (Wiebelt et al., 2013).

SDG 3: Health and wellbeing

Academic works examining the effects of climate change on human health related to a large body of literature. This is testified in the bibliometric analysis of Sweileh, (2020) which gathered 5454 documents dealing with climate change, human health, and infectious diseases covering the period 1980 to 2019. The recent study of Mousavi et al., (2020) revealed that climate change can cause respiratory diseases, skin cancer, vector-borne diseases, cholera, and diarrhea. Other researchers have investigated the impacts of changes in climate on mental health and catalogued mental disorders such as PTSD (Post Traumatic Stress Disorder) which can occur in the aftermath of flooding, wildfires and hurricanes amongst others, depression, mood disorders, and anxiety (Hrabok et al., 2020). Such results corroborate the findings of Namdar et al., (2021) which indicate the high probability of mortality caused by climate change in Yemen which is very poorly ranked within the MENA region.

While investigating the short-term and long-term impacts of climate change on population health in Yemen, Al-Akel., (2020) mention that diarrheal, cholera, typhoid, paratyphoid, skin diseases, psychological stress and trauma are expected to rise sharply especially given that the country is highly vulnerable to droughts, floods, heatwaves, sandstorms, land degradation and desertification. It is argued that precipitation might be beneficial in some ways for rainfed agriculture and farming, but the intensity of flash floods damage homes, farmlands and create murky areas which become fertile grounds for the spread of infectious water-borne diseases. Furthermore, it has been recognised from the literature review that, conflicts tend to aggravate the sanitary situation in countries under civil unrest due to displacement of people, the bombing of health centers, and the blocking of humanitarian aid from reaching the needy. This was reported in the Yemen-based study of Dureab et al., (2018) which found that: “the intensity of the conflict as measured by the total casualties per governorate (conflict-related injuries and death) is significantly correlated with the number of cholera cases per governorate.”.

Such severe living conditions are jeopardising lives, sanity and welfare of the younger population desperately, subsequently putting at risk the wellness and wellbeing of future generations for productive human capital.

SDG 4: Education and SDG 8: Growth and employment

In the last 30 years, Yemen has impressively expanded education, halving the illiteracy rate from 90% to 45% (International Bank of Reconstruction and Development, 2010). However, over a decade later, the coupling effects of climate change enhanced by those of the raging armed conflict, the education system in Yemen is disfigured. According to Save the Children 2021 report, over 2,500 schools are reported to be destroyed, damaged and/or utilized for non-educational purposes, and of these, 58% are damaged by conflict or floods. At the same time, the ravaging effects of climate change such as droughts, floods, intense heat, sandstorms and rising sea levels, might force families to be continuously on their move towards unharmed places in search of havens to be safe from extreme climate variability and the shelling of the war.

Indeed, food insecurity and malnourishment reduce the physical wellness and cognitive abilities of children, and eventually jeopardising both their health and future prospects. In fact, within the impoverished groups, the most exposed are children who are often victims of chronic malnutrition which shortens their height (stunted growth) and brain development for life. For many, dropping out of school becomes an

urgency in order to support their families during those perilous times of turmoil and changing climate wherein such circumstances schooling remains perhaps a distant unachievable dream. With reduced opportunities for school enrolment, employment avenues become even dimmer, especially considering the context of the war in Yemen which led to the considerable displacement of people and closure of businesses.

On the other hand, several studies such as that of Breisinger et al., (2011) and Wiebelt et al., (2013) have sought to forecast the impact of climate change on agricultural sector growth in Yemen, but results have been generally ambiguous. Some results tend to show that some crops will experience a fall in yield (wheat and maize) while others are expected to rise (sorghum and millet) depending on the ecological zones (Breisinger et al., 2011). Similarly, climate change is predicted to lead to a rise in world food prices, which might increase agriculture GDP in Yemen, but household incomes will reduce especially in the rural regions. Overall, the current scenario in Yemen foretells a future increase in poverty, higher unemployment rates and further downfall of the basic education system, especially when considering the effects of the war and recurrent climatic disturbances.

SDG 5: Gender equality and SDG 10: Inequality

Globally, natural disasters such as droughts, floods and storms kill more women than men, and tend to kill women at a younger age (Al-Akel., 2020). This view is strongly upheld in the literature, where Cianconi et al., (2020) argue that, women are more likely to experience psychopathologies such as distress, trauma, anxiety and other health-related issues arising from climate change. As maintained by Akther and Alam, (2020), the Middle East is “likely to suffer more due to rising temperatures and withering precipitation in the coming years” and this is supported by Al-Akel., (2020) who avers that, higher temperatures tend to shorten the gestation period and can even lead to stillbirth. As it is well-known, Yemen is one of the driest regions in the Arab world and temperatures are expected to be on a rising trend for the years to come. Individuals within the marginalized pockets of the society generally are at greater risk to contract maladies and face mortality, given their poor immune system and access to Water, Sanitation and Hygiene (WaSH) infrastructures.

The urban-rural dichotomy tends to generally make obvious the fact that rural households are less educated, have lower access to satisfactory sanitation and improved drinking water, and lower access to healthcare than urban households (Sharaf and Rashad., 2016). Also, rural areas’ mainstream of livelihood comes from agriculture, which itself is prone to climatic catastrophes such as floods, hurricanes, sandstorms, desiccation, locust attack and cyclones, thereby making farmers more vulnerable to anxiety, stress disorders, indebtedness, displacement and loss of lives.

Moreover, as droughts become more severe and prolonged, water resources become critically far reached, impacting rural women and children who might have to carry water on their heads or on their pack animals over long distances to fetch the precious elixir, which ultimately can make them easy targets for sexual abuse and human trafficking. Indeed, women, children, the elderly and infants are undoubtedly the most undermined group confronting the severe hardships of climate change, notably in many parts of the world which are already extremely disadvantaged compared to other more developed countries. This disparity is further enhanced by natural geographical location, since almost all of the Arab countries lie in semi-arid and arid regions that are highly vulnerable to climate change (UNDP, 2010).

SDG 6: Water and sanitation

The already precarious water scarcity conditions in Yemen may be worsened by future perturbations in climate (Haidera et al., 2011). Of Yemen’s predicaments, water scarcity is definitely one of the most pressingly urgent, which is potent enough to cause further unraveling of more crises. In fact, in a country where water resources are heavily dwindling as a result of increased evaporation tailgated by substantive

cultural aspects such as tribalism, the race to water resource grabbing is potentially intensifying the animosity amongst the various factions. As is recurrent, the most underprivileged rural households bear the brunt of the water crisis which unfolds into a sanitary pandemonium. For instance, Sharaf and Rashad, (2016), state that only 27.2% of rural households in Yemen have proper and non-shared toilet facilities and about 49.7% have access to water sources.

Hence, basic hygiene and cleanliness standards cannot be maintained, eventually propelling the spread of diseases such as cholera which is transmitted via the fecal-oral route as the bacteria remains active in a person's feces even after defecation. With living conditions as penurious as this, Yemen has experienced a gloomy fate with a cholera outbreak that started in 2016 and claimed more than 1.4 million lives between October 2016 and December 2018 (Alassar et al., 2020). The authors posit that long-term solutions to cholera in Yemen reside in access to safe and pure drinking water, adequate sanitation, proper personal hygiene and efficient water filtration systems. But that too, seems a far-fetched remedy given the severity of the water shortage in Yemen. Moreover, the shortage of water is heightened under conditions of sea-level rise which has been reported to occur along the shoreline in the Governorate of Aden, and this represents possibilities of water intrusion and salination of aquifers which inevitably impacts water quality and its drinkability. On the other hand, with an annual average growth rate of 3 % in recent years, Yemen has one of the highest population growths in the world and this represents additional burdens on declining resources for food production, thereby threatening the lives of young infants, babies, pregnant and lactating women. According to Namdar et al., (2021), Yemen is in the worst position amongst its MENA counterparts in terms of climate change vulnerability, due to its huge population living in slums and excessive pumping of groundwater at a pace faster than replenishment, which charges considerable pressures on water resources while preventing Yemenis to live in decent and sanitary appropriate conditions.

SDG 7: Sustainable energy for all

Yemen –being one of the least developed states in the MENA region, has a consequentially large proportion of its population who do not have adequate access to electric power services, especially in the most distant mountainous rural areas, where government presence and development is very minimal. Despite all the socio-economic problems attributed to Yemen in terms of food insecurity, malnutrition, high poverty and illiteracy rates, government instability backed by years of conflicts and persistent unemployment amongst many others, the country is nonetheless blessed with various opportunities to diversify its renewable energy sector. The work of Rawea et al., (2018), Ajlan et al., (2017) and Hashim Alkipsy et al., (2020) explore the benefits and prospects of green energy solutions in Yemen which include solar energy, wind energy, geothermal energy, and biomass energy. Hashim Alkipsy et al., (2020) argue that Yemen's economy is heavily dependent on agriculture which generates enormous amounts of biowastes and trash which can be potentially transformed into bioenergy for electricity generation through gasification.

However, climate change is set to lead to drier climates thereby dampening even more the natural water resources, which is expected to create a fundamental dilemma in the years ahead; whether to safeguard water to satisfy urgent human needs or harness it for irrigation. Likewise, Rawea et al., (2018) aver that Yemen has long coasts which can be put to renewable energy generation for wind energies, but climate change-induced beach erosion is viewed to make those regions unstable for such projects. The studies of Rawea et al., (2018), Ajlan et al., (2017) and Hashim Alkipsy et al., (2020) have highlighted the obstacles preventing the promotion of renewable energy in Yemen which are primarily financial, market, institutional, technical and social barriers, but it is obvious that climate variability too, is a significant hindrance to establishing renewable energy infrastructures in Yemen.

SDG 9: Infrastructure and SDG 11: Cities and human settlements

There is enough substantive evidence to show that climate variability brings damage and unsustainability to infrastructure, especially in areas that are densely populated thereby causing these buildings to become inhospitable for living. In fact, migration to urban areas in search of job prospects lead to chaotic urbanization, which makes cities tightly packed and most at risk to climate variability. Moreover, excessive rainfall and floods can increase landslides and rockfalls which according to Zaid et al., (2021) are frequently occurring hazards in Yemen that can cause damage to roads, especially in the rural regions where transport networks are an essential lifeline to support economic activities.

Additionally, Zaid et al., (2021) further explain that soil expansion occurs due to heavy rainfalls over long periods, thereby causing swelling of soil which in turn provokes landslides, and the researchers give an example of structures that collapsed in the city of Taiz due to the same reasons. Besides, Yemen boasts a cultural and historical heritage in terms of mud architecture which is falling prey to intensive precipitations, floods and strong winds which ultimately have resulted in the destruction and demolition of many mud houses and infrastructures in Wadi Hadhramaut, Yemen. [See Al-Masawa et al., (2018) for a comprehensive study of climatic impacts on mud architecture in Yemen]. In the same way, the coastal region in the Governorate of Aden is expected to experience a sea-level rise which is projected to cause inundation to infrastructures such as educational and health constructions, mosques, hospitals and even the Aden International Airport which is surrounded by water on both sides (Al Saafani et al., 2015).

SDG 14: Marine resources and SDG 15: Ecosystems and biodiversity

Climate change is perceived as an existential threat to ecosystems and biodiversity both on land and underwater, especially in regions sheltering large swathes of endemic and endangered species. In fact, adverse effects include changes in species habitats and compositions, and consequently changes in ecosystem functioning (Nunez et al., 2019). Nestled at the carrefour between Afrotropical, Oriental and Palearctic regions and bestowed with three different coastal regions; Red Sea, Gulf of Aden and Arabian sea, Yemen is considered one of the cradles of biodiversity in the world. It hosts about 2,500 species of plants, about 85 species of mammals 370 species of birds and more than 115 species of amphibians and reptiles (Al-Mahfadi & Dakki, 2016). However, both have earnestly warned that climate change is seriously harming Yemen's wetlands which also include saltwater wetlands that thrive along the shorelines, but due to floods and rising temperatures, these biodiversity holders are heavily threatened. In the same way, Lackner, (2020) mentioned that the increased precipitation over the recent years in Yemen has promulgated the proliferation of locusts which can invade large crop fields and destroy pastoral lands affecting humans and the fauna dependent on such ecosystems. Besides, Yemen's Socotra archipelago is equally bearing the effects of climate change, soil erosion, increased aridity, and cyclones which are pushing the endemic Dragon Blood Tree to the brink of extinction (Saraf, 2021). Also, Ahsan (2020) found that aridity and drought, vegetation cover decrease, loss of arable land due to increased salinity, loss of forest and yield, and globalisation are the principal factors causing desertification amongst OIC countries, and climate change is making matters worse especially for countries like Yemen which has a high vulnerability and a low adaptive capacity to climate change.

From the above discussions pertaining to the link between climate change and SDGs within the Yemenite context, it is confirmed that the extreme variability in climate is rendering the attainment of SDGs an almost impossible feat. Climate change is a hugely multidimensional phenomenon with effects wide and far, trickling through the slightest channel and hence, harming populations and ecosystems. Nonetheless, climate change, as has been seen in the Yemenite scenario, does not lead to devastating effects by itself, but instead gets amplified by pre-existing conditions. The relevant points elaborated above are depicted in the diagram below. Figure 2 denotes that climate change is often an additional woe to other already existing

problematics, and shows the various routes through which it can affect the SDGs. For instance, an over-dependence on agriculture will reduce water availability for other purposes, and with the compounding effects of climate change, SDG targets such as poverty and hunger eradication, assuring food security and ensuring health and well-being are deemed to be unrealizable. Likewise, political instability and poor state institutions tend to make countries unsuccessful in addressing climatic pressures, and issues of national importance such as increased food prices, water scarcity, hunger and poverty remain unresolved.

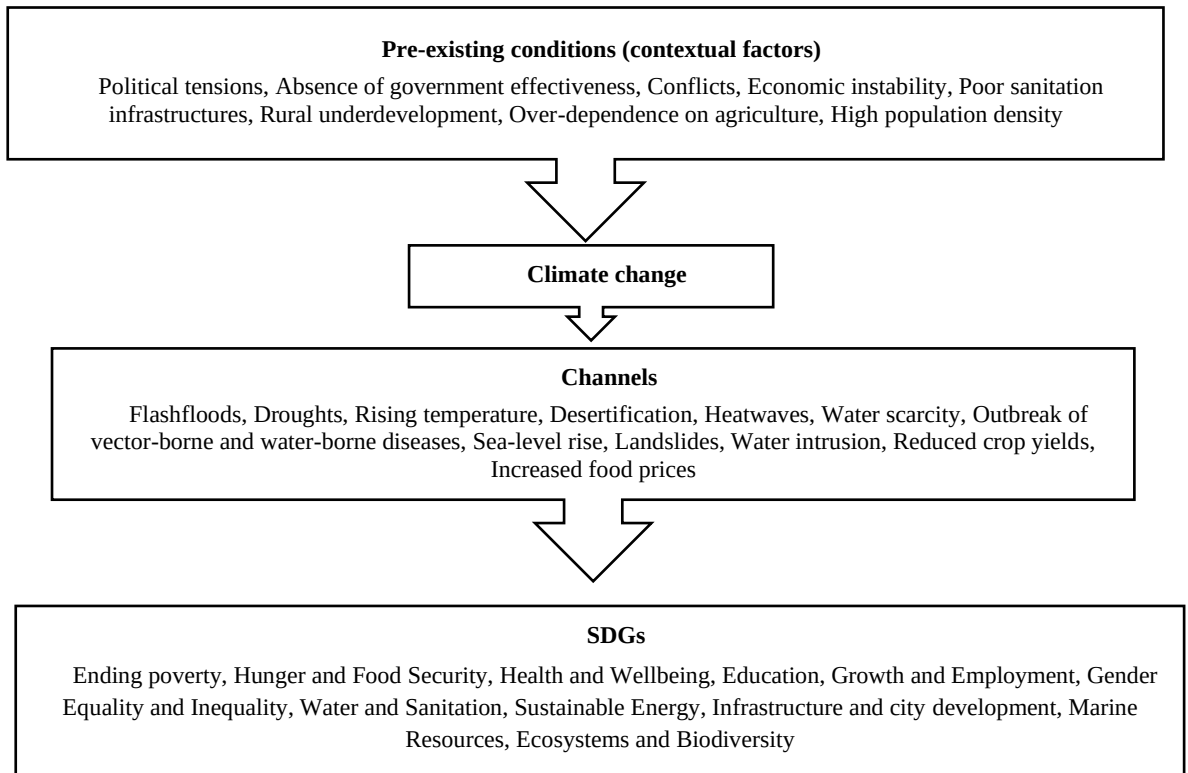


Fig 2. Cascading flowchart model. Source: (The author.)

3.2 Climate change, institutional quality and SDG 16: Peace, justice and strong institutions: From the lenses of Yemen.

3.2.1 Background of institutional quality and governance in Yemen.

The survey of the economics literature has revealed a consequential body of work dealing with institutional quality (hereafter IQ) and its dimensions, impacts and roles in a wide array of settings across various countries. For instance, the recent study of Azam et al., (2021) has aimed to assess the impact of IQ on sustainable development for a panel of developing countries, and the authors concluded that IQ does matter for the achievement of sustainable development (measured by genuine savings rate per capita) for the selected countries. However, they highlight that IQ is higher in lower middle-income countries than in low-income countries. In the same vein, Nawaz et al., (2014) confirm empirically that institutions are

critical in spurring long-term economic growth in their selected Asian economies, but they do note that institutions are more effective in developed Asia than in the developing Asian countries.

Their results are corroborative with that of Boateng et al., (2021) who contend that IQ and its sub-dimensions enhance economic growth. Similarly, Owusu-Nantwi (2019) has found that IQ has a significant positive effect on FDI, since high-quality institutions promote a favourable investment climate, advocate the rule of law and support entrepreneurial activities. Developing countries and LDCs rely extensively on FDI and foreign aid to support their domestic growth and investment strategies to foster national development. In those aid-recipient countries, having a strong institutional setup is vital since high IQ tend to attract more FDI as was found by Aluko, (2020) for a group of 47 African countries.

The relevance and importance of IQ are particularly more considerable in the context of natural resource-rich countries, because they tend to experience low economic development despite being blessed with an abundance of natural capital which generally brings tremendous amounts of revenues to the state. This is known as the “paradox of plenty” or the “resource curse”. Much has been written and debated on this perplexing puzzle, and various reasons have been proposed to explain why some countries holding immense reserves of natural resources cannot reap the benefits generated by the revenues of the primary sectors. In this regard, scholars have emphasized the importance of favourable and effective state institutions which do not endorse corrupt practices or engage in rent-seeking behaviours that obstruct the stream of income from flowing to the funding of economic and social agendas. Undoubtedly, countries with good institutions are more likely to effectively manage their revenues from the trade of natural resources and diversify their economy so that they cushion the volatility in commodity prices. In this way, economic development occurs across a broad range of sectoral activities which increase opportunities for employment, instigate social upswing, increase attractiveness to foreign investors and boost international trade. Hence, well-functioning institutions are the cornerstone of economic and social progress.

The current and ongoing national distress plaguing Yemen is interlaced with several other social, political, environmental and economic problems which at the heart of these, lies a diseased institutional background. Indeed, substantial improvements in IQ and governance can help in curing a breadth of ailments that have catapulted the Yemenite society into the state it is presently. The remaining part of this section will provide some reflections in light of some indices extracted from the World Bank database to support further the discussions. IQ is intimately related to SDG 16; Peace, Justice, and Strong institutions, since the latter is the most relevant goal to the field of public administration and is focused on achieving effective, accountable and inclusive institutions at all levels (El Baradei, 2020). Various empirical studies [see Boateng et al., 2021; Owusu-Nantwi, (2019); Huynh & Ho, (2020); Nawaz et al., (2014)] have used the World Governance Indicators from the World Bank’s impressive master database, as proxy for IQ and they refer to six inter-correlated dimensions: 1. Control of corruption, 2. Government effectiveness, 3. Political stability and absence of violence/terrorism, 4. Regulatory quality, 5. Rule of law and 6. Voice and accountability. The indices vary between a range of -2.5 to +2.5, where values in the positive spectrum indicate strong and favourable institutions, while negative values are indicative of a deficiency in governance. Overall, they are informative and useful enough to gain a comprehensive overview of a country’s performance in terms of stability, governance, nature of politics, and functioning of state bodies. Hence, the fostering of high-quality institutions is key in the attainability of SDGs and SDG 16 in particular.

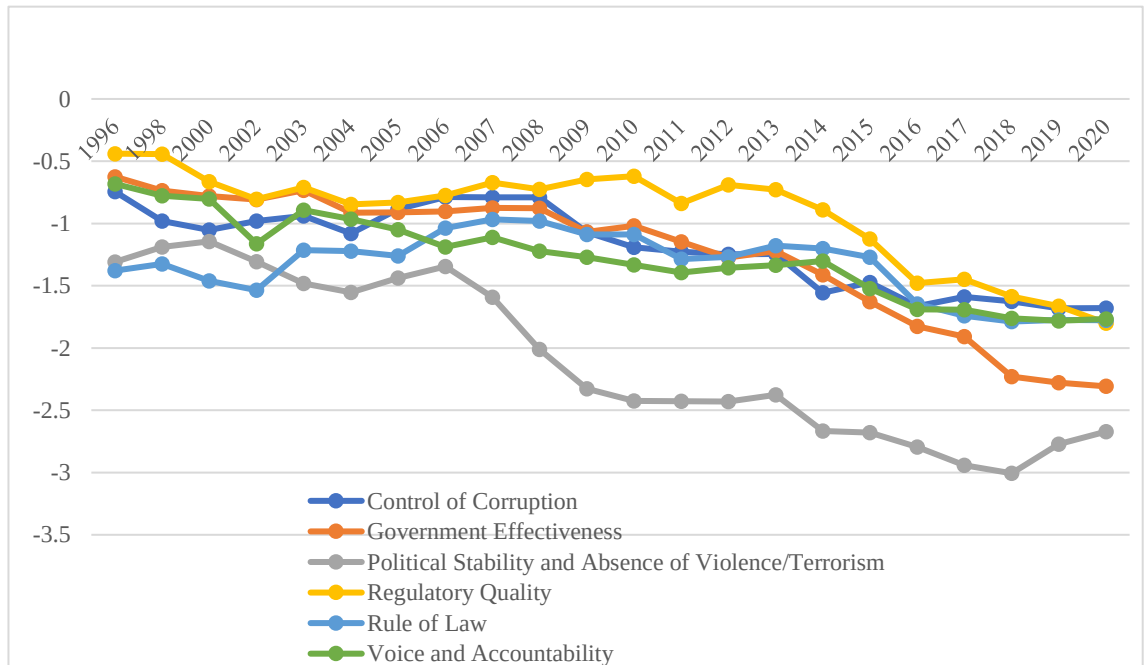


Fig 3. Institutional quality dimensions trend for the period 1996-2020. Source: (World Governance Indicators, 2021.)

From Figure 3 above, it is observed that all the indicators for IQ have been negative for the entire period; 1996 to 2020, which demonstrates that Yemen has been nurturing weak and defaulted institutions for years since the merging of the two states in 1990. For this reason, corruption has remained rife, rule of law has almost never been established, the accountability of the elites has been overlooked, regulations and government effectiveness have suffered greatly, eventually resulting in political instability and continuous sprouting of violence throughout decades. Poor institutions lack the capacity to enforce rules, laws, and regulations, while failing to inspire trust and confidence amongst their citizens which combined together, generate an environment of suppression, tension and conflict. In fact, as opined by Mombeuil, (2020), countries with corrupt and weak government institutions are desperately hindered in their quest to achieve the UN SDGs, where basic necessities for citizens are not adequately provided such as healthcare, sanitation, education, infrastructure, utility services and justice amongst others.

The persistent downward trend of the IQ dimensions since 1996 presents a disappointing case of Yemen's possibility in realizing the SDGs, especially the SDG 16; Peace, Justice and Strong institutions, which is '*sine qua non*' in the establishment of stable, vigorous and safe economies. However, it should be highlighted that there are reports of good-intentioned endeavours at different points in times, for example, the Yemeni government attempted an elaborate reform program for the financial sector in 1995 (Badeeb & Lean, 2017), but nonetheless attempts to initiate commendable economic and social progress have failed so far. Following the discovery of oil in 1985, Yemen's economic structure underwent radical changes, where dependence on oil has made it a contributor of 70 % to the governments' revenues, while making around 80% to 90% of the countrys' exports and it brings significant amounts of foreign exchange (Badeeb & Lean, 2017). As seen in Figure 4, Yemen has enjoyed reasonable levels of GDP growth from 1996 to 2010 which coincides with the period of high oil production.

Unfortunately, the spoils from the oil trade did not trickle down to the corners of the Yemenite society, and for that reason, Yemen has remained a low performer in terms of human development from 1990 to 2019 according to the Human Development Index trends 2020 report. Yemen's economic debacle and its

today's mayhem are in stark contrast with many of its counterparts in the Middle East and Gulf region. Taking the example of the UAE, which before the advent of oil extraction, was a subsistence state primarily dependent on fishing, pearling, agriculture, handicrafts, and herding with a harsh climate and scarce water resources (Elhiraika & Hamed, 2006). The authors explain that the UAE had spared no effort towards economic diversification in the mid-1980s and have evolved into a paragon of how oil resources can be a “blessing” in laying the foundations of a prosperous economy, thereby nullifying the “resource curse”. From their work, it is clear that modernization of infrastructures, favourable macroeconomic policies, promotion of human capital and welfare, development of the Islamic finance market, increased public and private investments- all backed by well-functioning state and civil service institutions have led the UAE in its success story to be one of the most advanced economies of the world and a regional powerhouse. From this comparison, it is evident that attributing Yemen's economic and social tragedy to hollow state institutions and lack of governance is strongly justified without a doubt.

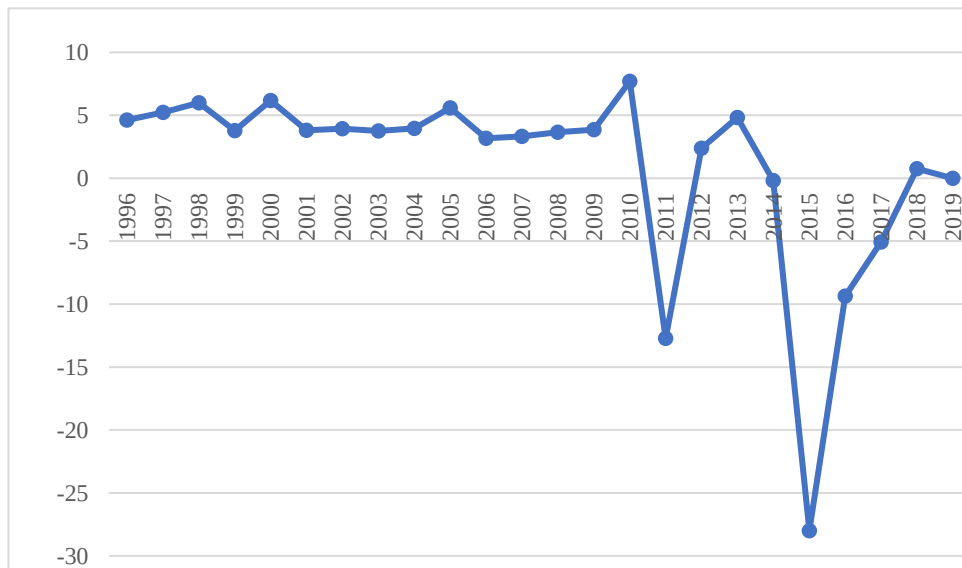


Fig 4. Annual GDP growth rate (%) for the period 1996-2019. Source: (The World Bank database, 2021.)

3.2.2 Climate change, institutional quality, and conflict: What does the literature say?

“Does climate change cause conflicts?”; such interrogation is easier asked than answered and the response is definitely not simplistically either “yes or no”. Reflective of this, the literature seems to be divided on the nexus between climate change and conflict. In this regard, Koubi, (2019) mentions that the literature has not detected a robust and general effect linking climate to conflict onset and in the same bandwidth, Nordås and Gleditsch, (2015) argue that despite climate change can be considered as a security issue from a broader perspective, whether it represents a threat to security is far more ambiguous on a narrower scale. On the other hand, Bowles et al., (2015) state that: “Most analysts of this topic conclude that climate change increases the chance of conflict, particularly over shrinking resources.”

Nonetheless, for Salehyan, (2014) the debate no longer centers on whether climate change leads or influences conflict, but the current and future preoccupation lies in understanding how and when does climate change becomes a “threat multiplier” and a specter of peace and stability. The link between climate change and conflict is multi-layered, multi-dimensional and complex, as the latter is generally multi-caused through different pathways. From a generalized point of view, climate change and its compounding effects are more serious in countries with deep ethnic differences, rural-urban disparity, whereby decreased

availability of essential resources could directly increase the probability of violence (Bowles et al., 2015). This view is supported by Douglas., (2016) as he avers that “climate disasters such as drought can contribute to violence, especially in ethnically divided countries”.

Countries already experiencing adverse climatic conditions, such as droughts and floods face accentuated vulnerability, especially if they are heavily dependent on agriculture as a pivotal means to livelihoods, since on one side resources such as water is becoming increasingly scarce and on the other side, means to earn incomes is scant. For Koubi, (2019) actual and perceived economic inequality can be heightened in situations of precarity caused by climate change, which motivates citizens to engage in protests and insurrection. Undoubtedly, the severity and intensity of those conflicts depend largely on the affected areas degree of native hostility, presence and strength of militias, ability to procure weapons and the number of factions involved which become essential ingredients in building pressure and driving rebellion against the state. Also, migration has been viewed as a direct result of climate change as individuals are forced to flee floods, droughts, desertification, and sea-level rises, to move to more urbanized quarters to find new job opportunities and security. Yet, if the displaced individuals are seen as competitors who will exert additional pressures on resources such as food, water, land and energies amongst others, then conflicts may arise between migrants and residents.

Studies relating to climate change and conflicts, emphasize the fact that climatic variations alone do not directly trigger tensions, but instead climate-related effects mix with the geopolitical, socio-economic and other contextual factors to create more instability. In fact, the share of responsibility of poor IQ, corrupt and frail government bodies have received much attention as being one of the foremost reasons why conflicts relating to climate erupt in some countries and not others [see Akther & Alam, (2020); Gleick, (2014) and Saghir, (2019)]. For instance, like all MENA countries, Saudi Arabia experiences tremendous pressures in terms of water scarcity, yet today the Kingdom has become a vanguard in desalination technologies which has replaced the latter's groundwater as the main source of drinking water (DeNicola et al., 2015), which unarguably is attributed to its wealth and sustained economic, social and government stability. While this comparison might be deemed unreasonable against other poorer states in the region, the point of reference here is the colossal role played by institutions in leading the country's leadership and vision towards national prosperity and success, ever since the discovery of oil.

Essentially, quality is defined as a change effort that targets improvements... (Huq, 2005) and based on this premise IQ can equally be considered as a state of achieving strengthened government institutions, effective enterprise of policy reforms and implementation, conducive political and socio-economic environments which enable nationwide prosperity and advancement. In Apergis and Payne, (2014), the authors' results showed that oil reserves for the selected MENA countries had a negative effect on growth up till 2003, but eventually coefficient of oil reserves had positive effects on growth till the end of their sample period; 2013. The authors have attributed this shift from the negative influence of oil reserves on growth to a positive one, to the improvements in institutional quality and policy reforms that have taken place in the MENA region across the years. As such, IQ is a condition that is achieved over time and requires profound and cogent structuring of the state bodies at national and sub-national levels. With this idea in mind, it can be posited that countries at lower levels of IQ, tend to experience higher vulnerability to conflicts, while those which have transitioned to a stage of higher IQ epitomized by rule of law, firm grip on governance and accountability, are expected to experience more stability and peace.

Subsequently, countries with weak governance structures, high levels of clientelism and corruption might be trapped in a vicious circle where low IQ creates opportunities for conflict unravelling, and more instability erodes institutional performance. This low IQ-conflict symbiosis is enhanced by extreme climate variability as illustrated in Figure 5, which itself, as seen precedingly, acts as an exacerbating factor to increased possibilities for conflicts to arise. In such conditions, LDCs and developing economies, battling the ramifications of climate change get entangled in a triple struggle; resisting the effects of climate variations while curtailing the channels that may lead to conflicts and also striving to impose institutional

functionality. Within the case of Yemen, Al-Tamimi et al., (2021) provide an elaborated and detailed analysis of the factors powering the Yemenite conflict. The authors stressed the main political drivers to the same which include: centralization of governance, systemic patronage and poor governance which have over the years paved the way for the stratospheric rise in corruption, elitism and exploitation, thereby unfolding onto other socio-economic problems such as marginalization, struggle over resources, rampant poverty and mushrooming of arms and weapons. In such circumstances, the government loses authority and legitimacy, forcing the population to search out services from other providers and this void has been filled by the growing extremist groups under this situation (Al-Tamimi et al., 2021).

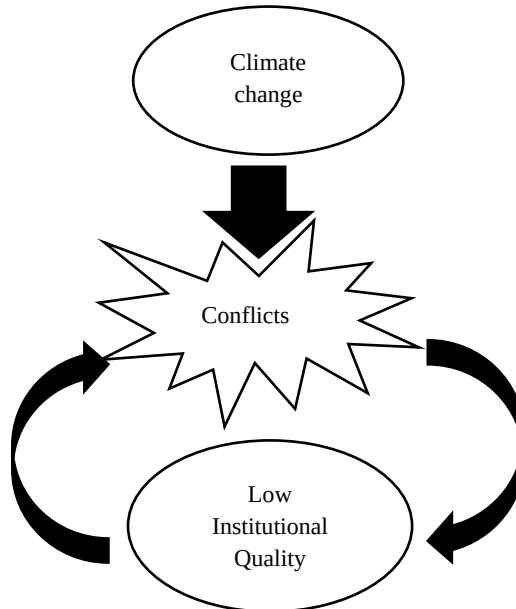


Fig 5. Low IQ-Conflict vicious circle, enhanced by climate change. Source: (The Author.)

4. Conclusion

The present study has aimed to explore the relationships between climate change, institutional quality and SDGs in the context of Yemen. Through the narrative review, it is clear that climate change impacts are forcing SDG goals to retreat, thereby causing the country to face additional challenges in meeting the UN targets for 2030. It has also been brought to light that climate change should not be viewed in isolation, but rather a broad range of contextual factors need to be considered to gauge a realistic picture of how far it is causing damage. Within the case study of Yemen, the discussions confirm that pre-existing conditions inherently act as amplifiers to climate-related effects through a plethora of channels.

Considering Figure 2, it can be said by intuition that, the more overwhelming are the amplifiers (e.g., political tensions, absence of government effectiveness, conflicts, economic instability, poor sanitation infrastructures etc.) and the broader are the pathways (e.g., flashfloods, droughts, rising temperature, desertification, heatwave, water scarcity etc.) and their inter-causality, then the meeting of SDGs become desperately unrealistic for certain countries, like Yemen for instance. In a context like that of Yemen, where weak, destabilized and corrupt state institutions have been the norm in the country for decades, climate change-related effects are known to be more impactful, impeding the attainment of SDGs, notably the SDG 16: Peace, Justice and Strong institutions since conflicts breed in environments already crippled by low institutional quality. This paper is a humble attempt to add to a literature that is burgeoning at a great pace, especially in the coming years, and elaborates on the impacts of climate change in FCAS, with particular reference to the pertinent role of institutional quality in mitigating the latter's effects on the SDG agenda.

Policy endeavours are further encouraged to re-structure the state institutions in Yemen. Besides, it emerges from Figure 2. that attempts should be made in resolving pre-existing tensions and in parallel addressing the related problems. This is because if pre-existing conditions are already crippling, then climate change effects are expected to be more impactful. In fact, voices have echoed across the board for the OIC (Organisation of Islamic Cooperation) to address with forte this intra-Arab conundrum, but efforts have so far miserably failed, with vested interests impeding the civilians' interests from being successfully addressed. Essentially, the OIC's core mission which includes preserving peace and stability within the Muslim Ummah needs to be revived, and possibly with Islamic values at the fore, conflict resolution and peaceful negotiations might start to show positive results. However, much difference exists between theoretical idealism and practical reality. Besides, another country that undoubtedly will capture international attention in the years to come is Afghanistan, since the new leaders seem to be full of benign intentions for their country. Important lessons need to be drawn from their transitioning stage and can be helpful in other states such as Yemen, as a solution to the conflict. Also, given the lack of empiricism in the study, future research should attempt deeper econometric analysis to gain a deeper insight on the causality, direction of effect and interactions between the different concepts and variables discussed in this study.

Acknowledgements

The author would like to acknowledge the Faculty of Law and Management, University of Mauritius for providing support on this research.

Conflict of interest statement

The author certifies that he has NO affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter or materials discussed in this manuscript.

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Authors' contributions

Ibnay Zuhayr Mustun conceptualized the idea, and was involved in writing, editing and revising the manuscript.



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