
MITIGATING CLIMATE CHANGE: A MICROECONOMIC PERSPECTIVE

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The devastating effects of climate change on economies cannot be over emphasized. This often translates into increased government expenditure with priority especially in the environment and health sectors whereas these resources could be used to develop other sectors of the economy. Governments, intergovernmental agencies and NGOs are leading the fight against climate change. The microeconomic units of the society comprising of individuals, household and firms especially in Africa are still to devote sufficient attention to its mitigation. The reason associated to this is tied to inadequate awareness amongst these set of people and reliance on the causality debate. Considering that it is an accumulation of human activities that are the major causes of climate change, the microeconomic units therefore play an important part in causing it and could do same in mitigating its effects if well guided. With this premise in mind, this paper seeks to boost awareness while highlighting measures that could be employed by individuals, households and firms in mitigating climate change. Using a qualitative approach, the paper establishes that there is a gap in awareness creation that needs to be closed in order to get these individual units into the mainstream of fighting climate change. To achieve the objective, the paper highlights a series of conscious choices that individual economic units can employ so as to boost climate change mitigating efforts. The paper recommends public awareness creation through proper information flow, integration of climate change as an important aspect of the curriculum of schools at all levels of education in Africa, and public discussion and finally the adoption of a climate - friendly conscious life style amongst others.

Keywords: Climate Change, Mitigation, Adaptation, Individual Economic Units, Life Style.

INTRODUCTION

At the mention of climate change, the first mental reflexes in this part of the digital divide (Africa) are directed towards high level inter- governmental meetings like G-20, G-8, EU, IMF and World Bank. With time, this narrows down to national, state governments and then most often reposes on NGOs and inter governmental agencies. Many are yet to embrace it as a microeconomic affair that directly concerns individuals, households and firms. While grappling with the issues of daily life that centers on poverty and daily bread, that of climate change is viewed as an issues that concerns mostly the developed and rich countries – (Ikeme 2008).

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Notwithstanding the paltry attention this phenomenon receives from individuals, households and firms, especially in Africa, its effects on them are serious. Man's quest for survival has brought a severe threat to the earth, through changes in climate at all levels, which in turns greatly affects man. When Climate change manifests itself through extreme weather conditions, it is the microeconomic units that receive the greatest shocks.

The ecosystem including man is under threat owing to climate change. Individuals and households (Man) cannot survive without the proper balance in the ecosystem. Hence, the survival of man is highly tied to his environment (ecosystem). The individual, household and firm in Africa have not devoted sufficient attention to the issues of fighting climate change. This accounts for why littering, bush burning, massive deforestation, and other unhealthy farming and other environmental practices are still visible in countries like Nigeria and most of Africa. As a result of this, its mitigation and adaptation is also a problem. Going by the above, the fight and control of climatic changes is often left in the hands of governments, intergovernmental agencies and NGOs, meanwhile, significant contributions could come from individuals, households and firms just through a conscious moderation of the life styles. This is not attainable without sufficient knowledge on the subject matter. Knowing how our actions and inactions affects the climate is therefore important.

The main objective of the paper is to bring microeconomic units – individuals, households and firms into the mainstream of climate change through achieving the following specific objectives:

- Identify the awareness gap in issues of climate change;
- Highlight microeconomic measures that could be employed to mitigate climate change;
- Suggest measures that could be used to narrow the awareness gap and encourage the implementation of mitigation measures at the microeconomic level.

Considering the focus of the work which hinges on bringing those at the microeconomic level into the mainstream of climate change, this paper is qualitative in approach. It resorts to secondary sources of information. Measures that individuals, household and firms could embark upon to mitigate Climate change are to be identified and selected from varied sources and then harmonized and explained in this paper.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Literature Review

The term climate change should not be confused with the concepts of global warming and ozone layer depletion. The causes (human – anthropogenic and natural), processes (chemically reactive) and impacts (on man and the earth) of these

global perturbations to the earth's system are completely different, but they have some links. (See *The Habitable Planet*).

Global warming connotes an increase in the average temperature near the surface of the earth and in the lower atmosphere as a result of a variation in the rate at which energy is received from the sun and the rate at which it is lost to the space. This is caused mostly by increasing concentrations of greenhouse gases in the atmosphere. Global warming is causing climate patterns to change. However, global warming itself represents only one aspect of climate change.

The ozone depletion also known as "ozone hole" refers to the destruction of a layer of ozone molecules found high in the earth's stratosphere. When healthy, this ozone layer helps to shield the earth from the sun's harmful ultraviolet rays. The ozone layer has become thinner because of chemicals called chlorofluorocarbons (CFCs) that were once commonly used in products ranging from refrigerants, spray cans to foam furniture cushions. A thinner ozone layer allows more ultraviolet rays to reach earth, increasing the risk to humans from skin cancer, cataracts, and other health impacts. This, however, has only minor effects on climate change. (See EPA).

Climate change on the other hand refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. Climate change exhibit peculiar features of: being global, having long time horizons, embedded with economics of risk and uncertainty, and having possibilities of major non-marginal changes. (See *Stern Review - Part 1*).

From the above, global warming and ozone hole are different aspects that contribute to climate change. Increase concentrations of green house gases (GHG) and CFCs accelerate the rate of climate change. Their manifested effects are just a few of the effects of climate change.

The IPCC concluded in 2001 that there is new and stronger evidence that most of the warming observed over at least the past 50 years is attributable to human activities. Over the past few decades, the conclusion raised considerable debate over whether the trend in global mean temperatures can be attributed to human activities. Attributing trends to a single influence is difficult to establish unequivocally because the climate system can often respond in unexpected ways to external influences and has a strong natural variability.

The Stern review submits that much of the debate over the attribution of climate change has now been settled as new evidence has emerged to reconcile outstanding issues. It is now clear that, while natural factors, such as changes in solar intensity and volcanic eruptions, can explain much of the trend in global temperatures in the early nineteenth century, the rising levels of greenhouse gases provide the only plausible explanation for the observed trend for at least the past 50 years.

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Ikeme (2008) posits that nations relying exclusively on monocultural production (a characteristic of most LDCs) will be gravely affected by the climate change abatement process. He underscores the need for concrete impetus in tackling the issue. This is based on the fact that most of their incomes will be directed towards resolving climate change related issues than on growing the economies. The involvement of individual units will therefore assist in future climate change trends and in curbing its effects. Using Nigeria as a case study, he further upholds that there is common argument that the climate change issue should be paid only minor attention in Africa for the following reasons: (i) Present greenhouse gas emissions from Africa are negligible on a global scale; (ii) climate change is a problem that is largely caused by emissions from industrial countries, and hence, these countries should bear the main responsibility and the major costs of reducing emissions – (A position most individual units support that justifies their disregard for controlling their activities against the environment). This is because climate change in itself stands to affect Nigeria adversely suggesting that its mitigation is in Nigeria's interest. Potential impacts of climate change on Nigeria runs across the entire sectors of the country's economic, social and environmental landscape with heavy impacts on the entire economy (as such collective efforts from all stakeholders should be a consideration). Most other LDCs exhibit similar thoughts and climate change traits.

IPCC (2001) holds that Climate change will have serious impacts on food security, fresh water supply, rural and urban settlement and infrastructure even if emissions would be curbed immediately. By implications, man needs to react to climate change.

The need for action has become crucially necessary because of the:

- Unique and threatened ecosystem (small rise in global temperature have irreversible damage on some systems and species);
- Global aggregate impact (slight increases in climate change would have negative impacts on nations' GDP);
- Distribution of impacts (Climate change impacts would leaves LDCs more vulnerable);
- Extreme weather events (Its suddenness and unpredictability endangers man's survival); and
- Large scale singular effects (The resultant effects of climate change could be too severe with difficulties to adapt and mitigate).

UNCFCCC has identified adaptation and mitigation as the main instruments for action against climate change. It identifies the following forms of adaptation to climate change:

- **Anticipatory / Proactive Adaptation** which takes place before impacts of climate change are observed;
- **Autonomous Adaptation** which is not a conscious response but a stimuli triggered by ecological changes;

- **Planned Adaptation** which is a result of a deliberate policy decision, based on awareness that conditions have changed or are about to change. This is usually in the interest of the actors' rational interest;
- **Public Adaptation** which is initiated and implemented by the governments at various levels, and usually directed towards collective needs; and
- **Reactive Adaptation** which is adaptation that takes place after the impact is being felt. This connotes the ability of a system to adjust to climate change, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

On the other hand, mitigation of climate change focuses on reducing GHG emissions and enhancing sinks. This however is effective only for preventing future occurrences and not reversing the existing trend. Measures to achieve this include:

- Increasing the use of renewable energy like solar energy, wind energy or nuclear power (weighing its environmental impact) in place of generators that makes use of fossil fuels;
- Change of vehicle technology to hydrogen cars, hybrid electric vehicles and other new technologies to replace the use of petroleum products;
- Afforestation and reforestation to enhance photosynthesis that helps reduce carbon dioxide in the atmosphere;
- Eliminating waste methane from coal mines, waste treatment plants, cattle defecation; and
- Carbon sequestration through the natural process by plants or through artificial process of reducing carbon dioxide in the air.

On mitigation of Climate change and catalyzing climate action, the World Bank Group (<http://climatechange.worldbank.org/overview>) holds that "burning fossil fuels to heat our homes or produce electricity releases carbon emissions, which cause climate change. The energy you use at home is likely to be your biggest contribution to climate change. 80 per cent of it goes on heating and hot water, so this is a good place to look for savings. Bush burning & flared gas are dangerous to the environment. These practices should be avoided."

THEORETICAL FRAMEWORK

Climate change is a concept embedded in the notion of sustainable development. Sustainable development is anchored on the premise that in the pursuit of economic development through the exploitation and use of the environment as a whole, due considerations should be devoted to ensuring that the survival of future generations are not jeopardized by our present action. Sustainable development has actually come to help check the abuses of man's action in his quest for survival and development. Climate change is one of the consequences of such abuses on the environment. On the other hand, given its global nature; and the aggregation of its

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causes and its effects, macroeconomics decision making and choices have been at the central stage in issues of climate change. Considering that the nature, causes and effects can be disaggregated or decomposed to smaller economic units like individuals, households and firms (microeconomic units), their role in mitigating climate change is also being identified. Hence, climate change is an issue of sustainable economic development with tap-roots buried in the activities of microeconomic units.

MICROECONOMIC MEASURES TO MITIGATE CLIMATE CHANGE

The objective of this work is to get individuals, households and firms into the mainstream of fighting climate change through conscious choices that boost mitigating efforts. Climate change represents fluctuations over decades, it is clear that while it might be impossible to reverse the present trend, it can be slowed down and the future effects mitigated.

The consequences of climate change are not selective as they affect each individual though at varying degrees and ways. The debate of its existence or otherwise has been settled as it is observable that all but a few acknowledges that something is happening to our climate. That is climate is changing and this is adversely affecting all. The debate of who is the cause of the climatic changes that are translated into extreme weather conditions today points to the fact that it results mostly from anthropogenic activities, with the industrial revolution in the west accounting for a greater share. Hence, Greenhouse gas emissions from Africa are negligible on a global scale – Ikeme.

With the issue of causality brought to rest, the focus is now on how to mitigate climate change so as to reduce its effects on the present and future generations as well reducing both personal and public expenditure on issues tied to climate change for economic development of other sectors.

Measures that could slow down climate change are considered below. By implication the measures represent things we ought to do but are not doing with the resultant effect being an acceleration of climate change. At the microeconomic level, the following measures could help reduce carbon footprint thereby slowing down and dampening the effects of climate change: Worthy of note is the fact that apart from enriching the environments, the measures considered below will boost personal incomes through a cut in personal expenditure and will also relieve government spending on climate change issues for other developmental projects. The measures for mitigating climate change at a micro level include the following:

- Encourage and become involve in reforestation by planting a tree on your own or help someone plant a tree locally or far away. The trees reduce the carbon dioxide in the atmosphere and help produce more oxygen while filtering the air. This slows down the rate of climate change. Economic trees will be income rewarding.
- Help protect the forest from destruction and deforestation so that the forest can fight climate change.

- Switch to a paperless billing and write-ups. This will reduce deforestation by paper pulp companies.
- Buy sustainable wood, repurposed wood or used-wood products for your furniture.
- Turn the temperature down on your thermostat to save energy. Any energy saved (is a savings on income), lessens the amount of fossil fuels used at energy plants.
- Use more energy efficient cars to reduce emissions and oil used. You may resort to promoting solar, wind and hydrogen driven cars.
- In the warmer months, use windows and fans for ventilation rather than air conditioning. Your expenditure on electricity will also drop as you do this.
- Re-use things in your life. By re-using items, there is no transformation or emission involved but just a bit of brain exercises. This reduces the level of energy requirement to produce new ones and to exterminate refuse.
- Unplug electrical appliances when they are not in use to save energy.
- Use florescent bulbs to reduce electricity usage. They are energy saving and brighter.
- Use less resources and energy when you travel by having a green vacation. You will pay cheaper for it while saving energy. This implies that you should camp outside (outdoor) on vacations instead of staying in hotel room where TVs and ACs will be used.
- Support clean energy to reduce climate change as well as other renewable energy sources like solar energy, wind energy and geothermal. They are cheaper and more environmental friendly.
- Take cooler showers as this reduces energy required for heating the water.
- Turn off your cell phone and other electronics at night to cut back electricity. By so doing you will save on bills and reduce fossil fuel consumption.
- Try a low energy cold water wash, combined with drying cloths on lines. This reduces your energy consumption. Also, use energy efficient washers and dryers. This will save your enormous sums and also benefit the environment.
- Use public transport. Even if you own a car, park it and take public transport even at least once a week. By so doing you will be reducing fossil fuel (carbon dioxide) emissions that contribute immensely to climate change;
- Start a garden, nothing taste fresher, it saves the use of cars to the market and also improves green scenes which naturally sequesterate carbon dioxide.

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- Buy your products at the source of production closest to you. This will not only be cheaper but it will minimize the release of fossil fuels used by transporting cars.
- Engage in car-pooling (car sharing). You will always have someone to talk to and you will be saving money spent on fuel and above all you will be reducing fossil fuel emissions.
- Be more organized, consolidate errands and plan your routes to save fuel. Schedule online meetings to save flight, car and travel expenses and more importantly transport energy. You will be saving much money while boosting the environment.
- When painting your homes, use zero-voc (volatile organic chemicals) paint because Voc paints are hazardous for you and for the ozone layer.
- Reduce the amount of aerosols, candles and perfumes (for they contain gases that hazardous to the climate) used, by switching to natural perfumes and natural fresheners.
- Go shopping with your own bags to avoid collecting from the shops. This will reduce littering and consequently expenses on refuse management.
- Implement the use of re-usable diapers to reduce its littering of the environment, which as at today stands at 4% of landfill space and takes hundreds of years to decompose.
- Use re-usable packs for lunch bags. Littering will be reduced and you will be saving some money.
- Buy most items for long term rather than short term use. Short terms items easily get bad and are thrown away. Hence, they pollute the environment more.
- Eat less food and exercise more. By so doing, less packages will be consumed, less waste, less littering, less spending and better health and longer lives.
- Buy products with less packaging and there will be less to throw away into landfills.
- Learn how to recycle items. Start with the easier ones like paper, plastic, cans and bottles and then get more serious by including other items like computers and electronics etc.
- Make use of your recycled products like paper and plastic, toys cans, bottles etc. This will be boosting the environment and your savings.

- Use re-usable products like towels, sponges and cloths to clean your home rather than disposable papers and rags.
- Sell your old items on E-buy and throw away less.
- Donate your stuff to charities and stores rather than throwing them away. They could be reused or recycled for use.
- Take your own re-usable cup to the café instead of taking a disposable cup in the café. This reduces littering.
- Swap cloths, toys and books with relations and neighbouring parents rather than buying new ones. This improves personal finances through savings and is friendly to the environment.
- Eat less meat and more vegetables because cattle are one of the largest producers of methane – a gas that contributes highly to global warming. By reducing the consumption of meat, fewer cattle will be reared and less methane will be produced.
- Shout less. By shouting less, you are conservation energy and will eat less. At the same time you are protecting the environment by not chasing away endangered species – which are of economically significant.
- Most importantly, educate others about climate change. This will help them embark on environmental friendly measures which will improve the environment and boost economic development as funds could be directed to other sectors rather than on the environment.

CONCLUSION

That the climate is changing alongside global warming and ozone layer depletion is now an established fact. Though with the biting effects of climate change on individuals and the society, efforts to curb the trend is still largely within the confines of the government at varied levels and NGOs. Personal initiatives are lagging. The reasons that can be advanced for this are; lack of awareness both on the concept and on the steps to take; and care-free attitudes of most of those who are aware of it as a result of the causality debate. As the government devotes macroeconomic efforts and spending to mitigating the plight through the measures initially mentioned, measures on personal action required as indicated in the preceding section, are also vital to tackle the issue from a micro perspective.

Cumulatively, the measures consist of actions directed towards (i) curbing deforestation, (ii) reducing the use of fossil fuel and (iii) waste management. If dedicated personal efforts are employed (in any of the three aforementioned domains) to compliment government's macroeconomic efforts, future climate change could be brought under check for the benefit of future generations. This is based on the premise that causes to climate change are mostly anthropogenic.

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RECOMMENDATIONS

The following are recommendations that could boost the implementation of climate change mitigating measures by microeconomics units are proffered.

The government and Inter – governmental agencies should sincerely lay the institutional framework and implement the macroeconomics adaptation and mitigation measures. This will reveal the level of government's commitment and will serve as an incentive to microeconomic units.

At the Microeconomic level, incentives like rewards schemes, inter-regional /zonal competitions etc should be put in place to encourage individuals, households and firms to participate or implement as much as possible, the measures of mitigating climate change enumerated above.

To get individuals, households and firms to be active players in climate change mitigation frameworks, Information, education and public discussion are vital tools. They play a powerful role in shaping understanding of reasonable behaviour. This should be vigorously pursued. This could be made a reality by integrated Climate change as an important aspect of the curriculum of schools at all levels, especially in the LDCs. Emphasis should be laid on practical issues that are related to climate change. This will create awareness and instill the culture of choices that are appealing to a favourable climate.

If the above recommendations and measures are put in place, it is expected that the rate of climate change will be slowed down for the benefit of future generations.

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