

SESSION 3: NUCLEAR SCIENCE AND TECHNOLOGY APPLICATIONS: SUSTAINING, ENABLING AND EMPOWERING

PANEL 3.2: Sustaining nuclear technology through capacity building



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As the Vice Chancellor of the Homi Bhabha National Institute (HBNI), a Deemed University under India's Department of Atomic Energy (DAE), P.R. Vasudeva Rao is responsible for the management of the academic programs pursued in 11 DAE institutions, including the Bhabha Atomic Research Centre, Institute of Plasma Research, Saha Institute of Nuclear Physics and Tata Memorial Centre



Nuclear Science Education and Research- Indian Experience



P.R. Vasudeva Rao

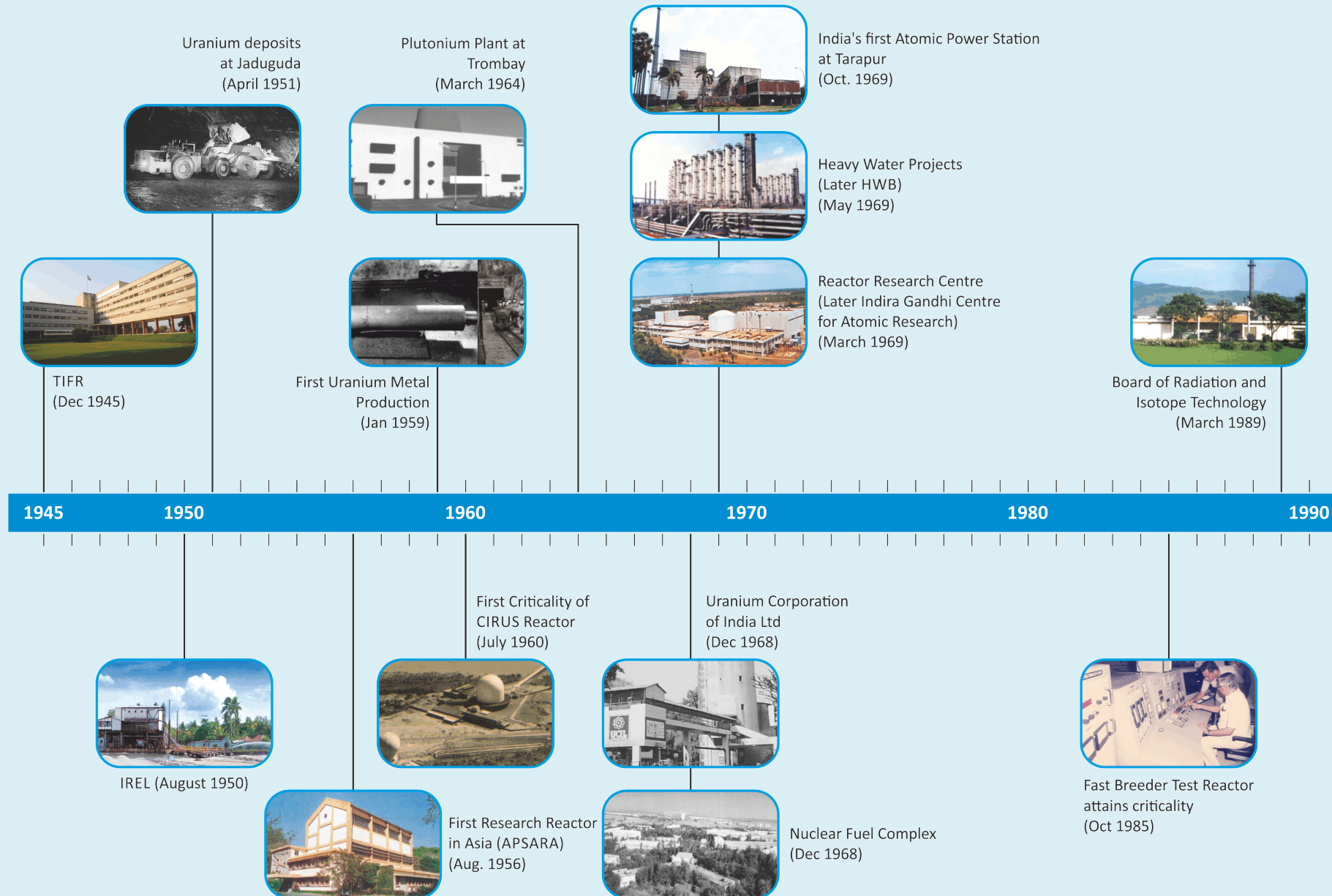
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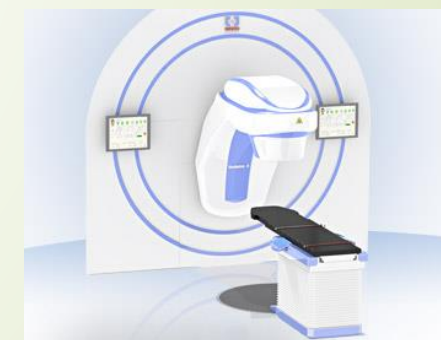
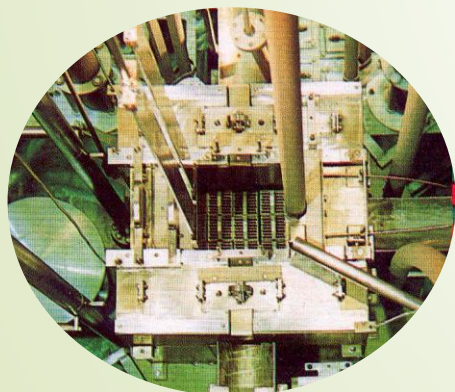
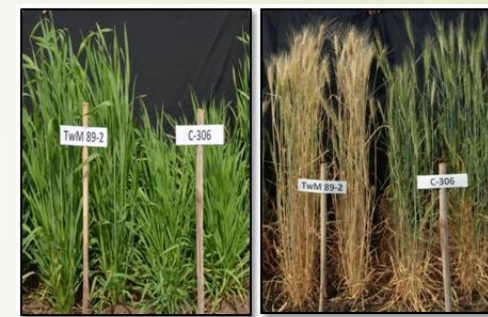


Growth of Indian Nuclear Program





Indian Program on Nuclear Science and Technology



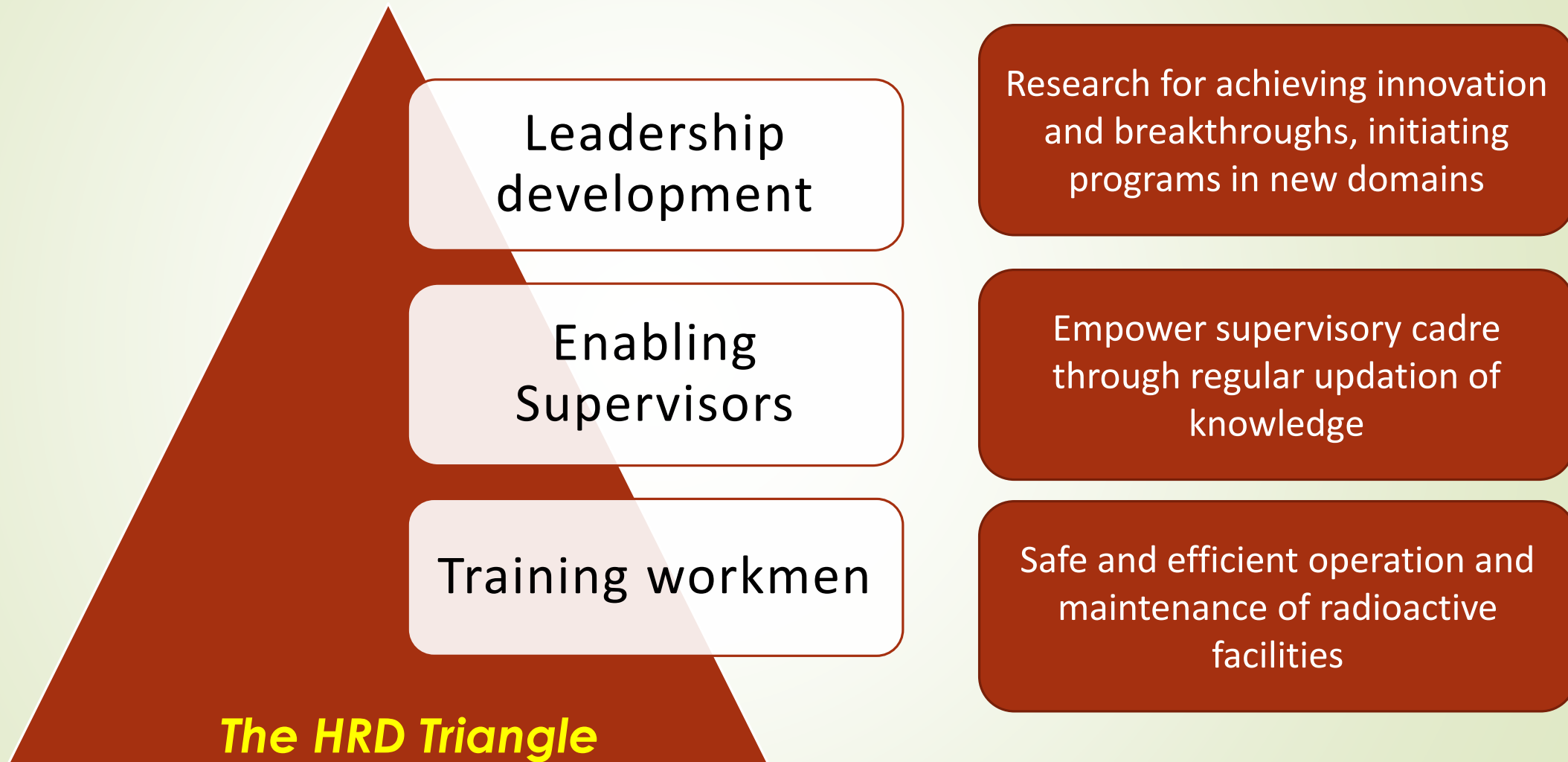
Indigenous reactors with natural uranium, Plutonium and U-233 based fuels

Comprehensive strength in fuel cycle, mining to waste management

Unique societal contributions- nuclear agriculture, radiation sterilization, nuclear medicine



Educational and training needs for Development of Nuclear S & T



HBNI addresses the first two elements of human resource development



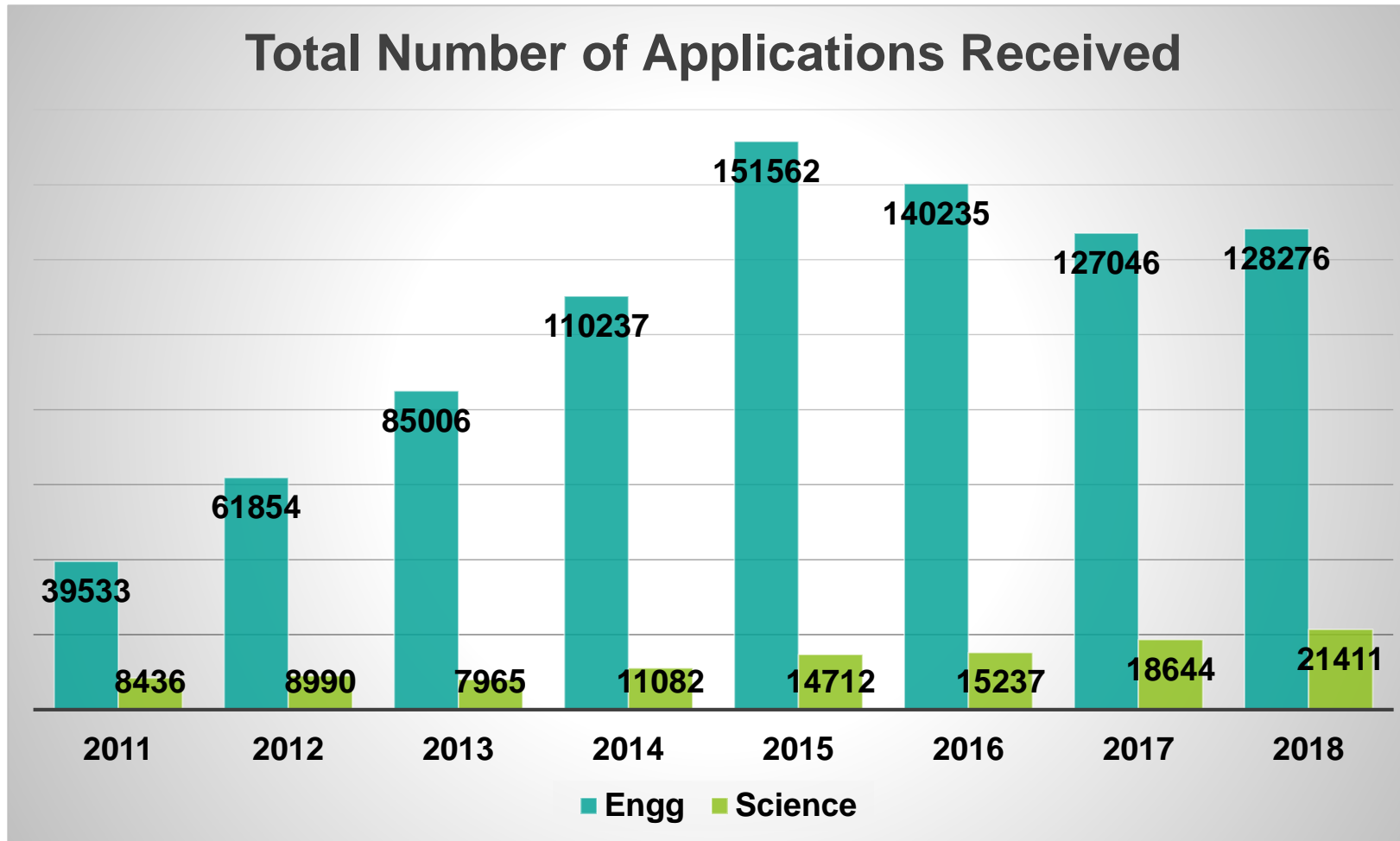
Sustained Human Resource Development

- **BARC Training School – a graduate school – has been providing high quality engineers and scientists for DAE’s programmes since 1957 on an uninterrupted basis**
- **Successful trainees employed as scientific officers in various units of DAE; Leaders of the DAE are all trained in BARC TS**
- **Course curriculum of TS is periodically revised and updated to include new subjects and new methodologies**
- **Faculty are themselves a product of TS, and are practicing researchers**
- **This program also constitutes a unique tool for knowledge management.**

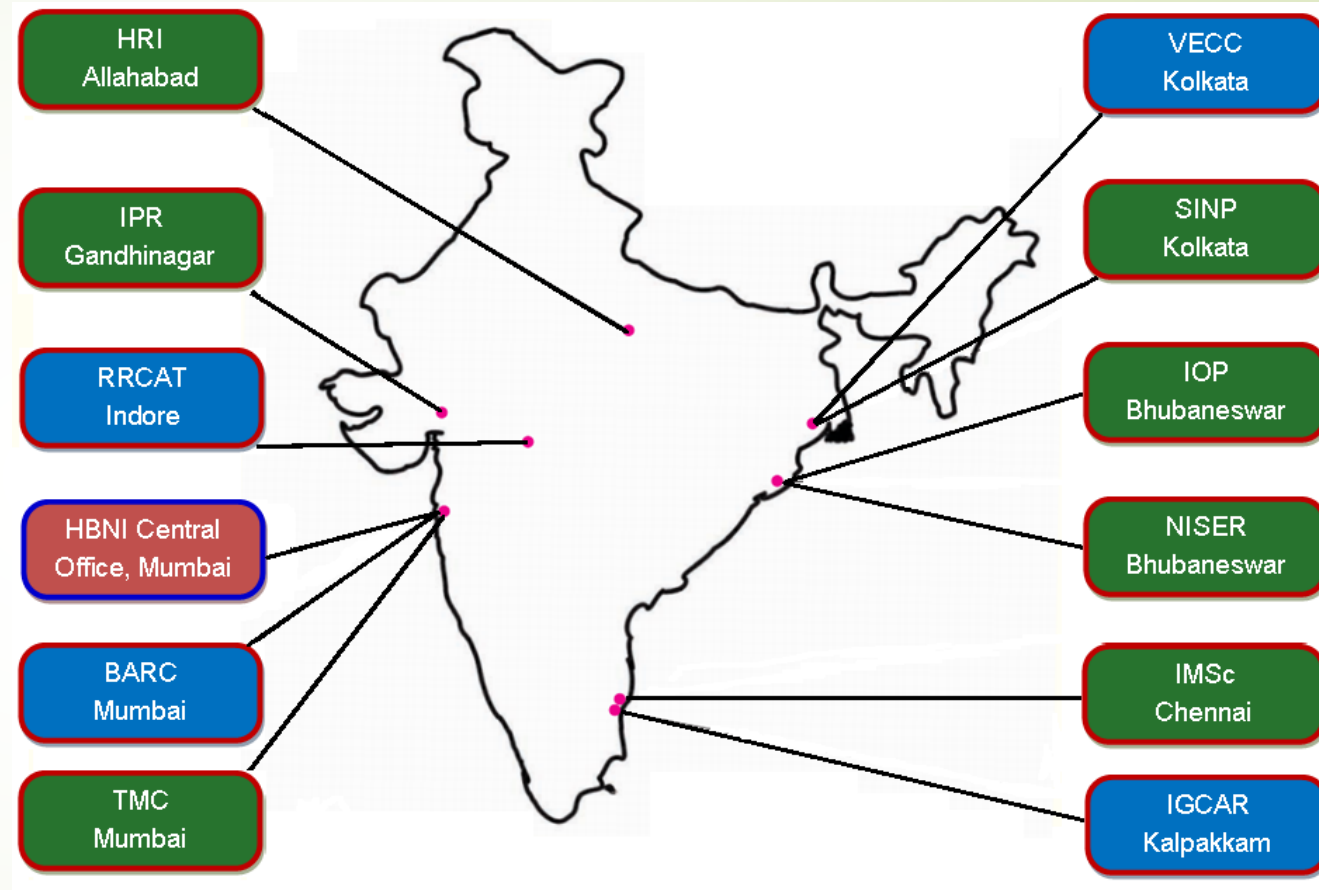


BARC Training School

Over the last decade, the number of applications for joining the Training School has been consistently very high



- The University has a distributed structure with a unique architecture : it brings together academic programmes of 11 premier institutions of DAE, comprising of 4 R & D Centres and 7 Grant-in-aid institutions.
- As a result of such integration, the University system develops expertise in several domains including several branches of sciences and engineering, that can support nuclear energy development



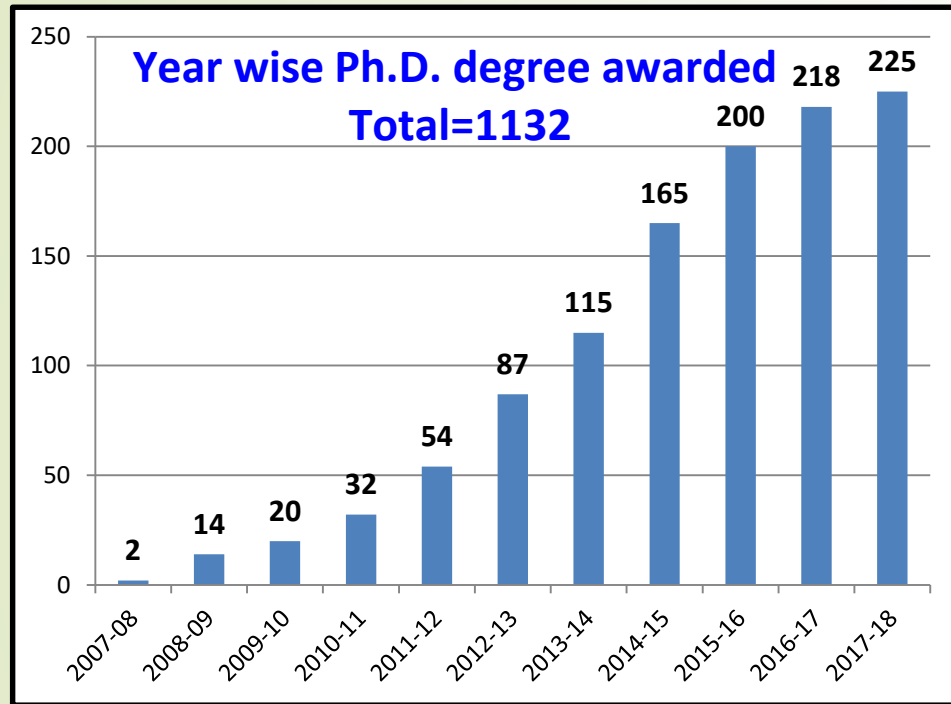


Education in synergy with R&D

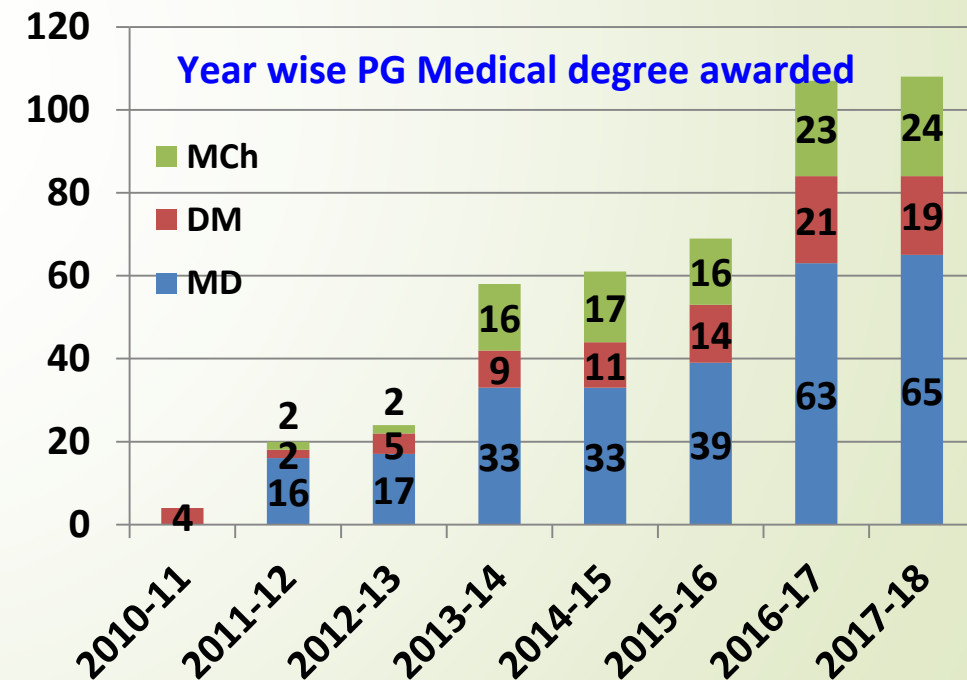
- The concept of HBNI has demonstrated the advantages of amalgamating research and education programs in a variety of disciplines needed for development of Nuclear S & T
- Attracts bright students by making available world class research infrastructure of DAE and challenging research programs not commonly pursued in other universities
- Provides multiple advantages:
 - strong academic linkage with peers in a number of premier educational/research institutes;
 - participation in fundamental research;
 - skill development for safety and regulatory activities related to applications of radioactivity and radiation

Over 350 diplomas have been awarded in radiation protection and imaging technologies

Doctoral theses from HBNI



Post Graduate Medical degrees
(Oncology, Nuclear Medicine)



Topics of Some Ph.D Thesis

Domains covered by thesis (partial list)

Reactor Engineering

Fuel Cycle

Nuclear physics

Particle Physics

Mathematics

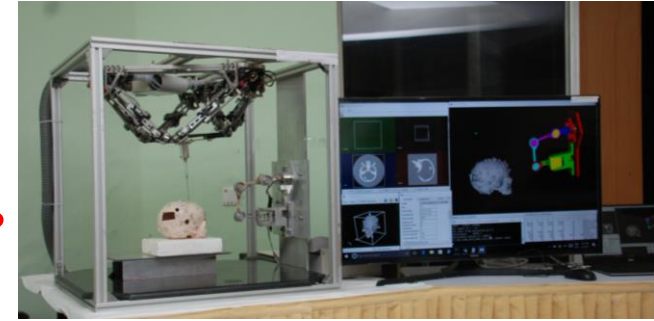
Structural Mechanics

Radiochemistry

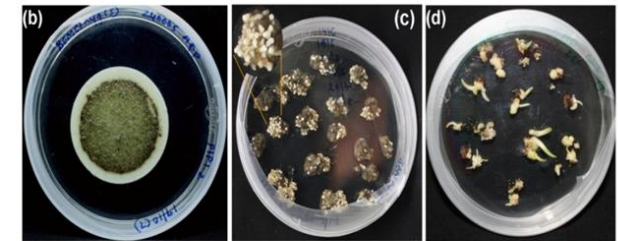
Radiopharmaceuticals

Oncology

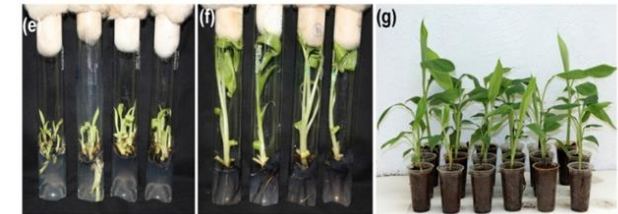
Robot based Neuronavigation and Stereotactic Neurosurgery: indigenously developed and demonstrated to be a low cost, import substitute



Antitumour and radioprotective efficacy of phytochemicals: Use of plant derived Malabaricone C as a single agent or as an adjuvant with existing chemotherapeutic drugs.



Generation of abiotic stress tolerant transgenic banana plants: first such propagation in India



¹³¹I Labeled Lipiodol Injection: A Cost Effective Alternative for Liver Cancer Treatment

¹⁸⁸Re-HEDP for bone pain palliation





University Education and Knowledge Management

- **Due to the academic environment, researchers of DAE grow into faculty and disseminate their knowledge to next generation. This provides an effective mechanism of knowledge management.**
- **The academic programs provide an impetus to the documentation of the results of research including practice based results, due to requirement of publications for award of degree.**
- **Future activities include emphasis on video recording of lectures and publication of books in specialized subjects**



Thank You