



Royal High Institute for Defence
Center for Security and Defence Studies



Proliferation Issues on the African Continent

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Koeberg's Nuclear Plant in South Africa.

Abstract

Africa was not free from Weapons of Mass Destruction (WMD) in the past. Recent efforts have realized a Nuclear Weapon-Free-Zone on the continent, and started to dismantle chemical stockpiles and biological programs. The future shortage in fossil fuel energy supplies, combined with increasing demand on the continent, will induce the use of nuclear powered plants for domestic energy supply. The available resources and the interest of foreign Nations in these resources will put a burden on the international community to strive for a comprehensive approach of the nuclear fuel cycle management. This will allow the African continent to hold indigenous mining capacity while avoiding to become a repository for Western spent nuclear fuel.

This paper has been written in a series of focus papers comprising other proliferation issues.

The views expressed are only those of the author.

Keywords: WMD, Nuclear Weapon Free Zone, Nuclear Energy, Non-Proliferation.



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Introduction

The African continent was not free from weapons of mass destruction: recent history has demonstrated that some countries developed or stockpiled weapons in the complete spectrum of the WMD capacity: whether it was Chemical, Biological or Nuclear, all these capabilities were at a certain moment available or in testing phase. Especially three countries on the continent possessed nuclear, chemical and biological WMD aspirations, programs or weapons: Egypt, South Africa and Libya.

Today, it looks like we are at the beginning of a new era on that continent. Arms control is a priority for the International community, and disarmament programs seem to have a successful outcome there. This does not imply that all future threats vanished: aspirations in the frame of nuclear energy supply uncover new challenges to avoid proliferation risks.

Together with huge potential wealth, Africa holds the poorest communities in the world and the highest density of developing countries. This can lead to external exploitation of the continent by foreign countries with no return to the African population or African governance.

In this paper, nuclear chemical en biological programs of the African continent will briefly be reviewed. Next, the present status of nuclear weapons programs and treaties will be addressed. Finally, policy recommendations are proposed.

Nuclear Programs

Egypt's effort to develop a nuclear program was materialized at the Inshas Nuclear Research Center. Inshas hosts a Soviet-supplied 2 MW research reactor, and an Argentine-supplied 22 MW light water research reactor that went critical in 1997. Cairo has long expressed the desire to import power-generation reactors, and debate continued about pursuing a weapons capability and developing an independent fuel cycle.

Apparently no serious work has been completed to this aim, since Egypt acceded to the Nuclear Non-Proliferation Treaty (NPT) in 1981, implementing the International Atomic Energy Agency's (IAEA) comprehensive safeguards in 1982. As immediate neighbor of Israël, a non-NPT nuclear weapons state, Egypt has been critic of the NPT and has supported a nuclear weapons free zone in the Middle East, citing Israel's non-ascension to the NPT as an obstacle to this process.

South Africa began the technical utility study for "peaceful nuclear explosions"¹ in 1960. In 1973, a limited nuclear deterrent capability program was approved. Six air-deliverable nuclear weapons were developed but the government halted the program in 1989 and dismantled the existing operational stockpile and equipment. South Africa acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) 1991, the Zangger Committee in 1994 and the Nuclear Suppliers Group in 1995. South Africa was instrumental in winning indefinite extension of the NPT in 1995, and more recently, South Africa began working more closely with the IAEA, in order to monitor international smuggling of nuclear weapons materials, after investigations a South African businessman exposed connections to the A.Q. Khan network. In 2004, there was also ample discussion concerning South Africa's dwindling coal reserves and its need for additional nuclear power generation. Today, South Africa has two nuclear power plants operational since 1985.

On the December 19, 2003 Libya announced that it would dismantle its WMD program. But unlike the previous announcements, Libya confirmed its nuclear program dismantlement and invited the IAEA to verify the elimination of nuclear activities. Libya was at that time about three to seven years away from producing a nuclear weapon, according to the IAEA and admitted having secretly imported raw uranium, equipment and know-how to convert it for enrichment into

¹ In the sense of a nuclear weapon program for self defense purposes only.

weapons-grade material. It was meanwhile proven that the Pakistani Khan-connection was responsible for providing Libya with its nuclear warhead plans, raw uranium and enrichment centrifuges through its black market network. In December 2003, Qadhafi pledged to adhere to the Nuclear Non-Proliferation Treaty. Libya ratified the NPT in 1975, and signed the Additional Protocol on March 10, 2004. Previously, the Comprehensive Test Ban Treaty was signed in November 2001 and ratified in January 2004. Besides, the Treaty of Pelindaba, establishing a nuclear-weapon-free zone in Africa, had been signed in 1996 but did not enter into force by the time. Previously secret nuclear sites were disclosed in late 2003 and above that, Libya possesses a Soviet-supplied 10MW research reactor in Tajura. With the lifting of UN sanctions in 1998, Russia overtly renewed its nuclear cooperation with Libya, providing funding for renovations to another nuclear complex.

Chemical and biological Programs

The Chemical Weapons Convention (CWC) was signed in 1993 and came into force in 1997. The CWC is of unlimited duration and obliges State Parties not to develop, produce, acquire, stockpile, transfer, use or prepare to use chemical weapons. The CWC further requires the destruction of existing stockpiles from any country, wherever it may be located².

Currently, 50 countries on the continent are State Parties of the CWC. Three are non-signatory parties: Angola, Egypt and Somalia. The success of the CWC on the African continent stems from the low number of countries detaining chemical weapons in the first place. Second, the Organization for the Prohibition of Chemical Weapons (OPCW) promotes universal extension of the CWC and finally the African Union (AU) declared the continent a chemical weapons free continent in its' inaugural conference of Durban, 2002.

² In the country of origin or abroad. The owner of the stockpile is responsible for adherence to all CWC clauses.

Four African countries have been allegedly involved in chemical weapons programs: South Africa, Libya, Egypt and Sudan. From these, Libya, formerly prone to unlimited use of any weapon against “Western imperialism”, acceded to the CWC in 2004 and engaged in the destruction of its’ schedule 1³ chemicals. The first deadline of April 2007 was extended till December 2010. Libya’s schedule 2 chemicals would be destroyed by December 2011. South Africa and Sudan have both been active in either OPCW training meetings for implementation of OPCW guidelines (September 2008), or in the African Group (AG) meetings. The AG is a forum to discuss African specific topics in relation to the CWC: since most countries are not involved in the destruction of stockpiles, the focus is shifted to specific issues as the peaceful use of chemical industry, best practices in transfer regulation, methods to identify scheduled chemicals and all implications for national customs organizations.

The Biological and Toxin Weapons Convention (BTWC)⁴ opened for signature in 1972 and entered into force in 1975. It prohibits the development, production, acquisition, transfer, retention, and stockpile of biological weapons and toxins. Unlike the CWC, the BTWC retains no executive body responsible for on-site challenge inspections. The Implementation Support Unit (ISU) is an embryonic form⁵ of such a body, holding solely administrative tasks. It has not the capabilities of the OPCW, the CWC verification body.

On the continent, ten countries have neither signed nor ratified the Convention. Except Algeria and South Africa, which have submitted a report in the frame of the UNSCR 1540 Committee,

³ Schedule 1 Chemicals can be used as such in chemical weapons. Schedule 2 chemicals are precursors to schedule 1 class or can in some cases be used as is. Schedule 3 chemicals can be used in the production process of chemical weapons but are commonly used in peaceful production processes.

⁴ BWC/MSP/2007/MX/ WP.1 of August 2, 2007

⁵ The only remains of the fully developed UNMOVIC organization, dismantled in 2008.

biological weapons control is not a priority on the African agenda. One reason may be the lack of incentives for active participation in the BTWC. The problem with biological agents is that all material and supplies are dual-use goods, which means they are hard to detect in the frame of a covert bio-weapons program. In the hypothesis that a non-state actor would try to obtain biological weapons from an existing production facility either legitimately or by theft, the African continent is not the first place to look for developed weaponized biological systems. What must be considered a major concern is the natural niche of biological agents that Africa retains. Possible transfers of bio-agents towards illicit networks established in states owing a biological weapon capacity, is one of the main challenges to be addressed in this particular case. According to William R. Clark “the US military gave up bio-weapons 30 years ago. They’re too undependable; they’re too hard to use; they’re too hard to make... it’s not practical; it’s never going to work.”⁶ This does not mean that new prototypes or new bio-agents can not be acquired and used by non-state actors in semi-weaponized form. The Khan-network illustrates that delivery of nuclear technology to Iran and North Korea, and non-state actors amongst others was possible⁷. A similar scenario could apply for the aforementioned bio-agents.

Besides the enhanced collaboration through confidence building measures, Khadija Rashida Masri stressed the importance of regional initiatives of the AU such as⁸:

1. The adoption of the Model Law on Safety and Biotechnology in 2001.

⁶ Death from life, in *NBC International*, Surrey House Corporate communication Ltd., January, 2009, pp. 6 – 7.

⁷ SOKOLSKI, H., *Pakistan’s nuclear future: worries beyond war*. DOD, Strategic Studies Institute, Januari 2008, pp.13-30.

⁸ DURAND, A., *Ship without sails*. Institute for Strategic Studies, paper 171, November 2008, p.5.

2. The Revised African Convention on the Conservation of Nature and Natural resources in 2003.
3. The Protocol to the Convention on the Prevention of Combating of Terrorism in 2004.
4. The endorsement of the Regional Approach to the Biosafety Policy in Eastern and Southern Africa, an initiative of the common Market for Eastern and Southern Africa.
5. The attendance by many African states in workshops hosted by the European Union in 2006 and 2007.

However in many instances, national laws, materializing the principles laid down in both the CWC and BTWC are lacking: most of the African countries have more urgent matters to deal with. Facing democratization processes to be installed, ethnic oppositions, corruption, civil war, humanitarian disasters, one can hardly blame those involved to neglect the BTWC which is not even accepted in the Western World in its actual form. An overlap exists however, between the World Health Organization (WHO) strategies on health security and the conclusions of the Foresight report on the detection and identification of infectious diseases⁹: the need for a more proactive approach to the development of DIM- systems (Detect, Identify, Monitor), became apparent. This is in complete accordance with the need for the development of such systems in the frame of bio-terror incidents: permanent, robust and reliable detection systems are not only needed on the African continent, but in cities prone to acts of bio-terrorism all over the world.

⁹ Infectious diseases: preparing for the future, in: *Findings of the Foresight project*, 26 April 2006.

Present Nuclear Weapons Status and Treaties

Burundi was the 28th African country to ratify the African Nuclear Weapon Free Zone Treaty on 15 July 2009. This activated the entry-into force of the Treaty, also known as the Treaty of Pelinbada. Thirteen years after it was opened for signature, the continent is striving to “ban nuclear weapons within the respective territories of the zones, including the acquisition, possession, placement, testing and use of such weapons”. Eight other treaties are at different stages of ratification and entry into force in different geographical areas. Amongst them, Latin America and the Caribbean (1967), the South Pacific (1985), South East Asia (1995), Central Asia (2006), Mongolia (1992), the Antarctic (1959), Outer Space (1967) and the Sea-Bed (1971).

The entry into force of the Pelinbada Treaty strengthens the non-proliferation regime, as Africa becomes part of the strife towards a nuclear free regime. This Treaty implies that, together with the above mentioned States, the southern hemisphere is now nuclear weapons free.

The additional protocols to the Pelinbada Treaty have been signed and ratified by the United Kingdom, France and China. Of the five nuclear weapons states, the Russian Federation and the United States of America are yet to ratify the Treaty, committing themselves to respecting the status of the African continent. The reticence to ratify the Treaty protocols by the United States and the Russian Federation are supposed to deal with the Diego Garcia dispute: this Indian Ocean atoll, a British possession, holds a US military airfield. While Great-Britain and the United States argue that Diego Garcia is not included in the geographical area of the Treaty, the AU considers it to be part of Mauritius, which is an AU member, hence included in the Treaty. The restraint from the Russian federation ensues from the assumption that Diego Garcia, if excluded from the Treaties geographical boundaries, could be used to station nuclear weapons. An additional problem remains with the intention of the non-NPT nuclear weapon states (India,

Pakistan, and Israël). As *de facto* nuclear weapon states, they did not sign the NPT, hence their recognition of the Pelinbada Treaty would imply the implicit recognition of their nuclear status without adherence to the cornerstone of the non-proliferation regime, which is the NPT.

The adoption of the nuclear weapons free status has been established in complete accordance with the art. IV of the NPT, allowing peaceful use of nuclear science and technology, with respect of the non-proliferation measures installed. In the present context of climate change and economic recession, alternative energy resources have to be found. Therefore, nuclear energy can not be circumvented in a continent that is the repository of major resources in that field. Table 1 illustrates the expected nuclear power growth in the field of nuclear energy, projected to horizon 2020.

Table 1¹⁰: 2020 projected nuclear power growth

| Country | Years | Annual electricity consumption, kWh/capita | Installed or projected nuclear power capacity, GW(e) | Projected growth in nuclear power capacity |
|----------|-------|--|--|--|
| China | 2002 | 1,208 | 5.3 | 6-7 times |
| | 2020 | | 32-40 | |
| India | 2002 | 421 | 2.6 | 11 times |
| | 2022 | | 29 | |
| Pakistan | 2002 | 384 | 0.42 | 10 times |
| | 2030 | | 4.2 | |
| Russia | 2002 | 5,350 | 21 | 2 times (100%) |
| | 2020 | | 40-45 | |
| ROK | 2005 | | 16.8 | 57% |
| | 2015 | | 26.4 | |
| USA | 2002 | 13,228 | 99 | 11% |
| | 2020 | | ~ 110 (?) | |
| Africa | 2002 | 514 | 1.8 | 0-128% |
| | 2020 | | 1.8-4.1 | |

¹⁰ SOKOLOV, Y., A., THE NUCLEAR POWER OPTIONS FOR AFRICA. In ATDF Journal, Volume 2, Issue 2, p.13.

Table 1 shows that, in absolute value, Africa is expected to reach by 2020 a capacity which is comparable to Pakistan. As stated in the conclusion of the International Ministerial Conference on Nuclear Power at Paris “a vast majority of participants affirmed that nuclear power can make a major contribution to meeting the energy needs and sustaining the world’s development in the 21st century, for a large number of both developed and developing countries.”¹¹ To this aim, a number of countries have requested to resolve energy shortages by the means of nuclear power. Amongst them are South Africa, Nigeria, Sudan, Egypt, Kenya, Uganda, Ghana and Morocco: South Africa is in possession of two operational nuclear power plants while Egypt, Ghana and Morocco are in possession of research reactors¹² and did not ratify the Pelinbaba Treaty to date.

It is common sense that nuclear activities, be it in peaceful use, are subject to proliferation or diversion to military programs. Africa constitutes an immense source for uranium mining: therefore it plays a key role in the front end of the nuclear fuel cycle¹³. Niger, Namibia and South Africa, hold combined 18% of the global distribution of the identified nuclear resources of the nuclear fuel cycle (Uranium in majority)¹⁴. Therefore, international efforts to settle the disputes concerning the uranium fuel cycle in proliferation issues, should also consider the back-end of the fuel cycle in order avoid emptying Africa from its’ natural resources and use it as a natural dumping place for spent fuel. The difficult balance between the interests of Private companies and their clients on the one hand¹⁵ and the

¹¹ SOKOLOV, Y., A., THE NUCLEAR POWER OPTIONS FOR AFRICA. In ATDF Journal, Volume 2, Issue 2, p.18.

¹² COLE, H., *African NWFZ Treaty Enters Into Force*, in: Arms Control Today, volume 39, N7, September 2009, p.26.

¹³ YUDIN, Y., *Materialization of the Nuclear Fuel Cycle*. UNIDIR, Geneva, 2009, p.75.

¹⁴ *Uranium 2007: Resources, Production and Demand*. OECD, 2008, pp.13-25.

¹⁵ The Uranium mines of Bakouma (Central African Republic) and Shinkolobwe (Democratic Republic of Congo) will be administered by the French “Areva” company when exploitation is resumed. Extrapolations of production rates can not be given since opening of the aforementioned mines is

national interests of the countries with natural resources on the other hand, would have to be under stringent control: to date many companies are exploiting African soil for export only, without return to the indigenous Africans since craftsmen are imported from abroad.

After entry into force of the Pelinbada Treaty, the parties agree, in accordance with article 12 of the Treaty, to create an African Commission on Nuclear Energy (AFCONE). Besides the establishment of a compliance mechanism, AFCONE will encourage regional programs for the cooperation in the field of peaceful applications of nuclear energy. To this aim African states would have to take responsibility for their natural resources (mining) and existing nuclear material (enriched nuclear material/radiological sources). Besides this, the toxic waste will have to be put under stringent control of the AFCONE. 25 countries¹⁶ on the continent are still in ratification process. The work of the AFCONE would be easier if the remaining ratifications would be finalized. The example of the nuclear weapon states, permanent members of the UN Security Council, is of utmost importance in this process. In this context, we are just at the forefront of the problems which could rise on the eve of all requests for the start up of nuclear power plants scattered over a region ranging from Egypt to the Near and Middle East.

Policy Recommendations

Unlike the International Atomic Energy Agency (IAEA), as nuclear watchdog of the United Nations, and the Organization for the Prohibition of Chemical Weapons (OPCW), as sentinel

foreseen for late 2009-2010. Areva is supplying the Chinese CGNPC electric power company with nuclear fuel eventually originating from the RDC. China is itself active in prospection and active research for concessions on the African soil.

¹⁶ Angola, Cameroon, Central African Republic, Cape Verde, Chad, Comoros, Congo, Djibouti, Democratic Republic of Congo, Egypt, Eritrea, Ghana, Guinea-Bissau, Liberia, Namibia, Niger, Seychelles, Sierra Leone, Somalia, Sao Tome, Sudan, Tunisia, Uganda and Zambia and Sahrawi Arab Democratic Republic.

for the application of the Chemical Warfare Convention (CWC), there is no fully developed permanent body which reports the correct appliance of the Biological and Toxin Weapon Convention (BTWC) to the UN: the temporary UNMOVIC structure was dismantled in 2008. The remaining ISU structure is not sufficient to do more than administrative work. Therefore a permanent structure (BTWC Agency) would allow for a better continuity and coordinated action: strengthening the Biological and Toxin Weapon Convention (BTWC) regime by systematic inspection protocols and safeguards agreements. Common definitions based on UNSCR 1540 and a safeguards agreement to the Biological and Toxin Weapon Convention (BTWC) should be endorsed. An African Centre for Disease Control (ACDC) could be a step in the right direction to create a roster of centers reporting critical biological events to the World Health Organization.

The OPCW has a comprehensive baseline in the CWC. However, much work remains to be done to attain the deadlines for complete dismantlement of the existing stockpiles (for example in Libya). International effort will be required to compel more African countries to ratify the CWC.

The activation of a Nuclear Weapon Free Zone (NWFZ) is not an endpoint: the increasing demand for the use of nuclear energy holds an inherent risk for nuclear proliferation of technology/materiel to third parties or even non-State actors if we can not ensure the safe use of nuclear energy. Furthermore, the fuel cycle management which rises again is not only an African problem. The International Atomic Energy Agency (IAEA) will have to control a comprehensive system for nuclear waste and fuel management. Once the nuclear fuel cycle can be closed, the problem will be resolved, but until then, it would be unacceptable to dump nuclear fuel waste on the African continent, while it is exploited for its primary resources.

Conclusion

The Biological and Toxin Weapon Convention (BTWC) in its actual form is inadequate, not only for Africa but for all signatory parties. The yearly Conventions, will hopefully allow, in the end to obtain a regime strengthened by protocols, procedures, networks and an efficient controlling Agency.

The Non-Proliferation Treaty (NPT) suffered the same shortcomings before the entry into force of safeguards agreements, but the creation of Weapon free zones allowed for the southern hemisphere to be free from military nuclear technology.

The CWC and its executive body, the OPCW, have succeeded to compel for the last chemical stockpiles to be dismantled. There is no guarantee, however, for covered programs to remain active to some extent.

Nuclear energy demand will increase in the future. That will also be the case in Africa. Meanwhile, foreign companies will strive to obtain concessions for the exploitation of natural resources, namely fuel for the front end of the nuclear fuel cycle. The International community, embodied by the UN, will have to regulate the natural resources and the nuclear fuel cycle management on a global scale in order to avoid preferential treatment of private companies or State parties.

Obviously, the entry into force of a NWFZ in Africa is far from being the endpoint for compliance to nonproliferation requirements: as mentioned in the policy recommendations, the IAEA will need to implement the means for effective control of nuclear fuel cycle management on the entire continent. Much work remains to be done in the frame of this fuel cycle. This involves not only the African continent, but countries with nuclear activities all over the world.

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- [17] Art.X of the the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons also known as the Biological and Toxin Weapon Convention states:

(1) The States Parties to this Convention undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes. Parties to the Convention in a position to do so shall also cooperate in contributing individually or together with other States or international organizations to the further development and application of scientific discoveries in the field of bacteriology (biology) for prevention of disease, or for other peaceful purposes.

(2) This Convention shall be implemented in a manner designed to avoid hampering the economic or technological development of States Parties to the Convention or international cooperation in the field of peaceful bacteriological (biological) activities, including the international exchange of bacteriological (biological) agents and toxins and equipment for the processing, use or production of bacteriological (biological) agents and toxins for peaceful purposes in accordance with the provisions of the Convention.



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