

CLIMATE CHANGE IMPACT ON ECONOMY

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Abstract— Throughout history Earth's climate has been changing, where the majority of these changes are accredited to very small disparities in the orbiting of Earth which results in variations of the amount of solar energy the planet receives. Climate change is the origin of all externalities, in which it is much larger, more intricate and more indeterminate than any of the other ecological issues.

This study is carried out and is aimed to converge on the influences of climatic transformation and its effects towards the economy. Additionally, this paper fixates on understanding how a certain quantity of climate change influences can modify various parts of the economy depending on the different regions and their vulnerability to climate change. The influences which will be involved in this study include damage to property and infrastructure, lost productivity, mass migration and security threats, coping costs, energy demand, health, extreme weather events, ecosystems, tourism flows, fisheries and catastrophic risks

In this research, the SPSS program was utilized in order to identify the effects that global warming has on the economy based on people's views. In which, 110 questionnaires were distributed where 55 were distributed to Cypriot citizens and 55 were distributed to citizens of multiple nationalities within the Near East University community. The results were analyzed and compared to identify the most important and most influential effects on the population. In addition, to compare how the differentiation of significance and priorities differ depending on the different regions and environments as to be able to work to address them or avoid the effects if possible.

Based on the results people in Cyprus considered that energy demand, lost productivity, fisheries, are the most influential factors based on the climatic and environmental conditions while the people of multiple nationalities within the Near East University considered that, mass migration and security threats, coping cost and lost productivity are the most influential factors based on the climatic and environmental conditions depending on Relative Importance Index and Mean values.

key words: Economic losses, Economy, Adaptation, Climate change.

1 INTRODUCTION

Climate change can be described as a possible disastrous universal externality. Additionally, this issue is one of the globes tremendous cumulative action complications. Cause and effect dissemination on climate change is remarkably disproportionate across regions and generations. There has been massive vagueness concerning the extant evaluations of the future damages resulting from climate impacts, in which to a tolerable degree, these afflictions are permanent and could be ruinous if environmental change is unhampered. Accordingly, the expenditures of reducing climate impacts consume a deteriorating constituent, in which it is unable to be completely reclaimed, in addition they are dependent upon a majority of aspects, which includes the degree at which the

universal economy expands over the long-term and the progress in which the low-emission technologies develop and spread across the worldwide economy. Further degeneration of both environmental and natural estates can accommodate anticipations for planned economic expansion and human welfare. In consonance with broader literary works, the "Organization for Economic Co-operation and Development (OECD) Environmental Outlook to 2050: Consequences of Inaction (OECD, 2012)" contemplated substantial outcomes if no action on climate change is taken. These outcomes include insufficient water supply, biodiversity deficiency, and health effects of pollution by the year 2050 if no demanding protocols are enforced. Strict policies are vital to conciliate economic expansion with the preservation and possible utilization of the biosphere and natural resources. This paper adds to the quantitative valuation of the industrial residuum of the climate damages.

Global warming cannot be evaded as it is already underway, but it is possible to reduce the impacts and slow down the process. The alterations to the Earth's physical, global, and biological processes are more evident than ever. The main global warming influences major grouping on people include health, food, water usage and costs which are divided into specific categories. These categories include the destruction of property and infrastructure, loss of efficiency, vast migration and security risk, coping costs, well-being, severe weather events, bionetworks, leisure industry, energy demand, fisheries and disastrous hazards which will be listed below with a brief explanation on each impact.

- **Damage to property and infrastructure:** Generally, the climatic impacts such as sea rise, famines, wildfires, severe storms, and natural disasters require extensive reparation of essential infrastructure including houses, road and rail network, bridges, airport runways, power lines, dams and embankments.
- **Lost productivity:** Day-to-day disturbances that can occur due to variations in the climatic conditions and may result in lost work and institutional days and damage trade, transportations, cultivation, energy manufacture, fisheries and leisure industry. Severe weather conditions such as rainfall and snowstorms lead to delay in cultivation, power outages, traffic and air travel delays and furthermore, making it difficult to go about daily businesses.
- **Mass migration and security threats:** Usually, individuals are enforced to abandon their homes in order to migrate to safer areas as result of harsh circumstances such as famine, floods or other climatic tragedies. These people are known to be "climate refugees", whose numbers are expected to rise due to the climatic impacts. Tremendous immigration of people and social disturbance can result in civil strife and stimulate military interference and unplanned consequences.
- **Coping costs:** It is possible for civilizations to seek tactics for preparation and coping with certain climate influences, given that carbon emissions are prevented from continuous persistency. Studies on coping costs portray that it is likely costly to minimize carbon emissions which in turn results in reducing associated climatic effects. If we take for example

the various alterations carried out from various organizations in their fields to avoid massive climatic impacts such as farmers, whom tend to formerly water rain-fed areas, cool helpless livestock, and manage new or more numerous pests. As for the local and state governments, early procedures are engaged to guarantee that homes are energy efficient and develop early warning systems for disasters as to be able to cope with severe conditions. Additionally, rebuilding after catastrophes is proven to be more costly than the previously mentioned prevention methods. These costs of course do not include the loss of lives and the various permanent consequences resulting from the accumulation of the carbon emissions trapped in our atmosphere.

- **Energy demand:** Temperature alterations can affect power supply where lower levels of lakes and rivers may threaten hydroelectric plants capacity, while higher levels may result in power brownouts. Therefore, alterations in the energy demand varies between heating and cooling.
- **Health:** With increasing climatic changes, the risks resulting from these disasters also incline. Every region suffers from its own health issues with respect to the climatic changes they are facing. This results in alterations in injuries/illnesses and leads to demand for healthcare.
- **Extreme weather events:** With all the impacts on climate change it is impossible to predict what type of disaster might be on the way. Severe meteorological conditions include those events which are unexpected, not common, unpredictable severe or unseasonal weather.
- **Ecosystems:** The variations occurring in the world's climate such as increasing temperatures and altering precipitation patterns are affecting the ecosystem massively. These influences affect the timing of the lifecycle of the events such as pollination, migration, and reproduction in addition to affecting changes in the efficiency of manufacture sectors.
- **Tourism flows:** Climatic impacts may lead to alterations in the manufacturing of tourism services.
- **Fisheries:** Modifications in the abundance and kinds of fish species can harm commercial fisheries and result in alterations in catchment. Additionally, climatic changes lead to warmer waters which can threaten the human intake, take for example the increasing in the threats of contagious

viruses. These severe impacts place the oceanic life and many of the universes fisheries at risk.

- Catastrophic risks: It is considered to be a theoretical impending occurrence in which the human well-being could be damaged on a universal scale.

Extensive literary works have been readily available on the topic at hand, that is the economic influences resulting from climate impacts (Nordhaus, 1994, 2007), (Tol, 2005) (Stern, 2007), (Agrawala et al. 2011) besides displaying the values of regulations procedure (OECD, 2012). Extensive local analysis regarding the outcomes of climate alterations are as well prevalent, most strikingly the following: The “Garnaut Review for Australia” (Garnaut, 2008, 2011) and the JRC-Peseta project for the European Union (Ciscar et al., 2011, 2014). There has also been evidence of various literary works on the effort to assess the rates of passivity and prosperity of policy approach regarding global warming. Prominently, the “Stern Review” (Stern, 2007) reasons that climate change may be able to reduce the well-being by a value proportionate to an abiding decrement in expenditure per capita ranging from 5% and 20%. The extent of the consequences that the environmental influences has on the financial system yet remains the topic of concern and also has been confirmed by the recent “Intergovernmental Panel on Climate Change”, IPCC, reports (IPCC, 2013, 2014a and 2014b) and (Covington,2015).

2 EFFECTS OF GLOBAL WARMING ON THE ECONOMY

The continuing warming of the global environment is envisioned to proceed in the upcoming decades, as new greenhouse gas emissions intensify the formerly vast equip of previous emissions. The accumulation of carbon emissions of CO₂, which is the greatest and fastest-amplifying foundation of greenhouse gas releases, are induced by the evolution in the Gross Domestic, per capita, and the populace inflation. These increments are only moderately counteracted by progression in the acuteness of power consumption (see Figure 1). Developing macroeconomies are responsible for the growth of these emissions, specifically the great and fast-growing nations for instance, India and China. On the contrary, the advanced economies are accountable for the

total former emissions and therefore are responsible for most of the existing emissions stocks. In spite of considering changes in land use and deforestation, an opposed conclusion dawns in which it proves that the advanced economies are responsible for partially fewer than half of the existing supply of overall emissions (den Elzen and others, 2005), (Baumert et al., 2005), (Rebecca et al., 2017).

The increasing of emissions is compelled by the GDP growth per capita and populace expansion, with advancement within power excess of production administering a limited outweigh. Developing and thriving economies supplement the greatest towards the expansion of emissions, while the leading economies are responsible for the majority of the former emissions.

3 ECONOMIC RATES OF CLIMATE CHANGE

Typically, the financial estimations of the climatic variations influences are dependent on the damage functions which disclose the GDP fatality to temperature increments. The GDP expenses assessment incarnated in damage functions incorporate a range of environment influences which are typically classified as market and nonmarket effects. Market influences encompass the effect on climate-sensitive divisions such as agronomics, afforestation, fisheries, leisure industry, the devastation of seaside regions resulting from sea-level growth, variations in power consumption (heating/cooling) and differentiation in aquatic sources. Nonmarket influences, alternatively, include consequences on well-being; such as the dispersing of contagious viruses, lack of water supply and contamination, recreational events such as sports and outdoor activities, bionetworks (biodiversity depletion), and humanoid settlements mainly because metropolises and cultural inheritance are unable to move elsewhere. (Abazid, et., 2018)

Be that as it may, the climate change influences on the economic expansion is difficult to assume. The necessary logic being the variation of the influence of climate change with the status of financial progression in addition to political ability of the region, with the stages and classifications of weather circumstances such as additional/fewer

precipitation, heat degrees (high/low), intensity/frequency levels of storms, and so on. Notably, even though economic and political impersonators acknowledge environmental situations through establishing and manipulating acclimatization tactics, their competency to carry on relies crucially on institutional, macroeconomic, and technical proficiencies.

The extant literary works contribute some authentication that innovations affect the economic turnout (GDP), for instance, the reduction of agriculture yields when temperature increases result in the recession of precipitation. (Mendelsohn et al., 1998), (Mendelsohn et al., 2006), (Nordhaus and Boyer, 2000), (Tol, 2002), (Deschenes and Greenstone, 2007), (Barrios et al., 2010), (Molina, 2016). Such affirmation correspondingly advocates that environmental differentiation must influence economic production. It may also be speculated that economic growth consequences are beyond explicit; if the vicissitudes in climate only affected the economic output level, a short-term effect would mostly be noted. For instance, an increase in temperature that leads to a reduction in precipitation would be counteracted by a consecutive decline in temperature in which the rainfall intensifies; which are a result of the compelling decrease of releases, which the GDP ought to restore to its preceding position.

Uncertainty, if economic expansion is affected by climate influences, then the case differs. The reason behind the differentiation is as follows. First, regardless of the GDP reverting to its former level, the economic growth will be lower as a result of lower expenditure and capital spending as a result of more reasonable compensations throughout the increasing temperature periods (lower rain). Additionally, because countries consume various resources habituating to the environmental impacts, they provoke opportunity expenditures regarding not consuming these resources on R&D and capital investment. This negatively affects economic growth. The climatic effects on economic conditions including the scarcely enduring impact on the output level will influence the average increase. In which manipulating economic evolution rates shall secure the

impacts on GDP stages, nevertheless the utilization of the GDP level as a replacement for of its growth degree might result in overseeing the influences on growth degree.

As a result of these apprehensions, the concentration is on the climatic influences changeability on macroeconomic expansion. The practical literary works provide few substantiations that economic evolution is altered by climatic circumstances. Comparatively (Miguel, Satyanath, and Sergenti, 2004) detected that economic development in Africa rises with respect to rainfall growth. (Dell, Jones, and Olken, 2008) indicate that only in developing countries, the advanced temperatures consume adverse consequences on economic evolution, whereas precipitation has no effect. Therefore, it is expected that the climatic changeability will impact economic expansion.

4 ECONOMIC LOSSES FROM CLIMATE CHANGE

“DS-damages” is referred to as the damage function of the climate, which was entitled after (“Dietz and Stern”, 2014). It is considered to be the greatest dangerous situation where the universal economy would endure substantial harm due to climate alteration. During this situation, where the warming will exceed 4°C, the yearly economic productivity will decline 50% in comparison to the case in which no warming takes place. (Dietz and Stern, 2014) were able to estimate that by the year 2100, warming would have reached 3.5°C. If stricter approaches were followed through, manipulating the same assumptions used in the W-damages, and assuming that by 2080 the 4°C is reached, the 3% annual economic expansion rate would decrease to 1.9% per year. Given by the following rate, climate alteration may partake an evident influence on impending evolution and existing criteria.

If warming reaches, a tilting juncture of 2-3°C, such as Dietz and Stern assume, this may perhaps result in a critical phase consisting of heating for the universal macroeconomy in which the expenses of inadequate response considerably assess on development. Christine Lagarde, whom is the supervisor of the International Monetary Fund (IMF), truly believes that the earth is dangerously near to reaching a tipping point in the climate change to the degree that

environment alteration imposes the most significant economic encounters of the 21st century.

Additional literary standard studies aimed at the economic influence of climate change are summarized in the following points.

- (Mendelsohn, Schlesinger, Morrison and Andronova, 2000) concluded that by 2060 warming would reach 2.0° C and would have a swelling impact of a deficit of 0.3% GDP. They also assumed that if 2° C of warming by 2060 is reached, most compensations will originate from cultivation. OECD financial prudence will advance from warming while the rest of the world contrarily will lose. Compensations intended for separating nations rarely ever follow continental means. The Ricardian model expects plentiful minor losses and advances than the degraded form model, foreseeing that in 2060, GDP levels from 2.0° C warming would reach a 0.04% net gain.

- (Mendelsohn, Schlesinger and Williams, 2000) estimated that by the year 2100 warming would reach about 2.5° C and swelling market impact costs will not surpass a value of 0.1% of GDP. They concluded that market effect expenses would diverge from one country to another throughout the world. It has been predicted that those nations with high latitude are expected to gain, while low latitude are predicted to be damaged by heating. Still, temperature impacts that exceed 2° C are anticipated to cut reimbursements and intensify compensations.

- (Stern, 2005) estimated that by the year 2100, warming would reach a starting point situation of temperatures between a range of 2.4° C and 5.8° C including an average deficit over the next two eras of a value of 5% of global GDP per year. Evaluations are constructed based on zero activity. Each year expenses rise to a GDP of 20% or above if a broader assortment of hazards and effects are considered. Built on modest extrapolations, severe meteorological conditions expenses alone may perhaps reach 0.5-1% of world GDP per annum by mid-century.

- Intergovernmental Panel on Climate Change, Fifth Assessment (2014) concluded that warming would reach about two degrees Celsius and a GDP of 0.2%-2.0% loss per annum. Significant variances are existent among countries,

especially when impairment estimates hasten exceeding warming of 3° C. The postponing of mitigation efforts past those presently in state to 2030 is projected to considerably incline the intricacy of transitioning to low lasting levels of emanation.

Considering the damage functions previously discussed and apart from the Stern review and approximations from the Intergovernmental Panel on Climate Change (IPCC), it is compromised that the financial expenses of peripheral heating ought to be minimal reaching about 2° C nonetheless it will begin assembling pace when moved to 4° C. This proves that losses from productivity will increase as soon as warming surpasses 2° C but then again will not be noticed for another 30 years. Once warming breaks 2° C, it is apparent through several studies conducted that investments will find negative returns to differentiated portfolios. Furthermore, it is evident where heating conceals through time and present-day movements have penalties for the time ahead.

Because warming procedure is mostly irrevocable throughout the average time, the universal macroeconomy has devotedly witnessed future warming to a certain degree already. Studies have been able to estimate a heating of about 1.5° C beyond pre-industrial eras is sealed inside the atmosphere of this planet which is inevitable. In the case in which no reasonable accomplishment is proposed in order to decrease such releases, it can be predicted that by mid-century earth would reach warming of 2° C and once the end of the century is reached it would reach up to 4° C or more. (Stern, 2006) predicts that the intensity of greenhouse gases is likely to increase their pre-industrial levels by twofold at the beginning of the year 2035 if no plans are considered in order to lower the releases. This could result in compelling the earth to temperature rises exceeding 2° C.

These projections are crucial to investors whom assess the rate of a stream of profits and given the uncertainty over each forecast, the utilization of various climate damage functions is advised. Conveying future economic losses in the current prices calls or disregarding the output loss returning to the existing date. Minimal alterations in deduction rate by nature

results in massive alterations in loss approximations knowing the endless possibility where global warming is likely to happen.

5 GLOBAL WARMING EFFECT ON SELECTION

In order to determine influences of environmental impacts affecting the economy and relying on the public's perspective, the SPSS program was manipulated to this favor. The program was utilized through the distribution of 110 questionnaires, in which 55 were sent out to Cypriot citizens and the other half were distributed among people of different nationalities within the community of the Near East University. The results obtained were analyzed and compared to ensure the ability to identify the significant and influential effects on the population. As well as comparing how the significance and priorities differ depending on the various regions and environments in order to compute the ability to work on addressing them or avoiding the influences if possible.

The analysis was used to select the most influential factors depending on the relative importance values as well as the Mean Relative Importance Index (RII) values.

In the multi selection question, including those utilized in the questionnaire, all the responses are ranked in order. This aids in determining how important the respondent believes the outcome should be set. Through the application of such a weight or ranking system, the Relative Importance Index, which also is the most dependent and precise average, will be manipulated in order to consider the importance of the answer selection made by the respondents. (Mackenbach et al., 1997).

The equation is as follows:

$$RII = (\sum w) / w_{highest}^n$$

Where:

W: Weight/ rank of each answer

n: The total responses received or some respondents.

W highest: The highest rank/weight that can be obtained

As portrayed from the formula given above, the RII outcome will always be equal to one or smaller but greater than zero.

In view of this as a reference to the acceptance value for RII, the value of 0.7 or higher is tolerable.

The figures 2 and 3 show the results of the questionnaire which was distributed to Cypriot within the Near East University community. Based on the relative importance and the mean values, where the factors that were adapted are those with the mean value exceeding 3 and RII higher than 0.7 :

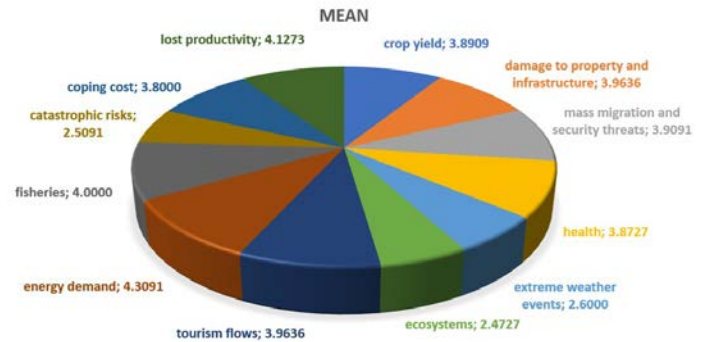


Figure 2. Mean values based on the opinions of the Cypriot people.

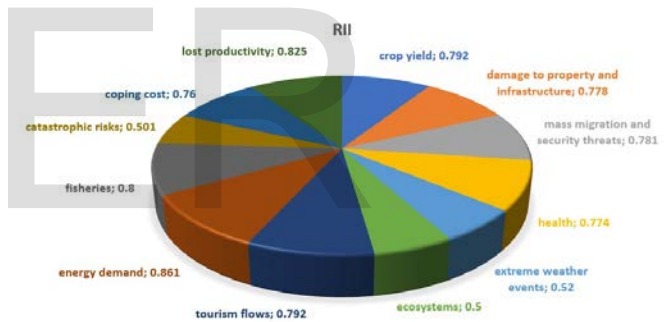


Figure 3. Relative importance values based on the opinions of the Cypriot people.

Based on the results that shown in figure 2 and 3, people in Cyprus considered that energy demand, lost productivity, fisheries, are the most influential factors based on the climatic and environmental conditions respectively of Mean Values and RII while extreme weather events and ecosystems aren't affected by climate change of Mean Values and RII.

The figures 4 and 5 show the results of the questionnaire which was distributed to people of multiple nationalities within the Near East University community.

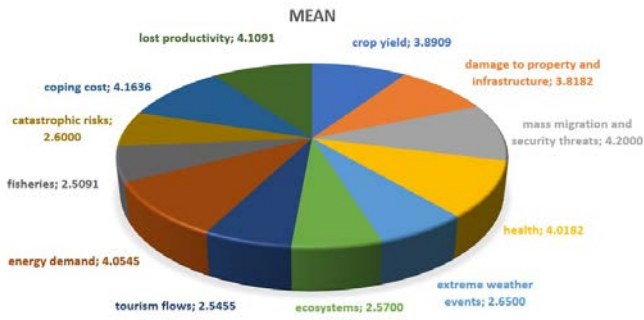


Figure 4. Mean values based on the opinions of the multiple nationalities within the Near East University community.

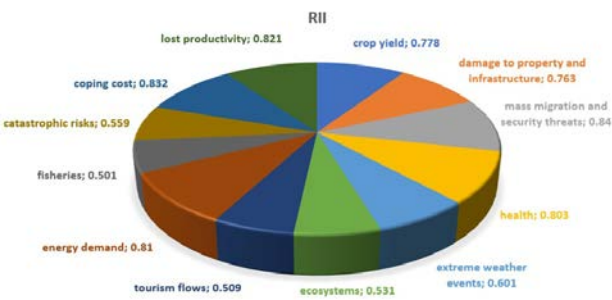


Figure 5. Relative importance values based on the opinions of the multiple nationalities within the Near East University community.

Based on the results that shown in figure 4 and 5, people of multiple nationalities within the Near East University considered that , mass migration and security threats, coping cost and lost productivity are the most influential factors based on the climatic and environmental conditions respectively of Mean Values and RII while tourism flows and fisheries aren't affected by climate change of Mean Values and RII.

Hence, it is witnessed that the different opinions of people about the most influential factors on the economy. As mentioned earlier, the influences of global warming are not evenly dispersed in the world, and here the difference is clear.

6 THE ADAPTATION & EFFECTIVE/EFFICIENT MITIGATION OF CLIMATE CHANGE

can be expected from individuals and organizations to continue changing their habits in response to the alternating climatic conditions such as the plantation of more crops that

resist to droughts. Moreover, it is most likely needed to include government involvement, which is presumably required to spur adaptation as to overcome market decays such as individual groups who are unable to comprehend incorporation of complete societal assistances with forming judgements. It is also to support adaptation to acquire the necessary public goods and services. For instance, support is needed for the coastline defense or the public health substructure which requires investment. And, the amplification of the private sector's capability to acclimate, such as in impoverished regions. Computable evaluations of adaptation rates are insufficient, yet studies converging on public division expenses advocate that adaptation may pressure government budgets, especially in emerging economies whose adaptation capabilities are weaker and are probable to be more strictly affected by global warming.

The optimum mechanism of developing climate-related adaptation capability is through economic and institutional development. Progression stimulates divergence away from massively evident divisions; it also improves health access, education, water and reduces poverty. Advanced tactics are required to consider the climate impact liabilities while pursuing to evade maladaptation, and to be effective in stimulating acclimation (IPCC, 2007). Accordingly, a country's ability to adapt to climatic variations is strengthened through high-quality institutions (Kahn, 2005). Monetary self-insurance is also needed in contradiction to climate impacts. Disbursements in acclimatization and social safety nets are required to be reinforced, particularly involving nations that will be impacted crucially through inclusive government budgets. External finance might be required to enhance local resources in regions where adaptation mandates exceed the developing countries capabilities.

Several criteria must be satisfied to maintain a stratagem structure which is effective for alleviating environmental alterations (global warming) which include the following;

- Prices of greenhouse gases must be raised by the alleviation policy to be effective and expose the minimal social

mutilation from emissions. The higher prices assist in producing inducements for decreasing management and utilization of supplies that reduce intensification of emissions and for establishment and implementation of modern, technologies that have minimal emissions.

- All firms, regions, divisions, and time periods must apply mitigation policies to ensure achievement of the goals through minimal expenditures if possible.
- It is crucial to approach dispersal contemplations all over organizations, profitters, and generations for causes of impartiality and dispersal justice in addition to ensuring the political viability of these policies.
- Alleviation policies should be compliant and vigorous to varying macroeconomic circumstances and modern logical statistics regarding global warming, since extremely unpredictable consequences may intensify the monetary rates of regulations and minimize political assistance.

7 CONCLUSIONS

Climate change has become a powerful universal movement, and in the upcoming decades, including trade and economic assimilation involvement, it is expected to comprise intense influences on financial systems and markets globally. While the temperatures and sea levels incline and rainfall models alter, the universal trend of virtual improvement will change. It will result in structural differentiations within countries, at both domestic and global levels. International trade will be modified in investment and movement flows, in the rates of merchandises, other supplies, amenities, and possessions.

On the contrary, the economic influences from climate change shall erratically be revealed throughout time and space. Underprivileged regions will be affected prior and harder as a result of the geographical conditions, strong agricultural dependency, and more limited capability to adapt. Well-being and water structures are more prone to be under pressure from recurrent ordinary catastrophes, coastlines could be swamped, and inhabitants might immigrate. Wealthy nations could be affected by congestion from climatic impacts in developing countries, in which they also would handle harsh direct damage if the end threats of environmental disasters should arise.

Throughout time, the capacity of domestic economic strategies will be tested to assist civic and remote divisions in managing environmental related threats. Comprehensive macroeconomic rules and smart financial and progressive tactics will be compulsory in aiding countries to efficaciously adjust to climate variation. Nations with higher incomes, sturdier financial situations, more developed financial markets, and higher suppleness in fundamental policy suppleness will be better situated to amend to the adversarial outcomes of environmental alteration. Nations that are gradually prone to threats from volatile meteorological conditions and intense climate events are required to formulate approaches to manage such threats, as well as suitable utilization of self-insurance through financial administration, the construction of reserves, the exploitation of climate derivatives, devastation pledges and various methods of catastrophe coverage.

Universal collaboration in conveying the financial management knowledge of the climatic related risks would profoundly assist impoverished regions in better adaptation to global warming. Also facing global warming establishes multifaceted policy obstacles ranging from developing collaborations in acclimatization and securing the environment to preserve power security and manage the hazards of protection. Relevantly, the essential objective is to identify the reasons and influences of global warming by considerably limiting releases of greenhouse gases over the following decades at the lowest probable price. This mandates cooperative action by advanced developing markets and economies.

There are fundamental differences between global climate changes, the two states of coldness and warmth, the Earth's connection to its rotation around the Sun, and those climatic changes that are associated with the density of human presence and its excessive consumption of organic fuels, where emissions are accumulated by the atmospheric layer of the earth. The planet Earth and its climatic conditions follow the law of the solar system, while human climate changes follow the acute human impact of the atmosphere, which in turn affects climate behavior and its system.

At the end of the 7th century, the various geographical

schools around the world converged almost unanimously on the results of climate studies and meteorology, which were involved in monitoring and analyzing the nature of the Earth's climate over millions of years, and over extended geological periods. Earth's properties have fluctuated between a long cycle of modern environment with the inevitable effect of continuous cold changes and a short interval of warmth, and to the characteristics of climatic ranges and locations of their geographical influence, which may affect the negative forms of life and normal human and cast a shadow on the manifestations of human civilization, which glistened over ten thousand years ago.

After the earth's crust has stabilized in its current geomorphological forms and manifestations, the arts, science and politics have developed. In addition to the flourishing of the character of agriculture, industry and extraction of mineral wealth and accumulated manifestations of urbanization throughout the global world. Also, the capability for the growing population, in witnessing the warm climate before returning to the cold (ice age).

Given the vulnerability of regions to climate change, each country must work more and more seriously to reduce or mitigate its negative impacts on the climate.

REFERENCES

- [1]Agrawala, S., F. Bosello., C. Carraro., E. De Cian., E. Lanzi., K.C. De Bruin & R.B. Dellink (2011), Plan or React? Analysis of adaptation costs and benefits using Integrated Assessment Models. *Climate Change Economics*, 2(3), 175-208.
- [2]Barrios, S., Luisito, B. & Eric, S. (2010). Trends in rainfall and economic growth in Africa: A neglected cause of the African growth tragedy. *Review of Economics and Statistics*, 92(2), 350-366.
- [3]Baumert, Kevin A., Timothy, H., and Jonathan, P. (2005). *Navigating the Numbers: Greenhouse Gas Data and International Climate Policy*. Washington: World Resources Institute.
- [4]Ciscar et al., (2011). Physical and Economic Consequences of Climate Change in Europe. *Proceedings of the National Academy of Science (PNAS)*, 108(1), 2678-2683.
- [5]Ciscar et al., (2014). Climate Impacts in Europe. The JRC PESETA II Project JRC Scientific and Policy Reports, EUR 26586EN.
- [6]Covington. H and Thamotheram. R (2015). The Case for Forceful Stewardship (Part 1): The Financial Risk from Global Warming. Available at SSRN: <http://ssrn.com/abstract=2551478>
- [7]Abazid, M. & Harb, H. (2018). An Overview of Risk Management in The Construction Projects. *Academic Research International*, 9(2), 66-72.
- [8]Dell, M., Benjamin, F. & Benjamin, A. (2008). Climate change and economic growth: Evidence from the last half century. US: Massachusetts.
- [9]den Elzen et al., (2005). Analysing countries' contribution to climate change: Scientific and policy-related choices. *Environmental Science and Policy*, 8(6), 614-36.
- [10] Deschenes, O. & Michael, G. (2007). The economic impacts of climate change: Evidence from agricultural output and random fluctuations in weather. *American Economic Review*, 97(2), 354-385.
- [11] Dietz.S. & Stern.N. (2014). Endogenous growth, convexity of damages and climate risk: how Nordhaus' framework supports deep cuts in carbon emissions. Centre for Climate Change Economics and Policy, Working Paper No.180
- [12] Garnaut, R. (2008), *The Garnaut climate change review: final report*. Port Melbourne. United Kingdom: Cambridge University Press.
- [13] Garnaut, R. (2011), *Australia in the global response to climate change*. United Kingdom: Cambridge University Press.
- [14] Intergovernmental Panel on Climate Change (IPCC). (2007). *Climate Change 2007: Mitigation*. United Kingdom: Cambridge University Press.
- [15] IPCC (2013). *Climate Change 2013: The physical science basis*. Geneva: Working Group I contribution to the Fifth Assessment Report of the IPCC.
- [16] IPCC (2014a). *Climate Change 2013: Impacts, adaptation, and vulnerability*. Geneva: Working Group II contribution to the Fifth Assessment Report of the IPCC.
- [17] IPCC (2014b). *Climate Change 2013: Mitigation of climate change*. Geneva: Working Group III contribution to the Fifth Assessment Report of the IPCC.
- [18] Kahn, M. E. (2005). *The Death Toll from Natural Disasters: The Role of Income, Geography, and Institutions*. *Review of Economics and Statistics*, 87(5), 271-84.
- [19] Mendelsohn, R et al., (1998). Country-specific market impacts of climate change. *Climate Change journal*, 45(4),553-569.
- [20] Mendelsohn, R., Ariel, D. & Larry, W. (2006). The distributional impact of climate change on rich and poor countries. *Environment and Development Economics*, 11(1), 159-178.
- [21] Mendelsohn.R., Morrison.W., Schlesinger.M. and Andronova.N. (2000). Country-specific Market Impacts of Climate Change. *Climatic Change Journal*, 45(3), 553-69.
- [22] Mendelsohn.R., Schlesinger, M. and Williams, L. (2000). Comparing Impacts Across Climate Models. *Integrated Assessment* 1, 37-48.
- [23] Miguel, E., Shanker, S. & Ernest, S. (2004). Economic shocks and civil conflict: An instrumental variables approach. *Journal of Political Economy* 112(4), 725-753.
- [24] Molina, V. (2016). The changing climate of climate change economics. *Ecological Economics*, 121(1), 12-19.
- [25] Nordhaus, W. & Joseph, B. (2000). *Warming the world: Economic Models of Global Warming*. US: MIT Press.
- [26] Nordhaus, W.D. (1994). *Managing the Global Commons: The Economics of the Greenhouse Effect*. US: MIT Press.
- [27] OECD (2012). *Environmental Outlook to 2050*, Paris: OECD Publishing.
- [28] Rebecca M et al., (2017). *Climate change in 2017 implications for business*. United Kingdom: Harvard Business Publishing.
- [29] Stern, Nicholas, H. & Chris, T. (2007). *Climate Change: Risks, Ethics and the Stern Review*. *Science Journal*, 317(5835), 203-4.
- [30] Stern.N. (2006). *Stern Review on The Economics of Climate Change, PART II: The Impacts of Climate Change on Growth and Development*. London: HM Treasury.
- [31] Tol, R. (2002). Estimates of the damage costs of climate change. Part II: Dynamic estimates. *Environmental and Resource Economics*, 21(1), 135-160.
- [32] Tol, Richard S. J. (2005). *Emission Abatement versus Development as Strategies to Reduce Vulnerability to Climate Change: An Application of FUND*. *Environment and Development Economics*, 10(5), 615-29.