

Preliminary Study on the National Radiation Monitoring Program for Uranium Mining in Tanzania

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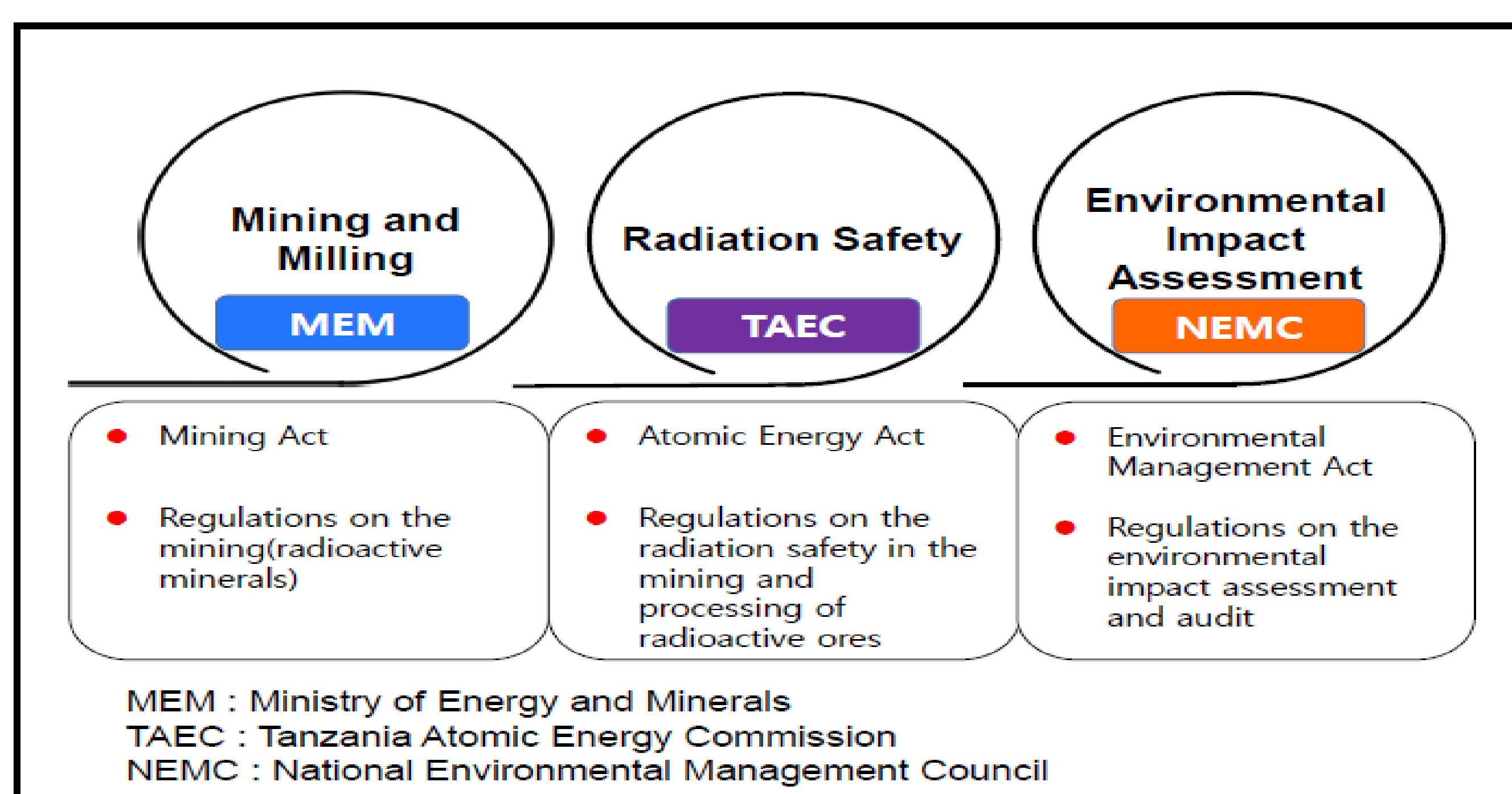
1. Introduction

- The united republic of Tanzania(Tanzania) has no power or research reactors but plans to commence uranium mining at its major Uranium development projects .
- Uranium ore contains natural Uranium comprising of U-238 (99.2739%), U-235 (0.7205%) and U-234 (0.0056%), which are radioactive.
- U-238 and its progeny significantly contribute to the radiological hazards in uranium mines due to the high abundance.
- In uranium mining and milling, the radionuclides of main concern are Ra- 226and 222-Rn, for aquatic and airborne releases respectively.
- In addition, Pb-210 and Po-210 are the radionuclides of radiological concern in mining areas owing to their half-life and radiotoxicity.
- Radiation monitoring program is a key aspect of the role of the regulatory authority and the project operator in the uranium mining and milling.
- In this study, we reviewed the current status of uranium mining in Tanzania, regulatory system of uranium mining, the impacts of uranium mining on humans and the environment.

2.1 Current Status of Uranium Mining in Tanzania

- The major uranium development projects is the Mkuju River Project, located in southern Tanzania.
- This area has been classified as a UNESCO World Heritage since 1982.
- In-Situ Recovery (ISR) mining technology, also called In-Situ Leaching(ISL) is being assessed as the method to be used in recovering uranium.
- The project is the first uranium mine to receive a license from Tanzania's ministry of energy and mineral resources in 2013.

2.2 Regulatory system of Uranium Mining in Tanzania



2.3 Impacts of Uranium Mining on Humans and the Environment

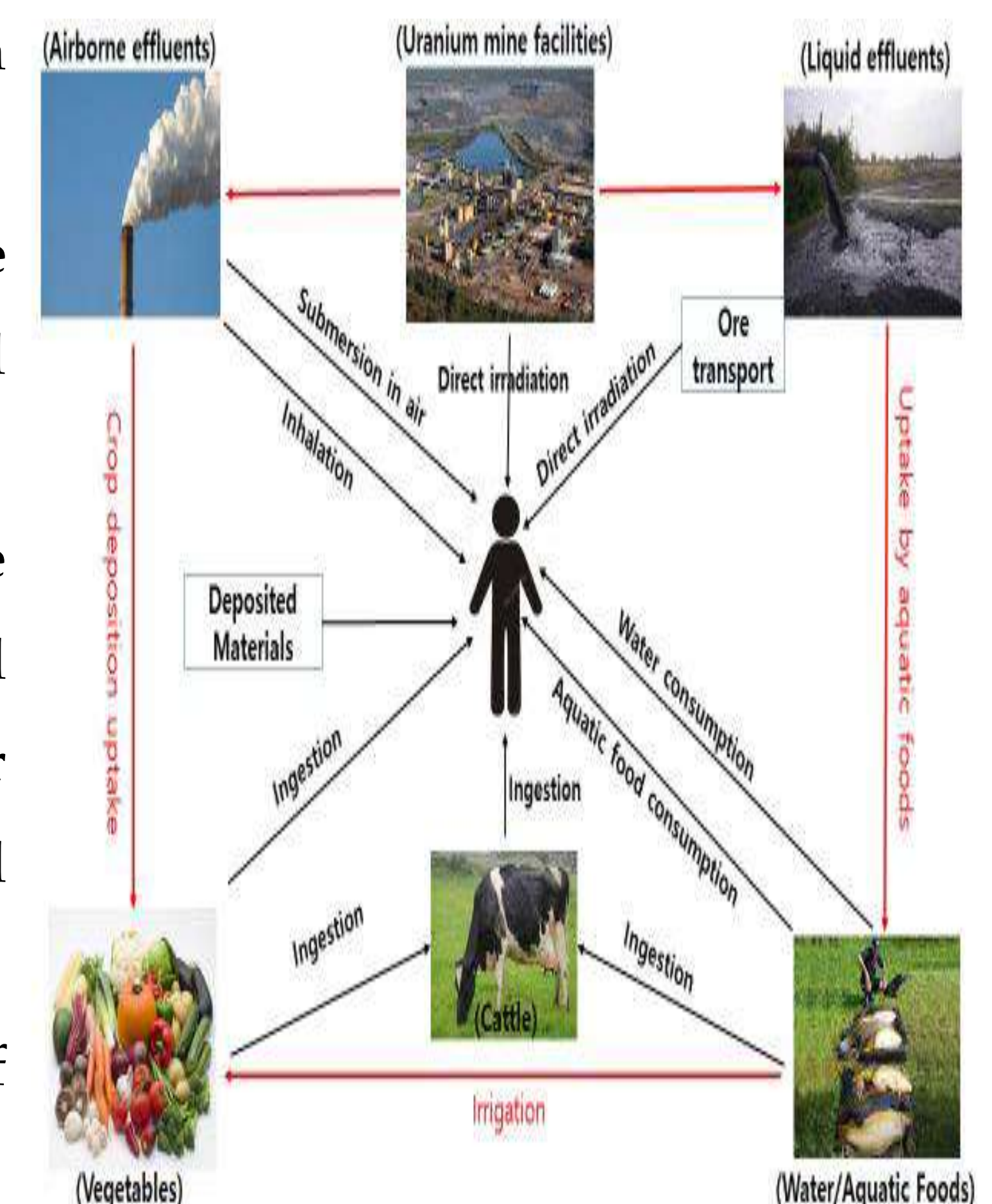
Uranium and its decay products emit various ionizing radiations such as alpha and beta particles, and gamma radiation. People living in uranium mining areas may be at risk if there is uncontrolled releases into the environment. Some of decay products are very radiotoxic when ingested. For example, ²¹⁰Pb and ²¹⁰Po. When ingested, a given activity of ²¹⁰Po gives a radiation dose 4. 8 times higher than the same activity of ²³⁹Pu. Therefore, uranium ores should be managed with a great deal of caution due to the risks of exposure to radiation.

2.4 Design of National Monitoring Program

- The primary objectives of environmental radiation monitoring for uranium mining areas are to characterize actual or potential exposure to the public or worker, and to demonstrate compliance with regulatory requirement, and to ensure that controls on the release of radioactive materials are commensurate with the risk.
- The monitoring program should be established considering types of mining method and its surrounding environment, quality and quantity of radionuclides expected to be released, population, agricultural activities, river or lake etc.
- In order to develop the most effective and economical environmental monitoring program transfer pathways and critical groups are well defined and identified. The design of an environmental monitoring program should also be reconsidered from time to time to incorporate new information and to reflect update monitoring technology
- The proper design of a sampling program and the choice of sample media are essential to achieve the monitoring objectives.

2.4.1 Transfer pathways

- Designing of a monitoring program should consider the transfer pathways
- It should also take into account the information on background concentrations
- In order to develop the most effective and economical environmental monitoring program, transfer pathways and critical groups are well defined and identified.



- and on levels of discharge.

3. Conclusions

Tanzania intends to establish the national environmental radiation monitoring program. At present, pre-operational monitoring has been carried out by the Russian operator under TAEC's supervision to get baseline data and the basic information for the development of appropriate monitoring and surveillance program during operation. This preliminary study will be very useful for developing our national environmental radiation monitoring program for uranium mining and milling areas, reflecting the domestic conditions and in line with international safety standards.

4. References

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