
ROLES OF MATHEMATICS, SCIENCE AND TECHNOLOGY IN ADDRESSING NIGERIA SECURITY CHALLENGES

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Abstract

The rate of increase in the security challenges facing Nigeria is something that is of great concern to all, and all efforts must be made to address the challenges as the nations' security is not important to the government alone, but the entire nation. Some security challenges facing the country include; health hazards, communal clashes, insurgency, youth restiveness, cyber crime, cattle rustling etc. This paper looks at the roles mathematics can play in addressing some of the security threats facing the country, and various ways through which science and technology can help address the security challenges in Nigeria. Some security threats (like diseases) that can be detrimental to a country could be combated using some developed mathematical models such as mathematical model of viral transmission and control. Also, looking at the nature and theories of science and technology, issue of insecurity in Nigeria could be addressed using science based approach and technology. It was concluded that there should be advancement in mathematics, science and technology to properly address those security challenges. Some of the recommendations made include; giving more priority to mathematics and science in the curriculum development, equipping security agencies looking after the country's borders with surveillance equipment to monitor people, and provision of functional mathematics, science and technology education at all levels by the government.

Key words: Mathematics, Science and Technology, Security

Introduction

Security of a nation is not only important to the government, but to the nation at large. Nigeria's security threat are generated from many quarters, such as the extreme sects like Boko Haram, Militia from the Niger Delta, high level of youths that are unemployed, cyber crime, ritual killings, cattle rustling, vandalism, illegal influx of migrants from the neighboring countries, emergence of political and regional thugs, and also the collapse of the judiciary system.

The merriam-webster dictionary define security as "the quality or state of being secure such as freedom from danger(safety) ; safety freedom from fear or anxiety; freedom from the prospect of being laid off(job security); something that secures (protection) or measures taken to guard against espionage or sabotage, crime, attack, or escape.

The state of insecurity in Nigeria has generated developmental crises that create the environment for poverty and unemployment

among others to emerge. These in turn lead to frustration and social discomfort that trigger violence and insecurity.

Science is the study of the nature and behavior of natural things and knowledge that we obtain about them. Science is defined as the observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena. Science is a body of organized knowledge which has a humanistic and moral influence on the society due to the possibilities it offers for the development and advancement of technology (Clement, Miswaru & Sadiyya, 2017). Science is a way of knowing, that is characterized by empirical criteria, logical argument and skeptical review.

Technology according to Collins dictionary refers to methods, systems, and devices which are the result of scientific knowledge being used for practical purposes. Technology is the utilization of science to carry out a function. Science and technology are concepts of primary

importance dealing with a practical application that something can be done in a new way completely (Muhammad, 2013). Technology is also the application of scientific knowledge for practical purpose.

Mathematics is the science that deals with the logic of shape, quality and arrangement that help us have better problem solving skills. It is also the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment.

In order to address some of the security issues raised above, mathematics, science and technology are employed as they play critical roles in addressing security issues, with the hope of ensuring safe and crime free Nigeria. They are inevitable in seeking solutions and overcoming limitations posed to the society and the governments.

Role of Mathematics in Addressing Security Challenges

Mathematics education is very central and significant in piloting the security affairs of the country. There are lots of mathematical models that can be used to address some of the security issues in Nigeria.

Diseases such as small fox, influenza and food and mouth disease amongst others can be contained using mathematical model of viral transmission and control (Banks, Castillo-Chavez and Jiang, 2005). Such models could be developed in combating a number of security threats that can be detrimental to any country.

Also, there are so many mathematical skills that have impact on national security as highlighted by Charles-Ogan (2014) in some characteristic areas. These are: cryptog-raphy, wavelet transformation, financial security, food security, economic security.

Cryptography is the science of using mathematics to encrypt and decrypt data, it is also the practice of hiding information and converting some secret information to a non-readable text. This enables storing or

transmission of sensitive information across insecure networks. According to Zakariyya and Barwa(2013), cryptography is one of the cornerstone of internet security.

Wavelength Transformation is based on series of numbers and it's vital in all types of signal emission. It solves difficult civil and security problems by applying the principle of mathematics and physics

Financial Security correct valuation of money and number identification are some of the skills needed for easy assessing of ATM cards and detection of fraud respectively. Also, mathematical skills such as counting and budgeting are needed for personal financial security (Charles-Ogan, 2014). Simple and compound interest rates are also some of the mathematics skills used in giving out Loans, overdrafts and Commission on Transaction (C.O.T).

Food Security mathematical variables such as percentages, rates, graph and numbering can be used to explain food security. Mathematical skills can also be used to calculate food security indicators like; Household Dietary Diversity Scale (HDDS)

Economic Security aspects of ratio, percentages, ordinal counting and algebra of numbers are essential mathematics that can be used to interpret the economy of any nation. Measuring the economic security to know the economic well being of a nation, involves the use of economic indices which requires the use of mathematical skills.

Roles of Science and Technology in Addressing Security Challenges

Science based approach can be used to address the issue of insecurity in Nigeria, by looking at the nature and theories of science. Reducing the security risk in food production, and the overall security of a country to a greater extent, Tsafe, Yusha'u, Kamar & Abdullahi (2016) pointed out that science and technology approaches can be used to address the problem of drought through the establishment of dams and lakes to aid agricultural activities. There are so many other security challenges that could be

addressed using science, natural disaster like flooding could be controlled through enactment of some certain laws that tends to reduce the rate of greenhouse gas emission or preferably avoid the depletion of the ozone layer by devising various means of converting the gases in order to lessen their effect (Tsafe et al, 2016). Science through Information technology (I.T.) will help the nation to identify potential threats, share the information, and also provide mechanisms to protect the Nation. The ability of the security agencies to combat security challenges in Nigeria can be improved through the use of Emergency Communication Systems, GPS-enabled devices, Social Networking Tools, emergency operation centers (EOCs), Intelligent Monitoring systems, Data Mining and Database Tracking systems and Information Sharing (Ogedegbe, P. M. & Jacob B. P., 2012).

As endorsed by NSST IDC (2017), some of the priorities of science and technology to national security include;

- Cyber security
- Border security and Identity management
- Investigative support and forensic science
- Technology foresighting

Cyber security

Investing in science and technology is highly important, as that will enable us to remain alert and responsive to evolving threats, to anticipate vulnerabilities, strengthen cyber systems and critical infrastructure, and enhance national capacity to respond to and recover from cyber-attack,

Border security and identity management

The capability to track and identify objects or people and monitor or screen for hazardous materials or threats could be enhanced by Science and technology. This can be done through the observation and assessment of explosives, chemical, biological or radiological agents, disease, drugs and other contraband. In order to track objects, tools can detect and trace movement and authenticate identity.

Investigative support and forensic science

The ability to use information in delivering forensic and investigative support to our

national security and law enforcement agencies is essential in ensuring effective prosecutions or the disruption of terrorist and trans-national criminal activities. To enable the 'in-field' screening and analysis of items to provide timely, accurate and scientific information to support investigations, new technologies are needed.

Technology foresighting

Technology foresighting will monitor global technology trends and developments in emerging science to forecast future challenges and opportunities to achieve this goal.

Conclusion

Mathematics, science and technology can be employed in addressing the security challenges facing the country, through the use of mathematical models and scientific theories. To adequately address the security challenges of Nigeria, there should be advancement in mathematics, science and technology. Thus the development should be backed by right policies in order to reap the benefits of mathematics, science and technology

Recommendation

- More priority should be given to science and mathematics education in the development of the curriculum.
- The security agencies that look after the country's borders should be equipped with surveillance equipment to monitor people and good into the Country.
- Use of modern scanners that can detect weapons and other materials used in making bombs and explosives must be put in place in scanning imported goods.
- More graduates of mathematics and sciences should be taken into the nation's security manpower structure to properly draw out critical/logical reasoning.
- Since mathematics and science are paramount in crime and security problems solving, government at all levels should provide functional mathematics and science education at all levels.

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