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## **МЕРЫ ПО СМЯГЧЕНИЮ ПОСЛЕДСТВИЙ ИЗМЕНЕНИЯ КЛИМАТА ДЛЯ ГАНЫ: НА ПРИМЕРЕ ЮЖНОЙ АФРИКИ И БРАЗИЛИИ**

*Аннотация. В этом исследовании представлен всеобъемлющий обзор воздействия политики в Гане на изменение климата и сопоставление ее с политикой, благоприятствующей изменению климата в других развивающихся странах. В исследовании также обсуждались тенденции выбросов в Гане в свете некоторых мер политики в области изменения климата, которые были введены правительством. Исходя из этого, результаты исследования указывают на то, что политика страны в области изменения климата не достигла желаемых результатов, поскольку это очевидно в тенденциях выбросов в стране. Кроме того, эффективность политики, благоприятствующей климату, в некоторых развивающихся странах, таких как Южная Африка и Бразилия, доказала свою эффективность в обеспечении зеленой экономики за счет сокращения выбросов парниковых газов в последние годы. В заключение в исследовании были сделаны некоторые политические рекомендации, которые могут помочь Гане в достижении низкоуглеродной экономики.*

*Ключевые слова: Изменение климата, парниковые газы, выбросы.*

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### **CLIMATE CHANGE MITIGATION MEASURES FOR GHANA: THE CASE OF SOUTH AFRICA AND BRAZIL**

*Abstract. This study presents a comprehensive review of the impact policies in Ghana has had with regards to climate change and contrast them with climate-friendly policies in other developing countries. The study further*

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*discussed the emission trends in Ghana in light of some climate change policies that have been introduced by the Government. On this basis, the findings from the study indicate that the country's climate change policies have not achieved the desired results as this is evident in the emission trends in the country. Furthermore, the effectiveness of climate-friendly policies in some developing countries like South Africa and Brazil have proven to be effective in ensuring a green economy through the reduction of GHG gases in recent years. The study, in conclusion, made some policy recommendations that could help Ghana achieve a low carbon economy.*

*Key Words: Climate change; Greenhouse gas; Emissions; Policies*

### **Introduction**

Climate change is fast becoming the defining global issue in recent time. As global greenhouse gas (GHG) emissions increase and global temperatures rise, life, as we know, is under threat in most developing countries (Appiah et al., 2017).

A contributing factor to the effect of climate change is the increase in CO<sub>2</sub> emissions as a result of population growth, a surge in energy demand, increasing economic growth, and growth in agricultural production to achieve food security (Asumadu-Sarkodie and Owusu, 2016; Shahbaz et al., 2017 cited in Sarkodie et al., 2019).

Global impact of climate change has gained a lot of attention worldwide with developing countries being the most affected (Alper and Onur, 2016, Dogan and Ozturk, 2017 and Aboagye, 2017). This has led to many global interventions such as the Kyoto Protocol and the Paris Agreement. Ghana, therefore, became a party to the Paris agreement on the 12th of December, 2015. This agreement among other things finds ways of reducing the effect of climate change on the global economy.

This study, therefore, sought to present a review on Ghana's climate change policies in comparison to climate-friendly policies of some selected countries that are successfully winning the fight against emission reduction and for that matter climate change.

#### **Climate change policies in Ghana**

Ghana's middle-income status is evidence that she is making significant progress in achieving economic development. However, the country is highly vulnerable to climate change as more than half of the population depend on small-scale agriculture which is threatened by climate change. Other key sectors such as the energy, water resources are all affected, as are health and livelihoods, resulting in increasing levels of poverty. The impact of climate change and variability is expected to worsen in the next couple of

decades, with projections that dry season temperatures across the country will increase by 3oC across all ecological zones by 2080, while rainfall across the country will also decrease by 1.7% by 2080 (MESTI and EPA, 2015).

Although emissions in Ghana are below global levels, net emissions are high. This poses a serious economic threat to the country if not addressed. The Government of Ghana in response have over the last decade implemented some policies and measures that seek to address the these externalities, some of which focused more on Low Carbon Growth.

Low carbon growth pathway has been identified as the most efficient and effective way of achieving economic development in the country (MEST, 2010). These include an increase in energy efficiency, improved public transport, waste management systems, sustainable forest management and higher penetration of sustainable and renewable energy (Würtenberger et al., 2011). The Government of Ghana, in 2007, passed a bill that banned the sale of incandescent bulbs and mandated the introduction of Compact-fluorescent lamp bulbs. The growing trend of rural-urban migration has directly or indirectly influence environmental pollution in urban areas due to increase in energy consumption as a result of vehicular traffic. The government of Ghana in effect developed the Ghana Urban Transport in 2007. This was to ensure that mobility is improved through implementing of a bus-rapid-transport (BRT) system. The project in effect was expected to oversee an increase in the use of low carbon emission vehicles. In recent years however, mitigation policies such as the Renewable Energy Act, National Gas Master Plan, REDD+ Strategy, Forest Plantation Development Strategy have been implemented to help address the issues of climate change through achieving a low carbon economy. These policies led to the cumulative reduction of emissions by 13 million tonnes between 2011 and 2017 in the energy, Forestry and Waste sectors (MESTI and EPA, 2018).

Despite Ghana having a long-standing engagement with climate-friendly policies as discussed above, net emission levels in the country across key sectors keep rising exposing the collective failure of these policy measures. Data on Ghana's greenhouse gas emission (see Table 1 below) revealed that the country's total greenhouse gas emission as of 1990 was 14.22 million tonnes (Mt) carbon dioxide-equivalent (CO<sub>2</sub>eq). This increased by 14.76 % in 2000 representing 16.32 MtCO<sub>2</sub>e and by 113% in 2010 representing 30.42 MtCO<sub>2</sub>e. Between 2010 and 2011, the percentage change in greenhouse gas emissions dropped drastically to 0.59%. However, absolute values showed a marginal increase (30.60 MtCO<sub>2</sub>e) in 2011. The corresponding figure for 2012 was 33.66 MtCO<sub>2</sub>e representing a 10% increase in the level of emissions in 2011. In total, energy sector emissions between 1990 to

2012 increase by about 286%. This was followed by emissions from the waste (246%), AFOLU (76%) and IPPU (-42%).

**Table 1. Ghana's net Greenhouse Gas Emission by sector from 1990 to 2012**

Sectors	<b>Emissions MtCO<sub>2</sub>e</b>				
	1990	2000	2010	2011	2012
Energy	3.5	5.54	11.27	11.63	13.51
IPPU	0.81	0.77	0.24	0.44	0.47
AFOLU	8.61	7.72	14.67	14.08	15.17
WASTE	1.31	2.29	4.24	4.45	4.52
<b>TOTAL</b>	<b>14.22</b>	<b>16.32</b>	<b>30.42</b>	<b>30.6</b>	<b>33.66</b>

Data source: Environmental Protection Agency (2015)

### **Literature Review**

In recent years a growing number of studies has focused more on examining emission reduction options and requirements at the regional level. These are aimed at examining the possibility of accomplishing the climate change control target to stay well below 2°C of average global temperature increase as stipulated by the Paris Agreement (COP-21, 2015).

Africa as a continent and a major player in the global GHG emission levels have taken some steps to support the global agenda of establishing low-emission strategies through the establishment of the African Renewable Energy Initiative. Van der Zwaan et al. (2018) in their study to assess the possible pathways to low-carbon development in Africa, noted that with good policies in place, it is possible to reduce the use of CO<sub>2</sub>-emitting technologies and massively deploy renewable options for a rapidly growing energy sector. Researchers have found that one way of achieving a low carbon economy is through carbon pricing. It is reported that 45 national and 25 subnational jurisdictions by 2018, were through either emissions trading schemes (ETSs) or carbon pricing schemes (taxation), placing a price on carbon (World Bank, 2018 cited in Wang-Helmreich and Kreibich, 2019). This policy initiative

could in itself lead to a massive reduction in carbon emission. However, certain domestic offset components as practiced in Colombia, Mexico, and South Africa for example, could either render it effective or otherwise (Wang-Helmreich and Kreibich, 2019). Given that the AFOLU sector is one of the major contributors of GHG in Africa, efforts to reverse this trend through the reduction of emission from the forest sector, in particular, is very important. As such strategies such as the REDD+ that seek to restore lost forest and establish new ones must involve all stakeholders such as local communities residing in these forest areas in forest governance initiatives (Djomo et al., 2017).

### ***Climate-friendly policies in developing countries***

The fight against the impact of climate change and variability over the last couple of decades have intensified. World bodies like the United Nations Framework Convention on Climate Change (UNFCCC) as noted earlier have over the years brought world nations together to discuss proactive ways of dealing with these threats through the reduction in greenhouse gas emissions. Some countries are setting the pace by developing hands-on policies to achieve this goal.

According to Appiah et al. (2018), South Africa is the largest emitter of CO<sub>2</sub> in Africa and placed 16th in the world. Gross annual emissions of greenhouse gases in South Africa, including forestry and other land use (FOLU), was 518,297 GgCO<sub>2e</sub> in 2012. This was a decline from the emission level recorded in 2010 (529,391 GgCO<sub>2e</sub>) and a slight increase in the 2011 emission level of 514,257 (see Table 2). According to DEA (2017), the total net reduction in GHG emissions achieved in 2010, 2012, and 2014 were 315.7 Mt CO<sub>2e</sub>, 451.71 Mt CO<sub>2e</sub>, and 593.4 Mt CO<sub>2e</sub> respectively. This could be attributed to some major policies such as the carbon tax, carbon offsets, desired emission reduction outcome (DEROs) for sectors, Company-level carbon budgets and regulatory standards for GHG pollutants and emitters that have been implemented over the last decade to aid in achieving these emission reducing targets.

***Table 2. South Africa's net GHG emissions by sector from 2000 to 2012.***

Sectors	<b><i>Emissions in GgCO<sub>2e</sub></i></b>			
	2000	2010	2011	2012
Energy	342.6	435.1	415.8	428.1

IPPU	33.6	35.5	38.9	37.1
AFOLU	45.9	38.5	38.4	31.1
WASTE	12.3	20.4	21.2	21,9
<b>TOTAL</b>	<b>434.3</b>	<b>529.4</b>	<b>514.3</b>	<b>518.3</b>

Source; DEA (2018)

Brazil is ranked among the top 15 countries with the highest carbon emissions globally. A trend analysis of net annual emission of greenhouse gases in Brazil between 1990 to 2012 show an undulating trend. Thus net annual emission steadily increased from the 1990 levels to about 2.6 million GgCO<sub>2</sub>e in 1995 and peaked to about 3.4 million GgCO<sub>2</sub>e in 2004 and then declined to about 1.2 million Gg CO<sub>2</sub>e in 2012 (see figure 1). The reduction in annual emissions especially between 2009 and 2012 could be attributed to the reduction in emissions from Land-use Change and forestry (LULUCF) through the reduction in deforestation and forest degradation in the country (MRE and MCTIC, 2017). However, the reduction in certain key sectors could also be attributed to some policy measures that were instituted by the country. For instance, according to MRE and MCTIC (2017), the Action Plan for the prevention and control of Deforestation in the Legal Amazon (PPCDAm) and the Action Plan for the prevention and control of deforestation and Forest Fires in the Cerrado Biome (PPCerrado) were established in 2004 and 2010 respectively to reduce CO<sub>2</sub> emissions in the LULUCF sectors. While the former was aimed at promoting the continuous reduction of deforestation in the Amazon, the latter was aimed at promoting the continuous reduction of the rate of deforestation and forest degradation, as well as the incidence of forest fires in the Cerrado biome. In 2011, Brazil established the National Plan for Low Carbon Emission in Agriculture (ABC Plan) to reduce CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub> emissions in the agricultural sector. The objective of this policy instrument was to increase the area under sustainable agricultural production systems. Others include the Sustainable Charcoal for Iron and Steel Production in the IPPU and Energy sector were launched to reduce CO<sub>2</sub> and CH<sub>4</sub> and the Implementation of Energy Efficiency in the energy sector to reduce CO<sub>2</sub> emissions. These policies are aimed at reducing emissions and increasing the competitiveness of sectors through the promotion of the sustainable production of charcoal used as an input in the production of iron and steel.

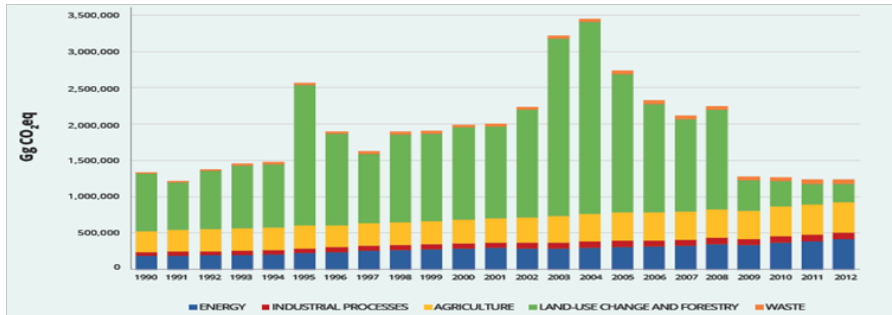


Figure 1: GHG emission trend from 1990 to 2012. Source: MRE and MCTIC (2017)

### Conclusion and Recommendations

Even though a number of policy measures have been introduced in Ghana to mitigate the impact of climate change and variability, these policies are yet to achieve their purpose. This study, therefore, looks at other climate-friendly policies in some developing countries that are on the right path of achieving a green economy.

For the purpose of this study, the researchers present a review of the impact of policies in Ghana with regards to climate change and contrast them with climate-friendly policies in other countries.

The findings from the study indicate that the country's climate change policies have not achieved the desired results as this is evident in the emission trends in the country. Thus in spite of the policies and measures that have been introduced in recent years, sectoral emissions have more than tripled and in some cases quadrupled.

Furthermore, the effectiveness of climate-friendly policies in some developing countries like South Africa and Brazil are proving to be potent in ensuring a green economy through the reduction of GHGs.

The study, in conclusion, recommends that the Government and other stakeholders should adopt those proactive climate-friendly policies that have been instituted in other developing countries and are helping to win the fight against GHG emissions. Given that GHG emissions have a negative effect on parties not directly involved in their emissions, the Government and other policymakers like the Environmental Protection Agency should consider the policy of Carbon Pricing to demotivate large emitters so as to incentivize low

emitters. Finally, the study recommends that a national GHG inventory board should be established with departments across the various sectors to ensure that up to date inventory is kept on emissions through a well-coordinated data collection scheme in the country. The possibility of introducing a carbon tax should also be explored by the government and other stakeholders to demotivate heavy emitters.

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УДК 339.138

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## **ЭКОТЕМЫ КАК МАРКЕТИНГОВЫЙ ПРИЕМ**

*Аннотация: Зеленый маркетинг, ставший явным трендом в XXI в., рассматривается применительно к сфере косметики. Анализируется контекст употребления выражений, относящихся к экологизации продукции в рекламных материалах и упаковках. Объект исследования — рекламные страницы журнала Flacon, выпускаемого парфюмерным супермаркетом «Золотое яблоко».*

*Ключевые слова: зеленый маркетинг, экологизация, экотренд, эко-маркетинг, экотемы, экомаркировка.*

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### *JEKOTEMY AS A MARKETING RECEPTION*

*Abstract: Greening is the trend of the current century. The concept of green marketing is considered to the field of cosmetics. The article analyzes the context of using of expressions connected with greening. The material for investigation is the magazine Flacon, produced by perfume supermarket «Golden Apple». The attention is directed to advertisement (image and call).*

*Key words: green marketing, greening, ekotrend, green marketing, ecological theme, eco-label.*

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