Implementing Rays of Hope (RoH) initiative and enabling sustainability: hopes and challenges of a light

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1. Introduction and general overview

The global annual cancer burden is expected to grow especially on low- and middle-income countries, where over 70 % of cancer deaths are expected to occur, and these countries do not hold adequate facilities and equipment and human resources in this area.

The IAEA Rays of Hope initiative, that aims globally to build, or strengthen cancer tools treatment in terms of access and equity by using nuclear sciences and technology, by the way appear as key point for contributing to the fulfilment of the UN Sustainable Development Goal number 3 related to ensuring good Health and well-Being for people by reducing between other, premature mortality from non-communicable diseases.

The assistance provided by the IAEA during the last decades has enabled Senegal and many other countries to establish or strengthen safe, secure, and effective radiations in radiotherapy, radiology, and nuclear medicine capabilities in terms of provisions of requirements; training and advises.

Despite this support of IAEA, and the hope drawn in the RoH initiative, it is essential for Senegal and the countries having similar characteristics in terms of management approach and coordination of the technical cooperation, to pay attention on some central elements to ensure a full success of the RoH.

A study based on look back of lessons learned of specific frame of the past years technical cooperation with IAEA combined with descriptive review of national coordination of multisectoral projects and programs urge to give particular attention on the three challenging aspects: - the information and reinforcement of high decision making; - A plan of staffing allied of training and capacity reinforcement provided by the IAEA; - adding in the coordination of projects civilian servants as co-coordinator or assistant for reporting directly to ministry and supporting the regulation and safe use of radiations.

The impacts of the consideration of these aspects will help to reduce the time of implementing of objective or sustaining gain received on the projects to increase traceability and imputability and to maximize benefit from end users and beneficiaries. These impacts are also and important point for commitment increase of financing; cost sharing contribution of the direct national sectorial managers.

2. General overview of technical cooperation programmes and activities

In 1957 the IAEA was formed; its mission was to promote safe, secure and peaceful nuclear technologies.

Senegal is member state since 1960 and signed with the agency, three times, a Country Programme Framework (CPF) FOR THE PERIODS OF 2001-2006, 2009-2013 AND 2016–2020.

CPF is the frame of reference for the medium-term planning of technical cooperation between Senegal and the IAEA and identifies priority areas where the transfer of nuclear technology and technical cooperation resources will be directed to support national development goals. **THE CPFS identify few priorities areas, including HUMAN HEALTH AND RADIATION SAFETY.**

2-1-Nuclear Medicine

Nuclear medicine has been at the forefront of **technical cooperation with the IAEA in the field of human health since 1976.**

The first two projects, namely SEN/6/006 on nuclear medicine (1976-1979) and SEN/6/007 on radioisotopes in medicine (1978-1985), made it possible to develop the management capacities of the Aristide Le Dantec hospital.

The third project, SEN/6/008 (1980-1990), made it possible to set up scintigraphic imaging and in vitro assay capabilities.

Then **a new project (1991-1995**) was developed which made it possible to introduce the production of a radio-immuno-assay kit using bulk reagents, with the appropriate quality controls. With regard to project SEN/6/010 on strengthening nuclear medicine facilities (1995-1999), it contributed to strengthening the radioisotope laboratory with regard to medical applications.

As part of the three-year project SEN/6/013 – Modernization of nuclear medicine services launched in 2005, Senegal received from the IAEA in 2007, a SPECT Gamma Camera in Dakar in 2009. The supply of this Gamma Camera is of paramount importance.

2-2 Radiotherapy

Senegal has benefited from capacity building on cancer diagnosis and treatment through the following regional projects:

i) the RAF/6/024 project – Treatment of the most common cancers in Africa (AFRA II-4), launched in 2001, and ii) the RAF/6/035 project – Strengthening access to care and quality of care for cancer patients (AFRA II-10), approved in 2007.

These two projects have helped modernize cancer diagnosis and treatment in Senegal by improving the knowledge and skills of staff and providing the necessary radiotherapy accessories to Le Dantec Hospital in Dakar.

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For the period 2012-13 and 2014-21, Senegal has benefited from quality control and radiation protection equipment, through the SEN6018 project, relating to the modernization of radiotherapy services in Senegal.

Senegal has received considerable assistance from the IAEA over more than a decade in the maintenance of nuclear instrumentation used in various varied fields, particularly in health.

2.3 Maintenance of Médical and Scientific Instruments

Agency assistance was initiated under Regional Projects RAF/4/014 (AFRA IV-3) – Maintenance of Medical and Scientific Instruments (1997-2003), and RAF/4/017 (AFRA IV -4) – Sustainable regional capacity for maintenance and repair (2001-2009). **For all project's cycles, capability for operating and maintenance of equipments from 2007 to 2016 were considered as of the highest priorities.**

3-Radiation Safety profile and major recommandations

Member States receiving IAEA assistance are obliged to apply IAEA Safety Standards. Enabling compliance with IAEA Safety Standards is a key point to attract growing support of IAEA because safety aspect of use of ionising radiation is guiding all IAEA actions.

In the regard, the IAEA established the Radiation Safety Information Management System (RASIMS) which is a web-based collaborative platform; to help in Collecting information on the MSs status of radiation safety infrastructures;

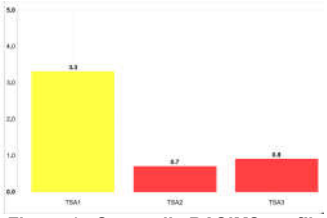

Figure 1: Senegal's RASIMS profile

The Performance levels, represented as legend by different colours is mentioned in the table 1

	4 ≤ PI ≤ 5 (80% ≤ %compliance ≤ 100%)
	3 ≤ PI < 5 (60% ≤ %compliance ≤ 80%)
	2 ≤ PI < 3 (40% ≤ %compliance ≤ 60%)
	1 ≤ PI < 2 (20% ≤ %compliance ≤ 40%)
	0 ≤ PI < 1 (0% ≤ %compliance ≤ 20%)

Table1: Performance level PI / RSIMS

3.1. Missions and Tools use to support better use of Ionizing radiations

- **ImPACT Mission**: The Division of Programme of Action for Cancer Therapy (PACT) and its partners c played an important supporting role by supporting in Senegal (July 2010) an imPACT missions (integrated PACT missions) to review, in collaboration with the government, the status of plans, strategies, programs, policies, capacities and infrastructures related to prevention, surveillance, early diagnosis, screening, treatment of cancer.

Advisory Missions/IRRS missions and others Expert missions:

Under the request of the government, Teams of IAEA technical officers (TO) and experts specialized in various thematic areas of radiation safety evaluate the following thematic safety areas: Regulatory Infrastructure (TSA-1), Radiological Protection in Occupational Exposure (TSA-2), Radiological Protection in Medical Exposure (TSA-3). during December 2009, and march 2020, two of such mission were conducted in Senegal.

3.2. Major RECOMMENDATIONS

After the two major missions on 2009 and 2015, the recommendations are still globally the same:

- •The government should finalize and formalize a document of the national policy and strategy for safety,
- •The government should evaluate possibilities of developing national capacity for calibration of radiation measurement equipment;
- •The government should enact the new comprehensive nuclear law
- •The government should speed up the approval process for the new law;
- •Issuing licenses with requirements until the medical exposure regulations have been approved. A graded approach in developing and codifying medical exposure regulations should be applied;
- 1.The existing legislation should be duly implemented by enacting the necessary decrees and regulations.
- 2.The Government should assign, with high priority, the necessary funding for the regulatory aspects and other fields including human health (cancer and nuclear medicine) and to develop regulations and guides to cover all regulated practices, in full compliance with IAEA Safety Standards.

3. Conclusions and general recommendations

The supports of IAEA, during the last years were very important and helped to attain a significant improvement in nuclear medicine, radiotherapy and in safety and security aspect of nuclear sciences and technology applications. In the meantime, the RASIMS profile does not reflect a significant progress from 2011 to 2023.

to ensure a full success of the RoH, a consideration of specific frames of the past years technical cooperation with IAEA to give particular attention on the three challenging aspects: - the information and reinforcement of high decision making; - A plan of staffing allied of training and capacity reinforcement provided by the IAEA; - adding in the coordination of projects civilian servants as co-coordinator or assistant for reporting directly to ministry.

4-Acknowledgements

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