NUCLEAR THREATS: TECHNOLOGICAL ADVANCES AND POSSIBLE SURVIVAL STRATEGIES

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INTRODUCTION

Nuclear weapons are the most dangerous weapons on earth. One can destroy a whole city, potentially killing millions, and jeopardizing the natural environment and lives of future generations through its long term (https://www.un.or>disarmament

There are two ways to make nuclear weapons: fusion weapons (also called hydrogen bombs, H-bombs or thermonuclear weapons.) The way they make energy for the nuclear explosions is different. Fusion weapons make bigger explosions.

Nuclear weapon is a device designed to release energy in an explosive manner as a result of nuclear fusion, nuclear fission, or a combination of the two processes. Fission weapons are commonly referred to as atomic bombs while the fusion weapons are called hydrogen bombs or thermonuclear weapons htts://ww.britanica.com>technology.

Nuclear bombs are weapons of mass destruction. They harness the forces that hold the nucleus of an atom together by using the energy released therein.

Modern nuclear weapons work by combining chemical explosives, nuclear fission, and nuclear fusion. The explosives compress nuclear materials, causing fission, and the fussion release massive energy (Ucsusa, 2016) union of concerned scientists USA.

The massive research projects and technological advances since the end of Word War II paved way for such advanced weaponry as ballistic missiles, cruise missiles jet-powered fighters and bombers in addition to modern biological warfare. The arms race has culminated in the proliferation of nuclear weapons which for several generations have threatened the human race with annihilation. For instance, a single submarine today carries more than 300 times the destructive power of the Hiroshima bomb. In recent times, the nuclear arsenal of only the United State and Russia is sufficient to destroy the inhabited portions of the earth several times besides the US and Russia, other countries like North Korea, China, India, Pakistan, the U.K, Israel and France also posses nuclear weapons.

Nuclear terrorism is the most serious danger the world is facing", according to Mohamed El Baradei a former International Atomic Energy Director and Nobel Prize Laureate. A nuclear World War III is therefore likely to usher in worldwide turmoil and disaster, and every citizen of every country will be mostly concerned with possible survival strategies. (El Baradei 2015) a number of technological advances are currently posing nuclear threats to mankind.

- North Korea has built a fully functional nuclear arsenal and has been testing submarine – launched ballistic missiles.
- Russia has parked a new generation of mobile atomic nuclear weapons on her boarders with Europe.

- Iran is pursuing nuclear – weapons technology and missiles aggressively with a view to deliver such weaponry
- Saudi Arabia has severally threatened to weaponized its civil nuclear technology.

HISTORY OF DEVELOPMENT OF NUCLEAR ENERGY

NO ACHIEVEMENT of this century has had such dramatic implications as the wresting of energy from the nucleus of the atom. Since the discovery of radioactivity in 1896, the accumulation of experimental and theoretical knowledge about the atom has engaged the passionate attention of a brilliant roll call of scientists. Under the spur of wartime emergency, an accelerated program of nuclear research, led by the men shown opposite, produced the atom bomb. Steps leading to that event and the progress made since are listed in the chronology that follows.

1896 French physicist Henri Beequerel discovers radioactivity when rays from unraniurn fog his photographic Plates.

1898 With the encouragement of Beequerel, physicists Marie and Pierre Curie in Paris undertake a project which culminates in the discovery of a new element radium.

1902 British physicist Ernest Rutherford and chemist Frederick Soddy explain radioactive decay in which elements like radium turn into different elements, yielding energy in the process.

1905 Albert Einstein, a patent clerk in Berne, shows the equivalence of mass and energy in the equation E me^2, as part

of his Special Theory of Relativity. These equation products that vast amounts of energy are looked in matter.

1901 Soddy proposes the existence of isotopes-forms of elements, which have the same chemical properties but different atomic weights.

1911 Rutherford, using alpha particles, probes into the interior of the atom, discovering its heavy nucleus.

1913 FRANCIS Aston, an English chemist, conclusively demonstrates the existence of isotopes. Danish physicist Niels Bohr puts forward his theory of the atom, based on Rutherford's findings and on German physicist Max Plank's quatum theory.

1919 Rutherford demonstrates the disintegration of nitrogen into oxygen and hydrogen upon bombardment with alpha particles. This is the first nuclear reaction observed hymen.

1928 In the first steps toward a fundamental understanding of nuclear forces, Americans Edward Condon and Ronald Gurney and Russian-born George gamow, in a separate investigation, explain how alpha particles are emitted from the nucleus.

1931 Deuterium, a heavy isotope of hydrogen later to be used in the first H-bomb, is discovered by American chemist Harold Urey.

1932 English physicist John cockcroft and Irish physicist Ernest Walton collaborate in transforming the lithium nucleus into helim nuclei, using artificially accelerated protons in a primitive "atom-

smasher.^ This is the first experimental verification of Einstein's equation E—mc^2. The neutron, atomic building block and eventual key to nuclear fission, is discovered by British physicist James Chadwick.

1933 Irene and Frederic Joliot-Curie, French physicist show that some normally stable atoms undergo nuclear ractions when bombarded by alpha particles, and change to short-lived unstable isotopes. This is the first artificially induced radioactivity.

1938 Hans Bethe in the United States theorizes that the sun's energy comes from the fusion reaction, a process in which lightweight nuclei fuse and release great quantities of energy. This is the reaction which now produced an h-bomb explosion.

1939 Otto Hahn and Fritz Stressmann in Berin bombard uranium with neutrons and find the lighter element barium as a product of the reaction, but are unable to account for harium's presences. German refugees Otto Friseh and Lise Meitner explain Hahn and Stressmann's experiment to be fission — the splitting a parted heavy nucleus into lighter pieces, such as barium nuclei with the release of vast amounts of energy. Frederic John Carie shows that fission of one uranium atom by one nucleus produces tow' or three free neutrons. This suggests the possibility of a chain reaction, in which the new neutrons continue and amplify the reaction begun by the original bombardment Borhr predicts that uranium 235 is the substance that fissions when bombard, hut U235 is very rare. Albert Einstein in the U. S. at the military dangers of atomic energy (opposite,).

1940 Chemist at the University of California, headed by Gleenn Scatory and Edwin McMilian, discover plutonium — a radioactive product of U-238 bombardment, and a satisfactory substitute for rare U-235. Gaseous-diffusion methods of separating uranium isotopes are developed at Columbia University.

1942 U. S. S. Nautiles, first atomic submarine is launched.

1956 The first atomic reactor for the production of electricity goes to work at Calder Hall, England.

1957 The Shippingport reactor, first U.S. atomic electric power plant, begins operation.

1959. The first testing of small atomic reator – Kiwi-A -- for use in powering rockets takes place in Nevada testing grounds.

1960 – France explodes an atom bomb in test in the Sahara.

1961 – The U.S.S.R sets off the largest H-bombs blast ever, 55 to 60 megatons on theocratic island Novagya Zamlya. The U.S. begins Project Ploughshare, a series of experimental large-scale nuclear explosions for peaceful purposes such as make canals.

1962 – The U.S explodes an H-bomb from a Thor rocket, creating a zone of man-made radiation. Maiden voyages of the United States' n. s. (Nuclear Ship) Savannah first atomic powered merchant vessel (Ozofor, 2004).

Experts have warned that nuclear weapons detonated in atmosphere high above unprepared, American, Russian, European and African populations could trigger a fearsome and instances climate change, with a paralyzing nuclear – generated

electromagnetic pulse attack. For instance, except for some military equipment which may be specially protected, anything connected to an electrical grid would be knocked out by a nuclear detonation. Computers would cease to function and the internet, Radios and televisions would be useless. Furthermore, with non existent electricity, and major food supplies destroyed or cut off, millions of people the world over would quickly starve, and millions would freeze with the onset of a nuclear winter.

And with the disappearance of modern medical supplies and modern sanitation and healthcare, diseases would take their deadly toll on mankind. This would be in addition to catastrophes that will result from attendant drought, famine and earthquakes.

METHODOLOGY

In conducting this study, the descriptive survey design was adopted. A sample size of 200 respondents consisting of scientists, Academics, the military and paramilitary personnel's in the south eastern Nigeria.

The specific objectives of the study include to find out:

i. The extent to which stockpiled nuclear energy in the possession of few countries become a threat to national and international peace and security.

ii. The extent to which third world countries of Africa and South America are more at risk of the nuclear weapons threat than others.

iii. The extent to which the superpowers are using nuclear energy for technological development and advancement and use the feat to the detriment of the developing.

iv. The extent to which survival strategies suggests by scientists could be applied by all countries (developed and developing, to neutralized the effect of nuclear fusion (H-bomb) and nuclear fission (A – bomb) and their effect to environmental contaminations.

Consequently the research questions constructed were analyzed and the hypotheses formulated were tested as shown below.

Human survival strategies in the wave of nuclear threats and global warning need to be focused on: -

- Possible safety gadget protections on sensitive military, government and civilian equipment and installations.
- Sensitization of the populace on possible nuclear hazards.
- Need for transformational leadership of God – fearing people who preside over the affairs of nations, and benefit nuclear tests and armaments.

Research Question 1

To what extent does the stockpiled nuclear energy in the possession of few countries a threat to peace nationally and internationally?

Table 1: Stockpiles of Nuclear energy

S/no	Nuclear weapon 600 mtons NWS (USSR)	VGE $\bar{X}$	$\bar{X}_2$
1	The Russia 7,000	VGE 4	4
2	USA 6800	VGE 4	4
3	France 360	VGE 4	4
4	China 260	VGE 4	4
5	UK 215	VGE 4	4
6	Pakistan 180	GE 3	4
7	India 120	GE 3	3
8	Israel 80	GE 3	3
9	North Korea 15	GE 1	3
		$X_e = 3.4$	3.6

Research Question 2

To what extent do the third world countries of Africa and South Africa the most at risk of the nuclear weapons threat?

Table 2: African & South America at higher risk

S/No	Items (continents)	Response VGE $\overline{X_1}$	$\overline{X_2}$
1.	African countries (Nigeria leading)	3.8	3.8
2.	South America Argentina, Brazil, Pera leading	3.7	3.5
3.	Asia Europe America (North)	2.0 2.0 1.0	2.1 2.0 1..0
		X = 3.0	3.05

Research Question 3

To what extent are the superpower using nuclear energy for technological development and advancement' achieve this feat to the detriment of the developing countries.

Table 3: Use of nuclear energy for development in technology

S/No	Superpower	Mean Response $\bar{X}_1$	$\bar{X}_2$
1.	USA	4.8	3.7
2	Russia (USSR)	4.8	3.8
3	France	3.5	3.2
4	UK	3.3	3.0
5	China	3.5	3.2
	Grand Mean	3.52	3.38

Research Question 4

To what extent are survival strategies discovered and could be applied by all countries (developed and developing) to neutralize the effect of nuclear fusion (H-bomb) and nuclear fission (A-bomb), and the effect of their environmental contaminations?

Table 4: Survival Strategies

S/No		$\bar{X}_1$	$\bar{X}_2$
1.	Safety gadgets for nuclear weapons	3.5	3.2
2	Sensitization of the populated on nuclear hazard	3.2	3.0
3	Emphasis on nuclear resistance	3.5	3.5
4	Earthquake proof-infrastructure	3.5	3.3
5.	Need for global transformal leadership/God fearing leaders	3,2	3.5
6	Allow all countries with good humane leaders acquire nuclear plants	3.5	3.0
	Grand mean =	3.4	3.3

HYPOTHESIS

Ho_1: There is no significant difference between the scientists and military personnel on nuclear energy and its associated weapon's threat to the peace and harmony of the countries of the world.

$\bar{X}_1$,	S_1,	n_1,	$\bar{X}_2$	S_2	n_2,	df	ted,	tcv Dec
3.5,	1.1,	100	3.4,	0.7,	100,	0.05/98	0.71	1.645 Accepted H_0

The hypothesis is accepted as the tcal is greater than tcv at significant level 5%.

Ho_2: There is no significant difference between the mean responses of the scientists and the military personnel on the best possible survival strategies of nuclear energy and its weapons for all countries of the world.

$\bar{X}_1$,	S_1,	n_1,	$\bar{X}_2$	S_2	n_2,	df	ted,	tcv Dec
3.5,	1.0,	100	3.3,	0.8,	100,	0.05/98	1.43	1.645 Accepted H_0

The hypothesis is accepted as the tcal is greater than tcv at significant level of 5%.

CONCLUSIONS

At the end of the data analysis the following findings were made:

Russia	7,000
USA	6800
France	360
China	260
UK	215
Pakistan	180
India	120
Israel	80
North Korea	15

ii. Most countries in Africa and South America especially Nigeria and other developing countries are more at risk of the nuclear weapons' threats than others.

iii. The superpowers, Russia, USA, UK, France, China have advanced and developed technologically using nuclear energy.

Their nuclear energy policy has to a great extent underdeveloped the developing countries.

iv. The following Human survival strategies in the wave of nuclear threats and global warming need be focused on:

- Possible safety gadget protections on sensitive military, government and civilian equipment and installations.
- Sensitization of the populace on possible nuclear hazards.

Need for transformational leadership of God – fearing people who preside over the affairs of nations, and benefit nuclear tests and armaments.

All countries with good democratic principles to be allowed to develop nuclear energy for technology development and safety. The more many countries have access to nuclear plants the better for world peace.

Nigeria as the most populous country in Africa should start developing its nuclear energy facilities through the National Nuclear Energy Commission.