INFLUENCE OF THE GLOBAL WARMING PHENOMENON ON RECREATIONAL TOURISM: APPLIED ON EGYPTIAN RED SEA AREA

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ABSTRACT

Global warming, climate change and tourism of deceased, have taken the middle phase of academic study. A raging discussion is on apart from the common writings and articles published on the theme. According to the International Panel on Climate Change "Warming of the climate system is unequivocal as is now clear from notes of growths in global average air and ocean temperatures, widespread melting of snow and ice since the mid-20th century". The approaches of this manuscript are conceptual and are self-oriented to carry readers an all-encompassed state of the art. The purpose of this study is to identify and recognize the extent of research carried out to assess the impact of global warming and climate change on tourism. A three pronged approach is adopted to collect data. First, a literature search is conducted on Google search engine, second, referred research journals in the areas of global warming, climate change and tourism are consulted and third, published reports of national and international scientific associations and government establishments are surveyed. The fortunes of tourism industry, given the nature of activity, obviously depend on the magnitude and impact of global warming and climate change. Countries like USA, China, Russia, India and Australia are mainly attributed for the growing pollution and the consequent changes in the worldwide climate. Sector- wise, flying accounts for 40%, vehicles 32%, accommodations 21% and others 7% are found to be the main suppliers. By the way, all these sectors are related both directly and indirectly to the tourism industry.

KEYWORDS: Global Warming, Climate Change, Recreational Tourism, Red Sea.

INTRODUCTION

Tourism is a very important branch of the economy, but it is vital also for human entertaining, relaxation, and leisure. Without doubt, climate is one of the important parameters affecting tourism. Changes in global climate are beyond the control of the tourism industry and may have far-reaching effects for many current tourist destinations as well as for places anticipating involvement in tourism. Understanding how climate and weather impact tourism is necessary if we want to estimate the impacts of climate change on tourism. Despite the evident close interrelationship between vacation choice (type, destination, and duration) and climate and weather conditions, the issued literature does not disclose sustained attention to deriving consensus on the measures of interdependency. Some consistency is evident in the evaluation of the sensitivity to weather of particular tourism and leisure activities, and in the meditation on the measures of comfort stages; but beyond that there is idiosyncrasy in purpose, way, and area studied. We should state at least three approaches: Tourism climate signs and climate-derived tourism activity zones, Tries to define suitable days for specific recreations or activity and Reviews of weather feeling for tourism activity *(Brommer and others, 2009)*

IMPORTANCE OF THE RESEARCH

We suppose that global warming will have some influence on Wish of and necessity for people to travel in places with several climates; Mobility, which matters available transportation means, transport safety, and ease; Safety: weather excesses are expected to become more regular and intense (natural disasters are likely to risk tourists more than local people, and there is the potential increase of vector-borne diseases); Charm of tourist destinations: some new destinations may appear, and some classical destinations may lose their current attraction, or could even go (for instance, some islands in the Pacific Ocean); Offers at visitor destinations

OBJECTIVES OF THE RESEARCH

A sustainable development plan should give some solutions to enable concurrent economic progress of the region and the conservation of the coastal and marine ecologies of the Red Sea. Therefore, it seems expedient:

- To explore the impact of Global Warming on Recreational Tourism in the red sea
- To explain the features of tourism in this province to focus the value of its coastal part.

- Then to analyze the prospective effects of Global Warming on Recreational Tourism " tourism based on the latest scientific reports.

METHODOLOGY AND DATA COLLECTION

Questionnaire was designed with the aim of tourists coming to the red sea. Tourists were interviewed in the arrival hall of Hurghada Airport. The requisites for the airport to be considered were: (i) frequent daily flights to red sea and; (ii) proximity to researchers working place. The self-completed questionnaire was elaborated in English language, the survey was adjusted accordingly and it was eventually carried out during three days in May and June 2019 in the check-in area of Hurghada airport. Limited resources and time only allowed for the given sampling days and locations, determining the number of finished questionnaires. The questionnaire was handed in to tourists coming to a red sea, regardless of what that destination would be. It was structured to focus on the role of global warming in general as a destination attribute specially issues of the relationship between recreation tourism and climate change influences. To avoid any potential effect on the respondents about the matter of the survey, the purpose of the questionnaire was not revealed in the introductory notes given to the respondents.

DEFINITION OF GLOBAL WARMING

Global warming **IS** the lasting heating of Earth's climate scheme noticed since the pre-industrial era (between 1850 and 1900) because of human activities, mainly fossil fuel burning, which raises heat-trapping greenhouse gas stages in Ground's atmosphere. The term is frequently used interchangeably with the term climate change; though the later refers to both human- and obviously produced warming and the effects it has on our globe. It is most usually measured as the regular spread in Earth's global surface heat. Since the pre-industrial age, human activities are estimated to have increased Earth's global average temperature by about 1 degree Celsius (1.8 degrees Fahrenheit), a figure that is currently increasing by 0.2 degrees Celsius (0.36 degrees Fahrenheit) per decade. Most of the current warming trend is extremely likely (greater than 95 percent probability) the result of human action since the 1950s and is happening at an unprecedented rate over decades to millennia. Here's a simple definition of global warming. (And yes, it's really happening.) Over the past 50 years, the average global temperature has increased at the wildest rate in recorded history. And experts see the trend is rushing: All but one of the 16 hottest years in NASA's 134-year record have occurred since 2000. Climate change deniers have discussed that there has been a "pause" or a "slowdown" in rising worldwide heats, but numerous recent

reports, including a 2015 paper published in the journal Science, have refuted this request. And experts say that unless we curb global-warming releases, average U.S. temperatures could rise by up to 10 degrees Fahrenheit over the next century. *(IPCC, 2007)*

CAUSES OF GLOBAL WARMING IN THE WORLD

Global warming happens when carbon dioxide (CO2) and other air pollutants and greenhouse gases gather in the air and engross sunlight and solar radiation that have bounced off the ground's surface. Generally, this radiation would leak into space—but these contaminants, which can last for years to centuries in the air, trap the heat and reason the planet to become hotter. That's what's known as the greenhouse influence. In the United States of America, the burning of fossil fuels to create electricity is the major source of heat-trapping pollution, making about two billion tons of CO2 each year. Coal-burning power plants are by far the largest polluters. The state's second-largest basis of carbon pollution is the transport sector, which produces about 1.7 billion tons of CO2 emissions a year. Curbing hazardous climate change requires very profound cuts in emissions, and also the use of choices to fossil fuels worldwide. The good news is that we've started a turnaround: CO2 emissions in the United States truly decreased from 2005 to 2014 cheers in part to new, energy-efficient technology and the use of cleaner fuels. And experts last to improve new ways to reform power plants, generate cleaner electricity, and burn less gasoline while we drive. The challenge is to be sure these solutions are put to practice and broadly adopted. *(Matzarakis, 2006)*

INFLUENCES OF GLOBAL WARMING

Global warming is estimated to have far-reaching, long-lasting and, in several cases, devastating concerns for planet Earth. Global Warming, the regular heating of Earth's surface, oceans and atmosphere, is produced by human activity, mostly the burning of fossil fuels that pump carbon dioxide (CO2), methane and greenhouse gases into the air. In Spite political debate about climate change, a main report released Sept. 27, 2013, by the Intergovernmental Panel on Climate Change (IPCC) stated that scientists are clearer than ever of the link between social activities and global warming. More than 197 international scientific associations approve that global warming is actual and has been caused by human action. Nowadays, global warming is having a measurable influence on the world. "We can notice this happening in real time in various places. Ice is melting in both polar ice caps and mountain glaciers. Lakes around the world, including Lake Superior, are warming quickly — in some situations

faster than the nearby environment. Animals are changing migration patterns and plants are changing the dates of activity," such as trees budding their leaves previous in the spring and dropping them later in the fall, Josef Werne, a professor of geology and environmental science at the University of Pittsburgh, told Live Science. *(Scott, D. et al, 2015)*

TOURISM IN THE FUTURE

Each year more than half a billion people across international borders. In Europe, the number of international tourists grew extremely in the last few years of the twentieth century, and the growth is expected to continue. This huge mobility of persons brings an increase in health risks for travelers and host people, together with more risks for the environment and for the cultural identity of the world's population. What are the incentives of tourists and temporary immigrants to go away? They are different, very various, and often related. Usually it could have been—and it is the same today—the search for more resources, more food, more safety, and more enjoyable and comfortable climates. It could have been the look for commercial revenue, or the invasion of more attractive destinations, but also a flight from war or other scaring situations. And what about the curiosity, the desire of finding new landscapes, new communities, and new cultures? People travel so that they can describe, write, or film, urged on by the excitement of adventure. People can also travel for reasons of work, looking for diverse markets proposing different treasures. Others travel to escape, seeking for freedom in unreachable exotic climates. Some people travel for motives of faith, on pilgrimages, or on visits to see preserves or oracles. Another reason for travel can be study and research; it is also probable to travel out of sheer curiosity. What about the spirit of adventure? We can accept that the motivation for traveling remains the same, but the potentials and chances will enlarge in the close future. *(Becken, 2015)*

The World Tourism Organization (UNWTO) expects that twenty-first century tourism will be the cure to high-tech living. The year 2020 will see the invasion of technology into all sides of life. People in the high-tech future will require the human touch and tourism will be the main means to reach this. Upscale, luxury facilities that pamper and spoil their clients have a brilliant future in the twenty-first century. At the even time there are good expectations for low-budget destinations and packages like self-catering holiday services that offer a lot of chances for socializing among families and friends. UNWTO predicts that 1.5 billion tourists will be visiting foreign countries yearly by 2021, spending more than US$5 billion each day. Tourist arrivals are expected to grow by an average 4.3% per

year over the first two decades of the twenty-first century, while revenues from international tourism will increase by 6.7% per year. In local tourism, UNWTO estimates multiply arrivals by 10 and quadruple receipts, which bring us to the major total of 16 billion tourists' expenditure US$8 trillion in 2021. Tourism in the twenty-first century will not only be the world's biggest industry, it will be the major by far that the world has ever seen. Beside with its remarkable growth, the tourism industry will also have to take on more responsibility for its wide impacts—and not only its economic effect, but also its effect on the environment, on civilizations, and on cultural places. *(Hall and Coles, 2008)*

Environmental standards, economic well-being, and tourist fitness are interdependent. Several actual and potential tourist destinations are worried or related with safety and security troubles derived from social conflict, delinquency, terrorism, natural catastrophes, and fitness hazards. Natural disasters and health hazards, at least, are closely related to climate variability and climate change. Global climate and regional physical environments are evolving. These changes can create situations and circumstances that favor or support new or different disease presentation. A typical example is the change in the habitat or location of vectors of human disease as a consequence of climatic or geographic change. If changes to the distribution of vectors or disease hosts happen in regions affected by or subject to population actions, we can witness the overview or reemergence of non- traditional diseases. Examples contain the spread of malaria into areas previously malaria free. Given the enormous enlarge in international travel, doctors today find themselves being increasingly asked to counsel their patients on vaccinations and chemoprophylaxis and having to diagnose exotic diseases. With climate change we imagine some diseases to spread even more, so it is reasonable to expect an increase in the essential for information on protection measures and to learn what personal behavior must be adopted in order to keep away from diseases transmitted by arthropods, food, and what health documentation or medicines to carry. *(Abegg, 2012)*

THERE ARE SEVERAL HAZARDS FROM TRAVEL

- Accidents happen on roads, in public areas, during travel
- Conflicts of biorhythms are caused by changes of time zone, sleep lack during the travel
- Natural catastrophes and severe climate can represent a risk to the health, property, and lives of tourists
- Disturbances with modification of stress
- Exposure to diverse kind of diseases

- With change of environmental temperatures we must consider difficulties of thermoregulatory mechanisms and hydrogen stability, and adaptation of those balances and acclimatization to be kept in-mind. *(Koetse and Rietveld, 2018)*

GLOBAL WARMING AND TOURISM

With its close relations to the environment and climate itself, tourism is considered to be an extremely climate-sensitive economic sector alike to agriculture, insurance, energy, and transportation. Certainly, climate change is not a remote future event for tourism, as the diverse influences of a changing climate are even now suitable evident at destinations around the world and climate change is already affecting decision-making in the tourism field. There are four wide categories of climate change that will affect tourism sites, their competitiveness and sustainability:

DIRECT CLIMATE INFLUENCES

Climate is a major resource for tourism, as it codetermines the suitability of sites for a wide range of tourist activities, is a main driver of global seasonality in tourism demand, and has an significant influence on operation costs, such as heating-cooling, snowmaking, irrigation, food and water supply, and insurance costs. So, changes in the length and quality of climate- dependent tourism seasons (e.g., sun-and-sea or winter sports vacations) could have considerable effects for competitive relations among destinations and so the success of tourism organizations. Studies show that a shift of attractive climatic circumstances for tourism towards higher altitudes is very probable. The IPCC has concluded that rises in the regularity or magnitude of certain weather and climate extremes (e.g. heat waves, droughts, floods, tropical cyclones) are likely to be a result of projected climate change (IPCC 2007a). Such changes will affect the tourism industry through increased infrastructure damage, additional emergency preparedness requirements, higher operation expenditures (e.g., insurance, backup water and power systems, and evacuations), and business interruptions. *(Perry, 2016)*

INDIRECT ENVIRONMENTAL CHANGE INFLUENCES

Because environmental circumstances are such a critical resource for tourism, a broad -range of climate-induced environmental changes will have deep effects on tourism at the local and regional destination level. Changes in water availability, biodiversity loss, decreased landscape aesthetic, altered agricultural production (e.g., food and wine tourism), increased natural threats, beach erosion and flood, damage to infrastructure and the expanding incidence of vector- borne diseases will

all influence tourism to varying degrees. In contrast to the varied impacts of a changed climate on tourism, the indirect effects of climate induced environmental change are probable to be fundamentally negative *(Simpson, 2008)*

EFFECTS OF MITIGATION POLICIES ON TOURIST FLEXIBILITY

National or international mitigation policies that are strategies that seek to decrease GHG emissions – may have an effect on tourist flows.*)***.** They are likely to lead to a rise in transport costs and may foster environmental attitudes that lead travelers to change their Travel models, especially as it relates to air travel. Long-haul destinations can be mainly affected and could adversely influence their national tourism economy. *(Simpson, 2003)*

INDIRECT SOCIETAL CHANGE EFFECTS

Climate change is consideration to pose a risk to future economic growth. Any such decrease of global GDP due to climate change would decrease the discretionary wealth available to consumers for tourism and have negative effects for expected future growth in tourism. Climate change is considered a national and international security danger that will steadily intensify, particularly under greater warming scenarios. Climate change associated security risks have been recognized in a number of areas where tourism is extremely important to local-national economies**.** A lot of which are believed to be in developing countries. *(Hamilton, 2005)*

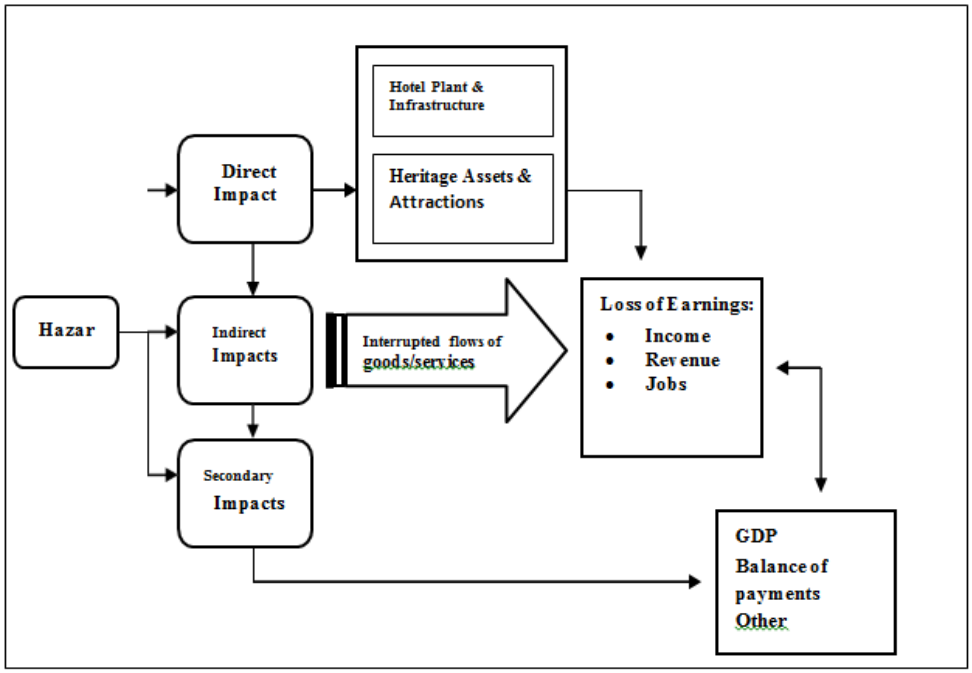

Figure 1: Hazardous Impact on Tourism
Source: Hamilton, J., 2005.

Indirect damage contains interruptions to runs of:

- Services from investment or physicals stocks such as loss of visitor income and loss of jobs.
- Facilities such as guest profits from natural attractions, tour guides, etc.
- Influences on macroeconomic variables such as GDP and Balance of Payments *(UNWTO, 2018)*

GLOBAL WARMING IN EGYPT

Egypt occupies the northeastern of Africa. It is bordered in the east by the Red Sea, in the west by Libya, in the north by the Mediterranean Sea and in the south by Sudan. The total land area is 997,688 square kilometers that comprise five main geographical regions: the Nile Valley, the Nile Delta, the Eastern Desert, Sinai and the Western Desert. The coastline extends for more than 3500 kilometers along the Mediterranean Sea and the Red Sea coasts. The Nile Delta coast which establish about 300 kilometers, hosts a number of highly populated cities such as Alexandria, Port said, Rosetta and Damietta. Egypt's climate is semi-desert, characterized by hot dry summer, reasonable winter and little rainfall. The country has areas with strong wind, especially along the Mediterranean and Red Sea coasts. Sites with an annual average wind speed of 8.0-10.0 meter/ second have been identified along the Red Sea coast and about 6.0-6.5 meter/ second along

the Mediterranean coast. Actually, there is proof that there is steady increase in temperature in Egypt. More warming is estimated for summer than for winter, and annual precipitation is estimated to fall. Scientific evidence and climate records have improved the focus on the relationship between the attentions of GHG in the air and the rise in temperature. Therefore, this will cause sea level to rise and reduce the quantity and the amount and pattern of precipitation. *(De Freitas, 2006)*

Egypt knows its own vulnerability to climate change in vital areas threatening the sustainability of its natural and socioeconomic systems. Egypt is among the first Arab countries to join the cooperative global efforts to confront climate change threats. Although GHG in Egypt do not exceed 0.6% of world total emissions, it will be highly affected by potential climate changes. Certainly, since the Rio de Janeiro Earth Summit in 1992, Egypt endorsed the United Nations Framework Convention on Climate Change (UNFCC) in 1994 and accordingly Egypt has prepared a National Action Plan on Climate Change to coordinate its efforts to face this serious and essential challenge. Furthermore, in 1999 Egypt signed the Kyoto Protocol (which aims to help member parties to reduce their emissions). Despite of the fact that Egypt is highly affected by climate change, there are inaccurate analyses on the negative effects that could occur in Egypt due to climate change. However, the sea level rise threatens Egypt's long coastal stretch on the Mediterranean and the Red sea with potential damages to the ecosystem in general and the tourism industry in particular. Moreover, there are forecast socioeconomic implications due to human migration, land loss and soil salinity. Moreover, the rise in temperature of sea water causes damage of marine life and coral reef bleaching. Egypt as a tourist destination is branded by its warm climate in winter, thus the influences of climate change in Egypt will mostly be in the summer months, as they are faced with loss of comfort resulting from rising temperatures and with water lacks. But, the country is well known for high temperatures in the summer, so that holiday makers have higher tolerance. In fact, Egypt benefits from a very balanced pattern of tourist arrival all over the year. *(International Institute for Sustainable Development, 2011)*

IMPACTS OF GLOBAL WARMING ON RECREATION

DIRECT IMPACTS

Global Warming will directly influence tourism

- Weather and climate influence decisions both at the destination and at the basis region

- Climate has a direct impact on such decisions as: 'When to go on holiday?' and 'where to go on holiday?

INDIRECT IMPACTS

- Sea level rise; and its influences on coastal erosion will severely threaten recreation and tourist activities associated with coastal locations.
- Reducing snow cover and duration may affect low lying ski resorts world-wide
- Melting permafrost will affect road access to remote communities.
- A reduction in air quality is already obvious in some national parks.
- Attentions of pollutants may increase to dangerous levels and additional threaten tourist destinations. *(Ehmer and Heymann, 2017)*
- Sustained warming trend will have a detrimental influence upon these ecosystems and tourism, in the form of coral bleaching and forest die back
- Effects of global warming on many ecosystems, on which much tourism depends, may be widespread.
- Increase in sea level, resulting from a continued warming trend, will threaten not only tourism but the very existence of many islands*(De Freitas, 2006)*
- Drying of Rivers and loss of riparian vegetation would have a major economic impact on tourism in red sea
- Dryer area conditions can lead to reduction of native undergrowth and disturbed soils conducive for aggressive weed invasion.
- Natural snow will be a gradually scarce leading to non-natural snow making.
- Reduced natural snow pack negatively impacts both winter and summer activities (ie. Skiing, snowmobiling, White Water rafting, fishing etc.)
- The great investment in snowmaking substantially reduced the vulnerability of the ski industry and climate change. *(Hall and Higham, 2005)*.

CLIMATE CHANGE ADAPTION IS THE WAY

- Restoring plains would develop river health and help slow and store floodwaters
- Preserving barrier islands saves sensitive coastal habitats and keeps seaside populations from punishing storms.
- Caring healthy coral reefs protections these jewels of the sea and helps sustain fisheries and other sources of economic living for coastal communities.

- Climate change scenarios need to become more locale specific.
- A profounder understanding of the economic costs of creating favorable recreation conditions is needed
- A comparative study needs to be conducted of competing attractions in areas bordering on the destination and the costs of engaging in these activities.
- Recent management strategies need to be advanced to take into account the changing resource base in its impact on vegetation, wildlife and entertaining choices.
- Resource conflicts due to competition for scarce resources such as water need to be expected and legislation or a process started for resolving these conflicts. *(Koetse and Rietveld, 2018)*

Table 1: Climate Change Adaption & Tourism

Areas of impact	Climate cc policy	Tourism Policy (National Sustainable Tourism Strategy 2013 – 2020)
Risks and insurance	• Application of integrated environmental management systems in touristic sites (e.g. IEMS for the coasts of the Red Sea – funded by the GEF (adaption). • Emerging plans to address dangers. • Measuring the vulnerability and the vulnerability of touristic areas to risks	• Develop the efficiency of tourism association, the institutional framework and the legal and controlling environment. • To adopt an method to development that will certify environmental sustainability
Climate variability	• Evaluating the degree of fragility and vulnerability to risk of touristic sites and locations of Archaeological worth.	• No definite measures/actions needed
Aviation itineraries modification	• Adjust tourism seasonality to heat waves (might make the climate fewer attractive for tourists).	• No specific ways /actions wanted
Infrastructures		• Create energy reviews for hotels and tourism attractions

		• Make new hotels and tourism attractions to construct in solar energy resolutions • Remove all continuing incandescent bulbs and replace with long life energy efficient CFL and LED bulbs. • Use condensing boilers where appropriate • Practice of light systems at night which are controlled by PIR's or sensors which switch on as required • Lagging of hot water pipes and storage– heat loss is higher than 35% in unlogged systems and use high efficiency absorption heat pumps where appropriate
Water lacks	• Executing an awareness campaign on the influence of CC. • Slowing down and reduced time storing for water55 and working competition in water demand among sectors56.	• Procedure boilers with high AFEU ratings to heat water and appropriate with automatic sensors to achieve hot water use load • Grow highest environmental criteria and apply Best Practice in water use.

Biodiversity cost	• Announcement of MPA's (adaptation measures for environmentally susceptible areas within tourist areas).	• Protect and present the complete range of the natural heritage of Egypt • To classify areas of specific environmental interest and habitat and sites of natural and scientific interest, and to protect them under the law and achieve public access for the advantage of inhabitants and guests • Adopt firm measures to keep and protect environment, heritage etc.
Cultural heritage	• No certain actions or evaluation for tourism • Minor importance if compared to water and agriculture, but contains some tourism concerns.	• Cultural values contain improved conservation and performance of the nation's heritage and culture to be enjoyed by residents, visitors, and future generations. The essential to leverage Egypt's great legacy of heritage in modern methods, avoiding sameness in new expansion. Lastly, development relays on enhancing, in a sustainable way,

		the very valuable coastal lands • The Supreme Council for Tourism is a sound structural module for Egypt's tourism industry. Up to 11 ministries could be involved in the council, but main players will probably be Civil Aviation, Heritage, Culture and the Arts,
Weakening of landscape	• Predictable tourism development away from environmentally sensitive zones and the areas that are most vulnerable to climate change.	• Green, sustainable structures blended closely with. Natural materials, internal parks, creative use of water (sight/sound), variable lighting
Vector-borne diseases	• Improved accessibility and analysis57 of existing historical facts and extra detailed data for all areas in relative to changed CC scenarios. • The greatest economic approach for farmers is to use integrated pest management practices to closely monitor insect and disease happening. • Create a map for the remark of plant diseases and their reasons, their occurrence.	• No specific measures/actions required

Infrastructural matters	• Developing a observing system for the expected effects of CC in touristic areas. • Applying and building fortifications anti floods in the regions vulnerable to flood hazards of coastal zones. • Restoration and help of natural protection • Responsibility engineering and protective works to avoid or control sea water intrusion	• Expansion planning in different tourism areas like the Red Sea, Mediterranean Coast, Siwa, and the Western Desert can be of the highest environmental value and Best Training • New constructions for tourism have to be environmentally friendly and determine a "green
Tourist offer/ Visits	• Arranging plans for emerging and activating tourism, with merging of adaptation plans. • Guiding touristic development away from environmentally sensitive districts and most vulnerable to risks	• Develop a range of Eco-tourism products that react to the requests of new and future tourists

Source: Bosello and others, 2015

RED SEA AREA ENGENDERS CONCERNS

The Red Sea is an extended, narrow body of water splitting north-east Africa from the Arabian Peninsula. Egypt lies on the western shore to the north and enjoys a total shoreline of 1,386 km. The Red Sea is a very rich and diverse environment and includes most of the interesting populations of tropical seas with extremely spectacular fauna and flora. As the Egyptian Tourism Authority promotes: "There are many types of colored fish that lose their colors once taken out of water."15 The greatest variety of reefs can be found along the Egyptian coast. The coral reef north of the Gaffan Islands is known to be one of the five best diving spots in the world.16 Coral reefs along the Egyptian Red Sea coast are among the best attractive, most photographed in the world. A nascent ocean, the Red Sea is very salty and has the wannest deep waters in the world. These physical attributes act for a huge economic resource for tourism and recreational usage. In the past, this region served two principal international tourism markets. The attractive climate facilitated a year-round season for the Arab market, and the spectacular coastal and marine characteristics drew young European divers who could not afford extra expensive destinations and did not mind staying at tourist villages. Beyond these two markets, the Egyptian Red Sea coast is little known as a tourist destination in today's international market. With the effort to expand tourist attractions, large-scale development will appeal to a much wider international market, and will consequently generate better influences on the coastal environment through raised tourist use. These impacts can be examined in three aspects: coastal structure, pollution issues, and local and vistor behavior. *(Morgan, 2000)*

COASTAL CONSTRUCTION INFLUENCES SEASHORE

The growth of a tourism infrastructure to offer accessibility and facilities for visitors has a direct effect on the coastal environment. Construction activities contain overall construction of roads, lodging accommodations, transportation services, and residual influences from these activities, including bulldozer procedures, and operational or uncaring oil spills. In the desert environment of the Red Sea area, wide infilling to construct seafront roads has been a public practice. This infilling can cause a subsequent washing out of the fine grained material into the ocean, causing in sedimentation, considered to be the major cause of destruction to many marine habitats throughout the tropics.'" The settling of great quantity of silt, sand, or other runoff materials onto the coast or seabed can damage various marine people. Many coral reefs can hardly endure the heavy loads of coarse grain material produced by coastal infilling. Huge damage of the

fringing reef near Jiddah, Saudi Arabia, was affected by heavy sedimentation resulting from infilling activity.ls to mitigate the soil runoff problem related with coastal construction; strip progress close to the shoreline wants to be controlled. Major roads and service facilities should have a greater setback distance from the beachfront. Meanwhile there are great expanses of arid and unproductive land available; it seems likely to support construction away from the shoreline. The difficulty of soil erosion can be thus decreased and the effect of sedimentation on corals can be minimized. *(Simpson, 2008)*

POLLUTION DIFFICULTIES PROVIDE WARNING

The pollution threat poses a chief risk to the beautiful physical facilities of the coastal environment. The Red Sea is about totally surrounded and is highly vulnerable to pollution since limited water exchange with the Indian Ocean considerably decreases the potential for the dispersion of pollutants. The main pollution input to the sea is of sewage, which, treated or untreated, is usually discharged to, or just below, the intertidal zone via pipelines, and is thus mostly a seaside problem.I9 If sewage is not wholly treated, algae can feed on the nutrients of the discharged waste. Enlarged algal growth stimulated by increased nutrient attentions can be damaging to coral reefs. Loss of corals caused by discharged sewage was carefully recorded by Walker and Onnond in the Gulf of Agaba.20 the death rate of the corals was create to be four to five times greater in the sewage polluted area than in a controlled area. Corals in the sewage polluted areas are under great stress because of the decreased light intensity caused by the blanket of algae. The enlarged number of visitors to the beach resorts will create more sewage, which, if improperly treated, can reduce the quality of the actual services which attract the tourists in the first place, the pure water and remarkable reefs. That is why the residents on the island of Oahu in Hawaii requirement that island resorts treat sewage four times before discharging it into the ocean. Furthermore to sewage, oil leaks and discharges from aground and offshore oil fields and plants in the Gulf of Suez area can be a possible threat to tourism and entertaining activities along the Red Sea shore. As Dicks describes: "Many kilometers of coastline are severely oiled intertidal from spills from oil rigs and ships. Weathered oil pavements many centimeters thick blanket rocky promontories, sandy beaches, and, in a few sites, shallow area and fringing coral reefs."21 Tourism growth and offshore oil exploitation have been on a crash course for years in Egypt.22 Even an Egyptian tourism minister often blames oil firms for Red Sea pollution.'~ A strong environmental act requires to be advanced to guide onshore and offshore oil manufacture, and to stop hurter oil pollution in the Red Sea destination**.** *(UNWTO, 2018)*

RESULTS

A total of 143 questionnaires were distributed and returned. Three of them were only partially answered and therefore not included in the analysis. To ease the analysis, the results are given for each of the four major sections covered on the questionnaire. Table 5.2 summarizes the results for the socio-demographic questions.

Table (2) Socio-demographic characteristics of the sample

	Frequency	Percent
Country of origin		
Red Sea - Egypt	140	100
Gender		
Male	62	44.3
Female	78	55.7
Travelling With		
Friends	50	35.8
Family	60	42.8
Alone	30	21.4
Holiday Organization		
Travel Agent	68	38.4
Independent	60	36.6
Other	12	2.7
Age		
20-44	55	39.3
45-64	49	35.0
+65	36	25.7
Nationality		
Argentina	2	1.4
Bahrain	7	5
Brazil	5	3.6
Canada	2	1.4
China	6	4.2
Czech	2	1.4
Cyprus	7	5
France	5	3.6
German	11	7.9

Greece	4	2.8
Kuwait	9	11.5
Italy	13	6.4
Japan	2	1.4
Lebanon	3	2.1
Morocco	6	4.1
Palestine	1	0.8
Russia	12	8.6
Saudi Arabia	5	3.6
Spain	8	5.7
Sweden	4	2.8
Tunisia	2	1.4
Ukraine	8	5.7
United Arab of Emirates	6	4.1
United Kingdom	10	7.2
United States of America	3	2.1

THE ROLE OF CLIMATE AS A VITAL APPEAL ATTRIBUTE TO RED SEA

from all the activities visitors planned to perform at their destination (multiple choices possible), Recreation tourism was chosen by 123 of the respondents (87.4%), more than double the second activity, cultural tourism, which was selected times (12.6%). The attractiveness of the destination was measured based on 14 attributes, using a Likert scale from unimportant (1) to very important (5). Table 5 shows that 'climate' is the feature that contributed the most to the attractiveness of the destinations (mean 4.56) for the overall sample (N=140), but even if the analysis is limited to the respondents that will not be involved in beach tourism (38 did not choose this activity), 'climate' still obtains the highest score (mean 4.56). Cultural impacts might affect the preferences of different nationalities for weather and climate (Scott et al., 2008). To test if this is the case with the available sample, a T-Test was performed. From the list of attributes in Table 5.3, the ones that were found to be significantly different between the two nationalities are indicated by an asterisk.

Table (3) Descriptive statistics of destination attributes (asterisk indicates significant difference between nationalities)

Attributes	Mean	Std, Deviation	N
Climate	4.56	.580	140
Security	4.15	.858	139
Price of Accommodation*	3.94	.820	137
Nature/Landscape	3.85	.774	138
Price of transport to destination	3.79	.881	139
Travel distance/time*	3.34	1.063	137
Shopping opportunities*	3.27	1.041	139
Cultural and historical attractions	3.25	1.054	138
Uniqueness of local people's way of life	3.13	.941	137
Sports and recreational opportunities	3.03	1.085	138
Festivals, special events*	2.38	.999	138

a 1 = unimportant; 5 = very important

THE ROLE OF (HIGH) TEMPERATURE AND OTHER WEATHER PARAMETERS AND DEFINITION OF 'UNFAVORABLE' WEATHER FOR BEACH TOURISM

The next set of questions aimed at investigating in depth the significance of weather specifically for recreation tourism. First, respondents were asked to grade how important a set of weather variables were, again using a Likert scale from not important to extremely important. 'Absence of rain' was the aspect seen as most important (mean 4.28), followed by 'comfortable temperature' (mean 4.22), with no significant difference between respondents that chose beach as their main activity and respondents that did not choose this option (Table 5.5; asterisk indicates significance difference between nationalities).

Table (4) Importance of weather parameters for beach tourism

Attributes	Mean	Std, Deviation	N
Absence of rain	4.28	1.105	140
Comfortable temperature	4.22	.761	139
Hours of sunlight	4.12	.857	137
Water temperature*	3.73	.976	140
Absence of clouds	3.51	1.079	140
Absence of strong wind	3.26	1.236	140

a 1 = unimportant; 5 = very important

PERCEPTIONS ABOUT GLOBAL WARMING IMPACTS IN THE RED SEA DESTINATION

Finally, the last question explored the effect on tourists' satisfaction of five different potential impacts of global warming in the red sea identified in the literature. The five influences had to be rated from no influence (1) to very negative influence (4). The impact considered more negatively was the 'risk of diseases', while 'heat waves' was ranked as the least negative of all of them (Table 7). Table 5.8 shows the responses both nationalities gave for the specific case of heat waves.

Table (5) Perceived importance of different climate change impacts on destinations
(Asterisk indicates significant difference between nationalities)

Attributes	Mean	Mode	Std, Deviation	N
Risk of diseases	4.28	4 (very negatively)	1.105	140
Forest fires	4.22	3 (negatively)	.761	138
Water restrictions in hotel*	4.12	3 (negatively)	.857	137
Reduced beach extension*	3.73	3 (negatively)	.976	140
Heat wave*	3.51	2 (not too negatively)	1.079	140

a 1 = unimportant; 5 = very important

Table (6) Adaptation Recommendations to Combat Vulnerability of Coastal Infrastructure & Land Uses to Climate Variability & Change

	Monitoring Measures	Land-Use Planning & Land Protection Tools	Economic & Market-Based Incentives	Public Awareness & Education	Research, Monitoring & Hazard Mapping
Growing of Tourism Industry		- Improve a full land use plan	-Market-based motivations to promote sustainable tourism	-Public knowledge & education	
Serious & Uncontrolled Coastal Growth		- Acquire a comprehensive land use plan -Integrate regional disaster mitigation plans with national/physical planning	-Eliminate subsidies that promote development in high hazard areas		- Create a computer network linking major sea level rise and climate change monitoring organizations
Location of Coastal Infrastructure in Dangerous Zones	-Introduce rules to phase out growth in high hazard sites	-Utilize a retreat approach to development in high hazard areas - Apply land protection tools to preserve/restore ecological buffers	-Eliminate subsidies that promote development in high hazard areas	-Public awareness & education	-Expand hazard mapping of coastal areas, based on global warming - Last to build and expand long-term coast monitoring programs
Inadequate Waste Disposal Systems	- Supported regulations to keep ecological buffers		-Market-based incentives to promote sustainable tourism		

Quality of Construction Construction & Insurance Incentives	-Strengthened building codes		-Link property insurance with structure quality - Create a revolving fund for home enhancement loans	-Public awareness & education	
Destruction of Ecological Buffers	-Strengthened guidelines to protect ecological buffers	-Utilize land protection tools to preserve/restore ecological buffers - Develop & implement integrated coastal management plans		-Public awareness & education	-Use of GIS mapping
Continued Reliance on Top-Down Approaches to Land-Use Planning		- Develop & implement integrated coastal management plans - Implement watershed mgt.			
Destructive Ag. & Forestry Practices		-Develop a comp. land use plan - Implement watershed mgt.		-Public awareness & education	

CONCLUSION AND RECOMMENDATIONS

- Though there are extremely many « sustainable » initiatives at all stages of red sea tourism, they have proved to be inadequate to face the future difficulties and the risks that will have to be taken up.
- In the emerging destinations, it is hard to keep under power the seaside model development. At local level tourism welfares are generally inadequate to finance struggle against pollution and environmental nuisance. In emerging or potential destinations, the most beautiful beach spots are coveted and are praise for savers who exert strong stress to get and achieve them. "Foreign enclaves" are developed and their benefits often totally elude the local communities.
- To avoid the influence of global warming on recreational tourism and vice versa, a joint organization for red sea tourism must exist and should meet the need of the States, the tourist destinations, the private sector and NGOs to group together and form joint ventures.
- Familiarizing to global warming needs expecting change. Some areas will be better able to plan than others relying on their capacity to adapt. Improving this capacity can decrease threats of adverse future effects. That is why it would be planned to increase adaptive capacity in tourism field.
- Reliance on natural resources is another effect on adaptive capacity. Actually, flexibility to respond to altered conditions, such as a modification in climate change, is actual important too. For example, when diving is no further attractive in a natural spot, emerging technical diving can last to attract tourists. So, rearranging tourism can militate against dependent resource sectors.
- Adapting to global warming does not necessarily mean arranging for the worst. It can mean preparing to take benefit of new circumstances. Thus exploring future positive in addition to negative results from climate change is essential in developing climate adaptation policies in tourism activities.

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