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Review and Analysis of Nigeria's National Counterterrorism and CBRNE Risk Mitigation Strategies in the Face of Emerging Security Risks

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January 2025

U.S. DEPARTMENT OF ENERGY
NNSA National Nuclear Security Administration

SAND 2025-09165R
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The views expressed in this paper are those of the author and do not necessarily reflect the position of their respective institutions or Sandia National Laboratories.

ACKNOWLEDGEMENTS

My profound appreciation goes to my loving wife, Amaka for being there for me day and night encouraging me to keep pushing on even when my strength, emotional drive and passion is waning due to stress of combining my official duties and completing my Ph.D dissertation/thesis.

To my lovely and wonderful kids—*Uchechukwu Jr, Ugochukwu, Udochukwu, and Kamsiyochukwu:* Daddy loves you all. To my mentor, Prof. L.A. Dim, Fnip., former Director General, Nigerian Nuclear Regulatory Authority. Thanks for the motivation and guidance. I would also like to extend my sincere gratitude to the Management of Cooperative Monitoring Center (CMC) at Sandia National Laboratories led by *Dr. Amir H. Mohagheghi*, for providing the opportunity and motivation as the 2024 Visiting Research Scholar at CMC, Sandia National Laboratories, U.S.A. Without your gesture this opportunity would not have materialized. To *Adriane Littlefield, Kaylee Michelle Jerman, Farnaz Lyla Alimehri* and *Hannah Ferrell*, thanks immensely for your unwavering support, constructive critique, guidance and advice at the onset of the program and while fine tuning the research report. Also, *Haesun Chung, Cindy L. Burns* and *Amanda Laurel Pavlakos* your efforts are deeply appreciated for facilitating and assisting with the funding aspect of the program. I'm highly indebted to you all.

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EXECUTIVE SUMMARY

The emerging threat of CBRNE proliferation in Nigeria is particularly concerning, given the nexus between terrorism and the potential use of unconventional weapons. In Nigeria and sub-Saharan Africa, CBRNE risks arise from several factors, including inadequate regulation of dual-use materials and biological agents, as well as weak public health systems. The potential proliferation of such weapons poses catastrophic implications not only for Nigeria but also for regional and global security. Efforts to address these threats are hindered by gaps in interagency coordination, resource constraints, and challenges in intelligence sharing, public awareness, and emergency preparedness.

This study explored the current state of CBRNE risk mitigation strategies in Nigeria, focusing on the public's awareness, governmental response mechanisms, and the challenges involved. This author conducted an in-depth survey from literature and through interviews of the current coordinating and emergency response mechanisms to handle CBRNE events in view of growing CBRNE terrorism threats and attacks by non-State actors in Nigeria. The survey participants stemmed from security, emergency response, government, and academic backgrounds. The survey found that respondents perceived CBRNE events to severely impact Nigeria's security, while 20% of respondents admitted to a low level of familiarity with CBRNE threats writ large. The majority of respondents had either never heard of nor participated in any CBRNE preparedness trainings. or utilizing CBRNE materials to further their agendas, posing substantial national security risks. The differing answers across questions like the Nigeria's CBRNE emergency response effectiveness and the greatest challenges to CBRNE preparedness demonstrate an overall lack of training on CBRNE risks across the field of participants.

Based on the findings of this study, the following policy recommendations should be vigorously pursued to effectively tackle the myriad challenges identified:

1. **Establishment of a National CBRNE Coordinating Agency**: This agency would serve to harmonize policies, foster inter-agency collaboration, and prioritize funding for CBRNE initiatives, ensuring a unified and strategic approach to risk mitigation.
2. **Capacity Building and Training**: It is essential to address existing education and training gaps by enhancing capacities in critical technical areas, such as forensic analysis and investigative capabilities. This will empower personnel to effectively respond to CBRNE incidents.
3. **Enhanced Surveillance and Detection**: Investing in advanced surveillance and detection technologies will improve the ability to identify and respond to potential CBRNE threats in a timely manner.
4. **Infrastructure Development**: Strengthening the physical and technological infrastructure necessary for effective CBRNE response is crucial for ensuring readiness and resilience.
5. **Public Awareness and Community Engagement**: Initiatives aimed at risk communication and community resilience should be prioritized to enhance public understanding of CBRNE threats and foster proactive community involvement in safety measures.

Additionally, Nigeria should actively pursue international cooperation at both multilateral and regional levels. This collaboration will facilitate access to technical expertise, address funding constraints, enhance capacity-building efforts, and effectively combat cross-border CBRNE threats. By implementing these recommendations, Nigeria can significantly strengthen its CBRNE risk mitigation strategies and enhance national security.

ACRONYMS AND DEFINITIONS

Abbreviation	Definition
AGOA	Africa Growth and Opportunity Act
BHT	Boko Haram Terrorists
BTWC	Biological & Toxins Weapons Convention
CBRNE	Chemical, Biological, Radiological, Nuclear & Explosives
CPPNM	Convention on the Physical Protection of Nuclear Material
CTITF	Counterterrorism Implementation Task Force
CWC	Chemical Weapons Convention
ECOWAS	Economic Community of West African States
OPCW	Organization for the Prohibition for Chemical Weapons
HEU	Highly Enriched Uranium
IED	Improvised Explosive Device
INED	Improvised Nuclear Explosive Device
ISWAP	Islamic State in West Africa Province
LCBC	Lake Chad Basin Commission
LEU	Low Enriched Uranium
LINAC	Linear Accelerator
MDA	Ministries, Departments & Agencies
MNJTF	Multi-National Joint Taskforce
MOX	Mixed Oxide
NACTEST	National Counterterrorism Strategy
NBS	National Bureau of Statistics
NCTC	National Counterterrorism Centre
NDT	Non Destructive Testing
OAS	Organization of American States
RDD	Radiological Dispersal Device
SALW	Small Arms and Light Weapons
VEO	Violent Extremist Organization
WMD	Weapons of Mass Destruction

1. INTRODUCTION

As a nation with one of the highest rates of terrorist activities in the world (IEP, 2024), the risk of CBRNE terrorism in Nigeria is real and present. CBRNE stands for Chemical, Biological, Radiological, Nuclear, and Explosives - a category of threats encompassing hazardous substances or devices with the potential to cause mass casualties and severe societal disruption. Nigeria and other sub-Saharan Africa States face a persistent and evolving terrorist threat from violent extremist organizations (VEOs). VEOs employ asymmetric tactics, including bombings, sabotage, kidnappings, and attacks on critical national infrastructure, particularly in the northeast, northwest, and northcentral geo-political zones of Nigeria. This study investigates CBRNE risk mitigation strategies in Nigeria with the following objectives:

1. To determine the correlation and statistical significance between macroeconomic variables and the proliferation of crime, terrorism, and small arms and light weapons (SALWs) in relation to terrorism in Nigeria.
2. To conduct a comprehensive survey, through literature review and interviews, of existing coordinating and emergency response mechanisms for CBRNE events amid increasing terrorism threats from non-state actors.
3. To identify effective response mechanisms and develop actionable policy recommendations for improvement.

This paper draws upon material in the public domain and in-depth field survey to address three fundamental questions:

1. What are CBRNE materials and weapons, and what are their sources? Are there beneficial uses and monitoring mechanisms? How can the risks posed by CBRNE be mitigated if they enter the hands of home-grown violent extremists (HVEs)?
2. In Nigeria's revised National Security Strategy (NSS) and National Counterterrorism Strategy (NACTEST) policy documents, what is defined as National Security? Does the strategy encompass all threats comprehensively?
3. What effective coordinating and emergency response mechanisms exists to handle CBRNE event(s) in view of growing terrorism threats and attacks by non-State actors in Nigeria?

Motivation for this study stems from Nigeria's fragmented approach to CBRNE risk mitigation due to several interconnected challenges from institutional, structural, and operational inefficiencies and the overriding need to close the gaps in the security framework to mitigate potential risks. The fragmented approach weakens the country's ability to effectively prevent, detect, and respond to CBRNE incidents.

1.1. Nigeria Snapshot

According to the U.S. State Department, the United States established diplomatic relations with Nigeria in 1960, following Nigeria's independence from the United Kingdom. Nigeria's economic, military, and strategic relevance as the most populous Black nation on Earth, has strengthened diplomatic and bilateral relations with the United States over the years through the US-Nigeria Bi-national Commission. The United States is the largest foreign investor in Nigeria, with U.S. foreign direct investment concentrated largely in the petroleum, mining, and wholesale trade sectors. In 2022, the two-way trade in goods between the United States and Nigeria totaled over $8.1 billion. At $3.4 billion in 2022, Nigeria is the second largest U.S. export destination in sub-Saharan Africa. U.S. exports to Nigeria include vehicles, wheat, machinery, fuels, and plastics. Nigerian exports to the United States include crude oil, cocoa, cashew nuts, and animal feed. Multiple U.S.-based film and entertainment companies are active in Nigeria, and Nigeria's creative industries have significant export potential as Nigeria is eligible for preferential trade benefits under the African Growth and Opportunity Act (AGOA).

Nigeria is also an important U.S. security partner in Africa. Nigeria is engaged in intensive efforts to defeat terrorist organizations within its borders, including Boko Haram and Islamic State in Iraq and Syria-West Africa (ISIS-WA) and splinter groups that are determined to use extreme violence to achieve imposing Sharia law in Nigeria. U.S. security cooperation strengthens the capacity of Nigeria's security forces and security institutions to respond effectively to these and other security threats, while prioritizing avoidance of civilian harm and promoting human rights. Nigeria is a vital member of the Defeat ISIS (D-ISIS) coalition and in October 2020, Nigeria co-hosted a virtual D-ISIS conference with the United States. Through U.S. assistance to Nigeria, the U.S. government works to protect Americans on Nigeria soil from terrorism and disease, creating the opportunity for trade, investment, and support for a more stable and prosperous. Nigeria and the United States are both members of the United Nations, International Monetary Fund, World Bank, World Trade Organization, and several other international organizations. Nigeria is a member state of the African Union and the Economic Community of West African States (ECOWAS), with its headquarters residing in the country. Nigeria also is an observer to the Organization of American States.

Nigeria, as a regional powerhouse in the West African sub-region, has long been impacted by terrorism, with significant fluctuations in its terrorism index. In 2023, the index fell to 7.58 from 8.07 in 2022, marking a decline from its peak of 9.12 in 2015 (Global Terrorism Index, 2023). Between 2018 and 2022, the frequency of attacks varied, with a notable reduction in 2022, 24 reported incidents, compared to prior years, such as 2019 with 201 attacks (NBS, 2024). The primary actors include *Jama'atu Ahlus Sunna Lidda'wati Wal Jihad*, otherwise known as Boko Haram and the Islamic State in Iraq and Syria (ISIS) West Africa, who often target civilians and military installations (Onuoha, *et.al.* 2023).

Although the tactics of terrorists have changed over time (Eldor & Melnick, 2004), the primary objective of terrorism is still to impose sufficient political and economic pressure on a government so that it concedes to the demands of the terrorists. The more challenging problem, however, is that

the motivation for terrorism in a resource-rich, socially heterogeneous developing country like Nigeria could be complicated by extra dimensions such as resource competition, ethnic fractionalization, and economic deprivation. These contributing factors complicate the path to understanding and designating solutions. Meaningful intellectual discourse on the impact and consequences of terrorism and CBRNE risk mitigation strategies requires a clear perspective on the definition of the concepts, especially in the light of the controversy about what should and should not be classified as terrorism.

The risk of CBRNE terrorism threat in Nigeria is real and present. CBRNE events are actions or occurrences in which CBRNE agents are intentionally or unintentionally released or dispersed into the environment. The threat of criminal CBRNE hazards can manifest as acts of terrorism, acts of sabotage, and illicit trafficking. This is attested to by UN General Assembly resolution A/RES/66/282 (2012) on the United Nations Global Counter Terrorism Strategy as revised in 2023 through Resolution A/RES/77/298. CBRNE events can also include incidents when weapons, specifically designed to inflict harm through the release of CBRNE agents, are used and have the potential for affecting the lives, health, and well-being of a large number of people, directly from exposure to the released agents or indirectly after the release and dispersal of the agent, such as through contamination (Malich, 2015).

The legal framework for the prevention of terrorism in Nigeria is embodied in two enactments: Terrorism Prevention Act (TPA) 2011 and Terrorism (Prevention) Amendment Act 2013. The TPA, as amended, carefully avoided the definition of terrorism as a concept. Rather, it defines 'act of terrorism'. Section 1(3) of the TPA (as amended) defines an 'act of terrorism' as an act that is deliberately done with malice aforethought and which may seriously harm or damage a country or an international organization. Any act also amounts to terrorism when it is deliberately done with malice aforethought and is unduly intended to compel a government or international organization to perform or abstain from performing any act.

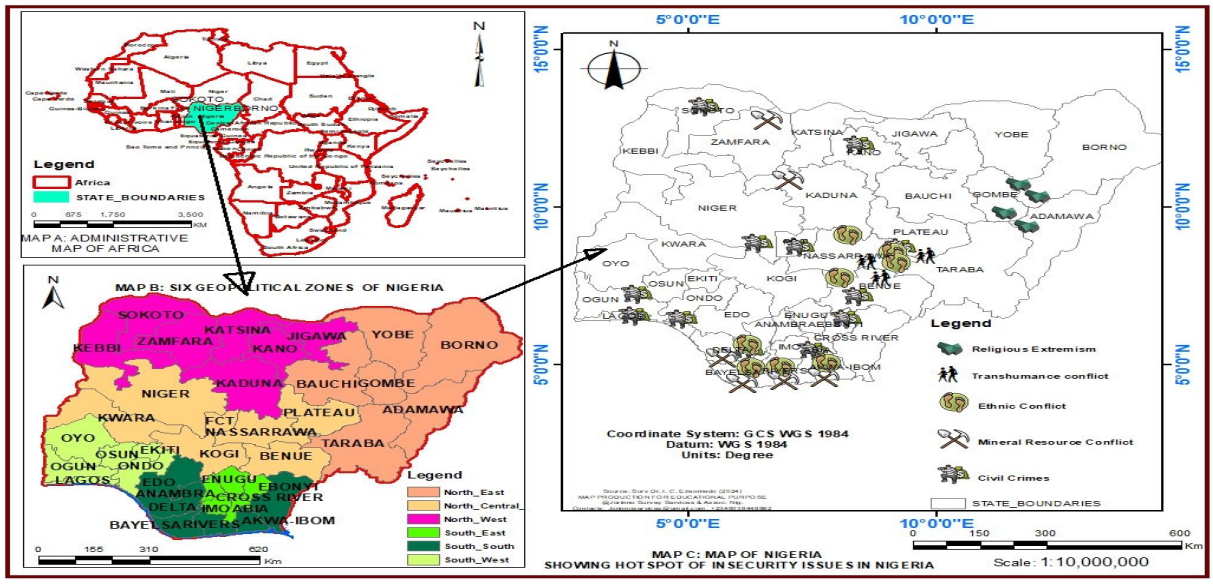

Figure 1: Map of Nigeria showing hotspots of Insecurities across the six geopolitical zones

1.2. Nigeria's History of Counter Terrorism

The myriad security coalitions present in Nigeria to combat terrorism have done so with varying success. Security forces continue to engage the groups on the frontlines of their forest bases. With the assistance of local and international joint task forces, such as the Civilian Joint Task Force (CJTF), the Africa Union Peace and Security Council (PSC), and the mandated Multinational Joint Task Force (MNJTF), shifting the conflict to more remote areas of Nigeria. Although the government security forces have gained enormous advantage in their frontal clashes with these extremists, by January 2018 the groups had successfully carried out several brutal assaults. These assaults included one on United Nations headquarters in Abuja and Doctors without Borders staff, shifting their strategy back to traditional hit-and-run guerilla tactics. During Easter of the same year, a single attack utilizing five suicide bombers resulted in over 29 dead and 84 wounded (Summers, 2019). The ability of extremists to adapt to counter-terrorism efforts and leverage local grievances poses continuous challenges to socio-economic landscape of Nigeria (e.g. unemployment, poverty, and lack of access to education), political and governance issues, and porous borders. CBRNE threats are a growing concern due to the possibility of non-State actors acquiring and using such materials for propagating their agenda.

Some evidence suggests the likelihood of Boko Haram and its affiliates to begin using CBRNE weapons in Nigeria is increasing. The ubiquity of the internet in the later part of the twentieth century, and web technologies, like Web 2.0 and 3.0, have largely contributed to the spread of CBRNE weapons know-how. This increases the potential of Boko Haram and its affiliates, with splinter groups like ISWAP, being able to obtain not only the ingredients needed to make CBRNE weapons, but also the information needed to build, weaponize, and successfully deploy them. Some of the base materials for such weapons systems even occur naturally, like castor beans, which can be

processed to produce the dangerous bio-toxin known as ricin and deployed against unsuspecting populations. Live strains of very contagious viruses like Ebola and smallpox can be found in high-tech research laboratories across the country. The accessibility of these components coupled with terrorist motivations demonstrates the need for both enhanced CBRNE security as well as a plan in case of its use.

While Nigeria has not experienced direct CBRNE attacks, vulnerabilities exist, particularly in industries handling hazardous materials in the form of oil spills, gas explosions and chemical leaks. Chemical risks are largely related to industrial chemicals used in agriculture, mining, and manufacturing, such as ammonia. Biological risks persist in Nigeria as a result of various public health emergencies, such as the 2019 SARS-CoV-2 virus (otherwise known as the COVID-19 virus) Avian flu,/influenza-A viruses (H5N1 and H9N2), Ebola virus disease (EVD) and more recently Lassa fever and human metapneumovirus-hMPV (WHO, 2025). Other CBRNE risks exist in the form of radiological and nuclear risks, encompassing radiological incidents that stem from the use of radioactive materials in medical and industrial applications, requiring stringent control measures.

According to the United Nations Office on Drugs and Crime Strategic Vision for Nigeria (2030), Nigeria is among the top three countries in Africa with the highest number of illicit firearms, with an estimated 6 million small arms and light weapons (SALWs) in circulation. 70% of these SALWs enter Nigeria through porous borders, while 30% are locally manufactured. The Niger Delta region of Nigeria is a major hub for SALWs inflow, with an estimated 20,000 to 30,000 weapons in circulation. The Nigerian government reports between 2019 and 2020, security agencies such as the Nigeria Customs Service (NCS), Nigeria Security and Civil Defence Corp (NSCDC), Nigeria Police Force (NPF), and others seized over 10,000 SALWs, including AK-47 assault rifles, pistols, and explosives most of which comes from neighboring countries, like Libya, Chad, and Cameroon, as well as China and Eastern Europe. These SALWs often end up in the hands of terrorist groups like Boko Haram, Al-Nusra Front, ISWAP, AQIM and bandits, kidnappers, and armed robbers that use it to perpetuate large-scale violence, kidnapping for ransom, crude oil theft, and terrorism (Alexandre et. al, 2022).

These trends are caused by conflicts and wars, poor governance and corruption, porous borders and smuggling activities, illegal arms trade, and demand for self-defense. The effects of SALWs proliferation on CBRNE materials include: increased violence and crime, human rights abuses, displacement and instability, terrorism and insurgency, undermining of development and peace at national, regional, and continental and global levels.

The consequences of SALWs proliferation in sub-Saharan Africa include fueling of conflicts such as in Libya, Sudan, Somalia; terrorist and insurgency empowerment as seen by Boko Haram, ISWAP, Al-Nusra, Al-Shabaab; crime and banditry experienced in Nigeria and South Africa; political instability like that in Central African Republic, Democratic Republic of Congo; and humanitarian crises such as refugee flows and civilian casualties. The possibility of extremists infiltrating nuclear and radiological facilities and smuggling out CBRNE material for use in terrorist activities, is a

growing security concern. IAEA has reported no less than 12 incidents of natural Uranium smuggling between 1995 and 2005. More details of crime hotspots in Nigeria are shown in Appendixes 2 and 3 respectively.

SALWs and CBRNE materials can intersect in a variety of ways, particularly in conflict zones or areas with weak governance. As a result of proliferation in conflict zones, SALWs can be used to attack facilities storing CBRNE materials, leading to their release or theft and trafficking. Others include insurgency, where insurgent groups may use SALWs to capture or disrupt CBRNE-related infrastructure, such as a nuclear power plant (NPP) or chemical facilities. Theft and diversion are also a concern as SALWs can be used to steal or divert CBRNE materials.

The global proliferation of non-conventional weapons has escalated the possibilities of terrorists and other non-state actors using Weapons of Mass Destruction (WMD) and CBRNE materials. During the Cold War, the belligerents of any nuclear conflict would have been easily identifiable; however, in the post-Cold-War era, non-State actors and terrorist groups like Boko Haram, ISWAP, Al Nusra Front, and a host of others, have emerged as potential players in a new variety of nuclear conflicts entirely based on terrorist models.

In an era characterized by evolving security threats, Nigeria faces a complex landscape of challenges, including terrorism and the risks associated with CBRNE hazards. For terrorist groups like Boko Haram, chemical and biological weapons are uniquely suited to their agenda and as such present attractive alternatives to nuclear weapons; they are difficult to detect, cost effective, and easy to deploy. Aerosols of biological agents are invisible to the naked eye, silent, odorless, tasteless, and relatively easily dispersed. Most importantly they are 600 to 2,000 times cheaper than other WMDs. Production is comparatively easy via the commonplace technology that is used in the manufacturing of antibiotics, vaccines, foods, and beverages, while delivery systems such as spray devices deployed from airplanes, boats, or automobiles are widely available. Another advantage of biological agents is the natural lead time provided by the organism's incubation period, three to seven days in most cases, allowing the terrorists to deploy the agent and then escape before an investigation by law enforcement and intelligence agencies can even begin.

The risk of non-conventional weapons proliferation and terrorism goes beyond nuclear weapons – it encompasses radiological dirty bombs and explosives. Plutonium and uranium could thus be weaponized in the form of a radiological dirty bomb, also known as a radiological dispersal device (RDD), which would cause widespread fatalities and cost billions of dollars in clean-up, evacuation, and relocation operations (NTI, 2014).

Terrorist groups like Boko Haram could easily build and use an RDD, given the widespread proliferation of fissile material and the dual-use materials that can produce the same radiological effects. Radiological dual-use materials from smoke alarms, medical radioisotopes, and diagnostic imaging radioisotopes are among the most easily accessible. Such highly radioactive isotopes are in fact used in life-saving blood transfusions and cancer treatments in hospitals with Cobalt, Proton, Brachytherapy, cyclotrons, intensity-modulated radiation therapy, stereotactic radio-surgery, image-

guided radiation therapy machines, and linear accelerators (LINACs) all around the world, including several in Nigeria.

The challenges faced in preventing the use of these weapons through international control mechanisms include the proliferation of larger quantities of substances, ease of use, and most especially advanced technological deployment facilities that portend a high-risk factor to larger populations. The contextual scenarios in Nigeria that validate this prognosis regarding Boko Haram and other VEOs' possible actions are strongly supported by their ideological persuasions. The fact that Boko Haram and ISWAP embrace a jihadist world view which endorses the use of CBRNE weapons is strengthened not only by its affiliation to ISIS through ISWAP, but also by the similarities in its strategic modus operandi. This was demonstrated by ISIS in Syria and Iraq when they used sulfur blistering agent, chlorine, suspected mustard gas, and sarin nerve agent, all chemical weapons, against both civilian and military populations (Fyanka, 2020).

Furthermore, most of the medical, commercial, and industrial groups that handle these materials are not adequately equipped to provide the security needed to prevent them from being stolen. On the other hand, the lack of regulatory controls in many countries has led to thousands of instances of missing or stolen radiological material that cannot be accounted for. Recently, the James Martin Center for Nonproliferation Studies found that 170 incidents where nuclear or radiological material was lost, stolen or outside regulatory control occurred in 2014 alone (NTI, 2014). RDDs are viable weapons for terrorist groups like Boko Haram to pursue. Weak nuclear security arrangements combined with the tenacity of VEGs, such as Boko Haram, makes Nigeria a prime location for possible CBRNE terrorism. With over 25 million USD in annual income, Boko Haram has the resources to obtain both the scientific know-how and the materials needed to build a crude nuclear or radiological device.

1.3. Problem Statement

Terrorism remains a significant and evolving threat in Nigeria and across sub-Saharan Africa. In Nigeria, the northeastern region has suffered the most, with attacks on civilians, military personnel, and critical infrastructure. Peculiar to Nigeria are its civil war and its aftermath, prolonged military rule and political violence, farmers-pastoralists clashes, kidnappings, banditry, environmental challenges, armed robbery, etc. These circumstances, which helped grow the number of SALWs, were complicated by major conflicts in North and West African countries, notably, Liberia, Sierra Leone, Cote d'Ivoire and much more recently Libya, Mali, and Sudan.

More disturbing is that the containment and deterrent measures in place to prevent, detect, and respond to such threats, are not well coordinated or sufficient to act as countermeasures against these myriad threats. These threats have been evolving in our security landscape due to mismatch between Nigeria's socio-economic and geo-political aspirations compared to its reality: limited strategic anticipation of future security threats and inter-agency rivalry among security and intelligence agencies. The problem is compounded by cross-border terrorism, socio-economic grievances, and governance challenges. The ripple effect of these factors extends beyond Nigeria, affecting neighboring countries in the Lake Chad Basin (LCB) and beyond, undermining regional stability (NSS, 2019). The threat of CBRNE proliferation is an emerging concern, particularly given the nexus between terrorism and the potential use of unconventional weapons.

In Nigeria and sub-Saharan Africa, CBRNE risks stem from several factors: access to dual-use materials and biological agents that are inadequately regulated and can be diverted for malicious use and weak regulatory and public health vulnerabilities. According to Famadewa, terrorist groups may exploit these vulnerabilities to pursue CBRNE capabilities, especially in regions where security measures are lax (2023). The proliferation of such weapons would have catastrophic implications, not only for Nigeria but for regional and global security. Efforts to address these threats face significant obstacles because of gaps in interagency co-ordination, resource constraints, intelligence and information sharing, public awareness, and emergency preparedness and response. The proliferation of terrorism and potential CBRNE threats in Nigeria and sub-Saharan Africa could have far-reaching economic, humanitarian, and global security implications. The above factors and several others necessitate a research analysis on CBRNE risk mitigation strategies and its nexus with terrorism and SALWs, to examine myriad paths forward for counterterrorism and CBRNE risk mitigation strategies in Nigeria and sub-Saharan Africa.

1.4. The Nigeria Strategic Context

According to (Onuoha, 2023), Boko Haram terrorism (BHT) emerged in northeastern Nigeria in 2002 and started spreading across other Lake Chad Basin Commission (LCBC) states – recruiting members and conducting terrorist attacks outside Nigeria's borders. In July 2009, the BHT grew into one of the greatest threats to security and stability in the Lake Chad region, with mounting attacks in Cameroon, Chad, Niger, and Nigeria. Although the group evolved from Nigeria's North-East under a different name, like the Yusuffiya sect, it later transformed into a major regional security threat following the intensification of cross-border attacks in Cameroon, Chad and Niger, and the seizure of several territories in Nigeria's North-East (Anugwom, 2020). Since 2009, it has engaged with the Nigerian state in a lethal terrorism campaign aimed at toppling the secular structure and replacing it with an Islamist state. ISIS-West Africa has been pivotal, employing tactics such as bombings, ambushes, and kidnappings (Onuoha, 2023; Human Rights Watch, 2021).

Boko Haram and ISWAP, according to the UN in 2015, are some of the deadliest terrorist groups in the world with Nigeria ranking number 8 among the 10 "Most Impacted Countries", with a Global Terrorism Index (GTI) score of 7.575. The GTI score in Nigeria decreased to 7.58 points in 2023 from 8.07 points in 2022. The GTI score in Nigeria averaged 7.07 points from 2002 until 2023, reaching an all-time high of 9.12 points in 2015 and a record low of 3.86 points in 2002. By October 2024, over 11,299 Nigerians have been killed in the insurgency since 2007 (NTI, 2024 & IEP, 2024).

By 2017, Boko Haram had been forced to retreat from the large swath of areas it had previously occupied in northeastern Nigeria. This is in large part due to the Multinational Joint Task Force (MNJTF) in West and Central Africa formed in January 2015 by the African Union (AU) to deal with the threat of Boko Haram and ISWAP. The MNJTF's successive victories created a need for Boko Haram to reassert themselves. The likelihood of this group re-strategizing and reconsolidating is high. For instance, according to Fyanka, the proliferation of fissile material across the continent heightens the possibility of non-State actors like Boko Haram and ISWAP gaining access to it (2020). Although, in sub-Saharan Africa, there is only one recorded theft of eight Uranium fuel rods from a Kinshasa research reactor in 1997, the disturbing fact about this is that seven of the rods were never recovered.

The availability of this material on the continent and within Nigeria itself presents ominous opportunities for the group. Apart from large deposits of uranium ore found in Africa, several countries, including South Africa, Morocco, Libya, Ghana, Egypt, the Democratic Republic of Congo (DRC), and Nigeria itself, presently possess nuclear research reactors (Firsing, 2012).

The overarching quest for development and energy security motivated the Federal Government of Nigeria (FGN) to consider adding nuclear option to its energy mix, considering current global energy imbalance: where 1.6 billion people are without access to electricity and 2.4 billion rely on traditional biomass for cooking and heating because they lack access to modern fuels. The World Institute for Nuclear Security (WINS) projected, in its 2013 International Energy Outlook Reference Case, that by the year 2040, global energy consumption will grow by 50 percent, but that worldwide electricity generation from renewable and nuclear power will dominate the energy increases.

With concerns about energy security and greenhouse gas emissions spurring the development of greater nuclear generating capacities, it is predicted that nuclear energy will almost double by 2040. Should these predictions be correct, this doubling means that nuclear energy production would increase from 2.6 trillion kilowatt-hours in 2010 to 5.5 trillion kilowatt-hours in 2040. Nigeria, with a population of more than 200 million has a total available energy capacity of 6,852 MW, but actual production peaks around 4,300 MW and is frequently unavailable. In other words, 40% of Nigerians are without electricity (NBS, 2024). For these reasons, and myriad others, developing countries like Nigeria are motivated consider adding nuclear technologies to their energy mix to guarantee energy security and sustainability.

Nigeria began operating its first research reactor, the Chinese-supplied Miniature Neutron Source Reactor (MNSR), for the analysis of materials and training in 2004. Contract for the construction of its first nuclear power plant (NPP) has been awarded to the Russian Rosatom in 2017 by FGN nuclear operator – Nigeria Atomic Energy Commission (NAEC).

Nuclear technology brings about different complexities due to inherent risks. Understanding this, the IAEA provided a list of 19 infrastructural elements newcomer countries must get right before having a functional NPP. Some of the requirements and best practices include a national position or commitment, funding and financing, a robust legislative framework encompassing safeguards and security human resource development, stakeholder involvement, and radioactive waste management.

The IAEA conducted its first Integrated Nuclear Infrastructure Review for Research Reactors (INIR-RR) mission to Nigeria in 2018. The IAEA INIR-RR extends the scope of IAEA peer reviews. The IAEA INIR-RR Mission to Nigeria, being the first of its kind in the world, has far-reaching implications. First, it widens the menu of IAEA peer reviews, which includes the INIR for Member States considering the introduction or expansion of an NPP. Second, it promotes global nuclear security initiatives by recommending the design of the new powerful research reactor to run on Low Enriched Uranium (LEU) fuel. This latter fact is critical, as Nigeria is faced with combating threats posed by non-State actors, like Boko Haram terrorists who seek CBRNE materials for producing IEDs, opportunities exist for them to obtain, use, and sabotage CBRNE material for use in explosive devices such as IEDs and RDDs.

To mitigate the CBRNE risks highlighted above, the IAEA and U.S. government assisted with the down blending of the miniature neutron source reactor (MNSR) fuel which runs on HEU to LEU fuel and the repatriation of its irradiated HEU core to China due to security concerns. The new, more powerful research reactor will use LEU and the reactor will be utilized for producing radioisotopes for cancer diagnosis and treatment, industrial applications, and developing skills and competencies as the country pushes forward with plans to introduce nuclear power by 2025. This nuclear facility is in the north of the country, where activities of HVEs have been ongoing.

Regarding nuclear security concerns, an outright attack on a facility with subpar physical security systems is a plausibility for Nigeria due to increasing radicalization of the civilian populace by the HVEs, such as Boko Haram and ISWAP. An attack of this nature would be reminiscent of the Pelindaba incident in 2007 in South Africa (NTI, 2014; Birch & Smith, 2014; and Bunn, 2008).

Another concern is unsecured radioactive waste. Substantial legacy sources presently located at a Steel Complex have not been properly disposed of and could easily be obtained by Boko Haram (Fyanka, 2020). To complicate matters further, the construction of a low to medium radioactive waste management facility at a proposed waste facility has been abandoned by Nigerian officials (Busari, 2018).

2. NIGERIA'S COUNTERTERRORISM STRATEGY

In 2014, President Goodluck Jonathan signed and launched Nigeria's first-ever National Security Strategy in response to the threat of terrorism, to serve as the overarching national strategy document in framing the country's pursuit of its national security (NSS, 2019 revised). Before this effort, the Terrorism Prevention Act (2011) as amended in 2013, designated the Office of the National Security Adviser (ONSA) as the coordinating office for Nigeria's Counterterrorism efforts. Consequently, the National Counter Terrorism Centre (NCTC) was established in 2012.

The NSS was presented as a framework for a holistic and more coordinated approach and response to security challenges in the country. The development of the 2014 NSS (revised in 2019), which aimed "to guide, organize, and harmonize national security policies and efforts," identified key security issues and assigned approach, roles and responsibilities to government, civil society, private agencies, and individuals in addressing them. The NSS is reviewed after a period of 5-10 years, to bring it up to date with the modern realities.

Since the adoption of the NSS in 2014, the domestic and international security environment has changed in number and complexity with new challenges such as: terrorism, insurgency, banditry, kidnapping, flooding and other natural disasters, and outbreak of diseases that reached pandemic scale among other real, existential and diverse security threats. This presented Nigeria with the opportunity to redefine the pursuit of its national security objectives.

In pursuance of this objective, President Muhammadu Buhari's Administration released a revised NSS for Nigeria in December 2019. The revised NSS is designed to chart the way forward by outlining the threats confronting the country. It lays out the framework for the country to meet the basic needs and security concerns of citizens and address internal and external threats. Moreover, the revised NSS is part of President Buhari regime's effort to reposition Nigeria along with three (3) broad but fundamental sectoral policy thrusts, namely: security, economy, and the fight against corruption.

In the revised security policy document, national security is defined in a manner encompassing not just traditional military and political aspects but also economic, social, environmental, and human rights considerations (NSS, 2019). The strategy emphasizes the interconnectedness of security with national values such as peace, stability, sovereignty, democracy, the rule of law, and economic prosperity. It aims to safeguard these interests while fostering an environment that enables citizens to thrive and develop their potential. The document also highlights Nigeria's commitment to promoting regional stability, international cooperation, and the protection of fundamental freedoms. It recognizes that national security is dynamic, requiring periodic updates to align with evolving threats and global developments.

In Chapter 3: National Security Threats of the NSS (2019) it outlines the security threats facing Nigeria including:

> "terrorism and violent extremism, armed banditry and kidnapping, militancy and separatist agitation, pastoralists and farmers conflicts, transnational organized crime, piracy and sea robbery, porous borders, cybercrimes and technology challenges, socio-political threats, fake news and hate speech, public health challenges and economic challenges with subsidiary issues such as: energy deficit, crude oil theft, unemployment and poverty, and regional and global security challenges respectively (p 10)."

The revised NSS (2019) recognizes the threat posed by CBRNE proliferation and states: "The proliferation of CBRNE weapons and their means of delivery, the spreading of technological skills required for their production and the possibility of their use constitute a threat to our security (p.10)."

The revised NSS (2019) calls out CBRNE material and delivery systems as a priority area, stating:

> "The potentials for non-state actors to carry out criminal or intentional unauthorized acts involving or directed at CBRNE material or their associated facilities and activities is also an ongoing global concern. There are known incidents of the use of explosive precursors such as ammonium nitrate, by Boko Haram to make improvised explosives devices in Nigeria, as well as incidents of loss of radioactive materials by oil prospecting companies in the Niger Delta. Accidental dispersal of materials with CBRNE components can compromise public safety and security. Large quantities of diverse CBRNE related material exist and are used in various sectors such as health, petroleum, industry, agriculture, security, energy, education and research as well as other emerging opportunities intended to improve lives and property. Ensuring the safe, secure and authorized usage, storage, transport, and other related activities involving CBRNE material is a matter of national security that requires the building of strong institutions with capacity to regulate and implement best practices (p. 32)."

However, while opinion is divided in security circles as to the comprehensiveness of the Nigeria State definition of "National Security" in the revised NSS (2019) and other key National Security instruments, this author strongly holds the view that the right way to move forward is to retain aspects of the definition that fulfills Nigeria's national security goals while incorporating emerging concepts that addresses our long term goals. These concepts include: neglect of regional and international dynamics by stressing on international threats such as CBRNE terrorism and SALWs proliferation, global economic shocks and regional terrorism networks, and technological and cybersecurity blind spots by emphasizing on emerging technologies and cybersecurity threats like CBRNE weapons, cybercrime, digital espionage, tech-enabled terrorism respectively.

A point to note and keep in a safe corner of our minds is that, security is not a synonym for defence. Defence maybe an aspect of security but it is not security. Famadewa asserted that "without providing the Nigerian version of the definition of national security outright, it means the NSS

(2019) adopted the contemporary notion (comprehensive approach) of national security" (2023). He asks the rhetorical questions:

> "If this is the case, why then is the focus of national security efforts in the country on the military? Why is it that the military commanders are always accused of ineptitude, when insecurity is on the rise in the country? Could this be a consequence of a history of prolonged military rule, which has inadvertently implanted in our psyche, the erroneous impression that national security is the exclusive preserve of the military?"

Or is it a case of the view expressed on governance by David Runciman in his book, *Where Power Stops: the Making and Unmaking of Presidents and Prime Ministers*. In the book, Runciman compares various elements of government to strings that are being pulled by what can be called the "puppet master." He further stresses that the quick resort to military solutions is due to the ease at which the military lends itself to responding to the urging of the master. Suffice to say that Nigerians tend to see problems of insecurity as exclusively the problem of the military, while forgetting that insecurity is a symptom of several other problems in the society. Can the military option stop kidnapping? Is the military a law enforcement agency?

We may do well to note that the puzzle behind the Boston Marathon bombing incident of 2013 was solved by the Federal Bureau of Investigation (FBI), with the assistance of the Bureau of Alcohol, Tobacco, Firearms and Explosives, as well as the Central Intelligence Agency (CIA), the National Counterterrorism Center (NCTC), and the Drug Enforcement Agency (DEA) respectively. Famadewa reasoned counterfactually, and submits that, were that incident to be in Nigeria, the Army would have cordoned the whole city, made several arrests, clashed with some other agencies, and the Service Chiefs would have gone to face the National Assembly to answer questions on the bombing (2023).

The example above may sound farfetched to Africans because some people hold the opinion that our society is yet to be sophisticated at that level; however, an Interpol report, released on June 9, 2023, revealed that notices from the organization assisted in the arrest of 14 terror suspects and the recovery of explosives, in an operation within Africa tagged the "Tripartite Spider." The operation, which included the Democratic Republic of Congo, Kenya, Somalia, Tanzania, and Uganda, was organized to support the ability of national counter-terrorism investigation teams to identify suspected terrorists and disrupt the financial networks behind them. The operation involved the police, customs, border forces, and counter-terrorism experts, including Interpol's Regional Counter-Terrorism Node in Africa, thereby underscoring the need for a multi-stakeholder effort against terrorism. Perhaps the military was involved in the one-month operation, but they were not the main effort. The major focus was law enforcement and tracking of terror financing. This is a proof that the multi-dimensional approach to mitigating threats to security is feasible and not totally alien to Africa.

While Nigeria's current NSS (2019) provides a foundation, its state-centric and conventional threat focus is insufficient to address the complex, multi-dimensional security challenges of today.

Adopting a human-centric, regional, and technologically adaptive definition could enhance the relevance and efficacy of Nigeria's national security framework.

At strategic level, the main countermeasure for the prevention of nuclear terrorism and other CBRNE threat is to ensure at the international level that CBRNE material does not fall into the hands of terrorist groups like Boko Haram and other non-state actors. This strategic goal is difficult to achieve given the lax security measures found at CBRNE installations all over the world. Recognising the danger, the United States under the Obama administration, committed in 2010 at a nuclear security summit in Washington D.C. to securing all nuclear material within four years in an effort to prevent nuclear terrorism (Fyanka, 2020).

Nigeria participated in this summit and committed to implementing the agreements reached. These attempts by the Obama administration followed up on the efforts embedded in the landmark 1987 Convention on the Physical Protection of Nuclear Material (CPPNM), which was meant to prevent nuclear material from being obtained by terrorists. The provisions of this convention were amended in 2005, and by 2010 the Washington summit had created the needed sense of urgency regarding the security of radiological and nuclear materials. Negotiations around the CPPNM started in 1979, and over the decades the growing proliferation of CBRNE material has combined with the increase in global terrorism to raise the profile of the issue of CBRNE material security.

A total of 93 states including Nigeria had ratified the CPPNM as of 2016; by 2024, according to the OECD and NTI, this number has increased to 165 countries resulting in tighter security control around the world at CBRNE installations and border controls. Nigeria has been engaged for decades in international efforts to control nuclear proliferation and terrorism. The country has ratified and acceded to over a dozen binding and non-binding international instruments since 1963, including the Convention on Offences and Certain Other Acts Committed on Board Aircraft (1963), the CPPNM (1987), the Amendment to the CPPNM (2005) including its Model Additional Protocols and the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT, 2007).

At the level of global collective security, Nigeria is involved in implementing the United Nations (UN) Global Counter-Terrorism Strategy, which was adopted unanimously by the General Assembly in Resolution 60/288, and United Nations Security Council Resolution (UNSCR) 1540 adopted in April 2004, which requires all states to "criminalize proliferation, enact strict export controls and secure all sensitive materials within their borders."

At the regional and sub-regional levels, the counterterrorism strategies of the African Union (AU) and the ECOWAS have been ratified and are in the process of being implemented at different stages. In pursuance of effecting these various international agreements, Nigeria instituted their National Counter-Terrorism Strategy, which was revised in 2016. Presently, Nigeria continues to work with the UN Counter-Terrorism Implementation Task Force (CTITF) on projects designed to build community resilience against terrorism, enhance cooperation among law enforcement agencies, and strengthen judicial institutions. The AU and ECOWAS recognize the growing threats

posed by CBRNE hazards to the continent's security development. As a pan-African body and regional bloc, the AU and ECOWAS developed a robust response mechanism to address CBRNE risks in a coordinated, systematic, and regionally integrated manner, such that it aligns with global treaties and Africa and sub-regional security priorities. The thematic areas include:

a. **Policy and Legal Frameworks:** through the AU Nonproliferation Framework, African Nuclear-Weapon-Free Zone Treaty (Pelindaba Treaty), Bamako Convention, UNSCR 1540, NPT, ECOWAS Regional Security Strategy by incorporating Chemical Weapons Convention (CWC), Biological Weapons Convention (BWC), and Agenda 2063 vision focusing on peace, security, and sustainable development.

b. **Institutional Coordination:** The AU's response mechanism leverages a network of institutions for coordination and implementation such as - AU PSC, African Centre for the Study and Research on Terrorism (ACSRT), Africa CDC (Centers for Disease Control and Prevention) and AU Commission on Trade and Industry. These institutions collaborate with regional economic communities (RECs) like ECOWAS – Early Warning Directorate, Southern Africa Development Commission (SADC), and East Africa Commission (EAC) to harmonize efforts across the continent.

c. **Capacity Building:** The AU/ECOWAS prioritizes capacity-building initiatives to ensure that member states are equipped to handle CBRNE incidents through: Training Programs, Knowledge Sharing and Specialized Units.

d. **Risk Assessment and Surveillance:** The AU emphasizes early warning and risk assessment to identify and mitigate CBRNE threats through: Continental and regional Early Warning System (CEWS/REWS), Disease Surveillance Networks and Hazardous Material Monitoring - encourages member states to implement control measures for dangerous chemicals, radioactive materials, and explosives.

e. **Emergency Response and Preparedness:** In case of a CBRNE incident, the AU's mechanism ensures a coordinated and swift response through: Rapid Response Teams (RRTs), Decontamination Resources, and Medical Preparedness - coordinates with Africa CDC to provide medical supplies, treatment protocols, and disease containment strategies.

f. **Public Awareness and Community Engagement:** The AU advocates for greater public awareness to enhance CBRNE preparedness through awareness campaigns, evacuation, and shelter guidelines and community engagement.

g. **International Cooperation**: The AU collaborates with global organizations and partners to strengthen its CBRNE response through the - United Nations (UN) -works with agencies like the IAEA, WHO, and OPCW for technical support and funding. European Union (EU) - supports the AU in capacity building, infrastructure development, and policy alignment through its Centre of Excellence for CBRNE Risk Mitigation Initiative. Global Initiative to Combat Nuclear Terrorism (GICNT) -Addresses threats related to nuclear and radiological terrorism and collaborative efforts with bilateral partners - Includes partnerships with countries like the U.S., China, and France for training and resources.

Overall, the counterterrorism measures put in place to deal with the aftermath of a chemical or biological attack have gained more credibility in the international community. Although there is no dedicated international inter-agency mechanism for coordinating the response to terrorism involving the release of toxic chemicals or biological agents, mechanisms have evolved in the context of humanitarian assistance and emergency response. These include the Global Outbreak Alert and Response Network (GOARN), the World Health Organization (WHO), the Global Early Warning System (GLEWS), the Global Framework for the Progressive Control of Trans-boundary Animal Diseases (GF-TAD), and the International Food Safety Authorities Network (INFOSAN). The primary inter-agency mechanism that coordinates responses to emergencies involving the agencies mentioned above is the UN Disaster Assessment and Coordination (UNDAC) (Fyanka, 2020). To further strengthen inter-agency coordination in the wake of a terrorist attack of catastrophic proportions, the UN CTITF is also focusing on planning for such an eventuality. At the local level, several key aspects of Nigeria's NACTEST are presently being utilized. The strategy is divided into five work streams:

Forestall: Prevent terrorism in Nigeria by engaging the public through sustained enlightenment and sensitization campaigns and de-radicalization programmes. Key objectives of this strand include the development of an effective counter-narrative to respond to the challenge of terrorism; create conditions to deter people from embracing terrorism and extremist ideologies; initiate programs that will require engagements with key sectors, such as the internet, identified as possible tools for radicalization, design programs to identify underlying causes for radicalization and develop strategies that provide solutions; and create opportunity and hope in the affected communities and restore their faith in their government.

Secure: Ensure the protection of life, property and key national infrastructure, and public services, including Nigerian interests around the world. This work stream has its objectives to include: reduce vulnerabilities of the national populace; strengthening of border security; introduce effective ways to protecting critical national infrastructure (CNI) and building resilience; embark on capacity building for security forces; improve protective security in crowded places like schools, bus terminals, and shopping malls; places of worship, sporting arena and reduce the vulnerability of the transport system.

Identify: Ensure that all terrorist acts are properly investigated, and that terrorists, along their sponsors, are brought to justice. This work stream has its objectives to include: disrupt terrorists threats before they are executed; ensure an increase in the capabilities of security agencies to detect, prevent, investigate and prosecute; deny terrorists the ability to raise funds; government, through its agencies, to maintain a sustainable relationship with community representatives, traditional and religious institutions, and civil society organizations (CSOs); work with foreign governments and multilateral organizations to better tackle threats from the source; continue to assess security powers and review them as necessary; and

build and improve capacity for the criminal justice system (CJS) to investigate, prosecute, and sanction people who commit terrorist offences

Prepare: Prepare the populace so that the consequences of terrorist incidents can be mitigated. This work stream has its objectives to include: first responders, security agencies and stakeholder organizations are able to respond to, and effectively recover from, various categories of terrorist attacks, there are dedicated agencies with capacity to respond to identified high-risk areas such as symbolic structure and worship centres; there are additional capacities readily available to manage ongoing and new terrorist attacks; and there are in-built redundancies to ensure continuity of government business and measures adopted to ensure civil society resilience in the event of an attack.

Implement: Devise a framework to effectively mobilise and sustain a coordinated, cross-governmental, population-centered effort. The Implement strand has the following objectives to include: stipulate how MDAs, stakeholder organizations will execute tasks consistent with their roles and statutory responsibilities. The ONSA will provide the requisite leadership role in the national counterterrorism efforts and describe how the accountability of the strategy will be ensured and its progress effectively monitored. It is expected that all security agencies will conduct threat analysis and develop their contingency plan to address implementation streams (NSS, 2019).

3. CURRENT CBRNE COORDINATION AGENCIES IN NIGERIA

The Terrorism Prevention Act (2011) as amended in 2013, designated the Office of the National Security Adviser (ONSA) as the coordinating office for Nigeria's Counter-terrorism efforts. Consequently, the National Counter Terrorism Centre (NCTC) was established in 2012. The Political and Economic Affairs Office serves as the Secretariat of the National Authority on CWC which facilitates Nigeria's fulfillment of its international obligation as a State Party to the CWC. Similarly, in October 2003, the Secretary to the Government of the Federation approved that the Secretary National Authority on CWC should take on the additional responsibility for the implementation of the Bacteriological (Biological) and Toxin Weapons Convention (BTWC) in Nigeria. Since then, the implementation of both the CWC and BTWC are supervised by the Secretariat now designated as the National Authority on Chemical and Biological Weapons Conventions (NAC & BWC). It is responsible for overseeing the implementation of CWC and BWC and serve as the National Focal Point (NFP) for effective coordination of the activities of the relevant MDAs in implementation of the CWC & BWC. In addition, the ONSA, apart from serving as a member of the Inter-Ministerial body, set up as a coordinating body on the activities of the NAC & BWC and oversees SALWs nonproliferation activities through the National Taskforce alongside other MDAs and Parastatals (see Appendix 1).

4. NIGERIA'S CBRNE RESPONSE MECHANISM

Nigeria's CBRNE response mechanism is an evolving framework aimed at safeguarding public health, safety, and national security. While progress has been made, addressing gaps in funding, training, border control issues and inter-agency coordination will be essential to building a resilient and effective system. Nigeria, like many nations, has developed a response mechanism to address CBRNE risks and incidents effectively. Nigeria's approach to CBRNE incident is outline as follows:

a. **National Framework and Policy:** Nigeria's response to CBRNE incidents is guided by a national framework that integrates policy, legislation, and strategy. The government has adopted key global conventions and protocols related to CBRNE threats.

The country aligns its CBRNE response mechanisms with international standards to address cross-border threats and collaborate with global partners.

b. **Institutional Coordination:** Various agencies and organizations are tasked with handling CBRNE incidents, ensuring a multi-sectoral approach. Key stakeholders include:

- **National Emergency Management Agency (NEMA):** Leads in disaster response and recovery efforts.
- **Nigerian Nuclear Regulatory Authority (NNRA):** Oversees nuclear and radiological safety.
- **National Agency for Food and Drug Administration and Control (NAFDAC): Regulates** chemicals and biological agents.
- **Nigerian Armed Forces and Police:** Provide security and enforcement during CBRNE events.
- **Federal Ministry of Health (FMOH):** Manages biological threats and health emergencies.
- **Federal Fire Service:** Handles hazardous materials (HAZMAT) and fire-related CBRNE incidents.

These agencies operate within a unified command structure to ensure efficient resource allocation and communication during emergencies.

c. **Surveillance and Risk Assessment:** Nigeria maintains surveillance systems to monitor potential CBRNE threats, including:

- **Public Health Surveillance:** Tracks outbreaks of diseases that could indicate biological attacks.
- **Chemical and Radiological Monitoring:** Conducted at borders, ports, and high-risk facilities to detect illegal or dangerous materials.
- **Intelligence Gathering:** Security agencies monitor terrorist organizations and criminal networks for potential CBRNE activity.

d. **Capacity Building and Training:** To ensure readiness, Nigeria invests in:

- Training first responders (e.g., firefighters, medical personnel, and law enforcement) in CBRNE protocols.
- Establishing specialized units for hazardous material management and bomb disposal.
- Conducting drills and simulations to improve response coordination.

e. **Infrastructure and Equipment:** Nigeria's CBRNE response infrastructure includes:

- **Emergency Operations Centers (EOCs):** Serve as hubs for coordination during incidents.
- **Laboratories:** For testing and analyzing biological, chemical, and radiological samples.
- **Protective Equipment:** Ensures safety for responders handling hazardous materials.

f. **Public Awareness and Engagement:** Educating the public is vital in mitigating the effects of CBRNE events. Nigeria uses:

- Media campaigns to raise awareness about signs of CBRNE threats.
- Community engagement programs to encourage reporting suspicious activities.
- Guidelines for civilians on evacuation, sheltering, and decontamination.

g. **International Cooperation:** Nigeria collaborates with regional and global organizations to strengthen its CBRNE capabilities:

- **African Union (AU)** and **ECOWAS** partnerships for regional threat management.
- Participation in training programs organized by the IAEA, WHO, and the OPCW.
- Support from international partners for technical assistance and capacity building.

Nigeria's CBRNE response mechanism is fragmented and under-funded. NEMA and related CBRNE response agencies lack the specialized training and equipment needed for effective and robust CBRNE response, due to several interconnected challenges that stem from institutional, structural, and operational inefficiencies. This fragmentation delays response to CBRNE events, reduce effectiveness, increases vulnerabilities and weakens the country's ability to effectively prevent, detect, and respond to CBRNE incidents.

The lack of a clearly defined, central coordinating body to oversee and streamline the efforts of these agencies by policymakers, creates a situation where agencies' roles and responsibilities overlap, delaying decision-making and creating confusion in cases of CBRNE emergencies. This weakness has a cascading effect on funding prioritization, inadequate investment in continuous training programs, and capacity building for personnel, a shortage of trained personnel in specialized areas such as hazardous materials (HAZMAT) handling, radiological safety, and biological outbreak management creates gaps in the country's CBRNE preparedness. For example, insufficient resources for decontamination units, personal protective equipment (PPE), and advanced surveillance systems hinder response effectiveness, often, funding for security focuses on immediate concerns such as counterterrorism, sidelining CBRNE readiness. Additionally, the brain drain of skilled professionals in scientific and technical fields further exacerbates the problem.

Another consequence of the fragmented approach to CBRNE risks in Nigeria is policymaker's inconsistent integration of CBRNE risks into broader national security strategy due to the erroneous perception of CBRNE risks as low-probability events. Policymakers tend to prioritize conventional security threats like terrorism and armed conflicts instead of anticipatorily discussing the risks associated with CBRNE events. Nigeria's CBRNE response mechanism is often reactive rather than proactive, with limited emphasis on prevention, preparedness, and early warning systems. This lack of emphasis on long-term planning and investment in state-of-the-art predictive technologies leads to a focus on crisis management rather than mitigation strategies.

In order to strengthen Nigeria's CBRNE response mechanism, an Emergency Preparedness Review (EPREV) mission was conducted by the IAEA in the Federal Republic of Nigeria from 15 to 23 June 2015 (IAEA, 2015). EPREV missions are designed to provide a peer review of emergency preparedness and response (EPR) arrangements in a country based on the IAEA safety standards. The purpose of this EPREV mission was to conduct a review of the Nigerian nuclear and radiological EPR arrangements and capabilities, with the consideration that Nigeria is embarking on a nuclear power programme.

The nuclear and radiological EPR framework in the Federal Republic of Nigeria is being effectively built on an existing national emergency management system that is clear, well defined, and tested. This all-hazards approach is consistent with IAEA safety standards and is a key to the future success of the nuclear and radiological EPR programme. In addition, the EPREV identified strengths in the following areas:

- Specific arrangements for responding to nuclear and radiological emergencies are well integrated into the country's all-hazards emergency management system.
- The roles of the NNRA and the NEMA are recognized and appreciated by relevant response organizations.

The EPREV identified some areas in which improvements should be considered, or where progress in implementation should be sustained. These include the following key elements:

- Capabilities to respond to a nuclear emergency should be strengthened in line with the progress being made in embarking on a nuclear power programme.
- State and local government levels need to be better involved in EPR.
- The roles of all response organizations and arrangements for appropriate coordination need to be clarified.
- The capabilities of first responders with regard to training, competence and the procurement and maintenance of equipment need improvement.
- Arrangements for providing instructions and keeping the public informed during emergencies need to be enhanced.
- Arrangements for a medical response to nuclear or radiological emergencies require improvement.

5. METHODOLOGY

This author conducted an analysis from literature and by interviews of the current coordinating and emergency response mechanisms to handle CBRNE events in view of growing CBRNE terrorism threats and attacks by non-State actors in Nigeria. Data was collected through an online survey using Google Forms, ensuring ease of access and participation. The collected dataset was analyzed using Statistical Package for the Social Sciences (SPSS) Version 26. The following statistical techniques were employed:

- **Descriptive Statistics:** To summarize demographic data and response distribution.
- **Correlation Analysis:** To examine relationships between key variables influencing CBRN risk mitigation strategies.
- **Regression Analysis:** To determine the predictive impact of various factors on effective risk mitigation.

The study also employed a quantitative research design method. The study focuses on Nigeria, encompassing key stakeholders in CBRNE risk management, including security personnel, emergency responders, and policymakers. The target population include: security personnel, emergency responders, policymakers, and other key stakeholders involved in CBRNE risk management in Nigeria. A convenience sampling technique was adopted to select 250 respondents for the study. The sample size was determined based on prior studies and statistical adequacy for meaningful analysis. A structured survey questionnaire was developed and administered via Google Forms. The questionnaire was divided into two sections:

- Section A: Demographic Information – Capturing respondents' age, gender, occupation, and experience in CBRN risk management.
- Section B: Research Variables – Containing items measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) to assess various aspects of CBRN risk mitigation strategies (Likert, 1932).

To ensure content and face validity, the questionnaire was reviewed by subject-matter experts in disaster management and risk mitigation. A pilot study was conducted with 30 respondents to assess clarity, relevance, and comprehensibility of the items, leading to necessary refinements. The reliability of the questionnaire was assessed using Cronbach's Alpha coefficient, with a threshold of 0.7 considered acceptable for internal consistency. The pilot test results ensured that the instrument yielded consistent measurements. Respondents were provided with detailed instructions and assured of confidentiality to encourage honest responses. To avoid conflict of interests, ethical considerations such as informed consent, anonymity, and data protection were strictly adhered to in this study.

6. RESULTS

This study explored the current state of CBRNE risk mitigation strategies in Nigeria, focusing on the public's awareness, governmental response mechanisms, and the challenges involved. The findings of the research provide insight into the effectiveness of existing systems, the public's perceptions, and the significant sources of CBRNE threats in the country.

Table 6.1: Respondents' Demographics

Demographic Category	Category	Frequency (N)	Percentage (%)
Gender	Male	138	55.2
	Female	112	44.8
Age	Under 25	38	15.2
	25-34 years	88	35.2
	35-44 years	62	24.8
	45-54 years	38	15.2
	55 years and above	24	9.6
Educational Level	Secondary Education	25	10
	Diploma/Certificate	50	20
	Bachelor's degree	100	40
	Master's degree	62	24.8
	PhD	13	5.2
Occupation	Security Personnel	75	30
	Government Official	50	20
	Academic/Researcher	62	24.8
	Emergency Response Team Member	63	25.2

A notable finding from this study reveals that the level of awareness regarding CBRNE threats among the general population is relatively low. According to the survey, a significant proportion of respondents representing 20% reported they were either somewhat familiar or not familiar at all with the concept of CBRNE threats; 76% agreed that CBRNE threats could severely impact the country's security; 20% believe that Nigeria's National Security Strategy is very comprehensive in addressing CBRNE threats. While 32% considers terrorist groups as the most significant source of CBRNE threats in Nigeria, other sources of threats include: Industrial Facilities (24%), Illegal Trafficking and Smuggling (24%) and Laboratories and Research Centers (20%) serving as sources of CBRNE materials respectively. This highlights the growing concern about extremist organizations potentially acquiring or utilizing CBRNE materials to further their agendas, posing substantial national security risks.

Table 6.3: Do you believe that CBRN threats pose a significant risk to Nigeria's national security?

Agreement Level	Frequency (N)	Percentage (%)
Strongly Agree (SA)	100	40
Agree (A)	90	36
Undecided (U)	30	12
Disagree (D)	20	8
Strongly Disagree (SD)	10	4
Total	250	100

Source: Field survey (2024)

This study also reveals that while 52% of respondents believe that Nigeria's emergency response and coordinating mechanisms for CBRNE events are very effective, 24% consider the mechanisms to be ineffective. While 48% of respondents believe there is sufficient collaboration between different agencies involved in CBRNE risk mitigation in Nigeria, 32% disagree. These respondents likely see efforts being made but may recognize challenges or inefficiencies in how the agencies interact. On perceived challenges against effectively managing CBRNE risks in Nigeria, while 32% among the survey demographics perceive lack of funding as one of the main challenges in managing CBRNE risks, 24% feel that inadequate training is a significant challenge, 28% highlight poor inter-agency coordination as a major challenge and 16% identify insufficient public awareness as a challenge respectively.

Table 6.4: How comprehensive do you find Nigeria's current National Security Strategy in addressing CBRN threats?

Comprehensiveness Level	Frequency (N)	Percentage (%)
Very Comprehensive	50	20
Somewhat Comprehensive	100	40
Not Comprehensive	60	24
Not Aware of the Strategy	40	16
Total	250	100

Source: Field survey (2024)

While 76% believe that terrorism has an extreme significant impact on Nigeria's economic growth and development, 16% of respondents believe the impact is moderate while only 6% feel that terrorism has a low impact on Nigeria economic growth. This highlights the severe and far-reaching consequences terrorism has on key sectors like infrastructure, trade, and foreign investment.

The survey included questions on the most significant sources of CBRN threats in Nigeria, which found the majority of respondents referencing Terrorist Groups, but other categories like Industrial Facilities and Laboratories and Research Centers also received attention for the amount of material available at these sites.

Table 6.5: what are the most significant sources of CBRN threats in Nigeria?

Sources of CBRN Threats	Frequency (N)	Percentage (%)
Industrial Facilities	60	24.00%
Laboratories and Research Centers	50	20.00%
Terrorist Groups	80	32.00%
Illegal Trafficking and Smuggling	60	24.00%
Total	250	100%

Source: Field survey (2024)

A telling response regarding CBRN preparedness drills showed that 72% of respondents had neither participated in nor heard of preparedness drills being conducted. This supports the author's assertion that lack of training contributes to the elevated risk of CBRNE events in Nigeria. While funding and interagency communication remain challenges to a comprehensive CRBNE response mechanism, continued internal checks to ensure employee preparedness over time is an integral component of a successful security plan.

Table 6.7: Have you participated in or are aware of any CBRN emergency preparedness drills in Nigeria?

Response	Frequency (N)	Percentage (%)
Yes	70	28.00%
No	180	72.00%
Total	250	100%

Source: Field survey (2024)

For more details on raw dataset obtained from the survey and results see Appendix 4.

7. POLICY RECOMMENDATIONS

Based on findings from the results of this study, the following policy recommendations should be pursued with vigor to address the myriad challenges identified earlier in this study:

a. **Establishment of national CBRNE coordinating agency**:
   - **Policy Harmonization:** Competent authority responsible for coordinating national strategy for CBRNE risk mitigation, so as to ensure the National Action Plan (NAP) aligns with international standards and frameworks, including those of the UN, WHO, EU Centre of Excellence on CBRNE Risk Mitigation, OPCW and IAEA respectively.
   - **Foster Inter-agency Collaboration:** Foster cooperation among military, civilian, and private sector stakeholders to ensure a unified approach to CBRNE risk mitigation.
   - **Funding Constraints:** Prioritize funding for CBRNE risk mitigation programs and ensure equitable distribution of resources across all regions.

b. **Capacity Building and Training:**
   - **Education and Training Programs:** Implement comprehensive training programs for emergency responders, healthcare professionals, and law enforcement on CBRNE threats recognition, response procedures, and decontamination techniques.
   - **Technical Expertise:** Develop specialized units within national agencies with expertise in handling CBRNE incidents, including forensic analysis and investigation capabilities.

c. **Enhanced Surveillance and Detection:**
   - **Early Warning Systems:** Establish a robust surveillance system to detect potential CBRNE threats early, including sensors and monitoring networks.
   - **Intelligence Sharing:** Strengthen collaboration between intelligence agencies and international partners to gather and analyze information on CBRNE threats and potential actors.

d. **Infrastructure Development:**
   - **Secure Storage and Transport:** Improve infrastructure for secure storage, handling, and transportation of hazardous materials, including upgrading facilities to international standards.
   - **Border Security:** Enhance border control measures to prevent illicit trafficking of CBRNE materials across national borders.

e. **Public Awareness and Community Engagement:**
   - **Risk Communication:** Conduct public awareness campaigns to educate communities about CBRNE risks, safety measures, and reporting protocols.
   - **Community Resilience:** Build community resilience through local partnerships, training programs, and emergency preparedness initiatives.

f. **International Cooperation:**
   - **Multilateral Partnerships:** Engage with international organizations and donor agencies to access technical expertise, funding, and support for capacity-building initiatives.

- **Regional Collaboration:** Foster regional cooperation with neighboring countries such as ECOWAS, to address cross-border CBRNE threats and enhance collective security measures.

8. CONCLUSION & FUTURE RESEARCH QUESTIONS

Terrorism continues to pose a significant and evolving threat in Nigeria with the northeastern region bearing the brunt of violent attacks targeting civilians, military personnel, and critical infrastructure. Unfortunately, the containment and deterrent measures currently in place are poorly coordinated and insufficient to effectively counter these multifaceted threats, leading to a mismatch between Nigeria's socio-economic and geopolitical aspirations and its reality.

Given the complex interplay of terrorism and CBRNE risks, there is a pressing need for comprehensive research on effective risk mitigation strategies. Future studies should explore the effectiveness of existing counterterrorism frameworks, assess the regulatory landscape for dual-use materials, and investigate the role of public awareness in enhancing emergency preparedness. Additionally, examining the impact of governance challenges and socio-economic grievances on security dynamics will be crucial in developing holistic approaches to countering terrorism and mitigating CBRNE risks in Nigeria and sub-Saharan Africa. What innovative strategies can be implemented to improve interagency coordination? How can public awareness campaigns be designed to enhance community resilience against CBRNE threats? What role can regional cooperation play in addressing these challenges? These questions warrant further exploration to strengthen Nigeria's national security framework and promote regional stability.

The potential for CBRNE events poses catastrophic implications not only for Nigeria but also for regional and global security. By pursuing any of the policy recommendations outlined in this paper, Nigeria would bring itself closer to a comprehensive emergency response plan. Investing in creating this response plan early would pay dividends in the future given the demonstrated risks of CBRNE events and the higher probability of these events given factors outlined at the beginning of this paper.

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APPENDIX 1

CBRNE RISK MITIGATION IMPLEMENTATION STAKEHOLDERS

Nigeria's CBRNE risk mitigation framework involves multiple stakeholders, each with distinct roles in preventing, detecting, and responding to chemical, biological, radiological, and nuclear threats. These stakeholders operate within a legal and regulatory framework to ensure national security and public safety. Their roles and responsibilities are outlined below:

a. Federal Government and Policy Formulation Agencies:

- ***Office of the National Security Adviser (ONSA):***
  - *Coordinates the development and implementation of national security strategies, including CBRNE risk mitigation policies.*
  - *Oversees interagency collaboration and ensures alignment with national and international security standards.*
- ***Federal Ministries (Health, Environment, Science, and Technology):***
  - *Oversee sector-specific risks (e.g., biological threats, environmental hazards) and implement health and safety protocols.*
  - *The Ministry of Health is particularly critical for biological risk management and pandemic response.*

b. Regulatory Bodies:

- ***Nigerian Nuclear Regulatory Authority (NNRA):***
  - *Monitors and enforces regulations on radioactive material use in health, industry, and research.*
- ***National Environmental Standards and Regulations Enforcement Agency (NESREA):***
  - *Regulates environmental hazards, including industrial chemicals that may pose CBRNE risks.*
- ***National Agency for Food and Drug Administration and Control (NAFDAC):***
  - *Controls the importation and distribution of chemicals and biological agents.*
- ***Standards Organization of Nigeria (SON):***
  - *Develops standards for handling and transporting hazardous materials.*
  - *Regulates chemical imports and ensures compliance with international conventions on chemical weapons.*

c. Security and Emergency Response Agencies:

- ***Nigeria Police Force (NPF):***
  - *Investigates and enforces laws related to illegal possession or misuse of CBRNE materials.*
- ***Nigerian Armed Forces:***
  - *Provides specialized units trained to respond to CBRNE incidents, including decontamination and neutralization.*
- ***National Emergency Management Agency (NEMA):***
  - *Coordinates disaster response efforts, including those involving CBRN incidents.*
  - *Develops contingency plans and conducts training exercises for emergency response.*
- ***Nigeria Security and Civil Defence Corps (NSCDC):***
  - ***Protection of Critical Infrastructure:*** *Safeguard critical national assets such as pipelines, power installations, telecommunications facilities, and government buildings. Monitor and protect against vandalism and sabotage, especially in sectors like oil and gas.*
  - ***Disaster and Emergency Management:*** *Collaborate with other agencies like NEMA to respond to emergencies and disasters. Provide first aid and evacuation services during crises.*
  - ***Combating Crime and Ensuring Public Safety:*** *Prevent and respond to criminal activities, including theft, vandalism, and terrorism. Assist in maintaining public order during large gatherings, protests, or civil disturbances.*
  - ***CBRNE Threat Mitigation:*** *Protect citizens and respond to incidents involving chemical, biological, radiological, and nuclear materials. Ensure safe handling and containment of hazardous materials.*
- ***Federal Fire Service:***
  - *Plays a role in responding to chemical spills and fire incidents involving hazardous materials.*
- ***Nigeria Immigration Service (NIS)****: Border security*

- ***Nigeria Customs Service (NCS):*** *import and export controls*

d. Scientific and Technical Institutions

- ***Nigerian Institute of Medical Research (NIMR):***
  - *Conducts research on biological threats and public health preparedness.*
- ***National Biotechnology Development Agency (NABDA):***
  - *Oversees the safe use of biotechnology and genetic research, ensuring compliance with bio-safety regulations.*

e. International Partners and Organizations:

- ***United Nations (UNODA, UNODC) and International Atomic Energy Agency (IAEA):***
  - *Provides technical assistance and training to strengthen Nigeria's CBRNE preparedness.*
  - *Facilitates information sharing and compliance with international treaties.*

f. Private Sector and Civil Society:

- ***Industries Handling Hazardous Materials:***
  - *Implement safety measures and comply with regulations for handling and storing CBRN materials.*
- ***Civil Society Organizations (CSOs):***
  - *Engage in public awareness campaigns and advocate for transparency in CBRNE risk management.*

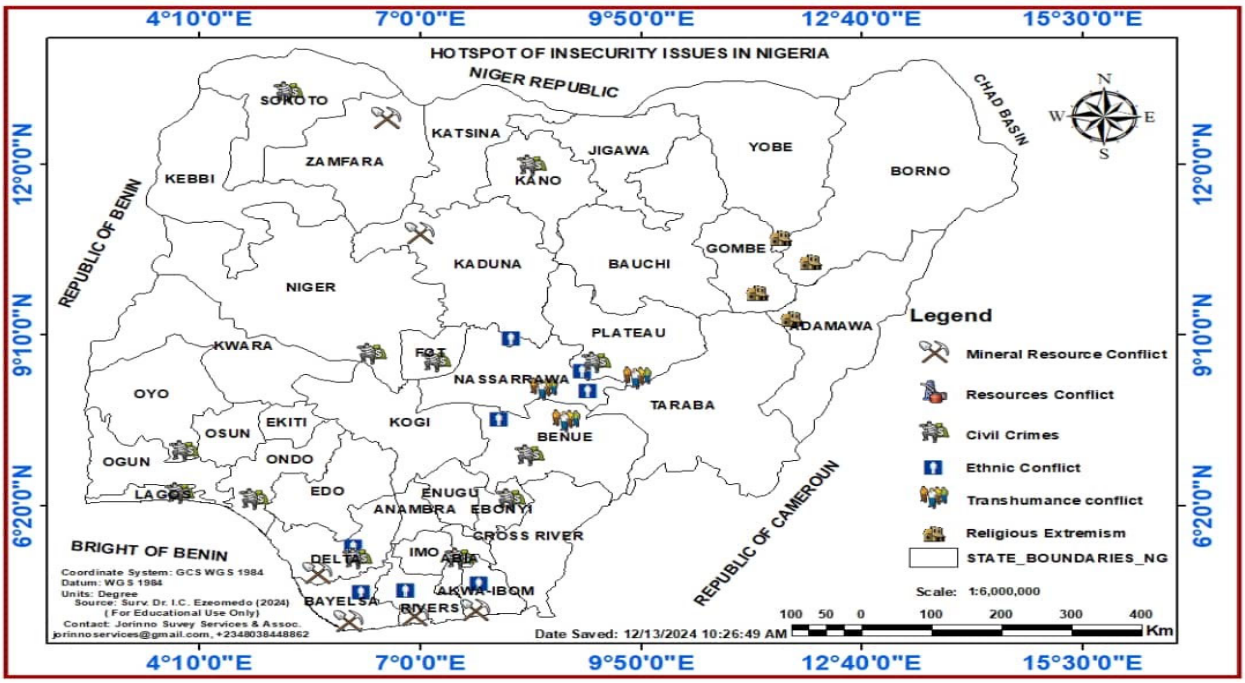
g. Community and Public Engagement

- ***Community Leaders and Local Governments:***
  - *Mobilize local resources and provide first-line response during incidents.*
  - *Facilitate communication between the public and authorities to enhance awareness and preparedness.*

Other MDAs involved in CBRN emergency response coordination in Nigeria are:

- *Ministry of Defense (Defense Headquarters);*
- *Ministry of Foreign Affairs (MFA);*
- *Federal Ministry of Science and Technology (FMS&T);*
- *Federal Ministry of Environment (FMEnv);*
- *Federal Ministry of Education (FMEdu);*
- *Federal Ministry of Petroleum Resources (FMPR);*
- *Federal Ministry of Justice (FMoJ);*
- *Federal Ministry of Health (FMoH);*
- *Federal Ministry of Information and Culture (FMI&C);*
- *Federal Ministry of Industry, Trade and Investment (FMITI;*
- *Federal Ministry of Agriculture and Rural Development (FMA&RD);*
- *Federal Ministry of Interior (FMoI);*
- *Directorate of State Services (DSS);*
- *National Intelligence Agency (NIA);*
- *National Universities Commission (NUC);*
- *National Biosafety Management Agency (NBMA);*
- *National Biotechnology Development Agency (NABDA);*
- *National Orientation Agency (NOA);*
- *National Research Institute for Chemical Technology (NARICT);*
- *University of Abuja (UNIABUJA);*
- *Sheda Science and Technology complex (SHESTCO);*
- *Manufacturers Association of Nigeria (MAN);*
- *Nigerian Association of Chambers of Commerce, Industry, Mines & Agriculture (NACCIMA);*
- *Institute of Chartered Chemist of Nigeria (ICCN); and*
- *Chemical Society of Nigeria (CSN) (Abuja Chapter).*

APPENDIX 2


HOTSPOT OF INSECURITY ISSUES IN NIGERIA
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7°0'0"E
9°50'0"E
12°40'0"E
15°30'0"E
12°0'0"N
9°10'0"N
6°20'0"N
NIGER REPUBLIC
CHAD BASIN
REPUBLIC OF BENIN
REPUBLIC OF CAMEROUN
BRIGHT OF BENIN
SOKOTO
KATSINA
JIGAWA
YOBE
BORNO
ZAMFARA
KEBBI
KANO
KADUNA
BAUCHI
GOMBE
NIGER
PLATEAU
ADAMAWA
KWARA
FCT
NASSARRAWA
TARABA
OYO
EKITI
KOGI
BENUE
OSUN
OGUN
ONDO
EDO
ENUGU
ANAMBRA
EBONYI
CROSS RIVER
LAGOS
DELTA
IMO
ABIA
AKWA-IBOM
BAYELSA
RIVERS
Legend
Mineral Resource Conflict
Resources Conflict
Civil Crimes
Ethnic Conflict
Transhumance conflict
Religious Extremism
STATE_BOUNDARIES_NG
Scale: 1:6,000,000
100 50 0 100 200 300 400
Km
Coordinate System: GCS WGS 1984
Datum: WGS 1984
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Source: Surv Dr. I.C. Ezeomedo (2024)
(For Educational Use Only)
Contact: Jorinno Suvey Services & Assoc.
jorinnoservices@gmail.com, +2348038448862
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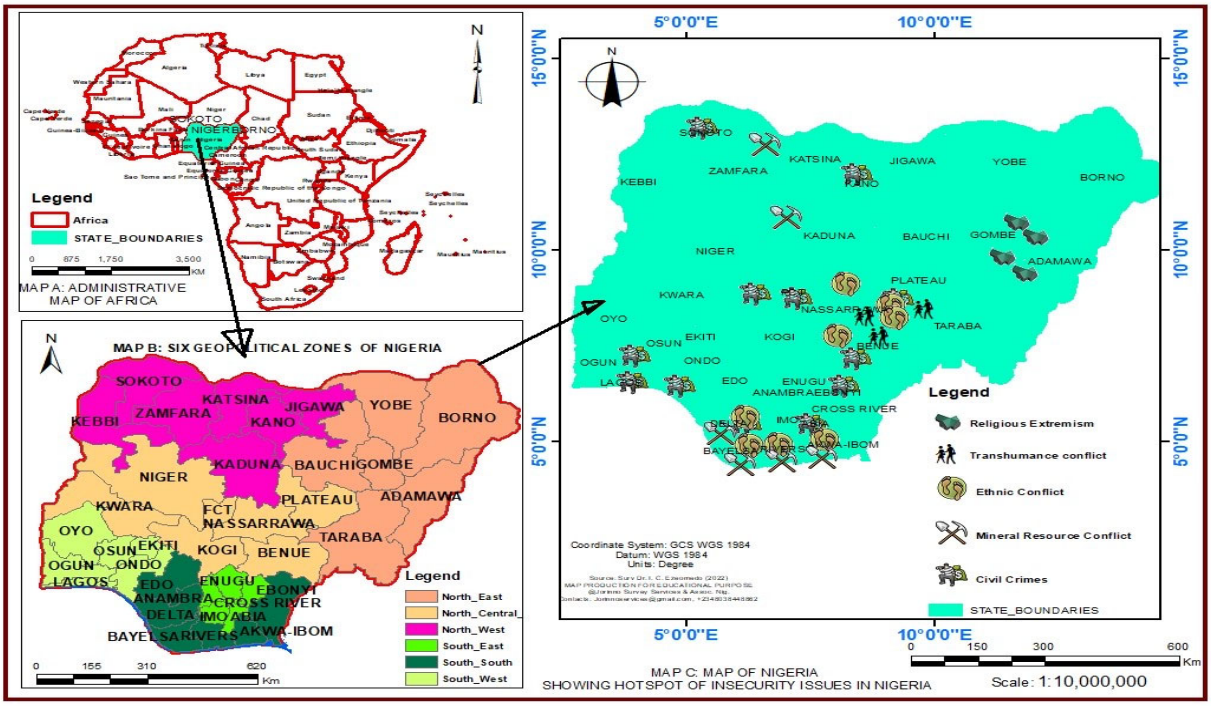
APPENDIX 3


MAP A: ADMINISTRATIVE MAP OF AFRICA
Legend
Africa
STATE_BOUNDARIES
MAP B: SIX GEOPOLITICAL ZONES OF NIGERIA
Legend
North_East
North_Central
North_West
South_East
South_South
South_West
MAP C: MAP OF NIGERIA SHOWING HOTSPOT OF INSECURITY ISSUES IN NIGERIA
Scale: 1:10,000,000
Legend
Religious Extremism
Transhumance conflict
Ethnic Conflict
Mineral Resource Conflict
Civil Crimes
STATE_BOUNDARIES

APPENDIX 4

Datasets and analysis

Table 6.1: Respondents' Demographics

Demographic Category	Category	Frequency (N)	Percentage (%)
Gender	Male	138	55.2
	Female	112	44.8
Age	Under 25	38	15.2
	25-34 years	88	35.2
	35-44 years	62	24.8
	45-54 years	38	15.2
	55 years and above	24	9.6
Educational Level	Secondary Education	25	10
	Diploma/Certificate	50	20
	Bachelor's degree	100	40
	Master's degree	62	24.8
	PhD	13	5.2
Occupation	Security Personnel	75	30
	Government Official	50	20
	Academic/Researcher	62	24.8
	Emergency Response Team Member	63	25.2

Source: Field survey (2024)

Insight

The prominence of the 25-44 age range aligns with the likely professional activity of security personnel, researchers, and emergency responders. The high percentage of respondents with tertiary education suggests a knowledge base suitable for discussing advanced strategies like CBRN risk mitigation. A near-balanced gender representation ensures diverse perspectives, though further efforts could be made for complete gender equity. The distribution reflects a strong focus on active stakeholders (security, research, government, and emergency response), which is vital for a comprehensive study of CBRN/E risks.

Section B: Understanding of CBRN and National Security

Table 6.2: How familiar are you with the concept of CBRN (Chemical, Biological, Radiological, and Nuclear) threats?

Familiarity Level	Frequency (N)	Percentage (%)	Numerical Value
Very Familiar (VF)	80	32	3
Somewhat Familiar (SF)	120	48	2
Not Familiar (NF)	50	20	1
Total	250	100	

Source: Field survey (2024)

- 32% (80 respondents) are highly knowledgeable about CBRN threats. This group likely includes professionals like security personnel, academics, and emergency response team members directly involved in handling or studying these risks.
- 48% (120 respondents) have a moderate understanding of CBRN threats. This majority may represent individuals indirectly engaged with CBRN-related activities or those with some formal exposure to the subject.
- 20% (50 respondents) lack familiarity with CBRN threats. This group might include respondents from roles where CBRN exposure is limited, such as certain government officials or less specialized personnel.

Table 6.3: Do you believe that CBRN threats pose a significant risk to Nigeria's national security?

Agreement Level	Frequency (N)	Percentage (%)
Strongly Agree (SA)	100	40
Agree (A)	90	36
Undecided (U)	30	12
Disagree (D)	20	8
Strongly Disagree (SD)	10	4
Total	250	100

Source: Field survey (2024)

- 40% (100 respondents) strongly believe that CBRN threats pose a significant risk to Nigeria's national security. This indicates a strong acknowledgment of the gravity of such threats among a substantial portion of respondents.
- 36% (90 respondents) agree with the statement, showing moderate concern about the risks posed by CBRN threats. Together with the "Strongly Agree" group, 76% of respondents perceive CBRN threats as significant, highlighting a widespread awareness of the issue.
- 12% (30 respondents) are neutral, reflecting either a lack of information or uncertainty about the risks.
- 8% (20 respondents) believe that CBRN threats are not significant for national security. Their stance could stem from limited exposure to the subject or skepticism about the actual impact of CBRN threats.
- 4% (10 respondents) strongly dismiss the notion that CBRN threats pose significant risks.

Table 6.4: How comprehensive do you find Nigeria's current National Security Strategy in addressing CBRN threats?

Comprehensiveness Level	Frequency (N)	Percentage (%)
Very Comprehensive	50	20
Somewhat Comprehensive	100	40
Not Comprehensive	60	24
Not Aware of the Strategy	40	16
Total	250	100

Source: Field survey (2024)

- 20% (50 respondents) believe that Nigeria's National Security Strategy is very comprehensive in addressing CBRN threats. This group perceives the strategy as thorough and capable of effectively handling CBRN risks.
- 40% (100 respondents) find the strategy somewhat comprehensive. While these individuals acknowledge that the strategy covers CBRN risks to an extent, they may feel that it lacks sufficient depth, resources, or clear implementation plans.
- 24% (60 respondents) think that the strategy is not comprehensive. This group may believe that Nigeria's current national security efforts are inadequate in addressing CBRN risks or that critical areas are not sufficiently covered.
- 16% (40 respondents) are not aware of the National Security Strategy altogether. This suggests a knowledge gap, potentially due to insufficient communication or outreach about the strategy's existence or details.

Table 6.5: what are the most significant sources of CBRN threats in Nigeria?

Sources of CBRN Threats	Frequency (N)	Percentage (%)
Industrial Facilities	60	24.00%
Laboratories and Research Centers	50	20.00%
Terrorist Groups	80	32.00%
Illegal Trafficking and Smuggling	60	24.00%
Total	250	100%

Source: Field survey (2024)

- The data reveals the distribution of perceptions about the most significant sources of Chemical, Biological, Radiological, and Nuclear (CBRN) threats in Nigeria:
- Terrorist Groups (32% / 80 respondents): The largest proportion of respondents (32%) considers terrorist groups as the most significant source of CBRN threats in Nigeria. This highlights the growing concern about extremist organizations potentially acquiring or utilizing CBRN materials to further their agendas, posing substantial national security risks.
- Industrial Facilities (24%/60 respondents): Industrial facilities are considered a significant source of CBRN threats by 24% of respondents. This indicates concerns about the safety and security of facilities dealing with hazardous materials, such as chemical plants, refineries, or power plants, which could be vulnerable to accidents, sabotage, or terrorism.
- Illegal Trafficking and Smuggling (24%/60 respondents): Illegal trafficking and smuggling of CBRN materials is another major concern, with 24% of respondents recognizing this as a significant threat. This reflects fears regarding the movement of dangerous substances across borders, where lax controls could enable the spread of CBRN agents to unauthorized individuals or groups.
- Laboratories and Research Centers (20% / 50 respondents): Laboratories and research centers account for 20% of respondents' concerns. While these institutions typically deal with controlled substances for scientific purposes, the potential for theft, misuse, or accidental release of CBRN materials raises significant national security risks.

Section C: Current Coordinating and Emergency Response Mechanisms

Table 6.6: How would you rate the effectiveness of Nigeria's current coordinating and emergency response mechanisms for handling CBRN events?

Effectiveness Level	Frequency (N)	Percentage (%)
Very Effective	50	20.00%
Effective	80	32.00%
Neutral	60	24.00%
Ineffective	40	16.00%
Very Ineffective	20	8.00%
Total	250	100%

Source: Field survey (2024)

- 20% of respondents believe that Nigeria's emergency response and coordinating mechanisms for CBRN events are very effective. This group likely views the current systems as well-prepared and capable of managing CBRN risks effectively, ensuring rapid response in the event of such incidents.
- 32% of respondents rate the mechanisms as effective. While these respondents acknowledge the mechanisms as functional, they may believe there are areas for improvement or that the response is not always flawless but generally adequate.
- 24% of respondents are neutral, indicating that they neither strongly agree nor disagree about the effectiveness of the response mechanisms. These individuals may lack sufficient information or feel that the systems in place are neither particularly strong nor weak.
- 16% consider the mechanisms to be ineffective. These respondents may feel that the systems in place are insufficient, underfunded, or poorly coordinated, leading to delays or inefficiencies in handling CBRN events.
- 8% of respondents rate the mechanisms as very ineffective, suggesting significant concerns about Nigeria's preparedness and response to CBRN threats. This group likely perceives a critical gap in the country's ability to handle such incidents effectively.

Table 6.7: Have you participated in or are aware of any CBRN emergency preparedness drills in Nigeria?

Response	Frequency (N)	Percentage (%)
Yes	70	28.00%
No	180	72.00%
Total	250	100%

Source: Field survey (2024)

- 28% of respondents have either participated in or are aware of CBRN emergency preparedness drills in Nigeria. This indicates that a portion of the population has had exposure to, or knowledge of, national or regional efforts to prepare for CBRN incidents. This could include drills organized by the government, security agencies, or international partners.

- Large majorities, 72% of respondents, have not participated in or are unaware of such drills. This suggests that there may be significant gaps in public engagement and education on CBRN emergency preparedness. It could reflect a lack of widespread outreach, limited media coverage, or insufficient training programs targeting the general public or key sectors.

Table 6.8: Do you believe there is sufficient collaboration between different agencies involved in CBRN risk mitigation in Nigeria?

Agreement Level	Frequency (N)	Percentage (%)
Strongly Agree (SA)	30	12.00%
Agree (A)	90	36.00%
Undecided (U)	50	20.00%
Disagree (D)	60	24.00%
Strongly Disagree (SD)	20	8.00%
Total	250	100%

Source: Field survey (2024)

- 12% of respondents believe there is sufficient collaboration between agencies. This indicates a small but notable portion of respondents who feel confident that the agencies involved in CBRN risk mitigation are working effectively together, with minimal barriers to communication and coordination.

- A larger group of 36% agrees that there is sufficient collaboration, which suggests that while collaboration exists, there may still be room for improvement. These respondents likely see efforts being made, but may recognize challenges or inefficiencies in how the agencies interact.

Table 6.9: What do you perceive as the main challenges in effectively managing CBRN risks in Nigeria?

	Frequency (N)	Percentage (%)
Lack of funding	80	32.00
Inadequate training	60	24.00
Poor inter-agency coordination	70	28.00
Insufficient public awareness	40	16.00
Total	250	100

Source: Field survey (2024)

- 32% of respondents perceive lack of funding as one of the main challenges in managing CBRN risks. This indicates that insufficient financial resources may hinder effective risk mitigation, preparedness, and response efforts. Funding gaps can impact essential activities such as acquiring necessary equipment, conducting training programs, and implementing preventive measures.

- 24% of respondents feel that inadequate training is a significant challenge. This suggests that personnel involved in CBRN risk management may lack the necessary skills and knowledge to handle emergencies efficiently. It points to the need for continuous and specialized training for responders, security personnel, and other stakeholders.

- 28% of respondents highlight poor inter-agency coordination as a major challenge. This indicates that agencies involved in CBRN risk mitigation may not be working in a unified manner, leading to inefficiencies and delays in response. Clear roles, communication channels, and joint planning are critical to improving coordination.

- 16% of respondents identify insufficient public awareness as a challenge. This suggests that the general public may not be adequately informed about CBRN risks or how to respond in case of an incident. Public education and awareness campaigns are needed to ensure people are better prepared and understand the importance of CBRN risk mitigation.

Section D: Impact of Terrorism on Growth and Development

Table 6.10: How significantly do you think terrorism has affected Nigeria's economic growth and development?

	Frequency (N)	Percentage (%)
Extremely significant	90	36.00

Significant	100	40.00
Moderate	40	16.00
Low	15	6.00
No impact	5	2.00
Total	250	100

Source: Field survey (2024)

- 36% of respondents believe that terrorism has an extremely significant impact on Nigeria's economic growth and development. This highlights the severe and far-reaching consequences terrorism has on key sectors like infrastructure, trade, and foreign investment.
- 40% of respondents think that terrorism has a significant effect on economic growth. This group recognizes the challenges posed by terrorism, such as disruption of business activities, destruction of property, and loss of investor confidence.
- 16% of respondents believe the impact is moderate. They might perceive terrorism as one of many factors influencing economic growth but not the sole or most important factor.
- Only 6% feel that terrorism has a low impact on economic growth, suggesting that this small group either believes other factors (such as corruption or poor governance) play a more significant role in Nigeria's economic challenges.
- 2% of respondents do not believe that terrorism has any noticeable effect on Nigeria's economic development, which indicates that a very small minority might either be unaware or dismissive of terrorism's economic consequences.

Table 6.11: which sectors have been most affected by terrorism in Nigeria?

Sectors	Frequency (N)	Percentage (%)
Agriculture	75	30.00%
Education	50	20.00%
Health	35	14.00%
Infrastructure	60	24.00%
Investment and business	30	12.00%
Total	250	100%

Source: Field survey (2024)

- 30% of respondents believe that the agriculture sector has been the most significantly impacted by terrorism. This may be due to the disruption of farming activities, displacement of farmers, and destruction of farmland, which directly affects food production and the rural economy.
- 20% of respondents feel that the education sector has been heavily affected by terrorism. Terrorist activities, including attacks on schools and kidnapping of students, have hindered access to education in affected regions, leading to disruptions in educational systems and long-term consequences for human capital development.
- 14% of respondents identify health as one of the sectors significantly affected. Terrorism contributes to the destruction of healthcare infrastructure, difficulty accessing medical services, and an increase in the number of casualties from attacks, putting pressure on health systems.
- 24% of respondents point to infrastructure as a key sector severely affected by terrorism. This includes the destruction of roads, bridges, power lines, and communication systems, which can have a lasting impact on both local and national development.
- 12% of respondents feel that investment and business have been notably impacted by terrorism. The insecurity caused by terrorism deters both domestic and foreign investment, disrupts businesses, and reduces economic activity, particularly in affected regions.

Table 6.12: Do you believe that the economic and fiscal impacts of terrorism in Nigeria are statistically significant?

Response	Frequency (N)	Percentage (%)
Yes	210	84.00%
No	40	16.00%

Total	250	100%

Source: Field survey (2024)

- 84% of respondents believe that the economic and fiscal impacts of terrorism in Nigeria are statistically significant. This highlights the widespread belief that terrorism has a considerable and measurable effect on Nigeria's economy, influencing factors like GDP growth, inflation, investment, and fiscal stability. Respondents likely recognize the costs associated with security operations, infrastructure damage, and the displacement of people, all of which have direct and indirect impacts on national economic performance.
- Only 16% of respondents do not believe that terrorism has a statistically significant economic and fiscal impact. This minority may either view other factors, such as corruption or poor governance, as more significant, or they may feel that the long-term economic effects of terrorism are less pronounced compared to other national challenges.

Table 6.13: Correlation Analysis

Variables	CBRN Risk Perception	Government Preparedness	Economic Impact of Terrorism	Terrorism Impact on Infrastructure	CBRN Risk Awareness
CBRN Risk Perception	1	0.72	-0.45	0.6	0.8
Government Preparedness	0.72	1	-0.3	0.5	0.65
Economic Impact of Terrorism	-0.45	-0.3	1	-0.7	-0.55
Terrorism Impact on Infrastructure	0.6	0.5	-0.7	1	0.55
CBRN Risk Awareness	0.8	0.65	-0.55	0.55	1

Source: Field survey (2024)

- CBRN Risk Perception and Government Preparedness: A moderate positive correlation (0.72) suggests that as people perceive higher risks from CBRN threats, government preparedness efforts tend to be stronger.
- CBRN Risk Perception and Economic Impact of Terrorism: A moderate negative correlation (-0.45) suggests that higher perceptions of CBRN risks might be associated with a lesser belief in the economic impact of terrorism, potentially reflecting a gap between perceived and actual risk.
- Economic Impact of Terrorism and Terrorism Impact on Infrastructure: A strong negative correlation (-0.70) indicates that as the economic impact of terrorism increases, the perceived impact on infrastructure becomes stronger, possibly because terrorism damages infrastructure, thus affecting the economy.
- CBRN Risk Perception and Awareness: A strong positive correlation (0.80) suggests that as people are more aware of CBRN risks, their perception of the threats increases, indicating that awareness plays a significant role in shaping perceptions.

Correlation Analysis in SPSS

Step-by-Step Procedure:

1. **Open SPSS** and load your dataset containing the variables:
    - CBRN Risk Perception
    - Government Preparedness
    - Economic Impact of Terrorism
    - Terrorism Impact on Infrastructure
    - CBRN Risk Awareness
2. **Perform Pearson's Correlation Analysis**:
    - Click on **Analyze → Correlate → Bivariate**
    - Select all the variables and move them to the **Variables** box.
    - Choose **Pearson correlation coefficient** (default option).
    - Select **Two-tailed significance test** to check if correlations are statistically significant.

- Click **OK** to generate the correlation matrix.

Interpreting SPSS Output:

SPSS produces a **correlation matrix** similar to the one you provided. Each cell contains:

- **Pearson correlation coefficient (r)**: Strength and direction of relationships.
- **Significance (p-value)**: If **p < 0.05**, the correlation is statistically significant.
- **Sample size (N)**: Number of observations used.

6.2.2 Multiple Regression Model

Factors influencing the perception of CBRN Risks. The dependent variable could be CBRN Risk Perception (dependent variable), and the independent variables could include:

- **Government Preparedness** (independent variable)
- **Economic Impact of Terrorism** (independent variable)
- **Terrorism Impact on Infrastructure** (independent variable)
- **CBRN Risk Awareness** (independent variable)

Regression Analysis in SPSS

Step-by-Step Procedure:

1. **Select Regression Model**:
   - Click **Analyze → Regression → Linear**
2. **Define Dependent & Independent Variables**:
   - Move **CBRN Risk Perception** to the **Dependent** box.
   - Move **Government Preparedness, Economic Impact of Terrorism, Terrorism Impact on Infrastructure, and CBRN Risk Awareness** to the **Independent(s)** box.
3. **Set Options:**
   - Check **Enter method** (default) to include all predictors at once.
   - Click **Statistics** and select:
     - R-squared (model fit)
     - Coefficients (β values)
     - Collinearity diagnostics (to check for multicollinearity)
4. **Click OK** to run the regression.

Interpreting SPSS Output:

SPSS generates multiple tables:

1. **Model Summary:**
   - R-squared (R2): Percentage of variance in CBRN Risk Perception explained by predictors.
   - Adjusted R2: Adjusted for the number of predictors.
2. **ANOVA Table:**
   - Tests if the model is statistically significant. If **Sig. (p-value) < 0.05**, the model is valid.
3. **Coefficients Table:**
   - Unstandardized β coefficients: Show the impact of each independent variable.
   - Standardized β coefficients: Compare variable importance.
   - Significance (p-values): If $p < 0.05$, the predictor significantly influences the dependent variable.

Key Takeaways from SPSS Analysis:

- Correlation Analysis identifies relationships between variables.
- Regression Analysis determines which variables significantly predict CBRN Risk Perception.
- Significance (p-values) & R-squared values help assess the model's validity.

Table 6.14: Ordinary Least Square (OLS)

Variables	Coefficient	Standard Error	t-value	p-value
Intercept (Constant)	2.45	0.5	4.9	< 0.01
Government Preparedness	0.23	0.1	2.3	0.05

Economic Impact of Terrorism	-0.1	0.12	-0.83	0.4
Terrorism Impact on Infrastructure	0.17	0.08	2.12	0.03
CBRN Risk Awareness	0.45	0.2	2.25	0.04

- Intercept (Constant): This is the value of the dependent variable (CBRN Risk Perception) when all independent variables are equal to zero. In this case, if all predictors (Government Preparedness, Economic Impact, etc.) are zero, the CBRN Risk Perception would be 2.45.
- Government Preparedness: The coefficient for Government Preparedness is 0.23, which means that for every one-unit increase in government preparedness, the CBRN Risk Perception increases by 0.23, holding all other variables constant. This suggests that higher government preparedness is associated with increased risk perception.
- Economic Impact of Terrorism: The coefficient for Economic Impact of Terrorism is -0.10, meaning that as the perceived economic impact of terrorism increases by one unit, CBRN Risk Perception decreases by 0.10, though this result is not statistically significant (p-value > 0.05).
- Terrorism Impact on Infrastructure: The coefficient for Terrorism Impact on Infrastructure is 0.17, meaning that higher perceived terrorism impact on infrastructure correlates with an increase in CBRN Risk Perception. This is statistically significant with a p-value of 0.03.
- CBRN Risk Awareness: The coefficient for CBRN Risk Awareness is 0.45, which means that increased awareness of CBRN risks leads to a significant increase in the perception of those risks. This is also statistically significant with a p-value of 0.04.
- The R-squared value indicates how well the independent variables explain the variation in the dependent variable. An R-squared value of 0.85 means that 85% of the variation in CBRN Risk Perception can be explained by the independent variables in the model.

About the Author

Mr. Uchechukwu Christian Arinze is a Nuclear Security, and Nuclear Nonproliferation expert. He possesses B.Sc (Hon.) and M.Sc degrees in Computer Science and is currently preparing for his Viva defense towards his Ph.D program in Computer Science at the University of Nigeria. He has over 45 journal publications and dozens of conference proceedings, book chapters and articles in research journals both local and international to his credit. He is a member and Nigeria Ambassador of World Institute of Nuclear Security (WINS), Nigeria Computer Society, Nigeria Society for Radiation Protection (NSRP), Nigerian Nuclear Society (NNS), WINS; IEEE; INMM.