Household Sustainability during COVID-19: Investigating Shifts in Food, Water and Energy Consumption Behaviours in Bayelsa State, Nigeria

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ABSTRACT

This comprehensive study investigates the impact of the COVID-19 pandemic on pro-environmental behaviours within Nigerian households. It extensively reviews literature exploring various models and theories, including Chernovich's model and the Protection Motivation Theory (PMT), to understand the intricate factors influencing household eco-friendly conduct. Employing a correlational study design, the research utilized both probability and non probability sampling techniques to gather data through self-administered questionnaires from households in Yenagoa city, Nigeria. Findings revealed a significant increase in pro-environmental behaviors during the pandemic-induced lock down. Statistical analysis highlighted a notable rise in actions such as conserving energy, minimizing water usage, and reducing food waste. The study observed heightened household efforts in shutting off electrical appliances, adopting water-saving measures, and practicing better food management during the lock down period. Analysis of Household Conservative Behaviors (HCB) before and during the lock down showed a marked increase in eco-friendly actions, signifying the pandemic's positive influence on environmental consciousness.

Recommendations stemming from this research include advocating for awareness campaigns, financial incentives, community engagement, educational integration, policy advocacy, and continuous research to sustain and enhance pro-environmental behaviors. The study underscores the importance of crisis-preparedness strategies integrating sustainability considerations and tailoring interventions to diverse cultural contexts. These efforts aim to foster a culture of sustainability, promote awareness, and encourage proactive engagement in eco-friendly practices among Nigerian households, particularly during crises like the COVID-19 pandemic and in everyday life.

Keywords: COVID-19, Pro-Environmental behavior, Household Conservative Behaviors, Environment

INTRODUCTION

In 2020, the world experienced the COVID-19 pandemic. The spread of the virus impacted all aspects of life in all countries leading to drastic changes in business-as-usual practices across all sectors of both the world and Indigenous economies. Research has shown the negative impacts of COVID-19 as it affected education (Eze et al, 2021; Ebohon, 2021; Okagbue, 2023), health (Amzat, 2020; Afolalu et al, 2021; World Bank, 2021), tourism (Oruonye, 2020), the financial markets (Adenike, 2022), changes in human interpersonal relations (Ezeah et al, 2020) as well as mental health (Aborode et al, 2022; Adiukwu, 2022; UNICEF).

Further research has shown a positive effect as it pertains to online learning and the use of new technologies (Ugochukwu-Ibe et al, 2021; Egielewa, 2022) as well as its positive impact on the global environment (Rume et al, 2020; Barouki et al, 2021; Yang et al, 2022; Loh et al, 2022). This study delineates this body of literature in that it focuses on pro-environmental behaviors (PEB). Similarly, on the impact of COVID-19 on PEB, Elshaer et al (2022) x-rayed changes in the hospitality industry in Egypt, and D'Arco et al (2022)'s focus on proximity to events. Others focused on the impact of green ICT practices (Alla, Hassan & Chen, 2020), the role of belief about the virus in shaping PEB (Daryanto, Song & Soopramanien, 2022), perception of risk among Chinese customers (Zhou, 2022) as well as PEB among travelers in their new destination (Calder et al, 2022). In light of this, the study further focuses on PEB in households in Nigeria, given that other research have focused on resident well-being and confinement changes (Ramkissoon, 2020), university undergraduates in Italy (Tzakova et al, 2023), food waste behavior in Iran (Allahyani et al, 2022) and in Tunisia (Jribi et al, 2020). Within the Nigerian household context, the research outcomes focused on poverty (World Bank, 2021), hunger (Ogunyi et al, 2021), health (NES group, 2021), food insecurity (Orjiakor et al, 2023; Balam et al, 2023) and waste management (Olukanni et al, 2023).

This study is therefore necessary in that it assesses changes in Households Conservative Behaviour necessitated by COVID-19 in Nigeria.

REVIEW OF LITERATURE

Households Pro-Environmental Behavior

A lot of research aims to figure out why households act pro-environmentally. According to Chernovich (2013), pro-environmental conduct is one such sort of behavior, "consciously seeks to minimize the negative impact of one's actions on the natural and built world (e.g. minimize resource and energy consumption, use of non-toxic substances, reduce waste production)". Literature looks at how various elements (demographic, economic, psychological, institutional, as well as knowledge, attitudes, beliefs, and intentions) affect how pro-environmentalist a household is (Wilson & Dowlatabadi (2007).

To impact pro-environmentalism, social/environmental values, physiological factors, and situational factors are described in their model of environmental behavior by Barr & Gilg (2007). In several research, it is discussed how social order, environmental values, and other values influence environmental behavior. Butler (2010), for instance, carried out focus group research in the UK, in which the participants affirmed that being environmentally conscious is the norm and is regarded as moral action. According to Shove (2003), reported in Chernovich (2013), pro-environmentalism may be an element of being normal, despite the researcher's assertion that comfort and persuasion should come first for the inhabitants. According to Mirosa et al. (2013), moral principles and household energy use are related. The researchers conclude that the importance of safeguarding the environment affects how people use energy and whether they choose to purchase energy-efficient appliances, etc. However, they also emphasize how vital intelligence and capacity are for engaging in behavior that is energy-efficient.

The situational variables in the model include "physical infrastructure, geographical location, socio-economic structure and knowledge" Barr & Gilg, (2007). Chernovich (2013) makes a distinction between low-cost and high-cost models of environmental behavior based on the obtain ability and development of physical infrastructure. By "cost environmental behavior," the writers refer to the time and energy required to carry out an environmental action. Despite the fact that people do not always make economically sound decisions, economic variables can greatly influence people's behaviour in the environment, according to Kollmuss & Agyeman (2002), cited in Chernovich (2013).

Psychological factors outlined in Barr and Gilg's (2007) model are diverse attitudinal constructions of individuals. Similarly, Chernovich (2013) describes internal locus of control as a determinant of

environmental behavior.

As can be observed, most models that strive to explain pro-environmental conduct take into account a wide range of elements; yet, the significance of technology in molding pro-environmental behavior is overlooked. The purchase of energy-efficient appliances, for example, can be an aspect of the model described by Chernovich (2013); nevertheless, with few exceptions, researchers rarely address the agency of technology (Hargreaves et al., 2013).

Protection Motivation Theory (PMT)

To understand the variables influencing behavioral change, Rogers (1975) originally proposed the protection motivation theory (PMT). The natural disaster and public health sectors have both seen extensive use of the protection motive theory (PMT) (Floyd et al., 2000; Maddux & Rogers, 1983). In line with PMT, people alter their actions as a result of their desire to defend themselves against dangers such as natural disasters, global climate change, pandemics, and nuclear explosions (Floyd et al., 2000). With a focus on perceived threat and efficacy, PMT emphasizes that people will act if they perceive a serious threat (such as the fear of catching and spreading the COVID-19 virus) and they believe they are capable of taking action (such as being at home and maintaining physical distance to prevent the virus' spread). Based on the findings of the danger and coping assessments, a decision is taken (Rogers, 1983). However, assessments of threats (such as perceived risk, vulnerability, and benefits) and coping mechanisms (such as self-efficacy, response efficacy, and costs) work together to motivate people to engage in protective behaviors.

Individuals make use of the cognitive process of threat evaluation to regulate the gravity of the threat. It contains two key components: an evaluation of the danger's perceived seriousness and the likelihood that the threat will have negative effects on the target (vulnerability). The perceived degree of the threat refers to how serious a person thinks the possible harms are. An individual's view of how susceptible they are to harms is reflected in their perceived vulnerability. The perception of reward, which encompasses the perceived advantages of present practices (maintaining dangerous behaviors), is also included in the threat assessment. People may be inspired to take adaptive actions, such practicing pro-environmental habits, as a result of these perceptions of vulnerability, severity, and reward. A greater sense of severity and vulnerability is likely to increase an individual's incentive to engage in risk-reducing conduct, but a greater sense of rewards from present practices will likely reduce risk-reducing behavior. Along with danger appraisal, coping assessment—which is the estimation of a person's potential to engage in risk-reducing behaviors—also has an impact on the drive to protect oneself.

Both self-efficacy and reaction efficacy are considered in the coping appraisal. An individual's opinion of their capacity to carry out the activities is known as self-efficacy. The term "response efficacy" describes how well people believe the suggested risk-reducing practices work. The cost of carrying out the advised behavior is taken into account as part of the coping appraisal process (Rogers, 1983). People may be discouraged from engaging in advised actions by the high expense of doing preventative measures. The sum of the self-efficacy and response efficacy assessments, less the costs associated with engaging in the recommended preventative behavior, is the coping appraisal. According to the concept, it is more likely that someone will choose to engage in adaptive behaviors the higher their response efficacy, self-efficacy, and the lower their response cost.

Applying this theory to this study, we can say that for households to adopt an environmentally friendly behaviour during COVID-19 pandemic lock down, he/she needs to believe that there is a severe threat and by adopting an environmentally friendly behaviour, they can effectively reduce the threat. Hence the intention of households to engage in pro-environmental behaviors and COVID-19 pandemic prevention is strongly influenced by several PMT characteristics, such as the perceived severity of the COVID-19

Pandemic's effects and the reported effectiveness of the reaction, and self-efficacy. Similarly, with Household's perception of COVID-19 Pandemic threats to human health, family income and the social environment affected their engagement in pro-environmental behaviors, and hence, people, in general, have the habit of involving in environmentally friendly behaviors (e.g. riding a bicycle and walking) rather than (e.g. driving fewer miles and avoiding idling) which are non-environmentally friendly behaviour.

METHODOLOGY

The study adopted the correlational study design. To select the sample technique for the study, both probability and non probability sampling techniques were adopted. The purposive/judgmental sampling techniques were used by the researcher to select the respondents that possess the required characteristics and information that the researcher is seeking, in this case, the population comprised mainly male and female households within Yenagoa city. Data collected for this study were collected primarily with a self-administered questionnaire to the respondents, which was retrieved from them after sampling. The results of the data collected were collated and statistically analyzed using simple percentages to find out the extent of variation. Results were presented in tables and charts to summarize the revealed facts, and to present them in such a way that all the imported factors as contained.

Sample Size

The sample size for the study was gotten from mainly members of households who were residents of Yenagoa City at the time of the survey.

Choosing a sample size is typically necessary when there are too many study participants for the researcher to contact individually (Asika, 2011). The researcher used a statistical formula to calculate the sample size given the above population size of 36,264. Using **Taro Yamani's** method for a specified population, the sample size for this investigation was appropriately estimated.

To this extent the sample size is determined by

$$\mathbf{n = N/(1+N(e)^2)}$$

Where:

n = the sample size

N = population **36,264**.

e the limit of tolerance

1 = *constant*

Thus, our sample size becomes

$$n = 36{,}264/1+36{,}264(0.05)^2$$

$$n = 36{,}264/1+36{,}264(0.0025)$$

$$n = 36{,}264/1+90.66$$

$$n = 36{,}264/91.66$$

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n = 395.6 Sample size approximately becomes **400.**

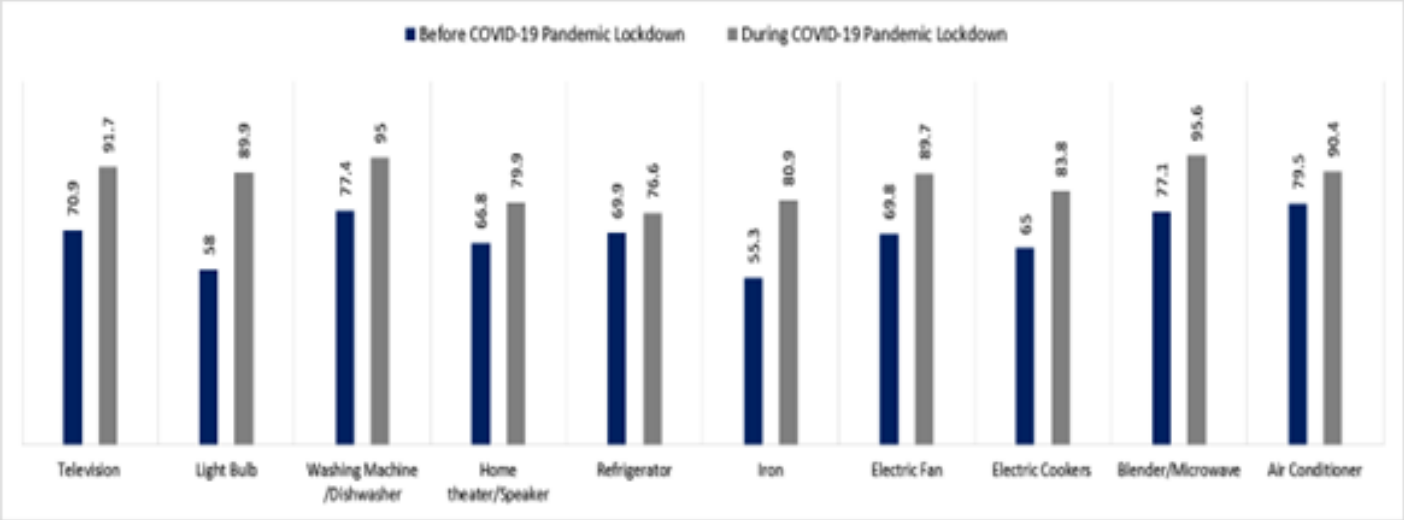
DATA PRESENTATION AND ANALYSIS

Households Conservative Behaviour (HCB) Before and During COVID-19 Pandemic Lock down.

In analysing HCB before and during COVID-19 Pandemic Lock down. Household energy Conservation, Household water and food Conservation and the rate of HCB were the indicators used in measuring HCB.

Figure 1 below, examines Household Energy Conservative Behavior (HECB) before and during COVID-19 Pandemic Lock down, findings from the study indicated an increase in Pro-Environmental Behavior (PEB) from 70.7% to 91.7% respectively with regards to putting off television; increase in pro-environmental behavior from 58% to 89.9% respectively with regards to putting off light bulb; increase from 77.4% to 95.0% respectively with regards to putting off washing machine/dishwasher; increase from 66.8% to 79.9% respectively with regards to putting off home theatre/speaker; 69.9% to 76.6% respectively with regards to putting off refrigerator, 55.3% to 80.9% increase respectively with regards to putting off iron; 69.8% to 89.7% increase respectively with regards to putting off electric fan; 65% to 83.8% increase respectively with regards to putting off electric cookers; 77.1% to 95.6% increase respectively with regards to putting off blender/microwaves; Lastly, the study indicated an increase in pro-environmental behavior from 79.5% to 90.4% respectively with regards to putting off air conditioner.

Fig 1: How often did Respondents put off Electric Appliances before and during COVID-19 lock down



Source: Field Survey, 2022

Figure 2 below examines Households attitude towards water and food conservative behaviour before and during COVID-19 Pandemic Lock down, findings from the study indicated an increase in (PEB) from 53.7% to 79.8% respectively in fixing leaking taps; increase from 67.9% to 94.5% respectively in turning off tap shower when bathing; increases from 54.9% to 87.8% respectively in turning off tap when washing dishes; increase from 68.9% to 91.0% respectively in turning off tap when brushing teeth; increase from 53.9% to 88.9% respectively in turn off taps when washing and cleaning with soap; increase from 45.9% to 85.0% respectively in sun drying food items to avoid spoilage; increase from 59.0% to 66.9% respectively in making list for shopping to avoid spoilage; increase from 75.0% to 95.4% respectively in choosing 1 and two days each week to eat leftover food in the fridge; increase from 53.7% to 86.3% respectively in sharing and donating food that would otherwise be wasted to family and friends.

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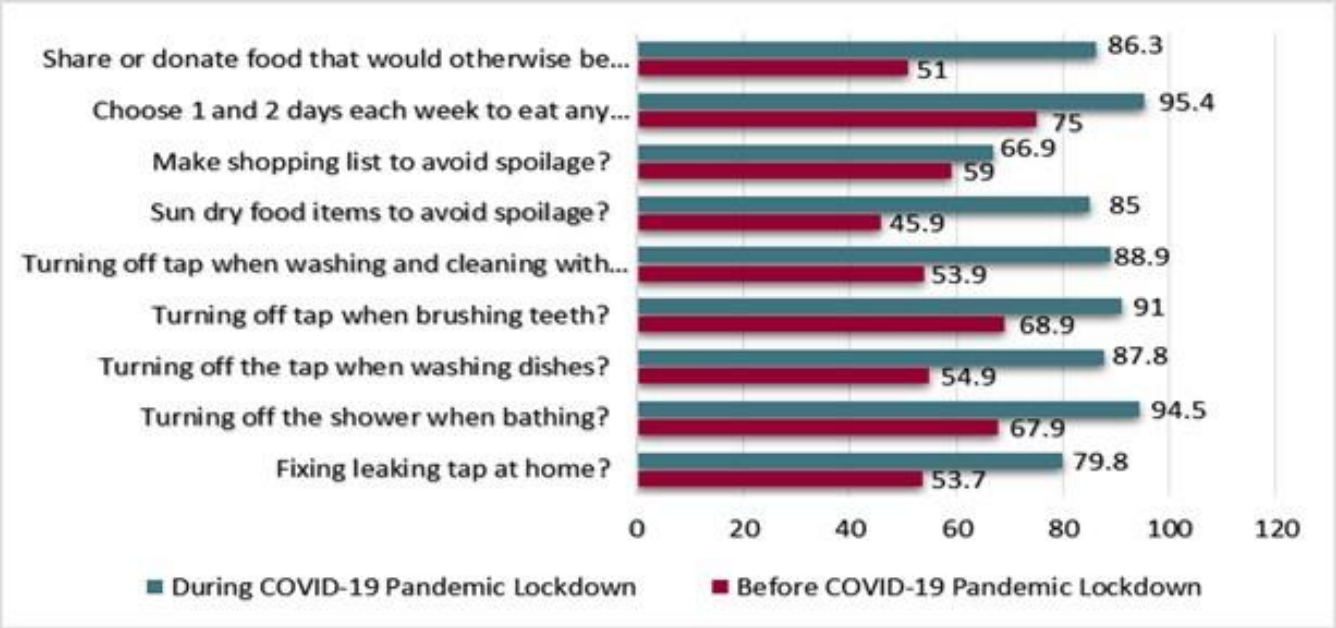
Fig 2 Respondents' attitude towards water and food conservative behaviour before and during the Covid-19 Lock down



Source: Field Survey, 2022

Table 2 examines the rate of Household Conservative behavior (HCB) before and during the COVID-19 Pandemic Lock down. From the table below, the highest number of respondent's rate of HCB before the COVID-19 lock down was 1 (92/24.0%); while the least was 8 (7/1.8%). During the COVID-19 lock down, the highest number of respondent's rate of HCB were 1 (82/21.4%); while the least were 8 (8/2.1%).

Table 2 The Rate of Household Environmental Conservative Behaviour Before and During COVID-19 Pandemic Lock down.

RESPONDS	Before COVID-19 Pandemic Lock down		During COVID-19 Pandemic Lock down	
	Frequency (n=384)	Percentage (%)	Frequency (n=384)	Percentage (%)
1	92	24.0	82	21.4
2	75	19.5	73	19.0
3	47	12.2	44	11.5
4	40	10.4	40	10.4
5	46	12.0	46	12.0
6	22	5.7	25	6.5
7	24	6.3	27	7.0
8	7	1.8	8	2.1
9	23	6.0	28	7.3
10	8	2.1	11	2.9

Source: Field Survey, 2022

In addition to the analysis above, the table 2 above clearly indicated a slight increase in the rate of HCB during the COVID-19 lock down in comparison with the rate before COVID-19 lock down. It is crystal clear that COVID-19 lock down in considerably influenced HCB during the lock down.

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Hypothesis 1 ($H_0$1) there is no difference in Household Conservative Behaviours (HCB) before COVID-19 lock down and during COVID-19 lock down.

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	HCB before COVID-19 Pandemic lock down. – .	3.69	384	2.536	.129
	HCB During COVID-19 Pandemic lock down. –	3.95	384	2.648	.135

Source: Field Survey, 2022

The table 3 shows that the descriptive statistics of the paired samples for each level of the variables. In effect, it shows that the measurement of the HCB before the COVID-19 lock down and the HCB during the COVID-19 lock down has different mean values. The mean value for the test before the COVID-19 Lock down is (M=3.69, S=2.536) while during COVID-19 lock down is M=3.95, SD=2.648. Since, the mean value of HCB during COVID-19 lock down is greater than the mean value of HCB before COVID-19 lock down we can conclude that the test is very effective and statistically significant.

Paired Samples Test									
		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	HCB test before COVID-19 Pandemic lock down. – HCB test during COVID-19 Pandemic lock down	-.258	1.338	0.68	-.392	-.124	3.776	383	.000

Source: Field Survey, 2022

Results of the paired sample t-test show that the mean of HCB differs before COVID-19 lock down (M=46.90, SD =4.943) and during COVID-19 lock down (M=52.07, SD=6.253) at the 0.5 level of Significance, t= (3.776), df=383, p<0.000, 95% CI for mean difference: -.392 to -.124.407, r=0.68. On average, the mean was about -.258 points greater than before the COVID-19 lock down. These results have a number of inferential implications; from which we can draw a logical conclusion. Firstly, the Mean difference of the paired sample t-test is -.258 which by the presence of the negative sign implies that there is effectiveness in the HCB test before lock down and the HCB test during the COVID-19 lock down. Secondly, since the p-value at the 2-tailed test (p<0.000) is less than the mean difference (Md=-.258) it means that the paired sample t-test of the two variables is statistically different from zero (0).

Hence, we can therefore conclude that there is a statistically significant difference between the before-test

and the during-test or between the HCB before the COVID-19 lock down and the HCB during the COVID-19 lock down.

So, we will reject the null hypotheses and accept the alternate hypotheses, because the treatment administered was effective. The alternate hypothesis as proven by the test above is restated thus: *"there is a significant difference in Household Conservative Behaviours (HCB) before COVID-19 lock down and during COVID-19 lock down".*

FINDINGS

Findings from this study indicated that about household energy conservation behaviour, there was a significant increase in conservative behaviour during the outbreak of COVID-19 when compared to before. Also, the conservative behaviours that showed significant increase include; putting off the television, putting off light bulbs, putting off refrigerators, electric cookers, air conditioners, electric fan etc. This finding is supported by Samuli et al., (2020) whose report revealed that during COVID-19 households tend to be more energy-consumptive by shutting off electrical appliances when not in use, reducing home air-conditioning use and turning off lights when not in use. The finding is also supported by the study of Gabriel (2020) which discovered that households relatively engage in switching off appliance after use during lock down.

Findings from this study also indicated that, with regards to household food and water conservation behaviour, there was a positive increase in conservative behaviour during the outbreak of COVID-19 when compared to before. The conservative behaviour that showed a positive increase includes; fixing leak taps, turning off the shower when bathing, turning off the tap when washing dishes, sundry food items to avoid spoilage making a shopping list to avoid spoilage, choosing 1 and two days each week to eat leftover food in the fridge, and shared and donate food that would otherwise be wasted to family and friends etc. This finding is in line with the report of Ayodeji in Kaduna 2020, the result revealed that metropolitan resident has significantly contributed to the lesser generation of wastes especially food and water waste during lock down.

Findings on Household Conservative Behaviours (HCB) showed that a lesser amount of the population regardless of the differences in their socio-demographic statuses developed a positive (pro-environmental) during the lock down more than they ever did before the lock down. They attained this by conserving energy through the use of television, turning off light bulbs, use of pressing irons, use of washing machines, etc. As such it was clear that HCB was much lower during the lock down than before the lock down due to the fact the lock down kept everyone indoors more often than not.

CONCLUSION

The impact of the COVID-19 pandemic on household behaviors, particularly pro-environmental behaviors in Nigeria, has been a pivotal focus in this comprehensive study. Through an in-depth review of literature that encompasses various models and theories exploring pro-environmental conduct, such as Chernovich's model and the Protection Motivation Theory (PMT), the study delves into the intricate web of factors influencing household behaviors.

The methodology employed a correlational study design, using both probability and non probability sampling techniques. Findings revealed significant changes in households' pro-environmental behaviors during the pandemic, particularly in energy and resource conservation, highlighted through statistics and surveys.

The study observed a notable increase in pro-environmental behaviors during the COVID-19 lock down,

evident in actions such as shutting off electrical appliances, conserving water, and minimizing food waste. These findings align with other research studies during the pandemic, indicating a trend toward more conscious resource usage and waste reduction.

Analyzing the Household Conservative Behaviors (HCB) before and during the COVID-19 lock down revealed a statistically significant increase in pro-environmental behaviors during the lock down period. Results showed a higher adoption of environmentally friendly actions like energy conservation and waste reduction during this time, suggesting that the lock down influenced household behaviors positively in terms of environmental consciousness.

In conclusion, the study accentuates the substantial impact of the pandemic on household behaviors, specifically in fostering pro-environmental actions. The findings underscore a shift toward more mindful resource usage and conservation practices during the lock down period, emphasizing the importance of external circumstances, such as the pandemic, in shaping and promoting environmentally conscious behaviors.

RECOMMENDATIONS

Based on the extensive study investigating the effects of COVID-19 on eco-friendly habits in Nigerian households, the following recommendations are made:

One approach involves educational campaigns to highlight the advantages of eco-conscious actions during and after the pandemic. These initiatives should emphasize the positive outcomes related to preserving resources, minimizing waste, and promoting long-term sustainability. Simultaneously, ensuring accessible information on energy conservation, reduced water usage, and better food management becomes crucial. This information dissemination could happen via digital platforms, local community centers, and educational programs, empowering households with practical, easy-to-follow guidelines.

Financial support initiatives, such as incentives or assistance programs, should be considered to encourage households to invest in energy-efficient appliances and waste reduction measures. This could include subsidies, tax breaks, or targeted support for low-income families. Additionally, fostering community involvement in environmental projects, like community gardens or waste reduction programs, and integrating environmental education into school curriculums can instill eco-friendly values early on. Collaborating with government bodies, NGOs, academic institutions, and businesses to craft policies supporting eco-friendly behaviors becomes pivotal. It could involve regulations promoting energy efficiency, sustainable waste management, and resource use. Continuous research to monitor the effectiveness of implemented measures and adapt strategies accordingly is crucial for ongoing improvement.

Lastly, aligning crisis management plans with sustainability considerations and tailoring interventions to resonate with diverse cultural contexts within Nigeria are essential steps toward fostering a sustainable culture and encouraging proactive engagement in eco-friendly practices in households, especially during crises like the COVID-19 pandemic and in daily life.

REFERENCE

1. Adiukwu, F., Ojeahere, M., Adesokun, O. & Babalola, G. (2022) Mental health distress during the COVID-19 pandemic in Nigeria: Need for psychological intervention. S Afr J Psychiatr. 2022; 28: 1550. Published online 2022 Jan 27. doi: 10.4102/sajpsychiatry. v28i0.1550 PMCID: PMC8832007PMID: 35169505
2. Afolalu,O.O., Atekoja, O.E., Oyewumi, Z.O., Adeyeye, S.O., Jolayemi, K.I., & Akingbade, O. (2021) Perceived impact of coronavirus pandemic on uptake of healthcare services in South West Nigeria.

Pan Afr Med J. 2021; 40: 26. Published online 2021 Sep 9. doi: 10.11604/pamj.2021.40.26.28279 PMCID: PMC8531964PMID: 34733394

3. Alla, K. R., Hassan, Z. and Chen,S.D (2020) The Pro-environmental Behaviour and the Effect of COVID-19 Pandemic in Malaysia on Green IT Practices, 2020 International Conference on Computational Intelligence (ICCI), Bandar Seri Iskandar, Malaysia, 2020, pp. 75-79, doi: 10.1109/ICCI51257.2020.9247762.
4. Amzat, J., Aminu, K., Kolo, V.I., Akinyele, A.A., Ogundairo,J.A., & Danjibob, M.C. (2020) Coronavirus outbreak in Nigeria: Burden and socio-medical response during the first 100 days. Int J Infect Dis. 2020 Sep; 98: 218–224. Published online 2020 Jun 22. doi: 10.1016/j.ijid.2020.06.067 PMCID: PMC7307993PMID: 32585282
5. Balana, B.B., Ogunniyi, A., Oyeyemi, M. (2023) COVID-19, food insecurity and dietary diversity of households: Survey evidence from Nigeria. Food Sec. 15, 219–241 (2023). https://doi.org/10.1007/s12571-022-01312-w
6. Barouki, R., Kogevinas, M., Audouze, Belesova, K. Bergman, A. Birnbaum, L., Boekhold, S., Denys, S., Desseille, C., Drakvik, E., Frumkin, H., Garric, J., Destoumieux-Garzon, D., Haines, A., Huss, A., Jensen, G., Karakitsios, S., Klanova, J., Koskela, L., Francine Laden, F., & Vineis, P. (2021) The COVID-19 pandemic and global environmental change: Emerging research needs. Environment International Vol 146
7. Barr S., Gilg A.W., (2007). A conceptual framework for understanding and analyzing attitudes towards environmental behavior. Geografiska Annaler: Series B, Human Geography, 89, Issue 4: 361–379.
8. Butler C. (2010). Morality and climate change: is leaving your TV on standby a risky behavior? Environmental values: 19.
9. Calder, G., Radic, A., Ryu, H.B., Ariza-Montes, A. & Han, H. (2022) COVID-19 and Pro-environmental Behaviour at Destinations Amongst International Travellers. Front. Psychol., 14 April 2022 Sec. Organizational Psychology. Volume 13 – 2022 | https://doi.org/10.3389/fpsyg.2022.879300
10. Chernovich, (2013). Technology and pro environmental behavior in urban households: how technologies mediate domestic routines. Junior Research Fellow, Institute for Statistical Studies and Economics of Knowledge, National Research University Higher School of Economics, e-mail: echernovich@hse.ru.
11. Daryanto, A., Song, Z. and Soopramanien, D. (2022) The COVID-19 pandemic as an impetus for pro-environmental behaviours: The role of causal attribution. Personality and Individual Differences. Volume 187, March 2022, 111415
12. Ebohon, O., Obienu, A.C., Irabor, F. (2021) Evaluating the impact of COVID-19 pandemic lockdown on education in Nigeria: Insights from teachers and students on virtual/online learning. Bull Natl Res Cent 45, 76. https://doi.org/10.1186/s42269-021-00538-6
13. Elshaer, A.M., Al-Abyadh, M., Alsetoohy, O. and Agina, M.F. (2022) COVID-19 Pandemic: A Motive for Pro-Environmental Behaviors (Pebs) in the Egyptian Tourism and Hospitality Industry. Rocznik Ochrona Środowiska 24:415-438 DOI: 10.54740/ros.2022.030
14. Eze, U.N., Sefotho, M.M., Onyishi, C.N., Chiedu Eseadi, C. (2021) Impact of COVID-19 pandemic on Education in Nigeria: Implications for Policy and Practice of e-learning. Library Philosophy and Practice (e-journal)
15. Ezeah, G., Ogechi, E.O., Ohia, N.C., & Celestine, G.V. (2020) Measuring the effect of interpersonal communication on awareness and knowledge of COVID-19 among rural communities in Eastern Nigeria, Health Education Research, Volume 35, Issue 5, October 2020, Pages 481–489, https://doi.org/10.1093/her/cyaa033
16. Floyd, D. L., Prentice-Dunn, S., and Rogers, R. W.: A Meta Analysis of Research on Protection Motivation Theory, J. Appl. Soc. Psychol., 30, 407–429, https://doi.org/10.1111/j.15591816.2000.tb02323.x, 2000.
17. Hargreaves T., Nye M., Burgess J. (2013). Keeping energy visible? Exploring how householders interact with feedback from smart energy monitors in the longer term. Energy policy, 52: 126-134.

18. Loh, H.C., Looi, I., Ch'ng, A.S.H., Goh, K.W., Ming, L.C. & Ang, K.H (2022) Positive global environmental impacts of the COVID-19 pandemic lock down: a review. Geo Journal. 2022; 87(5): 4425–4437. Published online 2021 Jul 23. doi: 10.1007/s 10708-021-10475-6 PMCID: PMC8299448PMID: 34316088
19. Maddux, J. E. and Rogers, R. W.: Protection motivation and self efficacy: A revised theory of fear appeals and attitude change, J. Exp. Soc. Psychol., 19, 469–479, https://doi.org/10.1016/00221031(83)90023-9, 1983.
20. Mirosa M., Lawson R., Gnoth D. (2013). Linking personal values to energy efficient behaviors in the home. Environment and Behavior 45(4) 454 -475.
21. Nes group (2021) Assessment of the Impact of COVID-19 Lock down on Households in Nigeria. Online: https://www.nesgroup.org/downloadresourcedocuments/Assessment%20of%20the%20 Impact %20of%20Covid-19 1616498934.pdf
22. Ogunji, J.; Iheanacho, S.; Ogunji, C.V.; Olaolu, M.; Oleforuh-Okoleh, V.; Amaechi, N.; David, E.; Ndukauba, O.; Ikegwu, T.M.; Biamba, C.; (2021) Counting the Cost: The Effect of COVID-19 Lock down on Households in South East Nigeria. Sustainability 2021, 13, 12417. https://doi.org/10.3390/su 132212417
23. Okagbue, E.F, Ezeachikulo, U.P., Nchekwubemchukwu, I.S., Chidiebere, I.E., Kosiso, O., Ouattaraa, C.A.T, Esther Onyinye Nwigwe, E.O. (2023) The effects of Covid-19 pandemic on the education system in Nigeria: The role of competency-based education. International Journal of Educational Research. Volume 4, https://doi.org/10.1016/j.ijedro.2022.100219
24. Olukanni, D.O., Nwafor, C. and Ogundare, O. (2022) COVID-19: Impacts and implications on waste management, the Nigeria economy and the way forward. AIP Conference Proceedings. August 2022. 2437(1):020158 DOI: 10.1063/5.0092657
25. Oruonye, E.D. (2020) An Appraisal of the Potential Impacts of Covid-19 on Tourism in Nigeria. Journal of Economics and Technology Research. Publisher: Scholink Co, Ltd.
26. Rogers, R. W. A Protection Motivation Theory of fear appeals and attitude change. J. Psychol. 1975,91,93–114. [CrossRef] [PubMed]
27. Rogers, R.W. Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In Social Psychophysiology: A Source book; Cacioppo, B.L., Petty, R.E., Eds.; Guil ford Press: London, UK, 1983.
28. Rumea, T and Didar-Ul I.S.M (2020) Environmental effects of COVID-19 pandemic and potential strategies of sustainability. Heliyon. 2020 Sep; 6(9): e04965. Published online 2020 Sep 17. doi: 10.1016/j.heliyon.2020.e04965 PMCID: PMC7498239PMID: 32964165
29. UNICEF (2021) Impact of COVID-19 on poor mental health in children and young people 'tip of the iceberg'. 05 October 2021. Available at: https://www.unicef.org/nigeria/press-releases/impact-covid-19-poor-mental-health-children-and-young-people-tip-iceberg-unicef
30. Ugochukwu-Ibe, I.M. & Ibeke, E. (2021) E-learning and COVID-19: the Nigerian experience: challenges of teaching technical courses in tertiary institutions. In Xhina, E. and Hoxha, K. (eds.) Recent trends and applications in computer science and information technology: proceedings of 4th Recent trends and applications in computer science and information technology international conference 2021 (RTA-CSIT 2021), 21-22 May 2021 [virtual conference]. CEUR workshop proceedings, 2872. Aachen: CEUR-WS [online], pages 46-51. Available from: http://ceur-ws.org/Vol-2872/paper07.pdf
31. Vishwanath, J.L (2021) The COVID-19 crisis in Nigeria: What's happening to welfare? New data call for expanded social protection in Africa's most populous country. NOVEMBER 16, 2021 https://blogs.world bank.org/africacan/covid-19-crisis-nigeria-whats-happening- welfare-new-data-call-expanded-social-protection
32. World Bank (2021) Monitoring COVID-19 Impact on Nigerian Households. Online: https://www.worldbank.org/en/country/nigeria/brief/monitoring-covid-19-impact-on-nigerian-households
33. Yang, M., Chen, L., Msigwa, G., Tang, K.H.D., & Yap, P. (2022) Implications of COVID-19 on

global environmental pollution and carbon emissions with strategies for sustainability in the COVID-19 era. Science of The Total Environment. Volume 809, 25 February 2022, 151657

34. Zhou, S. (2022) The effect of COVID-19 risk perception on pro-environmental behavior of Chinese consumers: Perspectives from affective event theory. Front. Psychol., 04 January 2023 Sec. Environmental Psychology Volume 13 – 2022 | https://doi.org/10.3389/fpsyg.2022.1093999