

NUCLEAR POWER & ENERGY AGENCY

NUCLEAR TECHNIQUES IN THE BIG 4 AGENDA

Presented by
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NuPEA



PRESENTATION OUTLINE

NuPEA

Peaceful Application of NS&T

Nuclear Projects in Big 4 Agenda

Conclusion

PEACEFUL APPLICATION OF NS&T

The logo for NuPEA (National Liaison Office) is located in the top right corner. It consists of the word "NuPEA" in a blue serif font, with the "Nu" in a smaller size and "PEA" in a larger size. The logo is enclosed in a circular border with a blue outer ring and a green inner ring.

- Kenya has been a Member of the International Atomic Energy Agency (IAEA) since 1965.
- NuPEA is the National Liaison Office (NLO) which coordinates the implementation of all National Technical Cooperation projects in all fields of peaceful uses of nuclear science and technology in the country.
- The Country Programme Framework (CPF) identifies the national priorities that can be addressed through nuclear science and technology in the framework of the TC programme,
- The Current CPF identifies 8 Priorities areas including: Health, Sustainable Energy, Agriculture, Industry, Education, Nuclear Safety, Radioactive Waste Management, Water Management.

Nuclear Techniques in Big 4 Agenda



Food & Agriculture

Promoting food security and sustainable agricultural development



Human Health

Improving the diagnosis and treatment of diseases and nutrition



Science & Industry

Providing knowledge and expertise for science and industry



Water Resources

Making cleaner water accessible to more people



Environment

Understanding and protecting the environment

Soil, Water and Nutrient Issues



Land Degradation
such as Soil Erosion



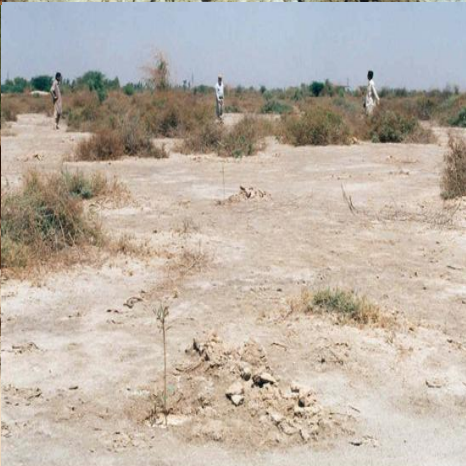
Salinity and Nutrient
Toxicities



Water Scarcity and
Low Water Use
Efficiency



Low Soil Fertility
and Poor Crop
Nutrition



Good News:

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Soil and Water Management and Crop Nutrition (SWMCN)

Subprogramme focusses on development of **packages of Climate Smart Agricultural Practices** using Nuclear techniques to help MS to improve Food Security and to minimize the impact of Climate Change.

Climate Smart Agriculture refers to:

- Increasing crop productivity
- Increasing soil resilience (adaptation)
- Reducing GHGs
- Preserving ecosystem functions of soil



Nuclear Techniques Used in SWMCN

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^{15}N

^{15}N ^{32}P

^{13}C

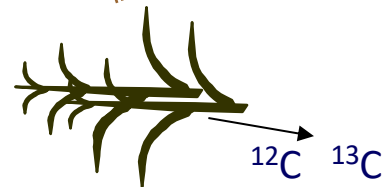
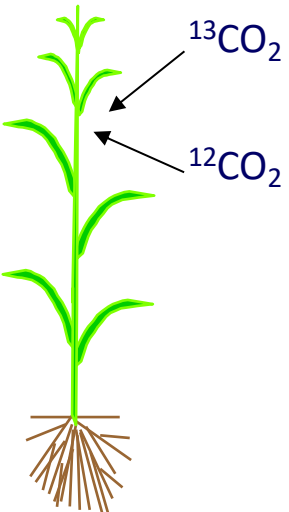
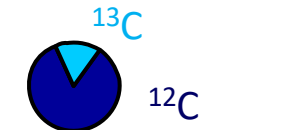
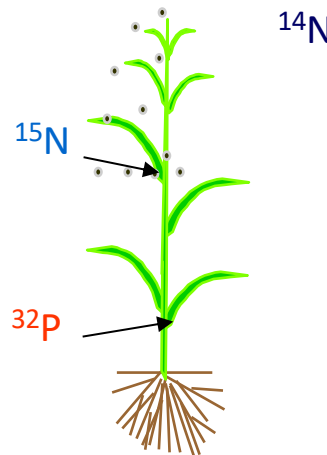
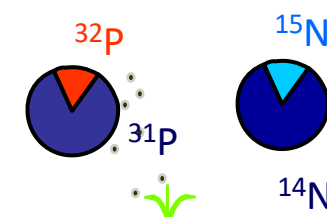
^{18}O ^2H

To quantify biological nitrogen fixation to save N fertilizers

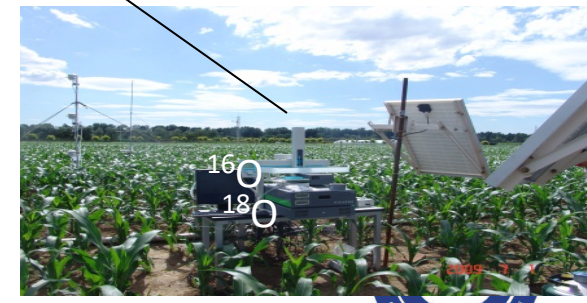
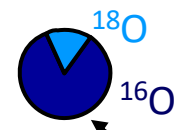
To quantify the flow and fate of N fertilizers to improve fertilizer use by crops

To assess adaptation of crop tolerance to drought and salinity

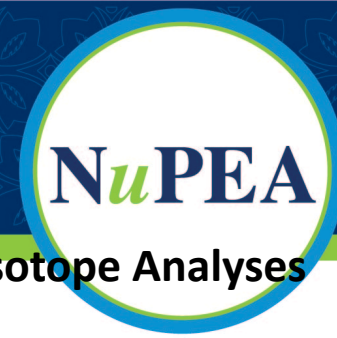
To estimate sources and fluxes of water to improve WUE



To assess soil organic carbon storage 'sequestration'



Nuclear Techniques Used (continued)

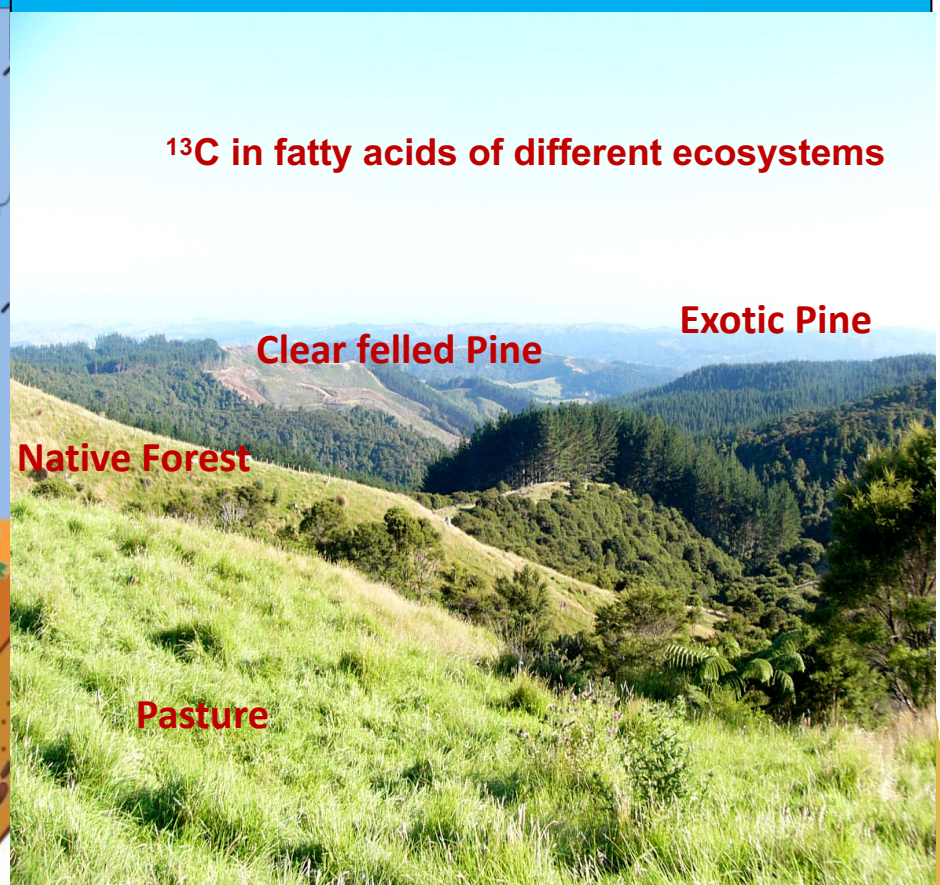
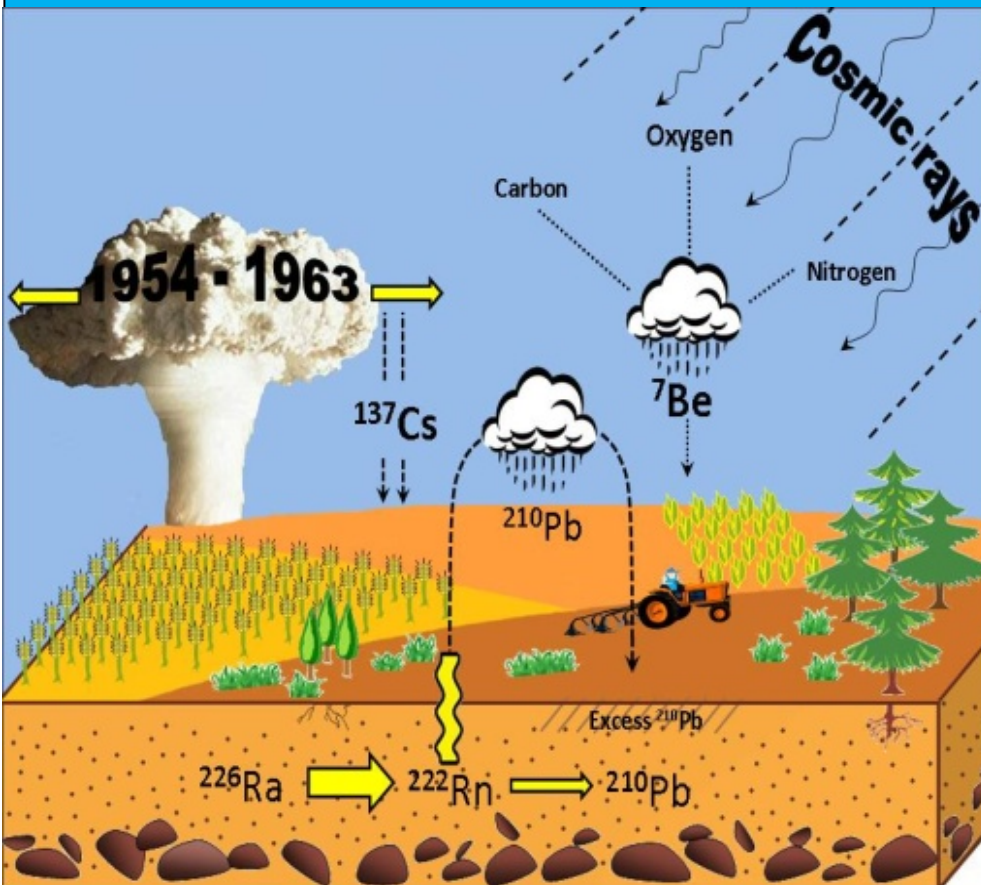


Fallout radionuclides:
 ^{137}Cs , ^{210}Pb and ^7Be

Compound Specific Stable Isotope Analyses
(CSSI)

To estimate erosion and sedimentation

To identify the sediment sources



(i) Food Security

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- There are 3 National Technical Cooperation projects in agriculture aimed at improving crop and animal production to enhance food security in the country.
- Benefits derived from these projects are;
 - i. Training of farmers on scientific and innovative ways of improving crop and animal production for food security.
 - ii. Development of mutant varieties of rice, animal feeds and wheat through biotechnology or irradiation techniques to produce rice, forages and wheat which are resistant to drought and diseases.

Two wheat varieties developed in Kenya are Mavuno and Eldo varieties which have been distributed to farmers.

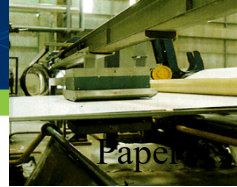
What is industry ?



Industrial processes



Water



Paper

Irrigation



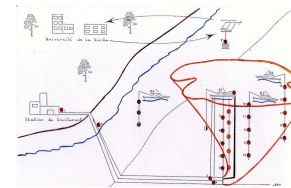
sediment transport



Dams



Outfalls



Pollutant release and aquifer protection



Dredging

Cement



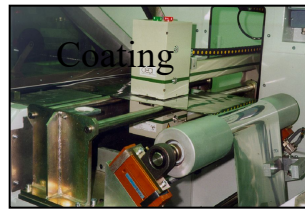
Wood



Industrial agriculture



Mechanics



Coating



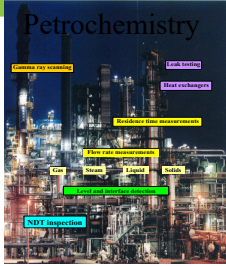
Nuclear



Gas



Metallurgy



Petrochemistry



Metallurgy

Ore processing



Mining



Tourism is
an industry



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Harbours and dams
are industries



(ii) Manufacturing

- There are 3 projects in industry aimed at improving industrial processes to enhance productivity using nuclear techniques.
- The achievement include:
 - i. Trainings of Kenyans in use of radiation techniques in industrial processes like non-destructive testing and radiotracer analysis.
 - ii. Donation of equipment for Non-Destructive Testing for elemental and radioactivity analysis
 - iii. Development and equipping of the Second Standard Dosimetry Lab at the Kenya National Bureau of Statistics.

Cancer burden: Global; Regional & National

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New cases

2018: 18 080 000

2030: 24 077 000

Deaths

2018: 9 555 000

2030: 12 999 000

New cases

2018: 1 021 000

2030: 1 494 000

Deaths

2018: 667 000

2030: 994 000

The new cases being reported with cancer is about 47,887 annually with 32,987 Deaths.

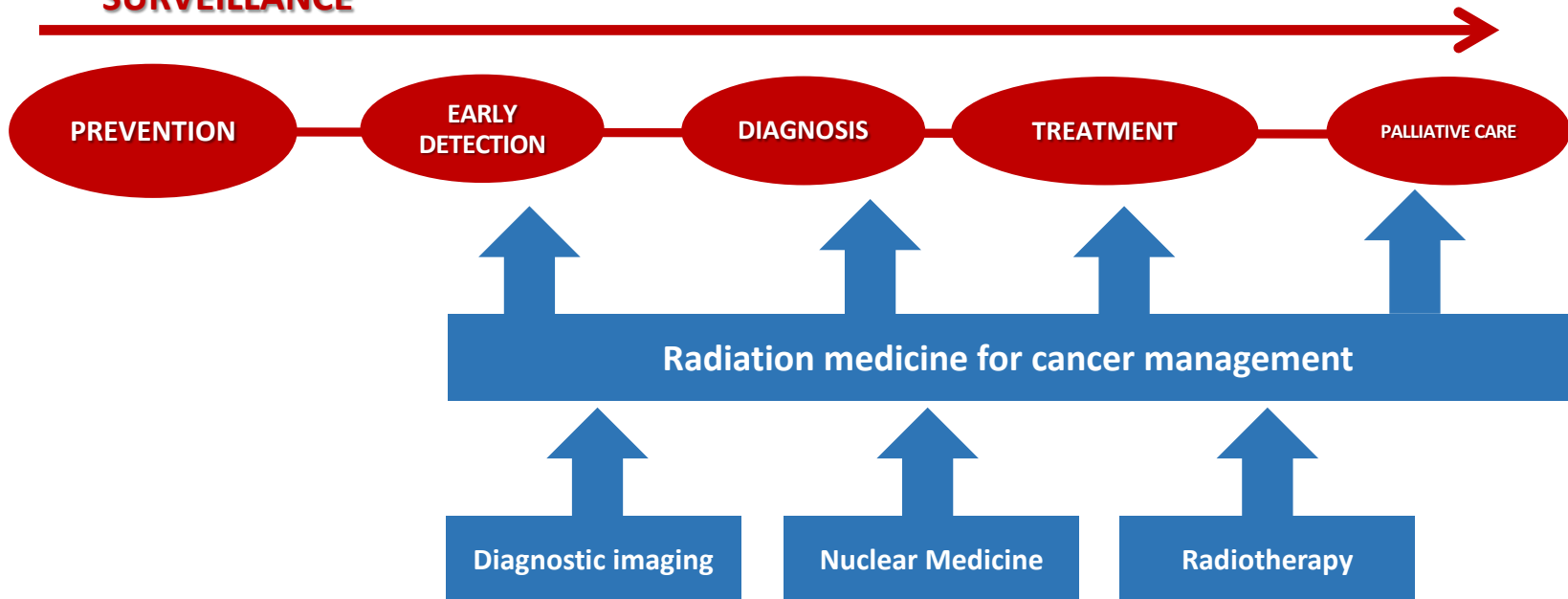
Childhood 3,272 new cases annually.

Unique role of the Nuclear Technique in Comprehensive Cancer Control

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COMPREHENSIVE CANCER CONTROL

SURVEILLANCE



iii. Universal Health Care

- Kenya is participating in 4 Technical cooperation projects related to health in the fields of detection, diagnosis and treatment of cancer.
- Benefits derived from the projects are;
 - i. Acquisition of radiotherapy equipment for cancer diagnosis and treatment for Moi Teaching and Referral Hospital (MTRH) and Kenyatta National Hospital (KNH)
 - ii. Training of radiologists, radiographers and medical physicists.
 - iii. Planned expansion of the radiotherapy centers in Mombasa, Nakuru, Kisumu and Garissa Counties.

Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less.”



Marie Curie

Technical efficiency

- Proven Technology

Availability

- Nuclear : over 90% , Solar 10~15%, Wind : around 20%

Site area comparison

< 1,000MW capacity basis >

