

IAEA Technical Cooperation and Contributions to ARGeo Project

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Atoms for Peace: The First Half Century
1957–2007



TECHNICAL COOPERATION UNDERLYING PRINCIPLES, CONCEPTS AND FRAMEWORK

- IAEA Statutory Mandate): “to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world” (Article II of the Statute).
- Revised Guiding Principles and General Operating Rules to Govern the Provision of Technical Assistance by the Agency
- Technical Cooperation Strategy
- IAEA Medium Term Strategy



IAEA STATUTE: WELL DEFINED FUNCTIONS

The Agency is authorized (Article III of the Statute):

- To encourage and assist on, and development of and practical application of, atomic energy for peaceful uses throughout the world
- To foster the exchange of scientific and technical information on peaceful uses of atomic energy
- To encourage the exchange and training of scientists and experts in the field of peaceful uses of atomic energy



IAEA TECHNICAL COOPERATION PROGRAMME

- Assisting countries to achieve the Millennium Development Goals (MDGs)
 - Eradicating extreme poverty and hunger (goal 1)
 - Reducing infant mortality (goal 4)
 - Improving maternal health (goal 5)
 - Combating HIV/AIDS, malaria and other diseases (goal 6)
 - Ensuring environment sustainability through water and desertification (goal 7)



MAIN AREAS FOR COOPERATION IN NUCLEAR APPLICATIONS

- Human Health:
 - cancer therapy; diagnosis of infectious and non-communicable diseases, detection of drug-resistant strains; sterilization of medical products; assessment of nutrition intervention programmes.
- Food and Agriculture:
 - development of new plant varieties; preservation of agricultural produce; food safety, control and eradication of pests, and control of animal diseases.

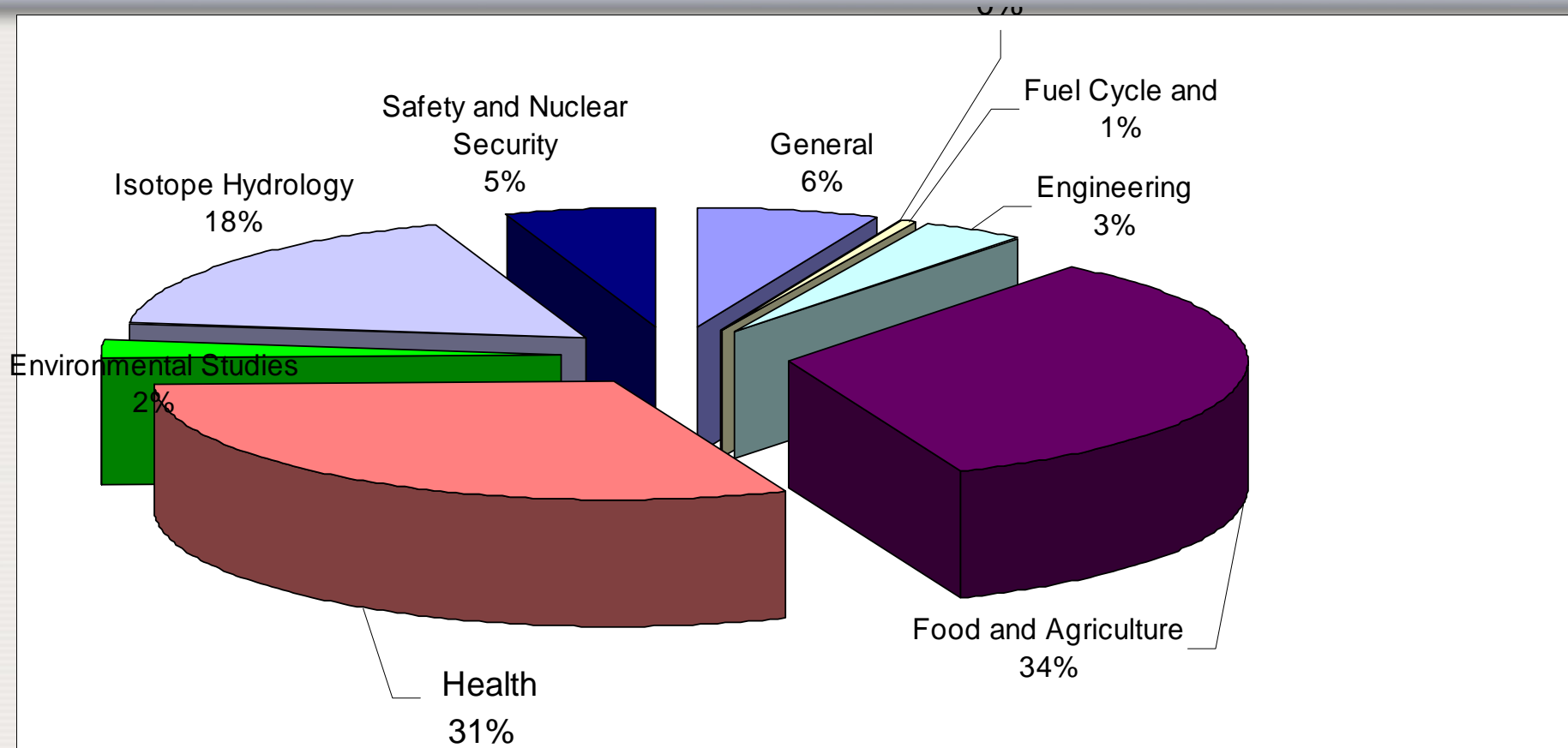


MAIN AREAS FOR COOPERATION IN NUCLEAR APPLICATIONS

- Isotope Hydrology:
 - Geothermal exploration and mapping of groundwater resources; monitoring of groundwater quality; dam safety
- Environment:
 - pollutant surveys; management and remediation of contaminated zones, marine environment and coastal zone management.
- Sustainable energy development:
 - comparative assessment of energy sources; nuclear energy production

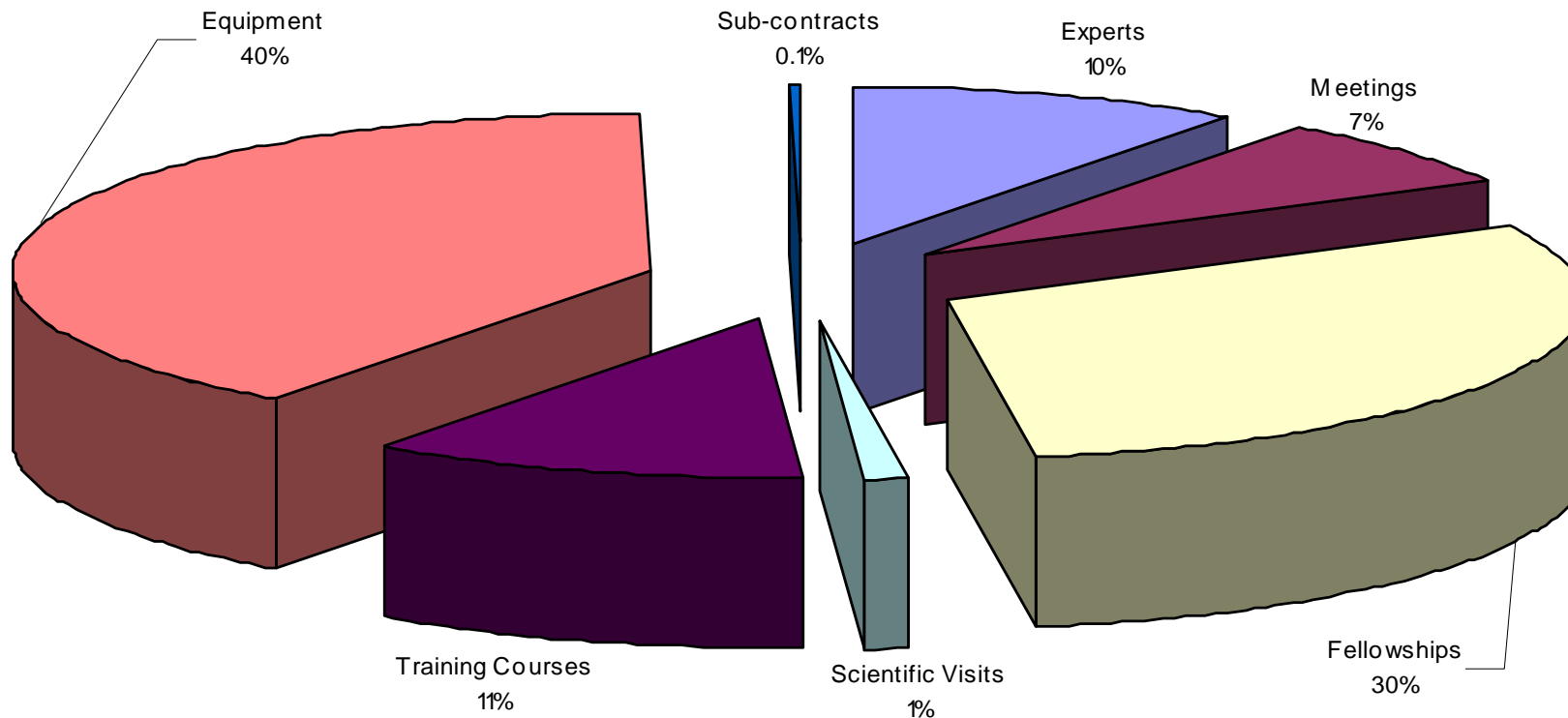


2004-2008 TC Support to Uganda by field of activity



Total: US\$3 131 719

2004-2008 TC Support to Uganda by components



Total: US\$3 131 719

MAJOR APPLICATIONS OF ISOTOPES AND NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE

- Efficiency in water and fertilizer use (neutron moisture probes and N-15 technique)
- Crop improvement (mutation breeding in association with biotechnologies)
- Animal production (radio immunoassay, breed improvement utilizing Artificial Insemination)
- Eradication/control of insect pests (Sterile Insect Technique)
- Control of major epizooties
- Food quality and safety (access to global markets and alleviation of technical barriers to trade through better control of pathogenic micro-organisms, pesticides and veterinary drug residues)



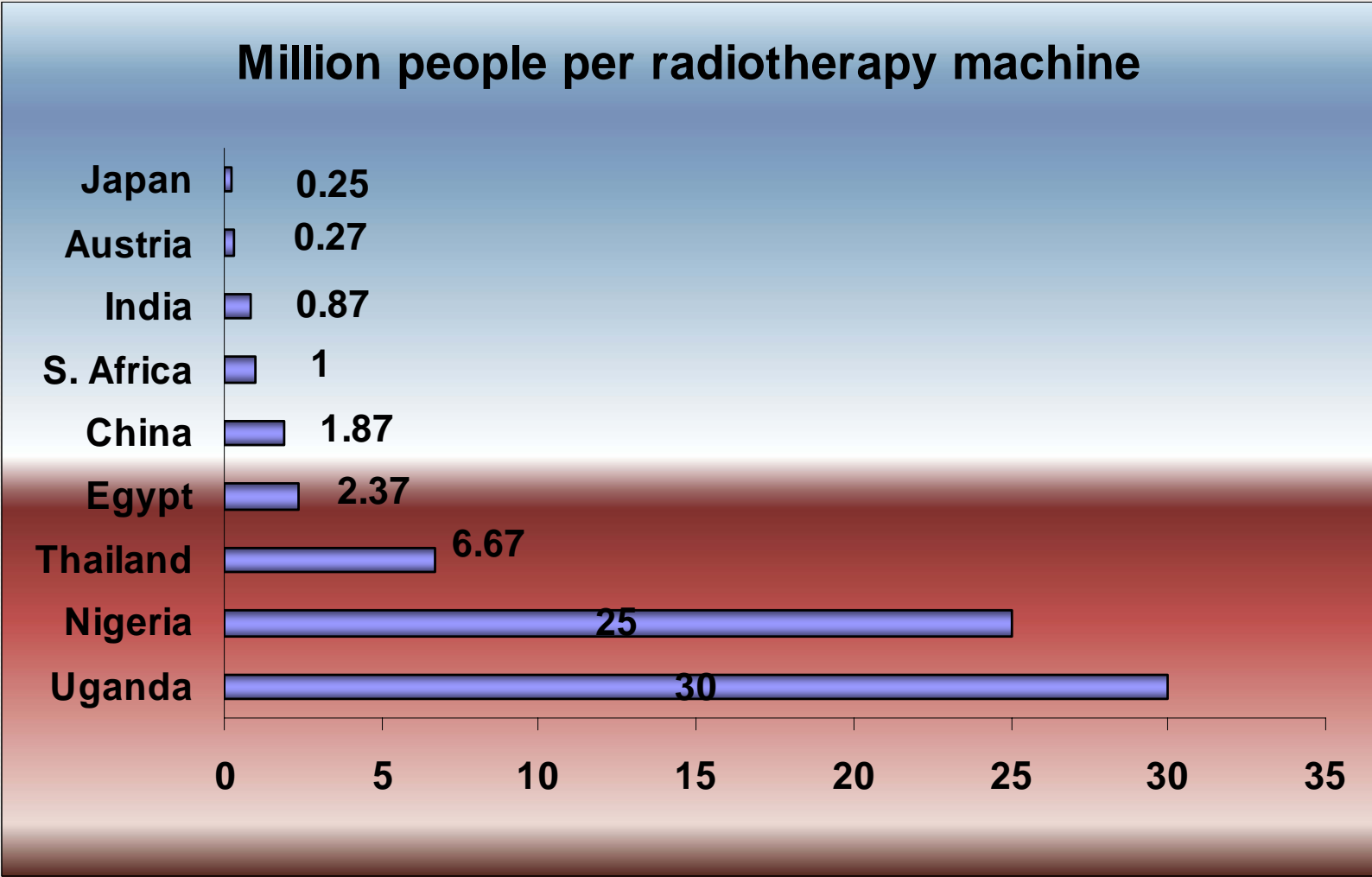
IMPROVING HUMAN HEALTH

- Special efforts are being made under the IAEA TC programme to further enhance planning with a view to enlarge the contribution of isotopes and nuclear techniques and to respond better to the basic priority needs expressed by national health authorities, with emphasis on the imperative of producing lasting benefits in primary health care.



Improving Human Health

Radiotherapy services



Improving Human Health

Radiotherapy services

RT Services in Africa

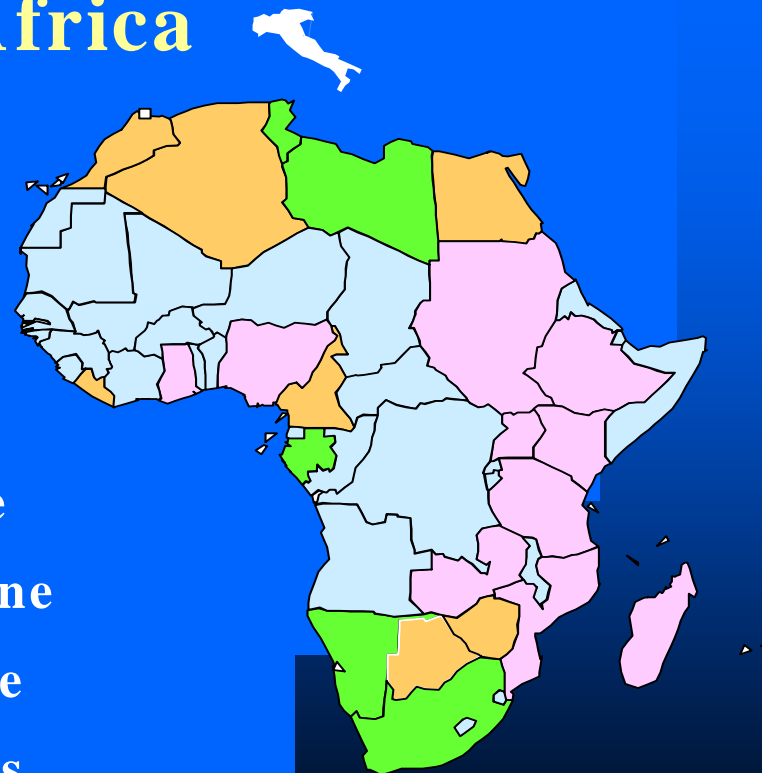
■ Europe
250,000/machine

● < 2 million/machine

● 2 - 10 million/machine

● > 10 million/machine

● No Known Machines



CANCER MANAGEMENT

- Support to Member States in establishing new radiotherapy facilities
- Upgrading Radiotherapy Facilities
- Training of Radiotherapy Professionals
- Quality Assurance in Radiotherapy Treatment
- Standardisation and Harmonisation of Radiation Dosimetry
- Auditing of Radiotherapy Facilities

A new initiative: Programme of Action for Cancer Therapy (PACT)



MEDICAL DIAGNOSIS (NUCLEAR MEDICINE)

Focus of IAEA Programmes in Nuclear Medicine :

- Training of professionals and technical staff
- Support to establishing new facilities and upgrading existing ones
- Support to networking
- Quality Assurance



CONTROL OF MALARIA AND TUBERCULOSIS

A regional technical cooperation project in Africa aims at helping Member States:

- To validate new diagnostic tools for national disease control and surveillance programmes.
- To establish the conditions for integration of advanced decision-making tools in the protocols of national control programmes for malaria and tuberculosis (TB).
- To support the World Health Organization's (WHO's) global programme for TB and malaria control initiatives.

Fighting HIV/AIDS: Vaccine Development

- Under a regional TC project in Africa, the Agency is supporting collaborative programmes and initiatives aimed at monitoring HIV-1 strains and transferring and validating the technology to assess immune responses to new interventions/vaccines.
- IAEA working with WHO-AFRO, UNAIDS and the African Aids Vaccine Programme.



ENERGY PLANNING AND ECONOMICS

- To strengthen capacity of Member States in managing the energy sector development in order to promote sustainable use of natural resources and increase access to affordable energy services, thereby fostering economic growth and improving living conditions of people in the long-term.
- Transfer of IAEA methodologies and tools for energy demand forecasting, integrated energy planning, least-cost electricity system expansion planning, financial analysis, quantification of environmental burdens, estimation of external costs, and multi-criteria decision analysis.
- Training of national teams in the use of these tools and to development of their skills to enable them to conduct country studies independently. Energy system specialists are encouraged to cooperate on a regional basis.



NUCLEAR POWER DEVELOPMENT

- Assists Member States in establishing and implementing best practices in the areas of introduction and infrastructure building, NPP design and engineering, operations, management and human performance.
- Provides global expertise and a focus towards excellence in the areas of infrastructure, engineering, management and training for all stages of the nuclear power life cycle.
- Facilitates the exchange of information, knowledge and experience in nuclear power development and plant operations.



ISOTOPE HYDROLOGY

Groundwater Assessment

- Isotope techniques have been used to carry out studies of aquifer systems in several areas of the country.
 - Wabulenzi,
 - Kisoro,
 - Rukungiri,
 - Mubende
- Isotope techniques being used to study the contribution of groundwater to the water balance of L. Victoria and the Nile.

ISOTOPE HYDROLOGY

Geothermal Exploration

- In the year 1999 to 2007 the IAEA assisted the Government to implement a project on the three geothermal prospects at Katwe, Buranga and Kibiro to assess their energy potential using isotope hydrology techniques.
- Isotopic techniques were used to study the flow characteristics of geothermal, surface and ground waters in three prospects with the aim to locate the origin of the geothermal fluids and their behaviour from the source to the geothermal reservoirs.

ISOTOPE HYDROLOGY

Geothermal Exploration 2009-11

- A New Regional Project
 - *Introducing Isotope Hydrology for Exploration and Management of Geothermal Resources in the African Rift System*
- Participating countries are Eritrea, Ethiopia, Kenya, Tanzania and Uganda



ISOTOPE HYDROLOGY

Objective of the new project (2009-11)

- Integration of isotope techniques in the ARGeo programme to support the presence of exploitable geothermal resources with the aim of minimizing risk failure for the Risk Mitigation Facility implemented by the World Bank, as well as feasibility study support to present bankable proposals to local and/or international sources of financing.

ISOTOPE HYDROLOGY

Expected outcome of the new project (2009-11)

- Better characterization of potential geothermal resources will contribute towards judicious decision-making with regard to exploration of the resources and minimization of the risk for potential investors and developers.

ISOTOPE HYDROLOGY

IAEA input in the new project (2009-11)

- Project Coordination Meeting
- Expert services in support of sampling campaigns
- Regional Training Course on data interpretation and monitoring of project progress following first sampling campaign
- Small items of equipment and consumables in support of first sampling campaign
- Isotopic analysis



CONCLUSION

- Various applications of nuclear technology have the potential to solve practical problems at the ground level of sustainable development and to address basic human needs
- When integrated in sectoral development plans and programmes, IAEA cooperation can make the difference and contribute towards the achievement of national sustainable development goals,
- Isotope hydrology will be an important component of the ARGeo project



**Thank you
for your kind attention**



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