https://africanjournalofbiomedicalresearch.com/index.php/AJBR
Afr. J. Biomed. Res. Vol. 27(4s) (December 2024); 8208 - 8218
Research Article

Knowledge, Attitude and Environmental Perception of Carbon Tax: A Case Study of Agricultural and Non-Agricultural Firms in Ekiti State Nigeria

Ayotunde Ola Kolawole[1*,5], Sylvester Oluwadare Ojo[1], Samuel Adeyemi Igbatayo[1], Isaiah Oluwatobi Owolabi[2], Olajide Oladamolami McKelvin Agunloye[3], Abimbola Moji Ezekiel[4], Kamal Adekunle Abdu-Raheem[5], Moyinoluwa Folaranmi Adesakin[5] and Patience Uneojo Ogwu[5]

[1*,1,1]College of Sciences, Department of Agricultural Sciences, Afe Babalola University, Ado-Ekiti Nigeria
[2]HACEY Health Initiatives, Nigeria
[3]Department of Environmental Management Technology, Federal College of Land Resources Technology, Owerri, Imo State, Nigeria
[4]Department of Agricultural Science and Technology, Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti, Nigeria
[5,5,5]Department of Agricultural Economic & Extension Services, Ekiti State University, Ado-Ekiti Nigeria

***Corresponding author:** Ayotunde Ola Kolawole
*Email: Ayotunde.kolawole@eksu.edu.ng, +2348034965672

Abstract
This study assessed agricultural and non-agricultural firms' knowledge, attitude, and environmental perception towards carbon emission tax in Ekiti State, Nigeria. Primary data was collected from 320 respondents through a well-structured questionnaire. Descriptive and inferential statistics were used to analyze the data. A one-sample t-test was used to test the hypothesis that there was no significant difference in carbon tax payment between agricultural and non-agricultural firms in the study area. The results revealed a higher examination rate for non-agricultural firms (72.2%) than for agricultural firms (27.8%). The study found that 51.8% of firms were informed about carbon tax payments, while 48.2% were uninformed. Waste burning (69.4%) and use of generators (68.1%) were the most carbon-emitting activities by firms. About 51.6 per cent were satisfied with the air quality of their environment, while 70.3 per cent were also concerned about air pollution. According to the respondents, the air pollution rating was not severe (78.4%), but 50.6 per cent felt worried about air pollution. One significant environmental perception statement that firms agreed on was the perception of the environment as a free rider (4.53). About 37.5 per cent of respondents believed that citizens could play an active role, followed by the government (28.1%). The t-test showed no statistically significant difference between the willingness of agricultural and non-agricultural small businesses to pay a carbon tax. This study recommends that the Ekiti State government and the Ekiti State Environmental Protection Agency (EKSEPA) establish robust legislation, foster collaboration, raise awareness, and promote public-private partnerships to implement successful policies for carbon tax payment and encourage the development of green energy among firms.

Keywords: Carbon Tax, Agricultural and Non-agricultural Firms, Greenhouse gases (GHGs) and Ekiti State

***Authors for correspondence: E-mail Id:** Ayotunde.kolawole@eksu.edu.ng,*

Received:10/11/2024 *Accepted:15/11/2024*

DOI: https://doi.org/10.53555/AJBR.v27i4S.3673

Introduction

The carbon tax has been a formidable environmental tool to protect the earth and discourage firms' use of fuel-powered engines in developed countries (Akinrinlola, 2022). The problem of climate change received global attention from the United Nations at the 2021 UN Climate Change Conference of the Parties (COP26) in Glasgow (Arora and Mishra, 2021). The United Nations Framework Convention on Climate Change (UNFCCC) and other treaties geared toward developing nations, especially West African countries, towards reducing greenhouse gas (GHG) emissions (Shirani *et al*., 2023; Akujor *et al.,* 2022). The COP26 aimed to ensure that UN countries re-affirm their commitment to securing a net-zero limit of carbon emissions by mid-century, to keep the 1.5-degree limit within reach, conserve the natural ecosystem, protect communities, and mobilize finance to compensate the environment (Ibrahim, 2022; Padhee and Whitbread, 2022 and Dutt, 2022).

In October 2021, the Nigeria National Assembly passed the Climate Change Act 2021, which President Muhammadu Buhari signed into law barely a week after the conference. This Act aims to establish a framework for achieving low GHG emissions, integrate climate change actions into national plans and programs, and calculate the cost of carbon emissions from all fuel-powered engines in the environment. In addition to establishing the National Council on Climate Change (NCCC), responsible for implementing policies and decisions related to climate change in Nigeria, collaborating with the Federal Inland Revenue Service (FIRS) is crucial in formulating a strategy for a carbon tax in Nigeria. Using tax proceeds, the Act proposes to fund a climate change fund.

Researchers have explored various environmental policy instruments to reduce human environmental impact (Liao, 2018). Such impacts are associated with air pollution, greenhouse emissions, deforestation, and global warming (Campbell-Lendrum and Prüss-Ustün, 2019). Particularly in developing countries, firms tend to underestimate the value of the ecosystem, either by disregarding the carbon emissions into the atmosphere or by failing to provide environmental compensation through carbon emission taxes (Rashid, 2022; Hazra and Shee. 2021; Zahra and Wright, 2016).

Agricultural and non-agricultural sectors have contributed immensely to global GHG emissions (Tongwane and Moeletsi, 2018; Hussain *et al*., 2019). In Nigeria, small and medium-sized enterprises (firms) in these sectors rely heavily on fossil fuels to power their machines and equipment. Hussain *et al.* (2019) state that agricultural activities like land use and tillage operations account for one-fifth of global anthropogenic GHG emissions. The share of non-agricultural firms like artisans and road users in total GHG emissions is much higher, as this sector is the third largest contributor after the energy and industrial sectors (Hussain *et al*., 2019). Carbon sequestration, a natural way of buffering this emission, requires a combined and comprehensive environmental policy instrument like a carbon tax to mitigate both carbon emitters' contributions to climate change adequately.

Fossil fuels are Nigeria's primary energy source, and agricultural and non-agricultural firms rely on them (Hussain *et al.*, 2019). Fuels that need combustion, such as coal, natural gas, and gasoline, constantly release greenhouse gases into the atmosphere. SDG targets include climate action, responsible consumption and production, and achieving net-zero carbon emissions for sustainable development by 2060. These include environmental goals, economic growth, climate change, sustainable cities, and inexpensive, clean energy. Firms contribute significantly to the global economy, and their actions can significantly impact the environment. Manufacturing, forestry, agriculture, transportation, and energy production have resulted in higher GHG emissions from Firms and cars that use fossil fuels for production and services (Tongwane and Moeletsi, 2018). Since many firms have few resources, they can see the carbon price as an extra expense. Adopting sustainable practices, however, may also help firms in other ways, such as higher brand recognition, more accessible access to green funding, and better competitiveness in international markets.

Sustainable Development Goals 7 and 12 state that responsible consumption and production are necessary for improved economic integration and a cleaner environment and to close the gap in current research by considering the level of knowledge and attitude of firms towards the environment in the area of carbon emission.

The specific focus of this study includes:

i. categorize the firms based on their production activities,
ii. elucidate how these firms are being informed about the carbon tax,
iii. examine how their activities emit carbon into the environment,
iv. assess the environmental quality and concerns of firms in the study area,
v. examine the firms' knowledge of the environment and carbon emission tax,
vi. identify the actors that should be prominent in air pollution reduction and
vii. hypothesize whether there is a statistical difference in the carbon tax payment between agricultural and non-agricultural firms in Ekiti State, Nigeria.

Methodology

The study focused on agricultural and non-agricultural firms in Ekiti State, Nigeria. The sample size depended on the number of firms operating in Ekiti State, Nigeria. A multistage sampling procedure was adopted. The first stage involved the purposive sampling of five (5) Local Government Areas (LGAs): Ado LGA, Ikere LGA, Oye LGA, Ikole LGA, and Ijero LGA. This was due to firms' predominance and institutional presence in these selected LGAs. The second stage involved the purposive sampling of firms engaged in production or services, such as transportation, that necessitate the use of fossil fuels. In the third stage, the firm sample was divided into ten groups (Table 1) and a random sampling was used to select ten respondents from each group in Ado LGA since there are more firms in this state capital than in other LGAs. Five (5) respondents were randomly sampled from each of the remaining LGAs, except ten (10) road users, selected from these other LGAs due to their widespread presence of motorists. The process resulted in selecting 100 firms in Ado LGA and fifty-five (55) firms from each LGA. As a result, three hundred and twenty (320) respondents were selected. This research adopted quantitative methods to obtain both primary and secondary data. Primary data was collected using a well-structured questionnaire. The questionnaires were physically distributed to the targeted firms in Ekiti State. The study employed both descriptive and inferential statistics to achieve its objectives. Descriptive statistics and a one-sample t-test were used to test the hypothesis.

Table 1: Samples of Firms in the Study Area

Enterprises	Ado	Oye	Ikole	Ijero	Ikere
Agricultural Sector					
(1) Agricultural Production (Irrigation farming, animal production (poultry farms, fish farms and piggery))	10	5	5	5	5
(2) Agricultural Processing (Cassava processor, rice mills, oil palm processor, frozen food (meat, fish and broilers)	10	5	5	5	5
(3) Cafeteria/Bakery/Confectionaries	10	5	5	5	5
Non-agricultural Sector					
(4) Road Users	10	10	10	10	10
(5) Service (IT, Telecommunication, Photography and Studio)	10	5	5	5	5
(6) Carpentry and furniture making	10	5	5	5	5
(7) Groceries and Supermarket	10	5	5	5	5
(8)Oil and gas sales outlet (filling station selling petrol, kerosene, diesel and gas)	10	5	5	5	5
(9) Fashion and boutique store	10	5	5	5	5
(10) Beauty and salon centre (barbing, hairdressing, pedicure, manicure and makeover etc.).	10	5	5	5	5
Total	100	55	55	55	55

Results and Discussion

Categorization of Firms' Operation

The categories of SMEs operating in the research area are depicted in Figure 1 with their form of production. Compared to agricultural enterprises (27.8%), more non-agricultural firms (72.2%) were examined. Although this is an agricultural region, some farmers may have improvised for other forms of income in non-agricultural sectors due to issues which might be low productivity, restricted access to technology, and fragmented land. In contrast to the very low number of power and heating enterprises (9.7%), these firms in the industry were actively providing services (55.3%). The fact that the majority of the study area's firms are non-agricultural that offer services like transportation, trading, information technology, carpentry and furniture, fashion and beauty parlours suggests that Ekiti State has not experienced much industrialization. This finding emphasized the importance of non-agricultural sectors in revenue generation. Despite the agrarian nature of Ekiti State, it is expected for non-agricultural firms to contribute more to carbon emissions due to their predominant sources of livelihood. This study corroborated the assertion of Hussain *et al.* (2019), that the share of non-agricultural firms in total greenhouse gas (GHG) emissions is much higher, as this sector is the third largest contributor. Their findings indicated that agricultural activities such as land use and tillage operations account for 20 percent of global anthropogenic GHG emissions. Bathaei and Treimikien (2023) stated that, agriculture contributes significantly to carbon emissions. However, the industry frequently lacks incentives to engage in renewable energy due to low profit margins and financial restrictions; hence, they may be unwilling to pay carbon tax. Tongwane and Moeletsi (2018), however, opined that more GHG emissions from manufacturing, forestry, agriculture, transportation, and energy production have come from firms and motorists that use fossil fuels in the course of production and rendering services. Also, the work of Carattini *et al.* (2018) represents the concerns of some agricultural firms regarding the financial burden of a carbon tax, suggesting a potential unwillingness for all of them to readily bear the full cost.

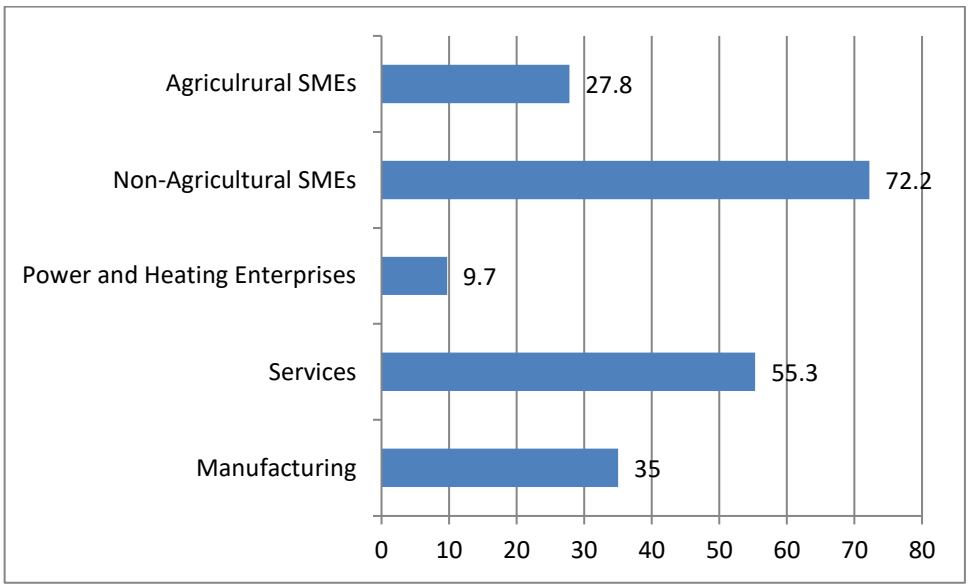

Figure 1: Categories of Small and Medium-sized Enterprises

Awareness and Information about Carbon Emission Tax Payment

Figure 2 depict that 51.3 percent were aware of carbon emission tax payment while 48.8 percent claimed to be uninformed about it in Ekiti State. This implies that more than half of firms have the understanding of carbon tax policies. This study corroborated with the findings of several studies on firms' knowledge of environmental laws (Asian Development Bank, 2021; Koh *et al.*, 2021; OECD and World Bank Group, 2023). From their studies, carbon pricing schemes have been conducted and a number of tools, including carbon taxes, emissions permits, emissions trading schemes, carbon offsetting obligations, carbon crediting methods, results-based financing, and shadow pricing, have been associated with implementing carbon pricing

According to UNFCCC (2022), the global regions have seen an increase in the number of businesses preparing to introduce or already implementing an internal carbon pricing, although level of knowledge varies. Fischer *et al.*, (2015) show that the level of knowledge about carbon taxes among firms differs greatly depending on the country and industry. Conway (2015) conducted a study which revealed that firms in industrialized nations exhibit more awareness as a result of more stringent environmental rules and improved information accessibility. For instance, countries such as Sweden and Denmark, where carbon taxes are firmly established, firms have greater levels of knowledge (Andersson, 2018; Bavbek, 2016) while firms in developing nations sometimes lack understanding as a result of insufficient enforcement and instructional resources. Furthermore, the level of consciousness differs across different sectors. Industries characterized by substantial energy usage, such as manufacturing and construction, exhibit increased awareness of carbon taxes owing to their direct influence on operating expenses. In contrast, service-based industries may have a lower level of awareness, as their carbon imprint is less perceptible (International Monetary Fund. Asia and Pacific, 2023; Moshood *et al.*, 2021).

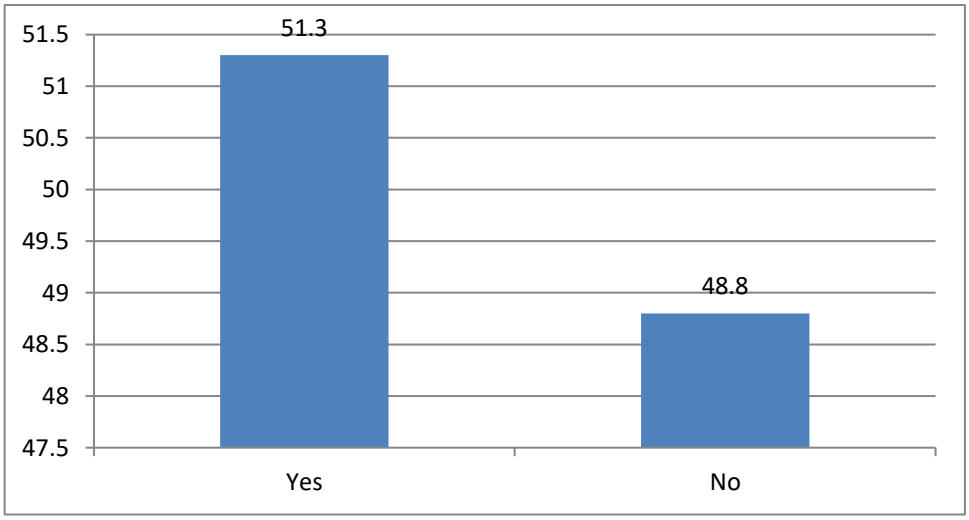

Figure 2: Information on Payment of Carbon Tax

Activities of Firms Emitting Carbon into the Environment

Figure 3 reveals that activities like waste burning (69.4%) and the use of generators (68.1%) emits more carbon into the environment. The use of vehicles (38.1%) and motorcycles (33.4%) follows as significant carbon emitters in the study area. This implies that carbon emissions from burning wastes and using generators could affect the environment by releasing carbon dioxide (CO_2) and other harmful substances. Shakya *et al.* (2022) show that firms that utilize diesel generators make a substantial contribution to both air pollution and greenhouse gas emissions. These emissions could be a contributing factor to health issues, air pollution, and climate change. Typically, fossil fuels like petrol and diesel are burnt in generators, releasing greenhouse gases like carbon dioxide. The type of fuel, generator's efficiency, and the length of use all affect how much emissions are produced. In general, modern generators are cleaner and more efficient than those whose life span had been exceeded.

Most firms collectively account for at least 50% of GHG emissions and could be responsible for significant greenhouse gas emissions (Puppim de Oliveira and Jabbour, 2017).

Furthermore, firms that frequently utilize charcoal or firewood as a source of heat or for culinary purposes, contributes to the emission of carbon dioxide (CO_2) and particulate matter (Borisade *et al.*, 2020; Vicente *et al.*, 2018). Toan *et al.* (2023) also emphasized the carbon emissions linked to the utilization of traditional biomass in small businesses.

In addition, firms that utilizes gasoline and diesel as fuels for their transportation needs, like motorbikes, vehicles, and trucks also contribute to the release of carbon dioxide (CO_2) and other harmful pollutants (Huang *et al.*, 2020). Schwanen (2019) highlighted the significant carbon emissions produced by firms through vehicular operations. Also, the act of smoking cigarettes by employees of firms can also have a detrimental impact on indoor air quality and contribute to the release of carbon dioxide (CO_2) into the atmosphere (Ebisike *et al.*, 2004; Schwanen, 2019).

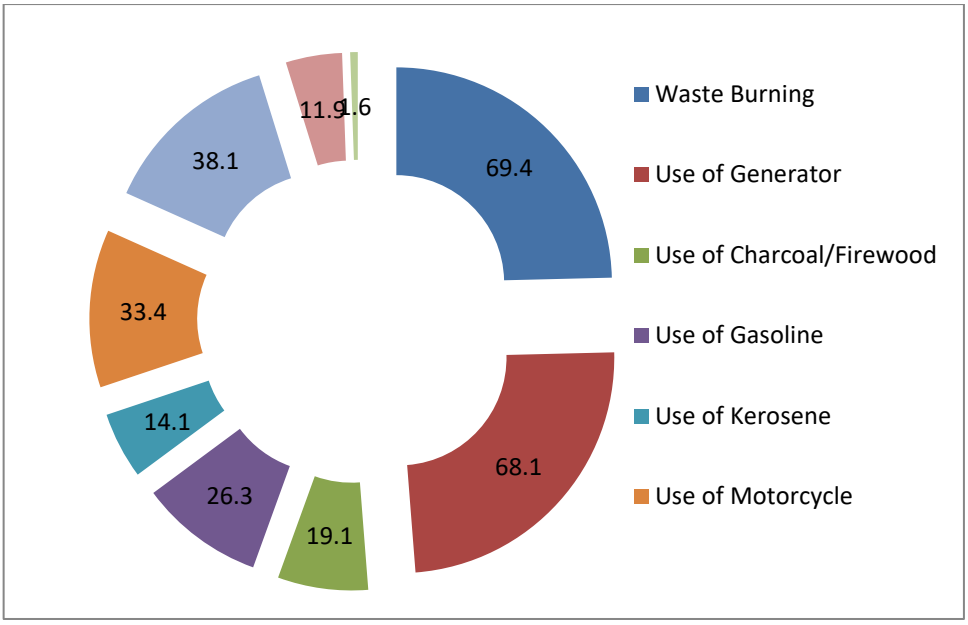

Figure 3: Carbon Emitting Activities by Respondents

Environmental Quality and Concern of Firms

Table 2 shows the view of firms' operators about some environmental indicators in the study area. About 51.6 percent were satisfied about the air quality of their environment, while 70.3 percent were also concerned about air pollution. Air pollution rating according to the respondents was not severe (78.4%) but 50.6 percent felt worried of air pollution. These environmental indicators and firms' opinion are germane and can tend towards environmental sustainability towards the use of green energy and an improved willingness to pay for carbon emission tax. Sustainability initiatives are said to be costly and challenging for firms to implement. According to estimates, the combined contribution of firms to global pollution can reach up to 70%. According to reports by Malick and Matindana (2024), firms in the manufacturing sector, in particular, are responsible for 64 percent of air pollution, although only 44 percent of them have an environmental management system in place. Under mounting environmental pressure, governments that control a substantial number of essential resources are sufficiently motivated and capable of managing resources to influence firms' green transformation (Abbass *et al.*, 2022). In this sense, corporate financial restrictions of green investment will undoubtedly be impacted by air pollution, a significant concern that garners public attention, through the influence of governments. Shen *et al.* (2022) contended that by gaining government support, businesses situated in areas with poor air quality may be able to take advantage of lower green financial limitations.

Table 2: Firms Environmental Quality Perception

Environmental Indicators	Freq. (%)
Air Quality Satisfaction	
Yes (1)	165(51.6%)
No (0)	155(48.4%)
Concern about Air Pollution	
Yes (1)	225(70.3%)
No (0)	95(29.7%)
Air Pollution Rating	
Severe (1)	69(21.6%)
Not Severe (0)	251(78.4%)
Quality of Air Pollution	
Worried (1)	162(50.6%)
Not Worried (0)	158(49.4%)

Source: Field Survey, 2024

Perception of Firms' Knowledge of the Environment and Carbon Emission Tax

Table 3 shows the perceptions of firm operators towards some statements relevant to environmental and carbon tax information. One significant statement that firms agreed on was the perception of the environment as a free rider (4.53). In the work of Revell *et al.* (2010), most business owners had the same perception of not taking into account their actions on the environment. The results of this research contradict other researchers, such as Williams and Schaefer (2013), who suggest that most firms want to take climate action and recognize it as the right thing to do. Small businesses usually tend to underestimate their environmental impacts, yet they are the largest contributors to commercial waste and carbon dioxide emissions (Sánchez-Infante *et al.*, 2019). According to Aboelmaged and Hashem (2019) work on absorptive capacity and green innovation adoption, firms account for 60 to 70% of the environmental impact and represent 90% of all companies worldwide. Research has also shown that while some firms pursue climate action because of financial opportunities, others readily respond to prosocial concerns because the owner cares for the well-being of their local community or natural environment (Kaesehage *et al.*, 2019). Some firms give importance to sustainability, while others may consider environmental issues less significant compared to immediate economic constraints. Tyler *et al.* (2023) indicated that firms frequently face challenges in obtaining the information and resources required to adopt environmentally sustainable practices. This lack of information can result in behaviours that are harmful to the environment, such as excessive pollution or wasteful utilization of resources. In addition, certain firms may behave as free riders, giving more importance to immediate profits than long-term sustainability in the absence of governmental supervision or market incentives.

There was a strong belief in the dangerous effect of carbon emissions on human health (4.12). According to Alam *et al.* (2022), firms in Africa responded to the knowledge that emissions are harmful to human health and contribute to global warming by creating mitigation strategies and enacting legislation to address climate risk. However, firms frequently lack complete understanding about the hazardous pollutants they emit and their effects on human health and global warming. Many firms are ignorant of how harmful their emissions are or how much they contribute to climate change (Alam *et al.*, 2022). Manisalidis *et al.* (2020) stated that firms in the manufacturing sector frequently underestimate the health hazards connected with their emissions, namely air pollutants such as particulate matter and volatile organic compounds. This lack of understanding can lead to poor emission control measures, endangering both workers and the surrounding community.

The following statements—that carbon emissions have a long-term effect on the environment (3.98), that they lead to climate change (3.94), and that they cause global warming (3.91)—take precedence. Firms may not completely understand the relationship between their emissions and global warming. Raar (2015) found that individuals, especially company owners, frequently struggle to understand abstract ideas such as climate change, making it difficult for firms to recognise their involvement in worsening the problem. Limited access to important information and resources also impedes firms' awareness of emissions-related hazards. Many firms operate on short budgets and may prioritise urgent economic issues above long-term environmental considerations (Albalushi *et al.*, 2022).

These firms play a crucial role in global climate action, accounting for 13% of global carbon emissions (IEA, 2015) and 50% of the world's commercial and industrial energy consumption (OECD, 2021). According to surveys conducted by the World Trade Organisation (2022), firms are aware of the effects of climate change and understand that decarbonisation is a requirement for their participation in supply chains, but they also face challenges, particularly in terms of information access and the associated costs. Alam *et al*. (2022), however, argued that firms frequently lack a thorough understanding of the effects of carbon emissions on climate change, owing to limited resources and access to information. Rodrigues and Franco (2023) stated that while some firms recognise

the need for sustainability, they may not completely understand carbon emissions and their role in climate change. Economic and technological constraints frequently prevent firms from correctly measuring and managing their carbon footprints.

Furthermore, Hampton *et al.* (2023) found that firms may underestimate their environmental consequences, particularly indirect emissions from their supplier networks. Without sufficient understanding, firms may ignore opportunities to reduce emissions and implement sustainable practices.

Regarding the least favourable perceptions of firms' careless use of fossil fuels (2.77) and their unintentional investment in green energy (solar technologies) (2.66), it is imperative that they adopt an environmental approach to sustain their business operations. Studies have shown that firms' over-reliance on fossil fuels as their main energy source is highly depleting over time (Chanchangi *et al.*, 2023). In addition, the Nigeria has suffered from the twin setbacks of persistently inefficient monopolistic FGN1-sponsoring, severe environmental degradation due to GHG emissions, and, in some very infamous cases, gas flaring, which results in poor energy output (Alola *et al.*, 2023).

Firms are becoming more concerned about fossil fuel use and are interested in investing in solar technology. Gadenne *et al.* (2009) stated that environmental consciousness impacts firms' decisions on sustainable practices, such as energy usage. The rising energy costs also prompt firms to look for other, more cost-effective energy sources. Energy prices have a substantial influence on firms' profitability, motivating them to pursue renewable energy solutions such as solar power.

The firms expressed their belief that the carbon tax is an environmental fraud (3.63). In terms of their environmental obligations, industries are now more informed than ever before. Businesses everywhere have come to understand that their surroundings may both create and support their companies (Chen *et al.*, 2021). According to this belief, entrepreneurs now bear a moral obligation to compensate for their role in environmental disasters. Environmental protection is gradually becoming a social obligation for organisations, and they pledge to do it (Jha *et al.*, 2018). However, some firms frequently see carbon prices as a government money instrument rather than a real environmental initiative, which breeds distrust. Some firms dispute the efficacy of the carbon tax in decreasing emissions (Boyce *et al.*, 2023). According to Parry and Williams (2010), while carbon pricing can motivate emission reductions, its effectiveness may be limited unless complementing measures that address market defects and technical impediments. This viewpoint raises scepticism among firms about the true environmental advantages of carbon pricing (Bertram *et al.*, 2015).

Table 3: Environmental Perception of Firms to Carbon Emission Tax

Perception Statements	SA	A	U	D	SD	Sum	Mean	Ranking
i. The environment is free for all to use	210(65.6)	87(27.2)	11(3.4)	7(2.2)	5(1.6)	1450	4.53	1st
ii. I do not care about fossil fuel burning	33(10.3)	70(21.9)	52(16.3)	119(37.2)	45(14.1)	884	2.77	11th
iii. The environment is not affected in any way by my action	59(18.4)	106(33.1)	40(12.5)	91(28.4)	24(7.5)	1045	3.27	10th
iv. I do not have plans to invest in solar technologies	20(6.3)	45(14.1)	106(33.1)	104(32.5)	45(14.1)	851	2.66	12th
v. Carbon tax is a burden to us	93(29.1)	110(34.4)	60(18.8)	47(14.7)	10(3.1)	1189	3.71	7th
vi. I do not think of planting trees	65(20.3)	95(29.7)	76(23.8)	66(20.6)	18(5.6)	1083	3.38	9th
vii. The tax is not spent on the environment	111(34.7)	120(37.5)	64(20.0)	20(6.3)	5(1.6)	1261	3.94	4th
viii. Carbon tax is an environmental scam	113(35.5)	122(38.1)	44(13.8)	35(10.9)	6(1.9)	1162	3.63	8th
ix. Carbon clothing in the environment is real	92(28.8)	84(26.3)	88(27.5)	46(14.4)	10(3.1)	1221	3.82	6th
x. Carbon emission is dangerous to our health	77(24.1)	145(45.3)	64(20.0)	30(9.4)	4(1.3)	1319	4.12	2nd
xi. Carbon emission causes global warming	135(42.2)	123(38.4)	32(10)	26(8.1)	4(1.3)	1252	3.91	5th
xii. Carbon emission has a long-term effect on the environment	101(31.6)	118(36.9)	75(23.4)	24(7.5)	2(0.6)	1271	3.98	3rd
xiii. Carbon emission leads to climate change	111(34.7)	120(37.5)	64(20.0)	20(6.3)	5(1.6)	1262	3.94	4th

SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree

Source: Field Survey, 2024

Actors in Air Pollution Reduction

Figure 4 reveals the actors who should be primarily responsible for air pollution reduction. About 37.5 percent of respondents were of the view that citizens can play an active role, followed by the government (28.1%). According to Jiménez-Parra *et al*. (2018), pollution is one of the most significant environmental impacts of corporate operations. As air pollution can have a significant negative influence on both the environment and society at large, it is imperative that all relevant parties address its consequences, especially corporations. Von Schickfus (2021) has acknowledged institutional investors, such as mutual funds, investment advisors, and individuals, as significant participants in the shift towards a sustainable economy. Governmental organizations are likewise seen to have a significant stake in carbon-intensive businesses (Benz *et al.*, 2021).

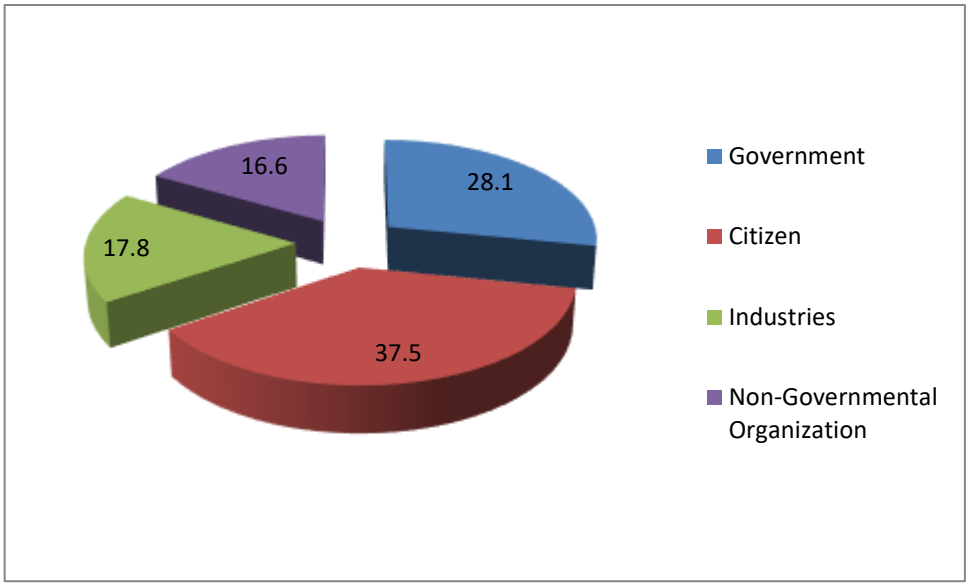

Figure 4: Actors in Reducing Air Pollution

Hypothesis Testing

Table 4 results confirm the acceptance of the hypothesis that there is no significant difference in the payment for carbon taxes between agricultural and non-agricultural firms. This indicates that both sectors have an equivalent level of willingness to contribute towards the reduction of carbon emissions. Smaller firms with fewer revenues may pay lesser, whereas larger firms with higher incomes may demonstrate a greater willingness to contribute to carbon tax payment. Industry type, company size, and environmental awareness are influential determinants of non-agricultural firms' payment for carbon taxes. Energy-intensive businesses and larger firms are likely to have a higher carbon tax payment, whereas smaller firms and those in less environmentally sensitive industries are likely to have a low carbon tax payment.

Table 4: T-Test Results

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Payment for Carbon Tax	Equal variances assumed	.006	.938	-.020	318	.984	-.00219	.10780
	Equal variances not assumed			-.020	151.015	.984	-.00219	.11096

Source: Field Survey, 2024

Conclusion and Recommendation

Overall, there is a substantial presence of non-agricultural enterprises, primarily engaged in sectors such as transportation, trading, information technology, carpentry, furniture, and fashion and beauty services. Although the research area is mostly an agrarian one, the significance of non-agricultural firms in generating revenue is growing. Non-agricultural firms make a substantial contribution to the overall amount of greenhouse gas emissions. Their apprehension about the economic strain of a carbon tax may impede their willingness to shoulder the entire expense.

Despite the limited understanding and awareness of carbon tax among firms in the research area, this study found that there is no significant difference in carbon tax payments between businesses in the agricultural sector and those in the non-agricultural sector. This suggests that both sectors exhibit equivalent levels of willingness to contribute towards the reduction of carbon emissions.

The study's findings lead to the following recommendations:

1. Since firms do not contribute their fair share towards protecting the environment and are not prepared to pay a significant amount for carbon taxes, it is necessary for the government to implement strict regulations that control the payment of carbon emission taxes. The Ekiti State Environmental Protection Agency (EKSEPA) should collaborate on this.
2. Collaboration and knowledge exchange among firms can have a substantial impact on supporting efforts to reduce carbon emissions. Through the exchange of best practices and experiences, businesses can acquire knowledge from one another and formulate more efficient strategies for managing their carbon impact.
3. The Ekiti State government should proactively endorse public-private partnerships (PPPs) to stimulate the implementation of environmentally friendly energy alternatives.
4. The government must allocate a portion of the revenue generated by carbon taxes to support programs that advance clean energy and sustainable development. This has the potential to establish a positive feedback loop in which the implementation of carbon pricing stimulates investments in reducing emissions, resulting in more decreases in carbon emissions.

References

1. Abbass, K., Qasim, M. Z., Song, H., Murshed, M., Mahmood, H., & Younis, I. (2022). A review of the global climate change impacts, adaptation, and sustainable mitigation measures. *Environmental Science and Pollution Research 2022 29:28*, *29*(28), 42539–42559. https://doi.org/10.1007/S11356-022-19718-6
2. Aboelmaged, M., & Hashem, G. (2019). Absorptive capacity and green innovation adoption in SMEs: The mediating effects of sustainable organisational capabilities. *Journal of Cleaner Production*, *220*, 853–863. https://doi.org/10.1016/J.JCLEPRO.2019.02.150
3. Akinrinlola, A. (2022). *Replacing combustion engines with hydrogen fuel cells to power mining haul trucks: challenges and opportunities*. Missouri University of Science and Technology.
4. Alam, A., Du, A. M., Rahman, M., Yazdifar, H., & Abbasi, K. (2022a). SMEs respond to climate change: Evidence from developing countries. *Technological Forecasting & Social Change*, *185*, 40–1625. https://doi.org/10.1016/j.techfore.2022.122087
5. Alam, A., Du, A. M., Rahman, M., Yazdifar, H., & Abbasi, K. (2022b). SMEs respond to climate change: Evidence from developing countries. *Technological Forecasting and Social Change*, *185*, 122087. https://doi.org/10.1016/J.TECHFORE.2022.122087
6. Alam, A., Du, A. M., Rahman, M., Yazdifar, H., & Abbasi, K. (2022c). SMEs respond to climate change: Evidence from developing countries. *Technological Forecasting and Social Change*, *185*, 122087. https://doi.org/10.1016/J.TECHFORE.2022.122087
7. Albalushi, I., Albalushi, K. I., & Muzamil Naqshbandi, M. (2022). Factors Affecting Success and Survival of Small and Medium Enterprises in the Middle East. *Knowledge* , *2*(3), 525–538. https://doi.org/10.3390/KNOWLEDGE2030031
8. Alola, A. A., Onifade, S. T., Magazzino, C., & Obekpa, H. O. (2023). The effects of gas flaring as moderated by government quality in leading natural gas flaring economies. *Scientific Reports*, *13*(1), 14394. https://doi.org/10.1038/S41598-023-38032-W
9. Andersson, J. J. (2018). *Carbon Taxes and CO 2 Emissions: Sweden as a Case Study*. www.ggdc.net/pwt.
10. Arora, N. K., & Mishra, I. (2021). COP26: more challenges than achievements. *Environmental Sustainability*, *4*, 585-588.
11. ASIAN DEVELOPMENT BANK. (2021). *Carbon Pricing for Green Recovery and Growth*. https://doi.org/10.22617/TCS210403-2
12. Benz, L., Paulus, S., Scherer, J., Syryca, J., & Trück, S. (2021). Investors' carbon risk exposure and their potential for shareholder engagement. *Business Strategy and the Environment*, *30*(1), 282–301. https://doi.org/10.1002/BSE.2621
13. Bertram, C., Luderer, G., Pietzcker, R. C., Schmid, E., Kriegler, E., & Edenhofer, O. (2015). Complementing carbon prices with technology policies to keep climate targets within reach. *Nature Climate Change*, *5*(3), 235–239. https://doi.org/10.1038/NCLIMATE2514
14. Borisade, A., Stanley, Dadu, Sani, I. F., & Abah, C. (2020). An Appraisal of Household Cooking Fuel Consumption and their Carbon related Emission in Zaria Metropolis, Nigeria. In *FUTY Journal of the Environment* (Vol. 14, Issue 1).
15. Boyce, J. K., Ash, M., & Ranalli, B. (2023). Environmental Justice and Carbon Pricing: Can They Be Reconciled? *Global Challenges*, *7*(4). https://doi.org/10.1002/GCH2.202200204
16. Campbell-Lendrum, D., & Prüss-Ustün, A. (2019). Climate change, air pollution and noncommunicable diseases. *Bulletin of the World Health Organization*, *97*(2), 160.
17. Carattini, S., Carvalho, M., & Fankhauser, S. (2018). Overcoming public resistance to carbon taxes. *Wiley Interdisciplinary Reviews. Climate Change*, *9*(5). https://doi.org/10.1002/WCC.531
18. Chanchangi, Y. N., Adu, F., Ghosh, A., Sundaram, S., & Mallick, T. K. (2023). Nigeria's energy

review: Focusing on solar energy potential and penetration. *Environment, Development and Sustainability*, *25*(7), 5755. https://doi.org/10.1007/S10668-022-02308-4

19. Chen, C. C., Khan, A., Hongsuchon, T., Ruangkanjanases, A., Chen, Y. T., Sivarak, O., & Chen, S. C. (2021). The Role of Corporate Social Responsibility and Corporate Image in Times of Crisis: The Mediating Role of Customer Trust. *International Journal of Environmental Research and Public Health*, *18*(16). https://doi.org/10.3390/IJERPH18168275
20. Conway, E. (2015). Engaging small and medium-sized enterprises (SMEs) in the low carbon agenda. *Energy, Sustainability and Society*, *5*(1), 1–9. https://doi.org/10.1186/S13705-015-0060-X/TABLES/1
21. Ebisike, K., . O. O. A., . J. A. S., . O. A. O., & . T. V. O. (2004). Pollution Impacts of Cigarette Consumption on Indoor Air Quality in Nigeria. *Journal of Applied Sciences*, *4*(4), 623–629. https://doi.org/10.3923/JAS.2004.623.629
22. Fischer, C., Morgenstern, R., & Richardson, N. (2015). The Distributional Burden of a Carbon Tax: Evidence and implications for policy. In I. Parry, A. Morris, & C. W. I. Roberton (Eds.), *Implementing a US Carbon Tax : Challenges and Debates*. Routledge. https://www.elibrary.imf.org/display/book/9781138825369/ch006.xml
23. Gadenne, D. L., Kennedy, J., & McKeiver, C. (2009). An empirical study of environmental awareness and practices in SMEs. *Journal of Business Ethics*, *84*(1), 45–63. https://doi.org/10.1007/S10551-008-9672-9
24. Hampton, S., Blundel, R., Eadson, W., Northall, P., & Sugar, K. (2023). Crisis and opportunity: Transforming climate governance for SMEs. *Global Environmental Change*, *82*, 102707. https://doi.org/10.1016/J.GLOENVCHA.2023.102707
25. Huang, Y., Unger, N., Harper, K., & Heyes, C. (2020). Global Climate and Human Health Effects of the Gasoline and Diesel Vehicle Fleets. *GeoHealth*, *4*(3). https://doi.org/10.1029/2019GH000240
26. Hussain, M., Butt, A. R., Uzma, F., Ahmed, R., Islam, T., & Yousaf, B. (2019). A comprehensive review of sectorial contribution towards greenhouse gas emissions and progress in carbon capture and storage in Pakistan. *Greenhouse Gases: Science and Technology*, *9*(4), 617-636.
27. Ibrahim, R. L. (2022). Post-COP26: Can energy consumption, resource dependence, and trade openness promote carbon neutrality? Homogeneous and heterogeneous analyses for G20 countries. *Environmental Science and Pollution Research*, *29*(57), 86759-86770.
28. International Monetary Fund. Asia and Pacific. (2023). The Financial Impact of Carbon Taxation on Corporates. *IMF Staff Country Reports*, *2023*(128). https://doi.org/10.5089/9798400237409.002.A006
29. Jha, A., Singh, N., Chauhan, S. S., & Mehendale, S. (2018). Environmental Awareness in Small and Medium Scale Enterprises-A Methodological and Thematic Review. *Asian Journal of Management*, *9*(1), 779. https://doi.org/10.5958/2321-5763.2018.00122.1
30. Kaesehage, K., Leyshon, M., Ferns, G., & Leyshon, C. (2019). Seriously Personal: The Reasons that Motivate Entrepreneurs to Address Climate Change. *Journal of Business Ethics*, *157*(4), 1091–1109. https://doi.org/10.1007/S10551-017-3624-1
31. Koh, J., Johari, S., Shuib, A., Matthew, N. K., & Siow, M. L. (2021). IMPACTS OF CARBON PRICING ON DEVELOPING ECONOMIES. *International Journal of Energy Economics and Policy*, *11*(4), 298–311. https://doi.org/10.32479/ijeep.11201
32. Liao, Z. (2018). Environmental policy instruments, environmental innovation and the reputation of enterprises. *Journal of Cleaner Production*, *171*, 1111-1117.
33. Malick, J., & M. Matindana, J. (2024). Evaluation of Environmental Management System for Small and Medium Enterprises in Dar Es Salaam, Tanzania. *Tanzania Journal of Engineering and Technology*, *42*(4), 1–10. https://doi.org/10.52339/tjet.v42i4.824
34. Manisalidis, I., Stavropoulou, E., Stavropoulos, A., & Bezirtzoglou, E. (2020). Environmental and Health Impacts of Air Pollution: A Review. *Frontiers in Public Health*, *8*, 14. https://doi.org/10.3389/FPUBH.2020.00014
35. Moshood, T. D., Nawanir, G., Mahmud, F., Sorooshian, S., & Adeleke, A. Q. (2021). Green and low carbon matters: A systematic review of the past, today, and future on sustainability supply chain management practices among manufacturing industry. *Cleaner Engineering and Technology*, *4*, 100144. https://doi.org/10.1016/J.CLET.2021.100144
36. Puppim de Oliveira, J. A., & Jabbour, C. J. C. (2017). Environmental Management, Climate Change, CSR, and Governance in Clusters of Small Firms in Developing Countries: Toward an Integrated Analytical Framework. *Business and Society*, *56*(1), 130–151. https://doi.org/10.1177/0007650315575470
37. Rashid, L. (2022). Bursting the bubble: why sustainability initiatives often lack adequate intention to action translation. *Small Business Economics*, *59*(1), 1-9.
38. Revell, A., Stokes, D., & Chen, H. (2010). Small businesses and the environment: turning over a new leaf?. *Business strategy and the environment*, *19*(5), 273-288.
39. Rodrigues, M., & Franco, M. (2023). Green Innovation in Small and Medium-Sized Enterprises (SMEs): A Qualitative Approach. *Sustainability* , *15*(5), 4510. https://doi.org/10.3390/SU15054510

40. Schwanen, T. (2019). Transport geography, climate change and space: opportunity for new thinking. *Journal of Transport Geography*, *81*, 102530. https://doi.org/10.1016/J.JTRANGEO.2019.102530
41. Shakya, S. R., Bajracharya, I., Vaidya, R. A., Bhave, P., Sharma, A., Rupakheti, M., & Bajracharya, T. R. (2022). Estimation of air pollutant emissions from captive diesel generators and its mitigation potential through microgrid and solar energy. *Energy Reports*, *8*, 3251–3262. https://doi.org/10.1016/J.EGYR.2022.02.084
42. Shen, Y., & Zhang, X. (2022). Study on the Impact of Environmental Tax on Industrial Green Transformation. *International Journal of Environmental Research and Public Health 2022, Vol. 19, Page 16749*, *19*(24), 16749. https://doi.org/10.3390/IJERPH192416749
43. Shirani Bidabadi, F., Mehdizadeh, H., Hai-Song, C., & Tavassoli Naini, M. (2023). An Overview of Different Approaches to Managing'CO2'Emissions from a Legal Perspective. *Journal of Chemical Health Risks*.
44. Toan, P. Van, Kim, L., Thanh, N. T., Toan, H. L., Tuan, L. A., Minh, H. V. T., & Kumar, P. (2023). Emission and Reduction of Air Pollutants from Charcoal-Making Process in the Vietnamese Mekong Delta. *Climate* , *11*(7), 149. https://doi.org/10.3390/CLI11070149
45. Tongwane, M. I., & Moeletsi, M. E. (2018). A review of greenhouse gas emissions from the agriculture sector in Africa. *Agricultural Systems*, *166*, 124-134.
46. Tyler, B. B., Lahneman, B., Cerrato, D., Cruz, A. D., Beukel, K., Spielmann, N., & Minciullo, M. (2023). Environmental practice adoption in SMEs: The effects of firm proactive orientation and regulatory pressure. *Journal of Small Business Management*. https://doi.org/10.1080/00472778.2023.2218435
47. Von Schickfus, M.-T. (2021). Institutional investors, climate policy risk, and directed innovation. *Ifo Working Paper*, *356*. https://hdl.handle.net/10419/235243
48. Williams, S., & Schaefer, A. (2013). Small and medium-sized enterprises and sustainability: Managers' values and engagement with environmental and climate change issues. *Business Strategy and the Environment*, *22*(3), 173-186.
49. World Trade Organization. (2022). *SMALL BUSINESS AND CLIMATE CHANGE*.