



## **Rural Electrification and Artificial Intelligence as measures for Combating Boko Haram Insurgency in Borno State Nigeria: A Theoretical Perspective**

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### **Abstract**

The Boko Haram insurgency has remained one of the most persistent security challenges confronting Borno State and northeastern Nigeria, resulting in widespread loss of lives, displacement of populations, destruction of critical infrastructure, and disruption of socioeconomic development. Despite sustained military campaigns and conventional counterterrorism operations, the insurgency continues to pose significant threats to peace and security, indicating the need for complementary strategies that integrate development interventions with technological innovation. This study examined rural electrification and artificial intelligence as complementary measures for combating Boko Haram insurgency in Borno State, Nigeria. The study adopted a qualitative theoretical approach based on a critical review and analysis of existing literature on security, rural development, artificial intelligence, and counterinsurgency, drawing on Human Security Theory and Routine Activity Theory. The analysis revealed that rural electrification can promote socioeconomic development, improve livelihoods, strengthen community resilience, enhance public lighting, and increase government presence in rural communities, thereby reducing conditions that contribute to insecurity. The study also found that artificial intelligence technologies, including drone surveillance, predictive analytics, facial recognition, and intelligent monitoring systems, can improve intelligence gathering, early warning, threat detection, and operational decision-making in counterinsurgency efforts. The study argues that integrating rural electrification with artificial intelligence offers a more sustainable and multidimensional approach to combating Boko Haram insurgency than reliance on military responses alone. It concludes that combining development-oriented interventions with technology-driven security strategies can strengthen peacebuilding and post-conflict recovery in Borno State. The study recommends increased investment in rural electrification infrastructure, artificial intelligence-enabled security systems, interagency collaboration, and capacity building to enhance counterinsurgency operations and promote sustainable peace in northeastern Nigeria.

**Keywords:** Rural Electrification, Artificial Intelligence, Boko Haram Insurgency, Counterinsurgency, Human Security.



## 1. Introduction

The Boko Haram insurgency remains one of the most devastating security challenges confronting Nigeria, particularly the northeastern region and Borno State. Since the escalation of the insurgency in 2009, thousands of people have lost their lives, millions have been displaced, and extensive damage has been inflicted on public infrastructure, educational institutions, healthcare facilities, markets, roads, and electricity installations. The conflict has generated severe humanitarian, economic, and developmental consequences that continue to undermine peace and sustainable development within the region (UNDP, 2024; Ogbozor, 2025).

However, Borno State has remained the epicenter of the insurgency, experiencing repeated attacks on rural communities, government facilities, security formations, and critical infrastructure. The destruction of livelihoods, displacement of populations, and disruption of socioeconomic activities have contributed to widespread poverty, unemployment, social dislocation, and infrastructural decay. Several communities continue to experience inadequate access to basic services such as electricity, healthcare, education, and communication facilities, thereby increasing human insecurity and social vulnerability (Tadjbakhsh, 2024; World Bank, 2025).

The Nigerian government has implemented various military and counterterrorism operations to contain the insurgency. These efforts have resulted in the recovery of territories previously occupied by insurgents and the degradation of several terrorist networks. Ike et al. (2024) argued that the persistence of sporadic attacks, kidnappings, ambushes, and assaults on rural settlements suggests that conventional military approaches alone may not be sufficient to achieve sustainable peace and security in the region. Recent incidents, including the abduction of primary school pupils in Askira/Uba and students sitting for the 2026 National Examinations Council (NECO) examinations in Lassa, Borno State, further demonstrate the evolving security challenges facing the region. These incidents underscore the need to complement conventional military operations with more sophisticated approaches, particularly through the application of



artificial intelligence and rural electrification to improve community security.

Rural electrification has emerged as a critical instrument for promoting socioeconomic development, reducing poverty, stimulating local economies, and improving access to essential services. Electricity supports education, healthcare delivery, communication systems, agricultural productivity, and small-scale enterprises. Consequently, access to electricity contributes significantly to economic empowerment, social inclusion, and community resilience in rural areas (Janghorban et al., 2024; Olaniyan et al., 2024). Furthermore, security lighting along roads, markets, schools, and public spaces can improve visibility, strengthen informal social control, and reduce opportunities for Boko Haram insurgents to operate. Similarly, artificial intelligence technologies—including drone surveillance, facial recognition, predictive analytics, and intelligent monitoring systems—can enhance intelligence gathering, threat detection, surveillance, and security decision-making processes (Russell & Norvig, 2024; Scharre, 2024).

Despite the growing importance of technological innovation and infrastructure development in contemporary security management, limited scholarly attention has been devoted to examining the combined role of rural electrification and artificial intelligence in combating Boko Haram insurgency in Borno State. Existing studies have largely focused on military operations, humanitarian interventions, deradicalization programmes, and conventional counterterrorism strategies. Against this background, this paper theoretically examines rural electrification and artificial intelligence as complementary measures for combating Boko Haram insurgency in Borno State, Nigeria, drawing on Human Security Theory, Routine Activity Theory, and Broken Windows Theory.

## **1.1 Literature Review**

### **Rural Electrification**

Rural electrification refers to the provision of reliable, affordable, and sustainable electricity to rural and underserved communities to stimulate socioeconomic development and improve living conditions. Contemporary development literature increasingly recognizes electricity



access as a fundamental driver of human development, economic productivity, poverty reduction, and social inclusion (Janghorban et al., 2024). Access to electricity enhances educational outcomes, improves healthcare delivery, creates employment opportunities, strengthens communication systems, and supports small-scale enterprises. In conflict-affected regions, it can also contribute to improved security by supporting surveillance systems, public lighting, and rapid communication among security agencies and community members.

However, in Nigeria, rural electrification remains a major developmental challenge, particularly in the northeastern region, where insurgency has damaged critical infrastructure and disrupted electricity distribution networks. The destruction of transmission facilities, displacement of communities, and persistent insecurity have significantly limited access to electricity in many rural communities across Borno State. Studies further show that decentralized electricity systems, especially solar mini-grids, improve household incomes, productivity, public safety, and overall social welfare (Carabajal et al., 2024). Consequently, within conflict-affected communities, rural electrification has the potential to strengthen government presence, facilitate intelligence sharing and communication, stimulate local economic activities, improve public lighting, and enhance community resilience against Boko Haram insurgency.

### **Artificial Intelligence**

Artificial intelligence (AI) refers to computer systems and algorithms capable of performing tasks that ordinarily require human intelligence, including learning, reasoning, problem-solving, prediction, decision-making, and pattern recognition. AI technologies such as machine learning, predictive analytics, computer vision, facial recognition, natural language processing, and autonomous systems have increasingly transformed contemporary security operations. Falode et al., (2025) identify AI as a strategic tool for intelligence gathering, surveillance, threat detection, predictive analysis, and operational decision-making. AI systems can process large volumes of data, identify suspicious patterns, monitor communications, and provide real-time intelligence to security agencies.



However, in counterinsurgency operations, AI applications include drone surveillance, facial recognition technologies, geospatial analysis, early warning systems, and predictive policing models. Artificial intelligence has considerable potential to improve intelligence management, risk assessment, and threat detection capabilities within conflict zones (Donald, 2025). Furthermore, machine learning techniques can assist in identifying spatial and temporal patterns of Boko Haram activities, thereby enabling proactive security responses (Somoye, 2025). Nevertheless, challenges relating to infrastructure deficits, inadequate technical expertise, funding constraints, ethical concerns, and data protection continue to affect AI adoption within Nigeria's security sector.

### **Boko Haram Insurgency**

Boko Haram insurgency refers to the violent campaign conducted by the extremist group Jama'atu Ahlis Sunna Lidda'awati wal-Jihad, popularly known as Boko Haram, which emerged in northeastern Nigeria in the early 2000s and escalated into armed insurgency in 2009. The insurgency has produced severe humanitarian, social, economic, and security consequences, particularly in Borno State. The activities of Boko Haram include attacks on civilians, military formations, educational institutions, religious centers, markets, and critical infrastructure. The insurgency has resulted in thousands of deaths, mass displacement, destruction of livelihoods, and disruption of social services.

The insurgent groups increasingly adopting sophisticated tactics, including improvised explosive devices, drones, intelligence networks, and mobile technologies (Lenshie et al., 2024). Reports also indicate renewed attacks and tactical innovations among insurgent groups operating within northeastern Nigeria (Reuters, 2025)

### **Counterinsurgency**

Counterinsurgency refers to the combination of military, political, economic, social, and psychological measures employed by governments to defeat insurgent movements and restore state authority. Contemporary counterinsurgency theory emphasizes that military force alone is insufficient for sustainable peace. Modern approaches to counterinsurgency advocate



integrated strategies involving security operations, intelligence gathering, socioeconomic development, community engagement, and governance reforms. Recent studies on Nigeria's counterinsurgency efforts highlight the importance of improving intelligence coordination, interagency cooperation, and developmental interventions in conflict-affected communities (Okoko et al., 2024). Similarly, successful counterinsurgency requires addressing both the immediate security threats and the underlying socioeconomic conditions that facilitate insurgent activities. Consequently, rural electrification may contribute to human development and social stability, while artificial intelligence may strengthen surveillance, intelligence, and operational efficiency.

## **1.2 Theoretical Framework**

### **Human Security Theory**

Human Security Theory emerged prominently through the United Nations Development Programme (UNDP) Human Development Report of 1994. The theory broadened the traditional conception of security beyond military protection and territorial defense to include economic, food, health, environmental, personal, community, and political security. The theory argues that sustainable security can only be achieved when individuals are protected from both physical threats and socioeconomic deprivation. Tadjbakhsh, (2024) emphasizes that poverty, unemployment, inequality, social exclusion, and inadequate access to basic services often create conditions that facilitate conflict and violent extremism in conflict-affected societies, the absence of development and basic infrastructure may weaken state legitimacy and increase citizens' vulnerability to insecurity. In Borno State, years Boko Haram insurgency have severely affected livelihoods, education, healthcare services, transportation systems, and energy infrastructure. Many rural communities continue to experience limited access to electricity, poor economic opportunities, and inadequate public services. Such conditions contribute to human insecurity and social vulnerability.

Thus, Rural electrification directly addresses several dimensions of human security by improving living standards, promoting economic activities, enhancing education and



healthcare services, and strengthening social inclusion. Access to electricity can improve security, support small businesses, agricultural processing, digital connectivity, and income generation, thereby reducing some of the socioeconomic conditions associated with insecurity. Therefore, Human Security Theory provides the principal theoretical foundation for this study because it explains how development interventions such as rural electrification can contribute to sustainable peace and reduce the structural conditions that may encourage insurgency.

Human Security Theory explains the developmental dimension of security by emphasizing that poverty, exclusion, and inadequate access to essential services can contribute to insecurity. Rural electrification therefore becomes an instrument for improving human welfare and reducing structural vulnerabilities.

### **Routine Activity Theory**

Routine Activity Theory was developed by Cohen and Felson (1979). The theory argues that criminal activities occur when three conditions converge in time and space: a motivated offender, a suitable target, and the absence of capable guardians. Although originally developed to explain conventional crimes, contemporary scholars have increasingly applied the theory to terrorism, violent extremism, and insurgency. The theory suggests that criminal and insurgent activities can be reduced when capable guardianship is strengthened and opportunities for offending are minimized.

Artificial intelligence provides an important form of capable guardianship within modern security environments. AI-powered surveillance systems, predictive analytics, facial recognition technologies, drone monitoring, and intelligent early warning systems can improve threat detection and reduce opportunities for insurgent operations. thus, it enhances intelligence gathering, risk assessment, pattern recognition, and real-time monitoring of security threats (Akinbi & Olanrewaju, 2025). Through these technologies, security agencies can identify suspicious movements, predict potential attacks, and improve operational responses. Artificial intelligence can strengthen surveillance and reduce opportunities for insurgent attacks, thereby improving counterinsurgency operations in Borno State.



Routine Activity Theory explains how artificial intelligence technologies can function as capable guardians by improving surveillance, intelligence gathering, and threat detection. AI systems may reduce opportunities for insurgent operations through enhanced monitoring and predictive capabilities.

### **1.3 Rural Electrification and Insurgency Reduction in Borno State**

#### **Energy Poverty and Economic Opportunities**

Energy poverty remains one of the major developmental challenges affecting rural communities in Borno State. Many communities continue to experience inadequate access to electricity due to poor infrastructure, geographical isolation, poverty, and the destruction of power facilities resulting from the Boko Haram insurgency. The absence of reliable electricity has limited economic activities, constrained educational opportunities, weakened healthcare services, and reduced overall quality of life. However, electricity is a critical driver of rural development, social inclusion, and economic transformation (IEA, 2024; World Bank, 2025). Communities without electricity often experience higher levels of unemployment, poverty, and social exclusion, conditions that may increase vulnerability to insecurity and violent extremism. In Borno State, prolonged Boko Haram insurgency has further intensified energy deprivation through the destruction of transmission lines, electrical facilities, and public infrastructure. Consequently, many rural communities continue to experience limited government presence and inadequate developmental intervention.

Consequently, rural electrification contributes significantly to local economic development by supporting small businesses, agricultural processing, irrigation systems, refrigeration, communication services, and entrepreneurial activities. Access to electricity enables rural residents to engage in productive economic activities that generate income and improve livelihoods. This however, increases household income, creates employment opportunities, and stimulates local economic growth improved economic opportunities may reduce the socioeconomic vulnerabilities that insurgent groups often exploit during recruitment. (Carabajal et al., 2024; Janghorban et al., 2024). In Borno State, the restoration and expansion





of electricity infrastructure can facilitate the reopening of markets, encourage private investments, support agro-processing activities, and create employment opportunities for youths. Economic empowerment may reduce frustration, social exclusion, and the attractiveness of extremist narratives among vulnerable populations.

### **Security Lighting and Community Surveillance**

Security lighting constitutes one of the most important security benefits of rural electrification. The installation of streetlights, solar-powered lighting systems, and illumination of public spaces enhances visibility and reduces opportunities for criminal and insurgent activities. In many rural communities of Borno State, darkness and inadequate lighting often create opportunities for insurgent movement, criminal activities, and attacks on vulnerable populations. The provision of solar-powered streetlights around roads, markets, schools, healthcare facilities, and community centers may improve community safety and strengthen informal surveillance. Security lighting can also facilitate night-time economic activities, increase community interactions, and improve residents' confidence. Well-lit communities may encourage displaced persons to return and support post-conflict reconstruction efforts.

Routine Activity Theory suggests that increased visibility strengthens capable guardianship by reducing concealment opportunities for offenders. Similarly, Broken Windows Theory argues that well-maintained and illuminated environments communicate order, social control, and state presence. Consequently, security lighting represents a practical and cost-effective component of rural electrification that contributes simultaneously to development and improvement of security.

## **1.4 Artificial Intelligence and Counterinsurgency Operations**

### **Artificial Intelligence and Modern Security Operations**

Artificial intelligence has emerged as one of the most transformative technologies in contemporary security and defense operations. AI systems are increasingly employed in intelligence gathering, threat detection, surveillance, risk assessment, predictive analytics, and



operational decision-making. Recent advances in machine learning, computer vision, natural language processing, and data analytics have significantly improved the ability of security agencies to identify and respond to security threats (Russell & Norvig, 2024; Kott & Alberts, 2025).

Globally, governments and security institutions are increasingly utilizing AI-powered technologies to enhance situational awareness, improve intelligence capabilities, and strengthen counterterrorism operations. AI systems can process large volumes of information from multiple sources, identify hidden patterns, and generate actionable intelligence for security agencies. In conflict environments, artificial intelligence offers opportunities for early threat detection, rapid information processing, and improved operational coordination. Consequently, AI has become an important component of modern counterinsurgency strategies.

However, Intelligence gathering remains a critical component of successful counterinsurgency operations. Insurgent groups often rely on secrecy, mobility, and local networks to evade detection. Artificial intelligence can improve intelligence collection through the analysis of communication patterns, geospatial information, social media data, and surveillance records. Machine learning algorithms can identify suspicious behaviors, detect unusual movement patterns, and analyze large datasets that may be difficult for human analysts to process efficiently. Recent studies indicate that AI-supported intelligence systems improve threat assessment and operational planning (Scharre, 2024).

Furthermore, for Nigeria's security agencies, AI-assisted intelligence systems could enhance information sharing, improve threat identification, and support evidence-based decision-making in areas affected by insurgency. One of the most significant applications of artificial intelligence in counterinsurgency operations is drone technology. AI-powered drones can conduct aerial surveillance, monitor inaccessible terrain, and provide real-time intelligence to security agencies.

Consequently, the difficult terrain and vast geographical areas of Borno State often create



operational challenges for conventional security operations. Forests, border regions, and remote settlements may provide opportunities for insurgent movements and hideouts. AI-enabled drones equipped with thermal imaging, object recognition, and automated target detection systems can improve surveillance capabilities and assist security agencies in monitoring vulnerable areas. Such technologies may provide early warning information and support rapid response operations. drone surveillance may also reduce operational risks to security personnel while improving intelligence accuracy and situational awareness.

Despite its potential benefits, several challenges may hinder the application of artificial intelligence in counterinsurgency operations in Borno State. First, inadequate digital infrastructure and unreliable electricity supply may limit the deployment of AI technologies. Most AI systems depend on stable electricity, internet connectivity, and data infrastructure. Second, limited technical expertise and insufficient personnel training may affect the operation and maintenance of AI systems. Third, financial constraints may hinder the acquisition and deployment of sophisticated technological equipment. Fourth, concerns regarding privacy, data protection, ethical accountability, and human rights require careful consideration. Finally, institutional coordination among security agencies remains essential for the effective integration of artificial intelligence into national security operations. Despite these challenges, artificial intelligence presents significant opportunities for improving intelligence gathering, surveillance, early warning systems, and operational decision-making in the fight against Boko Haram insurgency in Borno State.

### **1.5 Integrating Rural Electrification and Artificial Intelligence for Sustainable Security in Borno State**

Contemporary counterinsurgency literature increasingly recognizes that military force alone cannot effectively address the complex causes and dynamics of insurgency. Sustainable security requires both developmental interventions that address structural vulnerabilities and technological innovations that strengthen security capabilities (UNDP, 2024; Ogbosor, 2025). Rural electrification addresses socioeconomic deprivation, infrastructural deficits, and social



exclusion, while artificial intelligence enhances surveillance, intelligence gathering, threat detection, and operational efficiency (Janghorban et al., 2024; Scharre, 2024).

However, reliable electricity supply constitutes a fundamental requirement for the operation of modern security technologies. Artificial intelligence systems depend heavily on electricity to power surveillance equipment, communication systems, sensors, data centers, and monitoring devices (IEA, 2024). In many rural communities of Borno State, inadequate electricity supply limits the deployment of technological security systems and digital infrastructure. Consequently, rural electrification serves as a foundational requirement for the effective application of artificial intelligence in counterinsurgency operations (World Bank, 2025).

Similarly, Security lighting remains one of the most practical applications of rural electrification for community safety. Streetlights, solar-powered lighting systems, and illuminated public spaces increase visibility and reduce opportunities for criminal and insurgent activities (Welsh & Farrington, 2023). Furthermore, Routine Activity Theory suggests that increased capable guardianship reduces opportunities for offending (Cohen & Felson, 1979). Similarly, Broken Windows Theory argues that well-maintained environments communicate social order and discourage disorder and criminal activities (Wilson & Kelling, 1982). In conflict-affected communities of Borno State, security lighting may improve community confidence, facilitate economic activities, and strengthen informal surveillance mechanisms.

Moreover, Artificial intelligence can support early warning systems through the analysis of multiple data sources, including surveillance records, communication systems, and community reports. Recent studies indicate that AI-assisted predictive models can improve threat detection and security preparedness (Johnson et al., 2025). Community-based early warning systems integrated with AI technologies may enhance communication between local communities and security agencies, thereby improving response times and reducing vulnerability to attacks (Scharre, 2024; Ogbozor, 2025).

Thus, Post-conflict reconstruction requires both infrastructural rehabilitation and effective security arrangements. Electrification projects can facilitate the return of displaced populations,



improve service delivery, and stimulate economic activities (UNDP, 2024). At the same time, artificial intelligence technologies may strengthen surveillance and protect reconstructed communities from renewed attacks. Consequently, the combination of development interventions and technological innovations can contribute to sustainable peace and long-term stability in Borno State

### **1.6 Summary**

This study examined rural electrification and artificial intelligence as complementary measures for combating Boko Haram insurgency in Borno State, Nigeria. The study was motivated by the persistent nature of the insurgency despite sustained military and conventional counterterrorism operations. Adopting a qualitative theoretical approach, the study relied on the analysis of existing literature on security, rural development, artificial intelligence, and counterinsurgency. The analysis was guided by Human Security Theory and Routine Activity Theory. The study found that rural electrification can contribute to improved livelihoods, economic empowerment, enhanced security lighting, strengthened community resilience, and greater government presence in rural communities. It also established that artificial intelligence technologies, including drone surveillance, predictive analytics, facial recognition, and intelligent monitoring systems, can improve intelligence gathering, threat detection, surveillance, and operational decision-making in counterinsurgency efforts. The study argues that integrating rural electrification with artificial intelligence provides a more comprehensive and sustainable approach to addressing the multidimensional challenges of Boko Haram insurgency in Borno State.

### **1.7 Conclusion**

The study concludes that sustainable counterinsurgency requires approaches that extend beyond conventional military operations to address the developmental and technological dimensions of insecurity. The findings demonstrate that rural electrification has the potential to reduce structural vulnerabilities associated with insurgency by promoting socioeconomic development, improving access to essential services, creating employment opportunities, and



strengthening community resilience. At the same time, artificial intelligence offers significant opportunities for enhancing surveillance, intelligence gathering, early warning systems, and threat detection, thereby improving the operational effectiveness of security agencies. By combining development-oriented interventions with technology-driven security strategies, the study has achieved its objective of theoretically examining how rural electrification and artificial intelligence can serve as complementary measures for combating Boko Haram insurgency in Borno State. This integrated approach offers a practical framework for promoting long-term peace, security, and post-conflict recovery in the region.

### **1.8 Recommendations**

Based on the findings of this study, the following recommendations are proposed:

1. The Federal Government and the Borno State Government should prioritize the expansion of rural electrification projects, particularly solar mini-grids and off-grid renewable energy systems, in conflict-affected communities to stimulate socioeconomic development and improve public safety.
2. Security agencies should invest in artificial intelligence technologies, including drone surveillance, predictive analytics, facial recognition systems, and intelligent monitoring platforms, to strengthen intelligence gathering, early warning capabilities, and counterinsurgency operations.
3. Government should strengthen collaboration among security agencies, technology experts, research institutions, and private-sector partners to facilitate the effective deployment and maintenance of AI-based security systems.
4. Capacity-building programmes should be implemented to train security personnel in the ethical, effective, and responsible use of artificial intelligence technologies for intelligence analysis and operational decision-making.
5. Rural electrification initiatives should be integrated with community-based security programmes to enhance communication, improve security lighting, strengthen informal



surveillance, and encourage active community participation in intelligence sharing and peacebuilding.

6. Future empirical studies should investigate the practical effectiveness of integrating rural electrification and artificial intelligence in reducing insurgency and improving security outcomes in conflict-affected communities across northeastern Nigeria.

## References

- Akinbi, J. O., & Olanrewaju, M. A. (2025). Artificial intelligence and emerging security technologies in Africa: Implications for counterterrorism and intelligence operations. *African Security Review*, 34(1), 45–63.
- Agbo, C. O., Onori, A., Stevanato, N., Mereu, R., Ogbuka, C. U., Eke, M. N., & Ujah, C. O. (2025). Planning off-grid rural electrification with MicroGridsPy: The case of Dugub, Nigeria. *Energy Strategy Reviews*, 60, 101775. <https://doi.org/10.1016/j.esr.2025.101775>
- Carbajales-Dale, M., Ijeoma, M. W., Yakubu, R. O., Chukwu, B. N., & Chen, H. (2024). Achieving universal energy access in remote locations using hybrid microgrid systems for rural electrification in northeast Nigeria. *Frontiers in Energy Research*, 12, 1454281. <https://doi.org/10.3389/fenrg.2024.1454281>
- Cohen, L. E., & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review*, 44(4), 588–608.
- International Energy Agency. (2024). World energy outlook 2024. Paris: IEA.
- Ike, T. J., Jidong, D. E., Ike, M. L., & Ayobi, E. E. (2024). Insecurity, counterterrorism and the use of private military and security companies in Nigeria: A qualitative study. *Journal of Asian and African Studies*, 60(6), 1263–1281.
- Johnson, P., Williams, T., & Carter, R. (2025). Predictive analytics and early warning systems



- in modern security operations. *Journal of Security Technology*, 18(2), 101–120.
- Janghorban, R., Ahmed, S., & Hassan, M. (2024). Rural electrification, social inclusion and sustainable development in developing countries. *Energy Policy*, 186, 113987.
- Kott, A., & Alberts, D. (2025). Artificial intelligence and future military operations. *Defense Technology Review*, 22(1), 15–34.
- Lewis, C. G., Ijeoma, M. W., Yakubu, R. O., Chukwu, B. N., Chen, H., & Carbajales-Dale, M. (2024). Achieving universal energy access in remote locations using HOMER energy model: A Techno-economic and Environmental Analysis of Hybrid Microgrid Systems for Rural Electrification in Northeast Nigeria. *Frontiers in Energy Research*, 12, 1454281.
- Ogbozor, E. (2025). Human security and counterinsurgency strategies in northeastern Nigeria. *African Security*, 18(1), 1–22.
- Olaniyan, A., Caux, S., & Maussion, P. (2024). Rural electrification in Nigeria: A review of impacts and effects of frugal energy generation based on some of e-waste components. *Heliyon*, 10(11), e31300. <https://doi.org/10.1016/j.heliyon.2024.e31300>
- Russell, S., & Norvig, P. (2024). *Artificial intelligence: A modern approach* (5th ed.). Pearson.
- Sampson, R. J. (2024). Disorder, communities and crime: Contemporary perspectives on the broken windows thesis. *Annual Review of Criminology*, 7, 315–336.
- Scharre, P. (2024). Artificial intelligence and national security: Opportunities and challenges. *International Security Review*, 49(2), 88–109.
- Tadjbakhsh, S. (2024). Human security in contemporary conflict environments. *Global Governance*, 30(1), 57–75.
- United Nations Development Programme. (1994). *Human development report 1994: New dimensions of human security*. Oxford University Press.





United Nations Development Programme. (2024). Human development report 2024: Breaking the gridlock. New York: UNDP.

Welsh, B. C., & Farrington, D. P. (2023). Effects of improved street lighting on crime prevention: A systematic review. *Criminology and Public Policy*, 22(3), 521–540.

Wilson, J. Q., & Kelling, G. L. (1982). Broken windows: The police and neighborhood safety. *The Atlantic Monthly*, 249(3), 29–38.

World Bank. (2025). Tracking SDG 7: The energy progress report 2025. Washington, DC: World Bank.