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DETRMINATION OF GREENHOUSE GAS EMISSIONS IN SELECTED LOCAL GOVERNMENT AREAS OF OYO STATE, NIGERIA.

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Abstract

Effects of Greenhouse gas emissions, particularly from agriculture practices like deforestation, livestock farming, use of nitrogen fertilizers, and human factors like burning of fossil fuels since industrial age, waste management and other factors, exacerbate climate change, impacting crops yields, livestock production, and the overall sustainability of agricultural systems and human existence. The aim of the study was to determine Greenhouse gas emissions in some selected Local Government Areas of Oyo state, South Western Nigeria. Multi stage sampling was used to select arable farmers in five Local Government Areas of Oyo State,Orire36 respondents, Surulere 220 respondents, Irepo 32 respondents, Orelope 7 respondents and Olorunsogo 37 respondents, totaling 332 selected farmers, a structured questionnaire was administered to elicit information from the respondents. Soil samples were collected from the farm field of one farmer each of the local government areas for laboratory analysis, the data were subjected for SAS, 2005 package was employed used, ANOVA was used, means were separated with Duncan multiple range test on the soil samples data collected from the study areas. Carbon emissions in Irepo local government area, in the year 2023,wet season had the higher emissions of carbon,16.37ppm, nitrogen emissions was higher in wet season,0.737ppm, oxygen emissions was higher in wet season,0.023ppm, while methane emissions was higher in dry season,

Keywords:
Greenhouse gas emissions, carbon, nitrogen, oxygen, methane.

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0.067ppm.In the year 2024, emissions of carbon was higher in dry season,13 75ppm, nitrogen emissions was higher in wet season,0.559ppm, oxygen emissions was higher in wet season,0.033ppm and methane emissions was higher in wet season,0.163ppm.In Olorunsogo in the year 2023 wet season had the higher carbon emissions,14.47ppm, nitrogen had the higher emissions in the wet season,0 63ppm.dry season had the higher emissions of oxygen,0.04ppm,while methane emissions was higher in dry season,0.10ppm.In the year 2024, carbon emissions was higher in wet season,13.68ppm, nitrogen emissions was higher in wet season,0.47ppm, oxygen emissions was higher in dry season,0.06ppm,while methane emissions was higher in wet season,0.14ppm. In Orelope, in the year 2023, carbon emissions was higher in the wet season,17.36ppm, nitrogen emissions was higher in the wet season,0.630ppm, oxygen emissions was higher in the dry season,0.060ppm, while methane emissions was higher in dry season,0.137ppm.In the year 2024, carbon emissions was higher in dry season,13.667ppm, nitrogen emissions was higher in wet season,0.471ppm, oxygen emissions was higher in dry season,0.077ppm,while methane emissions was higher in dry season,0.170ppm.In Orire, in the year 2023, carbon emissions was higher in wet season,17.387ppm, nitrogen emissions was higher in the wet season,0.580ppm, oxygen emissions was higher in the dry season,0.033ppm, while methane emissions was higher in the dry season,0.143ppm.while in the year 2024, carbon emissions was higher in the wet season,14.587ppm, nitrogen emissions was higher in the wet season,0.583ppm, oxygen emissions was higher in the wet season,0.060ppm, while methane emissions was higher in the dry season,0.200ppm. In Surulere, in the year 2023, carbon emissions was higher in the wet season,16.273ppm, nitrogen emissions was higher in the wet season,0.611ppm, oxygen emissions was higher in the dry season,0.050ppm,while methane emissions was higher in the dry season,0.143ppm.In the year 2024, carbon emissions was higher in the wet season, 15.530ppm, nitrogen emissions was higher in the wet season, 0.628ppm, oxygen emissions was higher in the wet season, 0.030ppm, while methane emissions was higher in the dry season, 0.223ppm. Comparison of the Greenhouse gas emissions in the five Local Government Areas; In the year 2023, Orire had the higher emissions of carbon,16.368ppm, in the year 2024, Surulere had the higher carbon emissions, 14.485ppm, in the year 2023, Irepo had the higher nitrogen emissions, 0.528ppm, while in the year 2024, Surulere had the higher nitrogen emissions, 0.515ppm. In the year 2023, Orelope had the higher oxygen emissions, 0.052ppm while in the year 2024, Orelope had the higher oxygen emissions, 0.057ppm. In the year 2023, Surulere had the higher emissions of methane, 0.138ppm, in the year 2024, Surulere had the higher emissions of methane, 0.163ppm. Comparison by season of each Greenhouse gas emissions yearly; In the

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year 2023, carbon emissions was higher in the wet season, 16.6373ppm, in the year 2023, nitrogen emissions was higher in wet season,0.637ppm, in the year 2024, oxygen emissions was higher in dry season, 0.044ppm, while in the year 2024, methane emissions was higher in dry season, 0.161ppm. Each Greenhouse gas emissions yearly; Year 2023 had the higher emissions of carbon,15.186ppm,year 2023 had the higher emissions of nitrogen, 0.483ppm,year 2024,had the higher emissions of oxygen, 0.043ppm, while year 2024,had the higher emissions of methane, 0.147ppm.

Introduction

Effects of Greenhouse gas emissions, particularly from agriculture practices like deforestation, Livestock farming, use of nitrogen fertilizers, and human factors like burning of fossil fuels since industrial age, waste management, and other factors, exacerbate climate change impacting crops yields, livestock production, and the overall sustainability of agricultural systems (Springer open, 2025)These emissions can lead to increased temperature, changing weather patterns, and water scacity, all of which have negative impacts for agricultural productivity. (Aggrawal et al., 2013).Soil degradation, increased soil erosion due to changes in rainfall and temperature patterns further compromise agricultural productivity, greenhouse gas emissions which is a coursative of climate change may alter the nutritional composition of crops, potentially affecting food productivity and human health (CGIAR, 2009). It also increased pest and disease outbreaks due to warmer temperatures and altered climate patterns can favour the spread of pests and diseases (Beddington et al., 2011, US/EPA 2024). Objetive of the study was to determine greenhouse gas emissions in the selected local government areas of Oyo State, Nigeria.

MATERIALS AND METHOD

The study was carried out in Oyo State. The State is an inland State in south-western Nigeria, with Ibadan as capital, coordinates 8.1574°.N, 3.6147°E n. The climate and soil of the state are suitable for the cultivation of a wide range of crops. The major food crops include maize, yam, cassava, millet, rice and banana, while cash crops include cocoa, kolanut, cotton etc. The Climate is equatorial, notably with dry and wet seasons with high relative humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. Average daily temperature ranges between 25°C (77.0 °F) and 35°C (95.0°F), almost throughout the year. Some people engage in agriculture while some engage in civil service and trading (Oyo State official website, 2023).

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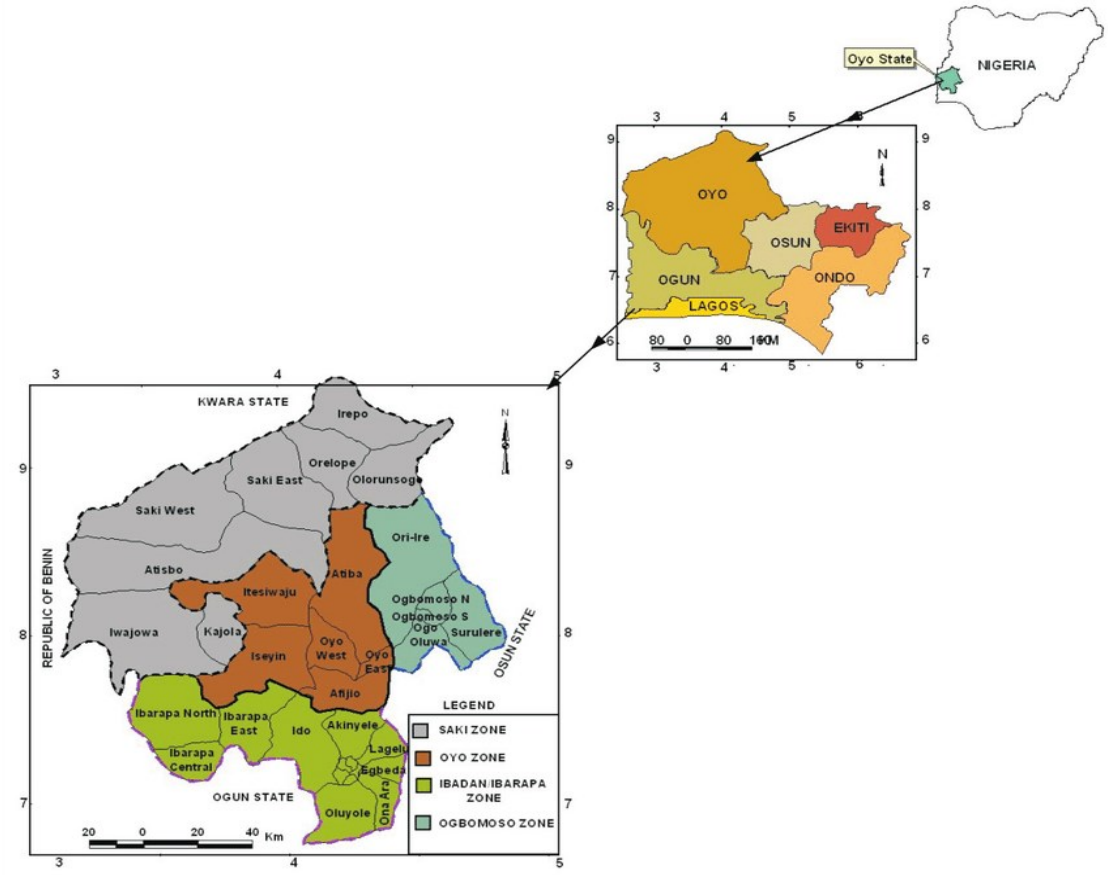

Figure 1: Map of Oyo State ADP Zones and Blocks
Source: Ashley-Dejo, 2012.

The population of the study comprises of the registered household farmers in Oriire, and Surulere Local Government Areas in Ogbomoso ADP Zone and Olorunsogo, Oorelope, and Irepo Local Government Areas in Saki ADP Zone in Oyo state, Nigeria who are involved in cassava cultivation.

Multistage sampling method was employed in the selection of respondents. During the first stage, 50% of the Agricultural zones were selected from Oyo State Agricultural Development Programme zoning, therefore Ogbomoso and Saki zones were randomly selected. Thereafter, 40% of the Local Government Areas (LGAs) were selected from each selected zone i.eOriire and Surulere LGAs from Ogbomoso Agricultural zone, Irepo, Orelope and Olorunsogo LGAs from Saki Agricultural zone, which amounted to a total of five LGAs from both Agricultural zones.

Third stage involved random selection of one percent (1%) villages from the list of registered villages in each LGAs and about (13.4%) household farmers from the list of

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Prof. H. U. Nwanjo [Nigeria]

registered households in each selected village, which amounted to a total of three hundred and thirty two (332) household farmers that constituted the sample size of the study.

The data used for this study were primary data and were obtained through well-structured interview scheduled and questionnaire.

In each of the five field randomly selected, different location were randomly selected for the collection of the soil sample, with the aid of soil auger, dip into the soil to a depth of 1.5cm for soil representative. Sample were from differenced 10 locations on the same field, samples collected were thoroughly mixed together and a quantity of the soil sample was taken out of it to represent the sample of that specific field for analyses, same was carried out for other fields in a two years samples were analyses for each field in both dry and wet seasons.

All the debris including stones and unnecessary particles were removed. The sample was later placed inside the digester. All the soil samples were weighed using a sensitive analytical weighing balance. The samples were then mixed with water in the ratio 1:1 and placed in 5 liter container (digester), a thermometer was placed inside the digester to monitor the temperature while the pH of the sample was monitored with a pH meter (All the samples were replicated).

The sample was tested for gas yield (methane, carbon, oxygen, nitrogen) during the laboratory analysis. Thus carbon, methane, oxygen and nitrogen were measured using gas analyzer (Werner *et al.*, 1989; Karuma, 2013).

SAS, 2005 package was employed, ANOVA was used, means were separated with Duncan Multiple Range Test.

Greenhouse gas emission in Irepo local government area Yearly and by Seasons

Table 1 in the year 2023 in wet season carbon had the highest quantity,16.37ppm emission, the dry season had the lowest quantity of carbon emission , 12.8 ppm, while in the year 2024 dry season had the highest, carbon emission 13.75 ppm and the wet season had the Lowest carbon emission,12.77 ppm.

In the year 2023 wet season had the highest emissions of Nitrogen 0.737 ppm, the dry season had the lowest emissions of Nitrogen 0.318 ppm, while in the year 2024, Nitrogen had the highest emissions,0.55ppm,in the wet season, in the dry season Nitrogen emissions was the lowest 0.432 ppm.

In the year 2023,wet season had the highest emissions of oxygen 0.023 ppm, in the dry season the oxygen emissions was lowest 0.010 ppm, while in the year 2024,wet season had the highest emissions of oxygen,0.033ppm,the dry season had the lowest emissions of oxygen,0.020ppm.

Year 2023 dry season had the highest emissions of methane,0.067 ppm, the wet season had the lowest emissions of methane, 0.043 ppm, while in the year 2024, wet season had the highest emissions of methane,0.163ppm,the dry season had the lowest emissions of methane,0.077ppm.

Table 1 Greenhouse Gas Emission in Irepo local government area. Yearly and by Seasons

GHG	CONCENTRATION(ppm)	
	2023	**2024**
CARBON	(Dry) 12.85b (Wet) 16.37a	(Dry) 13.75a (Wet) 12.77b
NITROGEN	(Dry) 0.318b (Wet) 0.737a	(Dry) 0.432b (Wet) 0.559a
OXYGEN	(Dry) 0.010b (Wet) 0.023a	(Dry) 0.020a (Wet) 0.033a
METHANE	(Dry) 0.067a (Wet) 0.043b	(Dry) 0.077b (Wet) 0.163a

Source: 2023/2024 Field Work Analysis

Means with the same letter along the row for the season and a gas are not significantly different.

Greenhouse gas emission in Olorunsogo local government area, yearly and by seasons.

Table 2 displayed that in the year 2023wet season carbon had the highest emission of 14.47ppp, the dry season had the lowest emission,12.45 ppm. While in the year 2024 wet season had the highest of carbon emission,13.60 ppm, emission, 13.40 ppm.

In the year 2023, wet season had the highest emission, 0.63 ppm, the dry season had the lowest emission 0.22 ppm, while in the year 2024, the wet season had the highest of Nitrogen, 0.47ppm, the dry season had the lowest 0.27 ppm.

The year 2023 dry season had the highest emission of oxygen, 0.04ppm, the dry season had the lowest emission of 0.02ppm, while in the 2024 dry season had the highest emission of 0.06 ppm and the wet season, 0.05 ppm had the lowest emission of oxygen.

In the year 2023, dry season, methane had the highest emission of 0.10 ppm, in the wet season was the lowest emissions of methane,0.07 ppm, while in the year 2024, methane had the highest emissions in the wet season,0.14 ppm, the dry season had the lowest emissions of methane,013 ppm

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Prof. H. U. Nwanjo [Nigeria]

Table 2: Greenhouse Gas Emission in Olorunsogo Local Government Area Yearly and by Seasons

GHG		CONCENTRATION(ppm)	
		2023	**2024**
CARBON		(Dry) 12.45b (Wet) 14.47a	(Dry) 13.40b (Wet) 13.68a
NITROGEN		(Dry) 0.22b (Wet) 0.63a	(Dry) 0.27b (Wet) 0.47a
OXYGEN		(Dry) 0.04a (Wet) 0.02b	(Dry)0.06a (Wet) 0.05 a
METHANE		(Dry) 0.10a (Wet) 0.07b	(Dry)0.13a (Wet) 0.14 a

Source: 2023/2024 Field Work

Means with the same letter along the row for the season and a gas are not significantly different

Green Gas Emission in Orelope local government area yearly and by seasons

Table 3 displayed that in the year 2023, carbon had the highest quantity of emission in wet season,17.363 ppm, dry season had the lowest emission,15.273 ppm, carbon had the highest emission on dry season, 13.667ppm, lowest emission in the wet season, 13.287ppm.

In the year 2023 wet season Nitrogen had the highest Nice emission, 0.630ppm, the dry season had the lowest emission,0.314 ppm, while in the year 2024, Nitrogen had the highest emission in wet season, 0.4719, the dry season had the lowest emission 0.290 ppm.

In the year 2023 in dry season oxygen had the highest emission,0.060 ppm, had the lowest emission in wet season,0.043ppm, while in the year 2025, oxygen had the highest emission in dry season,0.077 ppm, lowest quantity of emission in wet season,0.037ppm.in the year 2025, in the dry season methane had the highest emission,0.137ppm, the lowest in wet season,0.100 ppm, while in the year 2024 methane had the highest emission in dry season 0.170ppm, Lowest in the wet season,0.133 ppm.

Table 3: Greenhouse Gas Emission in Orelope Local Government Area yearly and seasons

GHG	CONCENTRATION(ppm) 2023	2024
CARBON	(Dry)15.273b (Wet) 17.363a	(Dry)13.667a (Wet) 13.287a
NITROGEN	(Dry) 0.314b	(Dry)0.290a

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

GHG	CONCENTRATION(ppm) 2023	2024
	(wet) 0.630a	(Wet) 0.471a
OXYGEN	(Dry)0.060a (Wet) 0.043a	(Dry)0.077a (Wet) 0.037b
METHANE	(Dry)0.137a (Wet) 0.100b	(Dry)0.170a (Dry) 0.133b

Source: 2023/2024 Field Work

Means with the same letter along the row the season and a gas are not significantly different.

Greenhouse gas emission in Orire local government area: yearly and seasons.

Table 4: Displayed that in the year 2023, the wet season had the highest emissions of carbon,17.387ppm,dry season had the lowest emissions of carbon,15.370ppm, while in the year 2024,the highest carbon emissions,14.587ppm was in wet season, the lowest emissions of carbon,12.573ppm,was in dry season .

In the year 2023, nitrogen had the highest emissions in wet season,0.580ppm, and the lowest emissions was in dry season,0.412 ppm, while in the year 2024, nitrogen had the highest emissions in the wet season, 0.583ppm, lowest emissions in the dry season,0.283ppm.

In the year 2923, oxygen had the highest emissions in the dry season, 0.033ppm, and lowest emissions in the wet season 0.017ppm, while in the year 2024, Oxygen had the highest emissions in the wet season, 0.060ppm, and lowest in the dry season, 0.043ppm.

In the year 2023, in the dry season, methane had the highest emissions, 0.143ppm, the lowest emissions in the dry season 0.050ppm, while in the year 2024, methane had the highest emissions in the dry season, 0.200ppm, lowest emissions in the wet season, 0.123ppm.

Table 4 Greenhouse Gas Emission in Orire Local Government Area yearly and by seasons

GHG	CONCENTRATION (ppm) 2023	2024
CARBON	(Dry) 15.370b (Wet) 17.387a	(Dry) 12.573b (Wet) 14.587a
NITROGEN	(Dry) 0.412b (Wet) 0.580a	(Dry) 0.283b (Wet) 0.583a
OXYGEN	(Dry)0.033a (Wet) 0.017b	(Dry) 0.043a (Wet) 0.060 a

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

GHG	CONCENTRATION (ppm)	
	2023	2024
METHANE	(Dry) 0.143a (Wet) 0.050b	(Dry)0.200a (Wet) 0.123b

Source: 2023/2024 Field Work

Means with the same letter along the row for the season and a gas are not significantly different

Greenhouse gas emissions in Surulere Local Government Area yearly and by seasons.

Table 5 that in the year 2023 in the wet season the carbon, had the highest emission. 16.273 ppm, the lowest emission While in the year 2024 carbon had the season,15.530 ppm, the lowest emission in dry season 13.440 ppm.

In the year 2023, Nitrogen had the emission in wet season,0.611 ppm, lowest emission in dry season,0.379ppm, While in the year 2024, Nitrogen had the highest emission in the wet season 0.638ppm, lowest emission in dry season,0.403 ppm.

In the year 2023, Oxygen had the highest emission in dry season,0.050 ppm, lowest emission in wet season,0.037ppm, while in the year 2024, oxygen had the highest emission in wet season,0.030 ppm and lowest emission in the dry season,0.023ppm.

In the year 2023 methane had the highest emission in the dry season 0.143ppm, and lowest emission in wet season 0.133 ppm, while in the year 2024, methane had the highest emission in dry season,0.223 ppm, Lowest emission in wet season,0.103 ppm.

Table: 5 Greenhouse Gas Emission in Surulere Local Government Area yearly and by seasons.

GHG	CONCENTRATION (ppm)	
	2023	2024
CARBON	(Dry) 14.053b (Wet) 16.273a	(Dry) 13.440b (Wet) 15.530a
NITROGEN	(Dry) 0.379b (Wet) 0.611a	(Dry) 0 .403b (Wet) 0.628a
OXYGEN	(Dry) 0.050a (Wet) 0.037a	(Dry) 0.023a (Wet) 0.030a
METHANE	(Dry) 0.143a (Wet) 0.133a	(Dry) 0.223a (wet) 0.103b

Source: 2023/2024 Field Work

Means with the same letter along the row for the season and a gas are not significantly different

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Prof. H. U. Nwanjo [Nigeria]

Comparison of Carbon Emission in the five local government areas.
Local Government Areas comparison of Carbon Emission

Table 6 shows that in year 2023 Orire Local Government Area had the highest emissions of Carbon, 16.378 ppm, Olorunsogo Local Government Area had the lowest emissions of Carbon 13.461 ppm were significantly different. Year 2024 Surulere Local Government Area had the highest emission of Carbon 14.485 ppm, Irepo Local Government Area had the Lowest Emission of carbon, 13.200 ppm were significantly different. In the year 2023 the total carbon emissions in the local government was 75.93 ppm, while in the year 2024 the five total carbon emissions in the five local government was 68.277 ppm, year 2023 had the highest carbon emissions, 75.93 ppm.

Table 6: Comparison of Carbon Emission from the five local government Areas

GHG	LGA	CONCENTRATION (ppm)	
		2023	**2024**
CARBON	ORIRE	16.378a	13.580b
	ORELOPE	16.318a	13.472b
	SURULERE	15.163b	14.485a
	IREPO	14.610c	13.200c
	OLORUNSOGO	13.461d	13.540b
	Total	75.93	68.277

Source: 2023/2024 Field Work

Means with the same letter along the column are not significantly different

Comparison of Nitrogen Emissions from the five local government areas

Table 7 Shows that Irepo Local Government Area had the highest emission of Nitrogen in year 2023 0.528 ppm, Olorunsogo Local Government Area had the lowest emission of Nitrogen, 0.424 ppm were significantly different. In year 2024, Surulere Local Government Area had the highest emission of Nitrogen, 0.515 ppm, while Olorunsogo Local Government Area had the lowest emissions of Nitrogen 0.371 ppm were significantly different. In the year 2023 the total nitrogen emissions in the five local government was, 2.415 ppm, while that of the year 2024 emissions was 2.195 ppm, year 2023 had the highest emissions of nitrogen, 2.415ppm.

Table 7: Comparison of Nitrogen Emission from the five Local Government Areas

GHG	LGA	CONCENTRATION (ppm)	
		2023	**2024**
NITROGEN	IREPO	0.528a	0.495Bb
	ORIRE	0.496b	0.433c
	SURULERE	0.495b	0.515a
	ORELOPE	0.472c	0.381d
	OLORUNSOGO	0.424d	0.371e
	Total	2.415	2.195

Source: 2023/2024 Field Work

Means with the same letter along the column are not significantly different.

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Comparison of Oxygen emission in the five Local Government Areas.

Table 8 Shows that Orelope Local Government Area had the highest emission of Oxygen, 0.052 ppm, in the year 2023, Irepo Local Government Area had the lowest emission of oxygen, 0.017 ppm were significantly different. In Year 2024 Orelope Local Government Area had the highest emission of Oxygen, 0.057 ppm while Surulere local Government Areas had the lowest emission of Oxygen, 0.027 ppm were significantly different. In the year 2023 the total oxygen emissions in the five local government was, 0.164 ppm, while that of the year 2024 was 0.215 ppm, year 2024 had the highest oxygen emissions of 0.215ppm.

Table 8: Comparison of Oxygen from the five Local Government Areas.

GHG	LGA	CONCENTRATION (ppm)	
		2023	2024
OXYGEN	ORELOPE	0.052a	0.057a
	SURULERE	0.043b	0.027b
	ORIRE	0.027c	0.052a
	OLORUNSOGO	0.025c	0.052a
	IREPO	0.017d	0.027b
	Total	0.164	0.215

Source: 2023/2024 Field Work
Means with the same letter along the column are not significantly different.

Comparison of Methane Emission from the Five Local Government Areas

Table 9 Shows that Surulere Local Government Area had the highest emission of Methane in year 2023, 0.134 ppm, Irepo Local Government Area had the lowest emissions of Methane 0.055 ppm they were significantly different. Year 2024 Surulere Local Government Area had the highest emissions of Methane 0.163 ppm, while IrepoIrepo Local Government Area had the lowest emissions of Methane 0.120 ppm they were significantly different. In the year 2023 the total methane emissions in the five local government was, 0.499ppm, while that of the year 2024 had the highest methane emissions of 0.734ppm.

Table 9: Comparison of Methane Emission from the Five Local Government Areas

GHG	LGA	CONCENTRATION (ppm)	
		2023	2024
METHANE	SURULERE ORELOPE	0.138a	0.163a
	ORIRE	0.117b	0.152a
	OLORUNSOGO	0.097c	0.162a
	IREPO	0.087	0.137b
	Total	0.055d	0.120c
		0.494	0.734

Source: 2023/2024 Field Work
Means with the same letter along the column are not significantly different.

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DISCUSSION

Though no specific international standard has been agreed on with the limitation of green house gas emission, united nation general assembly agreed on global warn of net to exceed 1.5°c (United nationals 2024). Agricultural practices contributed to the emission of greenhouse gas emission (human and natural factors both influence the earth's climate) such as deforestation, livestock farm of and fossil filed burning. Some of the forest in the study areas has been deforested, for farm of activities which in returns releases the emission of green house gases mostly carbon which is a heat trap gas, application of nitrogen component fertilizer, which also releases the emission of nitrogen gas a heat trap, gas, livestock farming with animal dropping releases emission of methane greenhouse gas emission into the atmosphere, also a heat trap gas, thus minimization of these greenhouse gases are required to avoid global warming getting above 1.5°c.All the field in the study area exhibit more of greenhouse gas emission in different values, Orire local government area had the highest emission of greenhouse gas values at 33:992 ppm in year 2023, while the lowest emission of greenhouse gas in the year 2024, 27.804 ppm. With in the scope the years of study 2023 and 2024.

CONCLUSION

The season that has the highest greenhouse gas emission was in wet season 2023, 17.050 ppm, the year that has the highest emission was year 2023, 17.050 ppm, the greenhouse gas emission that was more abundant in the year 2023, while the local government area with more prominent in greenhouse gas emission was Orire local government area in year 2023, 33.992 ppm.

RECOMMENDATION

1. Thus Lessing of Carbon emissions is good by rapidly cutting emission of Greenhouse Gas we can lessen the risk of dangerous climate change. (International work on climate change wwf 2024). Thus the benefits of zero carbon (neutrality) emissions are as follows:-
1. Bolstering public health,
2. Protecting ecosystems,
3. Securing food supplies,
4. Stabilizing energy prices,
5. Future proof operations,
6. Fostering innovations,
7. Building trust with stakeholders.

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Three reasons why humanity needs to limit Nitrogen pollution

1. -Nitrogen pollution is disrupting life on land and underwater: when the availability of Nitrogen Compounds exceeds consumption beyond plant, excess nitrogen gets into the environment often filtering into aquatic ecosystems, once there, it can lead to a rapid increase of toxic algae, known as algal blooms which deplete O_2 in H_2O and can course costal dead zones affecting underwater life. Thus Nitrogen pollution is the most influential global driver of human made biodiversity decline after habitat destruction and the emission of Greenhouse Gases. Thus a landmark global agreement to safeguard biodiversity finalized in December 2022 includes target to reduce pollution from all sources so that by 2030, pollutants are not harmful to life and ecosystems.
2. - Nitrogen is a key contributor to Climate Change when Nitrogen in its active form such as in fertilizer, is exposed to soil, microbial reactions take place that release nitrous oxide, this gas is 300times more potent at warming the atmosphere than carbon dioxide. It also remains active in the atmosphere for more than 100years, Algal blooms in lakes and waterways, often cause by fertilizer run-off also emits Greenhouse gases. Another issue is agricultural ammonia emissions, this is a gaseous form of nitrogen, which is emitted into the atmosphere from the housing, storage and spreading of animal manure and the spreading of synthetic fertilizer, while ammonia is not a Greenhouse Gas when it is released into the air, it acts as a base for emission of nitrous oxide a potent Greenhouse Gas.
3. - Nitrogen pollution is a threat to human health:- water containing elevated levels of nitrate a form of Nitrogen resulting from Animal waste, plant decomposition and fertilizer run-off, raises the risk of infants developing Methemoglobinemia, commonly referred to as "blue bay syndrome", which can fatal. High levels of nitrate in drinking water cam also increase the risk of cancer in adults. Ammonia emissions, as well as contributing to climate change are an important driver for fine particulate matter pollution, reducing air quality and increasing adverse costs the global economy between US$340 billion and US$4 trillion annually when taking into accounts it impacts on human health and ecosystems. Most of the UN's Sustainable Development Croals, humanity blueprint for a better future are linked with sustainable Nitrogen management. Experts say using the Nitrogen more efficiently in food production is key to reducing the surplus Nitrogen released into the environment.

Progress is being made to lower the impact of nitrogen on the planet, thus to fight the pervasive impact of pollution on society, UNEP launched #Beat pollution, a strategy for

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Prof. H. U. Nwanjo [Nigeria]

rapid large-scale and coordinated action against air, land and water pollution. The strategy highlights the impact of pollution on climate change, nature and biodiversity loss, and human health, through science-based messaging, the campaign highlights how transitioning to a pollution-free planet is vital for future generation.

If oxygen level is too high in the atmosphere:-

1. Breathly air that contains higher levels of oxygen than the usual 21% found on earth's atmosphere can cause organ damage, seizures and even death. By contrast, when oxygen concentrations are higher, the atmosphere gets thicker and scatters more sunlight as a result; there is less water vapour to trap heat).
2. If the atmosphere was 100% oxygen, Flexi says "If our atmosphere consisted of pure oxygen, it would have serious consequences. First fire would be much more common and intense because oxygen supports combultron. Secondly organisms that rely on other gases like Nitrogen and C_2O for their metabolic process would die".
3. Methane effects on human; inhaled in limited quantities however if large quantities of natural gas or methane is allowed to displace air, lack of oxygen may result in suffocation.
4. Long-term effects of methane gas poisoning can include neurological problem, lasting carchoecascular, and respiratory problem.
5. The concentration of methane in the atmosphere has more than doubled over the past 200years, scientist estimate that this increase is responsible for 20% to 30% of climate warming since the Industrial Revolution which began in 1750
6. Methane emission can be reduced; the good news is that there are many practical solutions available to reduce methane emission, feed additives for cattle, new rice farming techniques, advance approach to oil and gas leak detection, coal methane capture, modern water and waste facilities can all be effective.
7. Methane is the second after carbon dioxide a major contributor to climate change

Reducing methane will protect health and crop yields.

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