

Development of a Continent *by Mickel Edwerd*

For 20 years, an intergovernmental agreement supported by the IAEA has contributed to foster nuclear science and technology for African development.

The African Regional Cooperative Agreement (AFRA) is an intergovernmental agreement established in 1990 by the IAEA and African Member States to further strengthen and enlarge the contribution of nuclear science and technology to socio-economic development on the African continent.

AFRA seeks to maximize the use of the available infrastructure and expertise in Africa and assists countries to move toward regional self-sufficiency using peaceful applications of nuclear techniques. Based on the social context and the economic goals of its Member States, AFRA works to deepen the commitment of Member States to the application of nuclear science and technology for their socio-economic development through sustained funding.

The AFRA Agreement is renewed by its Member States every five years for a term of five years. This renewal is achieved by notifying the Director General of the IAEA of the AFRA Member States acceptance of the extension the Agreement, and of their desire to continue participating in the Agreement. The current third extension will remain in force until 3 April 2010.

The IAEA is not party to AFRA, but provides technical and scientific backstopping as well as financial and administrative support, in accordance with the rules and procedures governing the provision of technical assistance to its Member States.

Mandate and Management

AFRA supports regional self-sufficiency in the peaceful application of nuclear techniques by establishing and strengthening necessary infrastructure, coordinating intellectual and physical resources and cost efficient dissemination of innovative methods and practices.

Following the decision made by the High Level Policy Review Seminar (HLPRS) in Aswan, Egypt, in November 2007, to support the improvement

of the managerial procedures of AFRA, increase its effectiveness and promote full ownership of its programmes, the new management structure of AFRA includes three Committees — namely the Programme Management Committee, the Partnership Building and Resource Mobilization Committee and the High Level Steering Committee on Human Resource Development and Nuclear Knowledge Management.

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A Regional Strategic Cooperative Framework

The AFRA Regional Strategic Cooperative Framework (RCF) is the principal planning tool for setting regional cooperation priorities and developing AFRA regional cooperative programmes.

This framework, adopted by AFRA Member States in November 2007, covers the period 2008–2013. The RCF constitutes the frame of reference for the formulation of AFRA regional programmes and is used as the main modality for strengthening the planning and programming of AFRA regional projects, which covers six thematic areas. These are human health; food and agriculture; water resources; sustainable energy development; industrial applications; radiation and waste safety and nuclear security.

◆ **Human Health:** AFRA interventions focus on areas where nuclear techniques have proven to make a difference such as cancer, malnutrition and communicable diseases;

technologies, the use of radioisotopes for troubleshooting, the development of non-destructive testing techniques for industrial quality control and the effective use of research reactors; and

◆ **Radiation and waste safety, and nuclear security:** the AFRA strategy in this field promotes Member State self assessment of their regulatory infrastructure, radiation protection services, emergency preparedness and response capacities and nuclear security. AFRA also promotes the establishment of centralized national radioactive waste management facilities in Member States to manage waste in the safest and most secure manner.

AFRA Success Stories

Human Health: Under AFRA, 40 radiotherapy centres in 18 African countries have been upgraded and more than 250 radiotherapists, medical physicists, nurses and radiographers have been trained on improved radiotherapy protocols, medical physics and management of radiotherapy departments.

AFRA also supports efforts to strengthen regional capabilities in clinical nuclear medicine. The programme has enhanced Member State capabilities in the diagnosis and treatment of coronary artery disease, refractory arthritis, thyroid diseases, liver cancer, metastasis bone pain and lymphoma. Sound medical physics practices with regard to nuclear medicine have been promoted.

Food and Agriculture: A total of 17 AFRA Member States are working on the improvement of 'neglected crops' or traditional crops that have not yet benefited from conventional breeding techniques. The development of drought tolerant lines has also been of great importance to the AFRA Member States. As a result, six new crop varieties have been released and several countries have promised mutant materials and are in the advanced stages of development.

Other achievements include the development of fully established tissue culture laboratories in almost all the participating countries as well molecular laboratories in three countries.

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◆ **Food and Agriculture:** AFRA fosters regional cooperation in the use of nuclear techniques in the fields of animal production, crop production, soil fertility and water management, insect and pest control and food safety;

◆ **Water Resources:** AFRA focuses its interventions in projects that aim to maximize the regional technical capabilities in the water sector, including the establishment of regional centres in isotope hydrology and the promotion of investigations related to integrated water resources assessment, groundwater dependent ecosystem protection (wetlands) and the management of shared aquifers in Africa;

◆ **Sustainable energy development:** AFRA promotes the dissemination and wider use of the IAEA's analytical tools (MAED, MESSAGE and FINPLAN) for energy planning. The regional effort will provide strong linkages across the region with respect to planning and strategizing energy options, including the investigation of the feasibility of nuclear power as a source for electricity production and seawater desalination;

◆ **Industrial applications:** AFRA cooperative activities focus on the promotion of radiation processing

AFRA Members. As of June 2009, the AFRA enjoys a membership of 34 African countries: Algeria • Angola • Benin • Botswana • Burkina Faso • Cameroon • Chad • Democratic Republic of Congo • Central African Republic • Côte d'Ivoire • Egypt • Eritrea • Ethiopia

Industrial Applications and Quality Management:

The programme has provided training to managers and decision makers, facilitated regional networking and promoted the certification of nuclear laboratories in several countries. This network has already held its second regional conference on quality management in AFRA countries, aimed at improving recognition and implementation of ISO standards and their benefits for international trade and communication in Africa.

Information and Communication Technologies (ICTs):

AFRA Member States have established sustainable national and regional capabilities in the use of ICTs for training and education in the fields of nuclear science and technology relating to agriculture, human health, environmental monitoring, water resource management, nuclear instrumentation and other related nuclear fields. Emphasis was placed on training nuclear engineers, computer scientists and technicians, which was supplemented by the provision of ICT telecentres to several countries.

Radioactive Waste Safety:

AFRA developed, in collaboration with the South Africa Atomic Energy Corporation (Necsa), the Borehole Disposal for Sealed Radioactive Sources system, which was designed to provide safe, secure, permanent and economic disposal of disused sealed radioactive sources.

Nuclear Security:

The AFRA programme has provided nuclear security training for more than 850 participants, including law enforcement, customs, civil defense and regulatory personnel. Regional workshops on illicit trafficking information management and coordination have fostered communication, good practices and working relationships among stakeholders in AFRA Member States.

Regional Self Reliance and Sustainability

AFRA Member States promote regional self-reliance and sustainability in the peaceful, safe and secure application of nuclear science and technol-

ogy through the principle of technical cooperation among developing countries (TCDCs).

AFRA Member States implemented a regional strategy in human resource development (HRD) and nuclear knowledge management (NKM) through the AFRA Network for Education in Nuclear Science and Technology (AFRA-NEST) and a high level steering committee on HRD and NKM has been formed to oversee these initiatives. A harmonized curriculum for the AFRA Masters Degree in Nuclear Science and Technology has been adopted as a minimum standard for awarding such a degree in the region.

The AFRA programme also supports the establishment of International Nuclear Information System (INIS) centres for new AFRA Member States, as well as enhancing existing national facilities to access reliable, trustworthy nuclear information resources to support national and regional nuclear activities and programmes, to preserve national nuclear literature and to exchange expertise and share resources in the field of nuclear information processing.

Regional Designated Centres

A process to recognize Regional Designated Centres (RDCs) at the professional level and in higher education has been initiated to cater to the needs of Member States that do not yet have the capacity to present equivalent curriculum. In the context of AFRA, RDCs are defined as an established African institution able to provide multinational services. AFRA Member States apply a rigorous process to recognize RDCs.

As of June 2009, 11 institutions have been recognized by the AFRA Member States as Regional Designated Centres in various fields of activity. The IAEA is supporting a high priority project for the period 2009–2013 to enable students to attend RDCs through fellowship programmes.

The Human Factor

AFRA also uses specialized teams composed of regional experts to perform a range of services, including conditioning and storage of sealed radio-

• Gabon • Ghana • Kenya • Libya • Madagascar • Mali • Mauritania • Mauritius • Morocco • Namibia • Niger • Nigeria • Senegal • Sierra Leone • South Africa • Sudan • Tunisia • Uganda • Tanzania • Zambia • Zimbabwe.

20 Years Young

In collaboration with the Government of Cameroon and the International Atomic Energy Agency (IAEA), the African Regional Cooperative Arrangement (AFRA) on Research, Development and Training related to Nuclear Science and Technology organized its 20th Technical Working Group Meeting (TWGM) in Yaoundé, Cameroon in July 2009. This meeting marked the celebration by of AFRA's 20th anniversary with an exhibition highlighting achievements and success stories under its programmes. A press conference focused on AFRA achievements, policies and future challenges, was also held.

The meeting brought together National Coordinators from the 34 AFRA Member States to deliberate on AFRA policy and programme related

matters. Participants reviewed the AFRA draft Annual Report for 2008 and reviewed the implementation of cooperative projects, and also formulated recommendations for consideration by the AFRA Meeting of Representatives. Other issues addressed during the meeting included: the establishment of the AFRA Programme Management Committee (PMC) and the AFRA-Partnership Building and Resource Mobilization Committee (PBRMC); the initiation of the AFRA Fund; fundraising; the implementation of the AFRA Regional Cooperative Strategic Framework 2008-2013; and the linkages between Country Programme Frameworks and other national planning documents such as national development plans, UNDAF, PRSPs including the review of AFRA operational matters.

active sources, auditing of radiotherapy and nuclear medicine facilities, and advising on steps to achieve self-reliance and sustainability of national nuclear institutions.

When appropriate, AFRA Member States appoint Project Scientific Consultants (PSCs) to provide, upon request, technical backstopping to AFRA Member States and to the AFRA committees. PSCs are African scientists recognized as experts and regional leaders in their respective fields. PSCs participate in AFRA activities in their individual capacity. As of June 2009, 15 African scientists have been recognized by the AFRA Member States as PSCs of AFRA projects related to several thematic fields.

AFRA provides advice on the formulation and implementation of realistic Strategic Action Plans (SAPs) to guide national nuclear institutions to enhance their sustainability and to remain functional and relevant, with an agreed level of dependence on government support and the capability to adapt to changes in the external environment.

Challenges

One of the major challenges facing AFRA is the wide variation of development within AFRA Member States in the field of nuclear science and technology. This is a challenge that needs to be monitored constantly to avoid gap widening as the number of Member States increases. Another challenge for the near future will be maintaining the programme's expansion at the level desired by Member States tak-

ing into consideration the scarcity of resources. To face this challenge, an AFRA Fund has been established to enable Member States' voluntary contributions to attain 25% of the unfunded portion of the AFRA programme.

The synergy and innovative dynamics generated by AFRA should ultimately lead to the creation of a regional market of goods, services and knowledge in the field of nuclear science and technology. This has already started under some AFRA projects where several goods are being provided from within the region. This initiative will represent a significant challenge for AFRA as it is expected to play a leading role in understanding the evolution and trends of the regional demand for nuclear applications as well as promote the development process of goods and services and establish the legal framework by harmonizing regulations and procedures and facilitating transactions. Future emphasis will therefore be placed on small and medium sized joint ventures and cooperative undertakings between African countries themselves as well as between them and Member States in other regions. 

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