22nd

FNCA

Forum for Nuclear Cooperation in Asia

COUNTRY REPORT

GAMMA IRRADIATION

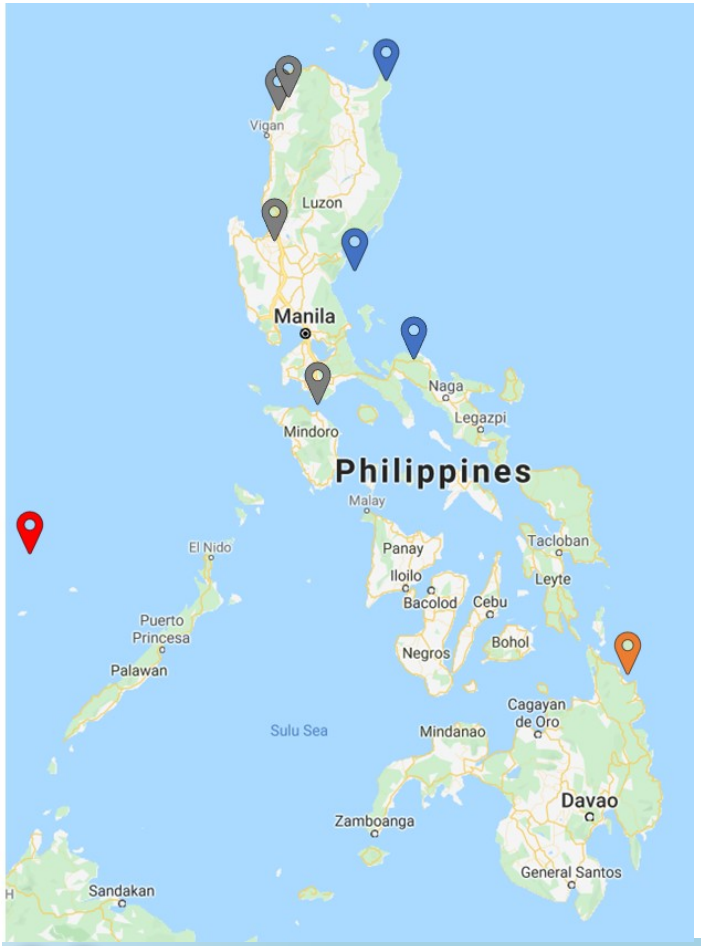
Mutation Breeding Project

ADVANTAGES OF THE MUTANT LINES OVER THE WILDTYPE

- Retained tolerance to drought stress
- Induced tolerance to salinity at seedling stage
- **Submergence tolerance at seedling and vegetative stages**
- Resistant to rice tungro disease (RTD)
- Better eating quality

ReforeStable Carbon-Plus:

Stable Isotopes-Based Evaluation of the Climate Change Mitigation Potential, Recovery Status, and Resilience of Reforested Soils Under the National Greening Program



Coral Sites:

5 modern and 3 fossil coral cores collected from various sites in the Philippines.

Comparison of modern corals vs. fossil corals to understand modern and geologic environmental settings and changes.

Analyses Performed:

1. 3DXCT for reconstructing Sea Surface Temperature (SST) in modern corals.
2. ^{14}C and U/Th dating of fossil corals to understand sea-level rise and geological-scale changes.
3. ^{129}I to detect signals from Nuclear Weapons Testing, Fuel Reprocessing, and Accidents.

Measurement & Analysis of Sources of NORM/TENORM

Soil concentrations (Bq/kg dry mass)

Nuclide	Arithmetic mean	Range (min-max)
^{40}K	282	0 - 2253.6
^{238}U	68	3.7 - 4830
^{226}Ra	no data	1.6 - 150
^{232}Th	69	0.8 - 2745.4

Building Materials (Bq/kg)

Nuclide	Concrete / Cement	Rocks (coal, shale, gypsum, limestone, silica)	Phospho-gypsum
^{40}K	1.15 - 618.63	17.8 - 256.7	0 - 328.7
^{226}Ra	0.23 - 450.7	1 - 38.0	91 - 1020
^{232}Th	2.85 - 71.66	2 - 5.4	1.6 - 36.0
^{238}U	No data	No data	87.8 - 1684.8

NORM Industries (Bq/kg)

Nuclide	Coal - Raw Mineral	Coal - Fly-ash, Bottom Ash	Metals Industry
^{40}K	13.90 - 80.23	180 - 630	31.3 - 2,723.1
^{238}U	2.61 - 13.67	57.93 - 268.03	18.5 - 2,909.7
^{226}Ra	1.84 - 11.70	30-181	no data
^{232}Th	2.62 - 15.77	41.66 - 155.93	4.1 - 2,216.4

Radon

Description	Non-uranium underground mines (Outdoors)	Homes (Indoor)	Rivers & Produced Water (Geothermal Areas)	Drinking Water (Geothermal Areas)
Period	1992 - 1995	1992 - 1995	2015 to present	
Detector	CR-39	CR-39	Tri-Carb 3180 TR/SL Liquid Scintillation Counter	
Number of sites measured	72	2,600	~12	~12
Concentration	30 - 347	1.4 - 57.6	Up to 28	Up to 31
Unit	Bq/m3	Bq/m3	Bq/L	Bq/L

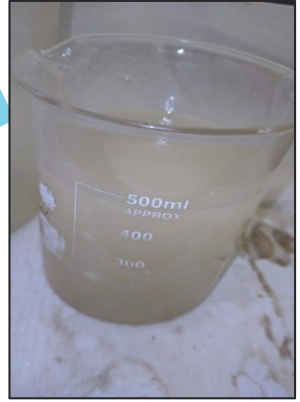
Continuous management of RW

- Adaptation, modification, and implementation of the Radioactive Waste Management Registry (RWMR)
- Received (2021) → 10 units DSRS + 2 units teletheraphy
- Processed (Cat 3-5) → 19 units of DSRS (2020), 322 units of DSRS (2021 to date)
- IAEA-TC Project (2022) → Repurposing Radiation Sources for Enhanced Nuclear Services and Applications (RES-ENSA)

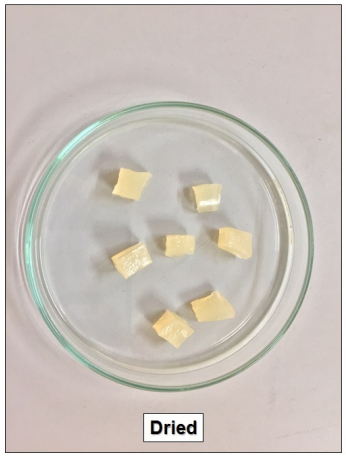
Interaction effects of nitrogen fixing inoculant with other BIOTECH biofertilizers/s

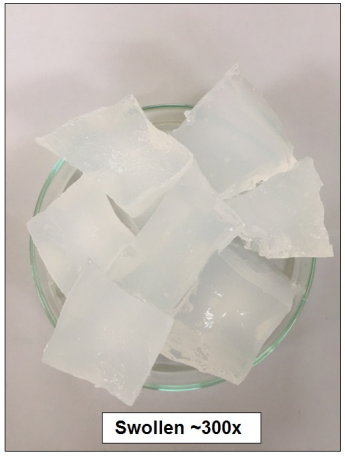
- protocol for the combined application of biofertiizers that will supply nutrient requirements of plants for sustaining desired crop productivity
- Tested for tomato and eggplant for organic production

Continues extension work for promotion and marketing of Bio N technology and Mass Production of Bio N biofertilizer



Pilot-scale production of Polyacrylic-Starch SWA (60L)





Reduced labor and irrigation cost by 33% in okra and cucumber

Field Trials

Ongoing Clinical Trials

Phase II Study of Neoadjuvant Chemotherapy with Concurrent Chemoradiotherapy (CCRT) for Nasopharyngeal Carcinoma (NPC-III)

Prospective Observational Study of 3D-Image guided brachy therapy for Locally Advanced Cervical Cancer (CERVIX-V) -

Phase II Study of Hypofractionated Radiotherapy for Breast Cancer (Postmastectomy Radiation Therapy (PMRT)/BREAST-I)

Quality Assurance/Quality Control in Image Guided Brachytherapy (IGBT)

FNCA Future Projects and Plans

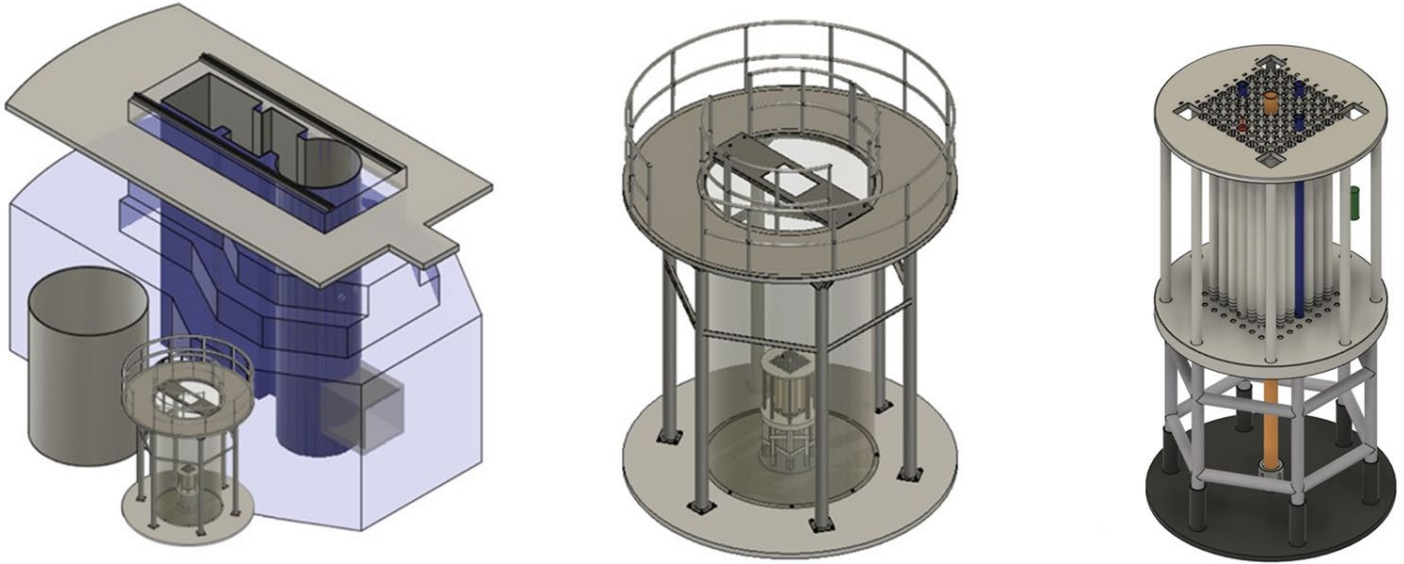
Radiation Oncology Project

Updates on Nuclear Security Implementation

- Virtual inspection of Category 1 facilities
- Establishment of Nuclear Security Training Room for Capacity-building of stakeholders involved in nuclear security regime
- Conducted Basic Radiological Training Courses with stakeholders involved n nuclear security (National Coast Watch Center, Philippine Air Force)
- Integration of Safeguards in the Regulatory Process (Licensing and Enforcement)
- Coordinated with stakeholders in proposed drafting of legislation on CPPNM and its amendment

PRR-1 SATER Background

To re-operate PRR-1 with a TRIGA-fueled subcritical assembly.



Subcritical **A**ssembly for **T**raining, **E**ducation, and **R**esearch (SATER)

FACILITY OBJECTIVES & UTILIZATION PLAN

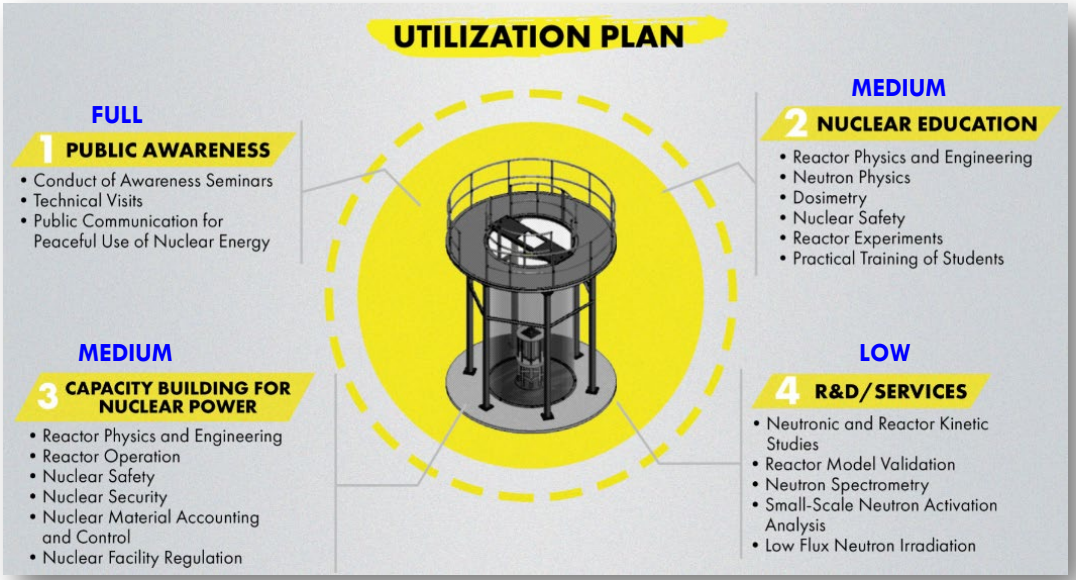
SUPPORT nuclear manpower development

ACCOMMODATE local access to an operating nuclear facility

TRAIN reactor operators, user, and regulators

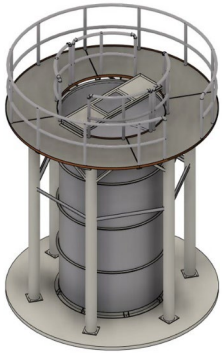
ENGAGE stakeholders in nuclear and reactor engineering

REPURPOSE resources of historical PRR-1 facility



Full – full capability;
Medium – some capability;
Low – demonstration capability

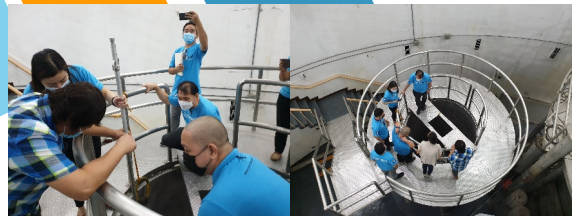
PROJECT TIMELINE



- **2014** Initial proposal to use PRR-1 fuel for subcritical assembly
- **2016** Capacity building for regulators, users, and operators began
- **2018** PRR-1 structure rehabilitation commenced
- **2019** First version of PRR-1 SATER PSAR completed
- **2020** Construction of PRR-1 SATER structures completed
- **2021** Procurement, installation, and testing of PRR-1 SATER I&C
- **2022** Target year for commissioning (June 2022)

PROJECT ACTIVITIES

Fuel Handling Training *(March 3)*



Inhouse Reactor Training Program *(March 8-19)*

Regulatory Inspection *(March 10)*

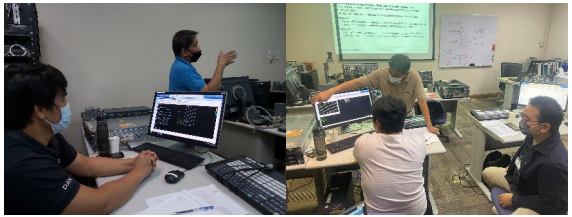
Neutron Source Delivery *(May 4)*

Control Rod Mechanism Delivered *(July 8)*

IAEA Internet Reactor Laboratory *(Aug 24-Dec 1)*

Reactor Pool & Storage Tank Retrofitting *(Oct 11-ongoing)*

SATER I&C System Training *(October 18-22)*

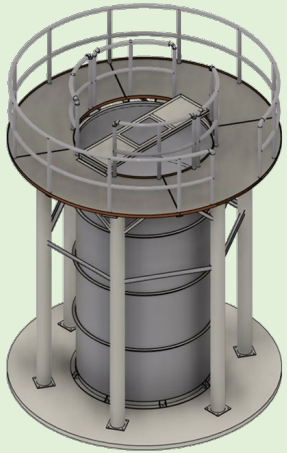


SATER I&C FAT at Yokogawa *(Oct 27-Nov 4)*

PARTNERSHIPS

IAEA **Internet Reactor Laboratory (IRL)** for distance learning: Agreement already signed, ongoing preparation of infrastructure

The IRL arrangement can supplement the limitation of SATER in the E&T aspect



PRR-1 SATER

PRR-1 SATER can provide local access to basic E, T, R & D in reactor physics and engineering

International Centres based on Research Reactors (ICERRs) and **FNCA**

*The ICERR and **FNCA** arrangement can supplement the limitation of SATER in the R&D aspect*

**Implementation of IRL will be funded through IAEA IRL project. Implementation of ICERR-related activities will be funded mostly through IAEA TC PHI0016, but with some support from local funding and TC PHI0017.

Thank You!