FNCA
Forum for Nuclear Cooperation in Asia
Newsletter

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Contents

The 16th FNCA Ministerial Level Meeting
December 8th, 2015, Tokyo Japan

The 16th FNCA Ministerial Level Meeting (MM), which was organized by Japan Atomic Energy Commission (JAEC) and the Cabinet Office of Japan (CAO), was held at Mita Conference Hall, Tokyo on December 8, 2015. The meeting was attended by ministerial level representatives (including two ministers, two vice ministers, directors of the nuclear administrative agencies) from eleven member countries (China was absent) and Director General of the OECD Nuclear Energy Agency (NEA). In association with the United Nations Summit and the United Nations Framework Convention on Climate Change, the Conference of Parties of United Nations Conventions No. 21 (COP21) held this year, discussions took place under the theme of "Climatic Changes and Role of Nuclear Energy" to explore FNCA's contributions to counter the climate change. Reforms for further developments of FNCA were also discussed. Discussion results were adopted as a joint communique.(See page 4 for the summary of the communique)

Minister of State for Science and Technology Policy Aiko Shimajiri

(1) Welcome Address

Minister of State for Science and Technology Policy Aiko Shimajiri delivered the welcome address. In that, while recognizing FNCA's contribution to the socio-economic development of all member countries through the result of activities over 15 years since its foundation, Minister Ms. Simajiri emphasized the importance of cooperation in the field of nuclear safety in Asia, where the growth of electricity demand has been remarkable.

(2) Keynote speech

OECD/NEA Director General Mr Magwood delivered the keynote speech "Cooperation with OECD/NEA and Development". He explained the importance of nuclear energy as a measure to ease climate changes and suggested various support measures that OECD/NEA could offer to FNCA to promote the infrastructure development of atomic energy.

OECD/NEA Director General Mr Magwood

(3) Country report

Representatives from all countries presented the energy policy including nuclear energy and the results from the research on the use of radiation.(See pages 2-3 for the summary of the reports)

(4) Roundtable discussion

Based on the theme of "Climate Changes and Role of Nuclear Energy", contributory measures to ease and adapt to climate changes using nuclear energy technology were discussed and an action plans in three fields (climate science, mitigation measure and adaptation measure) were adopted.

Reform of the FNCA framework was also discussed to suite FNCA activities to the needs of each participating country where economic development is remarkable. Discussion results were adopted in the joint communique.

(5) Future Plan

State Minister of Cabinet Office Mr. Matsumoto suggested holding an FNCA Ministerial Level Meeting in 2016 in Japan and Dr. Batyrbekov, representative of Kazakhstan, suggested holding the meeting in 2017 in Kazakhstan. They obtained the consent of participating countries.

Delegates of Member Countries

Australia

- Energy White Paper (2015) supports a technology neutral approach to Australia's future electricity and transport fuel supply.
- The Australian Government has no plans to introduce nuclear power without bipartisan political support and widespread community support.
- Australia has committed to an Emission Reduction Fund (ERF) to help reduce Australia's greenhouse gas emissions by 5% on 2000 emissions by 2020.
- The development of the new $168 million Australian Nuclear Science and Technology Organisation's nuclear medicine facility is continuing. Australia will become a global leader in the manufacture of nuclear medicines.

Mr Paul Maurice JONES
General Manager Nuclear Security
Government and International Affairs Division
Australian Nuclear Science and Technology Organisation

Bangladesh

- The present government declared to provide electricity to all by 2021 by generating about 20,000 MW of electricity - 10% of which is expected to be coming from nuclear.
- The National Parliament approved the first nuclear power plant at Rooppur site in 2010, passed its Act in 2014. Nuclear Power Company Bangladesh Limited was established under its act. Preconstruction activities of Rooppur NPP are to become complete by 2016.
- To develop national nuclear power infrastructure, IAEA TC projects such as "Establishing Nuclear Power" and "Developing National Infrastructure for the first Nuclear Power Programme" are being implemented.

Dr Md. Saidul ISLAM
Member, Bangladesh Atomic Energy Commission

Kazakhstan

- The Republic of Kazakhstan set a course towards "green energy" including nuclear sources which shall not be less than half of all total power consumption of the country by 2050.
- The agreement signed between Kazakhstan and IAEA concerning Establishing International Bank of Low Enriched Uranium in August became one of the important steps towards implementation of multiple approaches to use nuclear fuel cycle in the world not only in the area of fuel enrichment but also in spent fuel reprocessing.
- The activities to substantiate the safety of modern projects on nuclear power and research reactors are conducted at the base of Kazakhstan research reactors in close cooperation with organizations from Japan, France, Belgium, etc.

Dr Erlan BATYRBEKOV
Director General, National Nuclear Center

Republic of Korea

- Currently 24 nuclear power plants are operated and 4 are under construction. The share of electricity production by energy source is nuclear supplied about 30% of the total.
- The Comprehensive Nuclear Promotion Plan is the highest concept of nuclear policy since 1997.
- Korea's first nuclear reactor Kori unit-1 will be decommissioned in June 2017, after its 37-years' operation. Meanwhile, Wolsong unit-1, whose design life of 30 years ended in November 2012, was approved for continued operation until 2022.

Mr Chung Won LEE
Deputy Director General
Space, Nuclear and Big Science Policy Bureau
Ministry of Science, ICT and Future Planning

Philippines

- Department of Science and Technology and Philippine Nuclear Research Institute are working together to increase the yield of rice and to make rice stalks more resistant to lodging as well as rice plant more resistant to virus by the plant growth promoter from radiation-modified carrageenan.
- Our stand on the nuclear power has not changed with regard to the nuclear options in the long term. The current national government has not declared its supposition. However we recognize that capacity building and sustainability of human resources development in the nuclear power are essential.
- Nuclear/radiation technology is used for fields like health and environment. The technology also supported the APEC Meeting in the Philippines in November 2015 in the forms of security monitoring by radiation technology. The system was deployed in the airport, hotels and main arterial highways.

Dr Amelia P. GUEVARA
Undersecretary (Vice Minister) for Research and Development,
Department of Science and Technology

Thailand

- The National Strategic Plan on Climate Change Preparedness (2008-2012) positions nuclear power as one of the alternative energies that "dose not release greenhouse gas" and should be supported among other forms of alternative energy, including hydropower, wind and solar.
- The public view of nuclear power in Thailand is mixed and view on nuclear-climate linkage is unclear due to opposing arguments and conflicting information.
- Country positioning on nuclear policy after Fukushima Nuclear Accident is still uncertain. Any further domestic movement towards the adoption of nuclear power in Thailand will come down to balancing 3 key driving forces: energy security, international competitiveness and climate change mitigation.

Dr Hannarong SHAMSUB
Deputy Executive Director, Acting for Executive Director
Thailand Institute of Nuclear Technology

Indonesia

- In terms of climate change mitigation, in energy sector Indonesia commits to use cleaner source of energy. Nuclear science and technology is believed to have an important role in climate change mitigation and adaptation.
- President Regulation 79 year 2014 on National Energy Policy has been enacted which promotes the use of new and renewable energy sources in the mix energy strategy.
- As a target, by 2025 the energy coming from new and renewable would achieve at least 23% of total energy sources used. Nuclear energy is still one option of new energy category considered in the National Energy Policy.

Prof. Dr Djarot Sulistio WISNUBROTO
Chairman, National Nuclear Energy Agency

Japan

- "The Strategic Energy Plan" approved by the Cabinet in 2014 has the policy of the Government to restart nuclear power plants as an important baseload power source, once they satisfy the safety standards. Two power stations were restarted having gone through rigorous legal regulatory procedures under the new regulatory.
- In July 2015, the "Long-term Energy Supply and Demand Outlook" based on the Strategic Energy Plan was developed. The Outlook indicates that the portion of nuclear power in the total electricity generation will be 20 to 22% in FY 2030. From now we will take comprehensive efforts to realize the realistic and well-balanced energy-mix.
- For the direction of overall nuclear power policy, Japan Atomic Energy Commission is working to develop the "Basic Guidelines" for nuclear policy. The guideline is to be released possibly in 2016.

Mr Hironori NAKANISHI
Deputy Director General for Science, Technology and Innovation
Cabinet Office

Malaysia

- Malaysia thorough the Economic Transformation Programme (ETP) 2010-2020 has initiated an effort to explore nuclear energy as one of the option for electricity generation in Peninsular Malaysia post-2020.
- ETP identifies 4 critical paths that must be addressed with highest priority, namely, 1) public acceptance, 2) ratification of the relevant international treaties, 3) ensuring correct regulatory framework in place, and 4) approval for plant site.
- Effective implementation of these critical paths will further support the decision making process related to development of nuclear energy in Malaysia, including to put nuclear energy as part of the national energy mix.

The Hon. YB Datuk Madius TANGAU
Minister, Ministry of Science, Technology and Innovation

Mongolia

- The Parliament approved the State Policy on Exploration of Radioactive Minerals and Nuclear Energy in June 2009, and the Nuclear Energy Law of Mongolia in July 2009.
- The National Program on Climate Change was endorsed by the Parliament in 2011 and is to be implemented in the following two phases in duration of 2011-2021.
  -The 1st Phase (2011-2016):
  To strengthen the national capacity of climate change mitigation and adaptation; and to create legal framework, organizational structure and management system and to increase public participation
  -The 2nd Phase (2017-2021):
  To implement reasonable measures adaptive to climate change and to implement sustainable activities for reduction of greenhouse gas emissions growth

Mr Manlaijav GUNAAJAV
Secretary and Head of the Executive Office
Nuclear Energy Commission

Vietnam

- Hydroelectric and thermoelectric account for 95% of total electricity generation capacity of Vietnam. The generations of these kinds of energy and climate change effect to each other in a negative way. Vietnam has realized that nuclear energy is a vital component for energy security and climate change mitigation.
- The Feasibility Study and Site Approval Dossier of the Ninh Thuan 1 project are being completed to submit to the State Verification Committee. For the Ninh Thuan 2 project, it has been in the process of site additional investigation.
- For adaptation with climate change, under cooperation framework with the IAEA, Vietnam has taken part in nuclear applications in environment and agriculture such as research for soil erosion and mutation breeding.

Mr CHU Ngoc Anh
Deputy Minister, Ministry of Science and Technology

Nuclear Energy Trends in FNCA Member Countries

Presented at the 16th Ministerial Level Meeting

※except China that was absent from the meeting

Topic 1 FNCA Workshop on Human Resources Development – Fukui

The FNCA Workshop on Human Resources Development was held in Fukui City, Fukui Prefecture from August 19 to 21, 2015. The workshop was co-sponsored by MEXT and other related-organizations (Fukui Prefectural Government, The Wakasa Wan Energy Research Center (WERC) and the University of Fukui). It was attended by 25 participants from 11 FNCA member countries.

During the workshop, participants from 11 countries delivered their country reports focusing on "National Policy of Stakeholder Involvement for Promotion of Nuclear Energy Program" and "National Strategy of Training Nuclear Communicators" and where related information was exchanged. Mr. Fumiaki Kataoka, Tsuruga Head Office, Japan Atomic Energy Agency (JAEA) presented a speech on "Community Relations Activities of JAEA Tsuruga". He introduced the activities to promote an understanding of JAEA's R&D. This included a site tour, a briefing at a local council meeting and participation in local activities and with volunteers who promoted the participants' understanding toward the JAEA's efforts for symbiosis with local residents in the areas of nuclear facilities. In addition, Dr. Miyoko O. Watanabe, Japan Science and Technology Agency (JST) presented a talk on "Science Communication for Stakeholder Involvement". She explained what is needed for science communication between citizens and scientists/engineers. She also introduced activities conducted by JST including a science forum and information dissemination to the public.

An Open Seminar entitled "Perspectives of Nuclear Power and Radiation Application in Asia" was held on the last day of the workshop. It gathered a large audience including not only workshop participants but other people also involved in the nuclear field.

Fukui Prefectural Government presented a lecture on nuclear power development in Fukui Prefecture and WERC spoke on IAEA/Fukui Pref. / WERC/ANSN Workshop on Instructor Training Program, which is conducted by WERC. The lecturers and audience shared the experience and knowledge of Fukui prefecture who owns a number of nuclear related facilities. After the seminar a technical visit to the Fukui Atomic Information Center "At Home" was conducted. Participants observed the exhibits of energy and environment and experienced interactive attractions, which deepened their knowledge of the activities of public acceptance in Fukui Prefecture. (See page 15 for the details)

Workshop Participants

technical visit to "At Home"

Topic 2 The Joint Communique was adopted in Ministerial Level Meeting

The 16th FNCA Ministerial Level Meeting as described in Page 1 reviewed the last 15 year's outcomes of FNCA activities. The meeting discussed the themes to consider along with the regional necessity and priorities for the further development of FNCA. The results of the discussion were adopted as the Joint Communique. The overview of the communique is as follows.

- Launching a new research project on climate change utilizing nuclear science and technology in 2017.
- Further advancing FNCA's nuclear application projects such as the Mutation Breeding Project which could contribute for sustainable development as an adaptive response to climate change.
- Further advancing the Radiation Oncology Project which can bring common benefits to the region.
- Enhancing the activities related to building trust toward nuclear technology through stakeholder engagement and improved communication with public, and enhancing national regimes for the compensation of nuclear damage, which include consideration of adherence to the international conventions.
- Promoting cooperation with international organizations such as IAEA and OECD/NEA for enhancing FNCA's key role and for mutual benefit from the strength of those parties.
- Diversification of financial resources and further encouragement of the use of the results of the projects/themes.

A scene of Meeting

CS in JFY2015

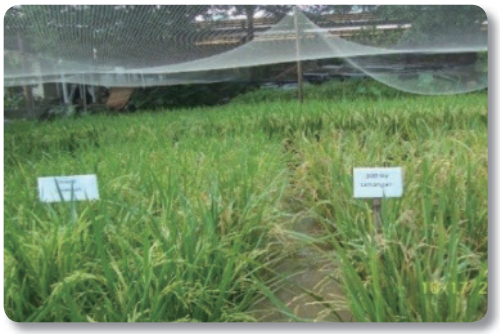
Topic 3 Research Outcomes from Radiation Utilization Development Projects (Agricultural Field)

Mutation Breeding Project

This is the 3rd year for the activity on "Mutation Breeding of Rice for Sustainable Agriculture". Each participating country conducted mid-term evaluation and confirmed major outcomes. Followings are notable outcomes from 3 participating countries.

Vietnam: High yielding and early mature mutant variety DT80 (Left) derived from the original variety TL6.2 (Right) having salt tolerance, with gamma rays irradiation.

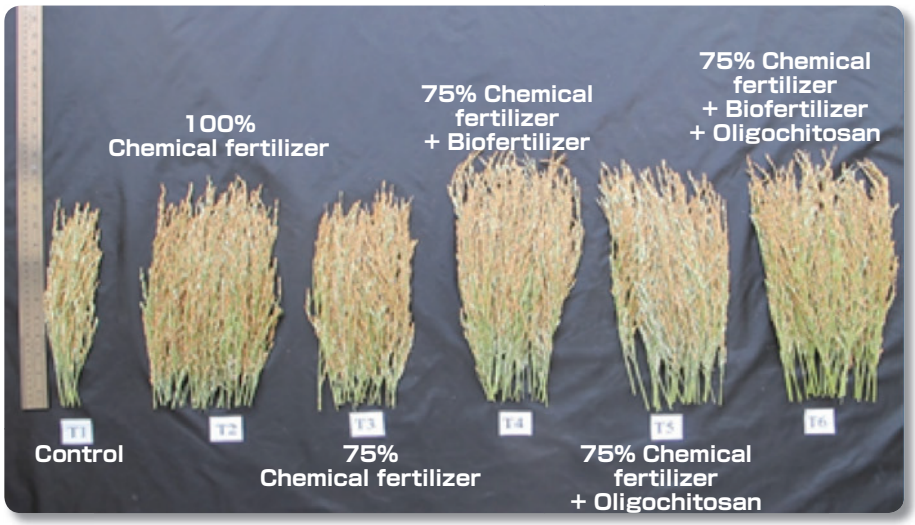
Malaysia: Drought tolerance and high yielding mutant NMR 152 with gamma irradiation.



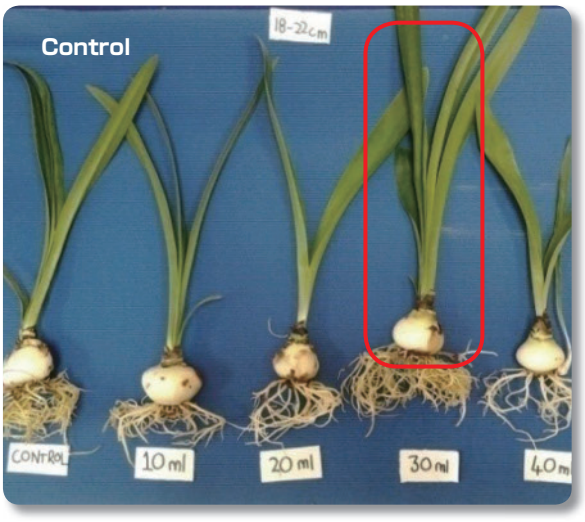
The Philippines: Early maturing putative mutant line (Right) irradiated with gamma-rays and sprayed with naturally occurring carrageenan for organic farming, which was derived from original variety Umangan. (Left)

Biofertilizer Project

The 4th phase was started this year and each participating country reported research progress on biofertilizer development.



Thailand: When biofertilizer and oligochitosan was used together with chemical fertilizers for paddy-field rice, the same yield was achieved using 75% of the standard amount of chemical fertilizer.



Malaysia: The experiment for Amaryllis indicated growth of leaves by up to 65% for the bulbs using liquid biofertilizer commercialized by Malaysian Nuclear Agency.

Introduction of 10 On-going FNCA Projects

Radiation Utilization Development

-Industrial/Environmental Utilization-

Mutation Breeding Project

Project Overview

This project aims to contribute to increased production and quality improvement of food in Asia, by developing new varieties of key crops such as rice, bananas, orchids, sorghum and soybean with resistance to diseases, insects, drought and other factors through mutation breeding using gamma rays and ion beams. From JFY2013, activities have been conducted under the topic of "Mutation Breeding of Rice for Sustainable Agriculture" to develop rice varieties that deliver high yields using less fertilizer and agricultural chemicals, and that are resistant to diseases, drought, climate change and so forth.

Recent Project Achievements

●Development of new varieties of rice for sustainable agriculture

- "BINA Dhan 14" was developed in Bangladesh, exhibiting early maturity, semi-dwarf[*1] and high yields (approximately 14% higher than parent variety), which was officially registered in 2013.
- "DT39 Quelam" was developed in Vietnam, with a high protein content, pest resistance such as bacterial leaf blight[*2] and brown plant hoppers[*3] and a high yield (approximately 18% higher than parent variety), which was officially registered in 2013.
- Mutant varieties "MR219-9" and "MR219-4" with drought-resistance and high yields developed in Malaysia were grown with biofertilizer and oligochitosan growth-promoter which were made using radiations, resulting in a significant increase in yield compared to parent variety (these varieties are being registered).

●Development of drought-resistant sorghum and soybean

- In Indonesia, two varieties of sorghum for use as bio-ethanol and food, and two varieties of soybean with larger grain sizes and resistance to rust disease[*4] were officially registered in 2014 and widely used on farms.

●Development of disease-resistant bananas

- A variety of banana with resistance to Banana bunchy top virus[*5] was developed in the Philippines (preparation are being made to register).

Drought and disease resistant mutant variety developed in Malaysia (right)

Workshop Overview

■ Dates: November 24 to 27, 2015
■ Venue: Bangkok (Thailand)
■ No. of participants: 12
(Bangladesh, China, Indonesia, Japan, Republic of Korea(ROK), Malaysia, Mongolia, Philippines, Thailand, Vietnam, observer : IAEA)

Scene from observation of rice test plot

■ Topics:

- A consensus was reached to create and release a paper by the next fiscal year showing the superiority of biofertilizer carrier sterilized with radiation compared with fertilizer sterilized with autoclave in Indonesia, the Philippines, Thailand and Vietnam.
- The Verification was made for continuing assessments related to synergistic effects tests of biofertilizer and oligo-chitosan plant growth-promoter made using radiation.
- At multi-location test in Thailand, when biofertilizer was used together with chemical fertilizers and reduced the amount of sowing required for paddy-field rice, with results indicating the same yield was achieved using 75% of the standard amount of chemical fertilizer, and reducing costs by approximately 50%.
- Technical visits involved the observation of sugar cane fields where tests related to the effects of biofertilizer are being conducted with the cooperation of the Department of Agriculture, Thailand.
- Open Seminar on Development of Nuclear Technology and Biofertilizer for Sustainable Agriculture was held on the first day with ca. 50 participants from department, research institutions, universities, private companies and FNCA participants.

Early maturity, high-yield mutant variety developed in Bangladesh (left)

*1 Semi-dwarf: Rice with a short stalk length. Dwarf variety is more resistant to the lodging compared to the variety with longer stalks that can affect quality and yield.
*2 Bacterial leaf blight: Rice disease that can subject rice production to immense damage. The disease is transmitted through irrigation water. Infected plants have yellow to white lesions on the outer edges of leaves, and they eventually wither.
*3 Brown plant hoppers: Major pests for rice. The pests bite into stalks and other areas to suck the sap, which inhibit growth and can spread infectious diseases. There are many pests that have developed a resistance to agricultural chemicals in recent years, causing major problems.
*4 Rust disease: Disease affecting the leaves, stalks and fruit of many types of plants. Yellow-white lesions develop, leaves and stalks become deformed, and the plant can wither.
*5 Banana bunchy top virus: A virus that can subject banana production to immense damage. Infections cannot be cured with chemicals, and withering inhibits plant growth. Banana varieties do not have seeds, which makes it difficult to breed for disease-resistance, and mutation breeding using radiation is effective.

Biofertilizer Project

Project Overview

Soil contains many types of microbes that are beneficial for plant growth: rhizobium and nitrogen fixing bacteria that live alongside plants and supply them with nitrogen, an essential nutrient for plants; mycorrhizal fungus and other phosphorus-soluble bacteria that help absorption of phosphorus. This project involves the development of a high-quality biofertilizer that uses radiation for sterilization without having to modify the carrier[*1] followed by mixing of microbes that are beneficial for plant growth. This biofertilizer can maintain microbial activity over an extended period of time. This action supplies the plant with nutrients, and reduces the amount of chemical fertilizers used, to lower the environmental impact of using excessive amounts of chemical fertilizers while also increasing crop yields. This will contribute to the development of environmentally friendly and sustainable agriculture in Asia.

The project is currently focusing on steadily increasing the use of radiation sterilization, as well as the development and dissemination of high-quality biofertilizer with added functions that encourage plant growth and suppress plant diseases.

Rice plants using biofertilizer (left) and without (right) (Thailand)

Recent Project Achievements

●Commercialization of biofertilizer that uses radiation sterilization carrier

- The Biofertilizer that uses radiation sterilization for carrier has been commercialized in Bangladesh, Malaysia and the Philippines (from 2012) (Indonesia has commercialized it in the past).
- The close relationship between nuclear research institutions, agricultural research institutions and industry has led to the development and marketing of many types of biofertilizers.

Biofertilizer developed and marketed in Malaysia

●FNCA biofertilizer guidelines

To increase the uptake of biofertilizer, guidelines have been created for the quality assurance and control of FNCA biofertilizer, with "Vol.1 Quantification of beneficial microbes in biofertilizer" published in 2014. This guideline has been created to be easy to understand for researchers and specialists involved in the research of biofertilizers, and can be used as reference material by administrative and government institutions conducting quality checks of biofertilizers, as well as a standard analysis method for measuring the number of microbes to register products by biofertilizer manufacturers or to sell products in the general market.

Workshop Overview

■ Dates: November 24 to 27, 2015
■ Venue: Bangkok (Thailand)
■ No. of participants: 12
(Bangladesh, Indonesia, Japan, Malaysia, Mongolia, Philippines, Thailand, Vietnam)

Observing sugar cane test sites that use biofertilizer

■ Topics:

- A consensus was reached to create and release a paper by the next fiscal year showing the superiority of biofertilizer carrier sterilized with radiation compared with fertilizer sterilized with autoclave in Indonesia, the Philippines, Thailand and Vietnam.
- The Verification was made for continuing assessments related to synergistic effects tests of biofertilizer and oligo-chitosan plant growth-promoter made using radiation.
- At multi-location test in Thailand, when biofertilizer was used together with chemical fertilizers and reduced the amount of sowing required for paddy-field rice, with results indicating the same yield was achieved using 75% of the standard amount of chemical fertilizer, and reducing costs by approximately 50%.
- Technical visits involved the observation of sugar cane fields where tests related to the effects of biofertilizer are being conducted with the cooperation of the Department of Agriculture, Thailand.
- Open Seminar on Development of Nuclear Technology and Biofertilizer for Sustainable Agriculture was held on the first day with ca. 50 participants from department, research institutions, universities, private companies and FNCA participants.

*1 Carrier: material for retaining and growing microbes, and uses peat and compost

Electron Accelerator Application Project

Project Overview

Research activities are being conducted with the aim of increasing the use of electron accelerators[*1] and gamma rays in industry fields in order to encourage commercialization of products that can bring benefits to participating countries. Research and development into plant growth promoters (PGP) and super water absorbents (SWA) as soil conditioners using radiation processing of natural polymers[*2] has increased in recent years, and associated information and test data is being shared with the hope of bringing flow-on effects to IAEA/RCA activities. The goal during the 5th phase (from JFY2015 to JFY2017) is for all participating countries to commercialize PGP within three years, as well as optimize the SWA production process and run cost assessments. Countries that have completed commercialization of their products are finding new applications and research efforts, and will eventually start on new application topics with positive economic results.

Recent Project Achievements

●Commercialization of PGP and SWA made using radiation processes

- PGP/elicitor commercialization: China, Indonesia, Japan, Malaysia, Thailand, Vietnam (6 countries)
- SWA commercialization: Japan, Thailand, Vietnam (3 countries)

PGP "RIZASA 3SL" (2015) for crops such as rice, sugar cane and chili (Vietnam)

(left) TINT chitosan PGP (2012) and (right) SWA (2013) (Thailand)

●FNCA guidelines

- Publishing and uploading the "FNCA Guidelines on Oligochitosan[*3] PGP Application for Rice, Chili and Other Crops" for PGP end-users on the FNCA website allows the information to be used not only by FNCA participating countries, but also RCA member countries and other countries around the world that need such information.

●Activities and results of other member countries

- Research and development conducted in the Philippines has observed the effects of growth promotion, and large, externally funded field tests have already started over an area measuring some 37,000 hectares of spanning multiple areas. The manufacture of PGP was initially planned at γ rays facilities, however as some 600,000 liters of PGP is required for the above test fields, efficient methods using electron beam irradiation are currently under development.
- In Malaysia, PGP has been adapted for new types of rice grown as part of the mutation breeding project.
- In Thailand, a plant capable of producing 200 kg/day of SWA was constructed in γ ray facilities.

Workshop Overview

■ Dates: February 8 to 11, 2016
■ Venue: Manila (Philippines)
■ No. of participants: 18
(Bangladesh, Indonesia, Japan, Kazakhstan, Malaysia, Mongolia, Philippines, Thailand)
■ Topics:

- With this year being the first year of the 5th phase, the effects of PGP and SWA over the year were summarized, and plans were developed to promote future commercialization.
- Potential obstacles or issues impacting commercialization were outlined so that all participating countries could commercialize PGP.
  - Bangladesh: starting joint work with the biofertilizer group was recommended in order to conduct efficient field tests.
  - Mongolia: installing irradiation facilities and selecting the optimum plants using pot tests was recommended in order to begin work on the project.
- Obstacles and issues impacting SWA commercialization were outlined, and implementation plans were developed.
  - Conduct assessments of cost effectiveness in order to encourage commercialization.
  - Develop efficient production methods to bring the cost effectiveness of radiation processing on a commercial scale, due to the high costs incurred during the drying and pulverization stages of the production process.
- An open seminar was held at the Philippine Nuclear Research Institute (PNRI) with approximately 50 people participating from related research institutions and universities, and included presentations and vibrant Q&A sessions on the applications of radiation technology for sustainable development.
- The technical visit involved a tour of the multi-purpose irradiation facilities at the PNRI to observe the production process of oligocarrageenan[*3] PGP using radiation degradation.

Participants experiencing production of oligocarrageenan PGP

Effect of PGP and/or SWA on eggplant reported by Bangladesh (left one is control)

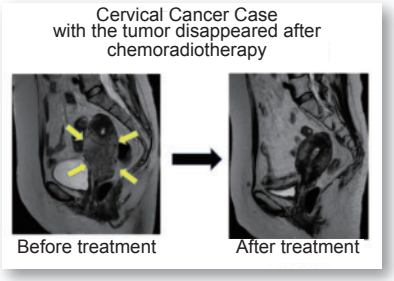
*1 Electron accelerator: device that accelerates electrons at a high voltage to generate high-energy electron beams. These are used for radiation processing.
*2 Natural polymers: polymers that are produced naturally. Well-known polymers include cellulose, starch, proteins, chitin and chitosan.
*3 Oligochitosan/oligocarrageenan: the natural polymers chitosan and carrageenan are depolymerized using radiation, which promote plant growth.

Radiation Utilization Development
-Healthcare Utilization-

Radiation Oncology Project

Project Overview

Standardized radiation treatment protocols (treatment procedures) have been established based on multi-institutional clinical studies on cancers with a high morbidity rate (in particular cervical cancer, nasopharyngeal cancer and breast cancer) in Asia, with the aim of increasing the level and popularization of radiation treatment in the region. Clinical studies are currently being conducted on cervical cancer, nasopharyngeal cancer and breast cancer.



Recent Project Achievements

●**Papers published on the developed protocol, and included in international academic journals**

➢The 3rd protocol on cervical cancer (CERVIX-III) (2013)
http://www.redjournal.org/article/S0360-3016%2813%2900543-9/abstract
- Used at 10 treatment facilities in FNCA member countries

➢The 1st protocol on nasopharyngeal cancer (NPC-I) (2013)
http://jrr.oxfordjournals.org/content/54/3/467.abstract
- Used at 7 treatment facilities in FNCA member countries

➢The 2nd protocol on nasopharyngeal cancer (NPC-II) (2015)
http://jrr.oxfordjournals.org/content/early/2015/08/07/jrr.rrv046.abstract
- Used at 8 treatment facilities in FNCA member countries

●**Quality assurance and quality control (QA/QC) of external radiation therapy**

Between JFY2006 and JFY2014, the dose audits for external beam were performed for 46 beams at 16 facilities in 11 countries.

Left: scene from dose audit and technical guidance for QA/QC of external radiation therapy (Indonesia)
Right: nasopharyngeal cancer 2nd protocol (NPC-II) paper

●**Cooperation with IAEA/RCA**

From JFY2010, a total of 12 observers from IAEA/RCA member countries have participated in workshops, sharing information on one another's project activities and protocols.

Workshop Overview

■ Dates: December 1 to 4, 2015
■ Venue: Hanoi (Vietnam)
■ No. of participants: 33
(Bangladesh, China, Indonesia, Japan, Kazakhstan, ROK, Malaysia, Mongolia, Philippines, Thailand, Vietnam)
■ Topics:
- The number of registered cases for the 4th protocol on cervical cancer (CERVIX-IV) has reached the target number, and the patient's enrollment has ended. The 5-year-overall survival and local control rates were 92% and 69% respectively, which showed favorable results. Follow-up studies will be conducted in the future.
- Discussions were held on the development of the 5th protocol on cervical cancer (CERVIX-V), and a consensus was reached for conducting a retrospective study from the next fiscal year.
- A consensus was reached on continuing with another year for the 3rd protocol for nasopharyngeal cancer (NPC-III), and cases will be continuously registered.
- More than half of the planned number for the protocol on breast cancer (BREAST-I) was reached.
- It was announced that the results of studies on external radiation therapy dose conducted during clinical trials held in member countries would be submitted to a peer review journal. A decision was also reached for conducting a study on irradiation dose of brachytherapy in the future.
- There were approximately 60 participants from the medical field at the open seminar, where seven lectures on radiation treatment were presented from Japan, Bangladesh, ROK and Vietnam.
- Technical visits covered facilities such as linacs at two government-run cancer hospitals.

Workshop participants viewing treatment plans at the National Cancer Hospital

Scene from the open seminar

Research Reactor Utilization Development

Research Reactor Network Project

Project Overview

This project aims to promote mutual understanding of the characteristics, usage conditions and other factors surrounding test and research reactors owned by countries in Asia, as well as improve the technical skill level of researchers and encourage mutual utilization of those test and research reactors owned by countries in Asia. A particular focus is the exchange of information and discussions on cooperative policies related to regional networks to ensure the stable supply of radioisotopes (RI)[*1] for medical use.

Recent Project Achievements

- An FNCA regional network for producing and supplying RI was established, and national committees that included the project leader as members were formed in each country. The latest supply and demand conditions of medical RI in each country shared via the network could be verified.
- Information on the production plans and demand of Mo-99 was exchanged with the Nuclear Energy Agency under OECD/NEA and AIPES[*2] which helped to identify the conditions and develop cooperative relationships with countries that do not participate in FNCA.
- Information on the current state of test and research reactors and new test and research reactor construction plans in each country was exchanged, which assisted in examining plans in countries such as Thailand and Vietnam that are developing construction plans for test and research reactors.
- Proactive exchange of information on Mo-99 production technology using the (n,γ) reaction[*3] contributed to efforts for examining Mo-99 production methods in each country from the perspective of benefits such as promoting non-proliferation and reducing radioactive waste products.

Workshop Overview

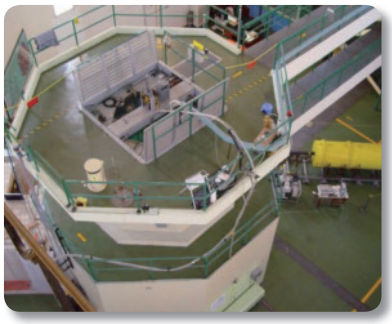
■ Dates: October 27 to 29, 2015
■ Venue: Kajang (Malaysia)
■ No. of participants: 14
(Bangladesh, China, Indonesia, Japan, Kazakhstan, ROK, Malaysia, Mongolia, Philippines, Thailand, Vietnam)

Scene from the workshop

■ Topics:

- Exchange of information on the plans and designs of new research reactors was beneficial for Thailand, Vietnam, Mongolia and Bangladesh that are planning the construction of new research reactors, and Australia, China, Japan and ROK shared their past experiences with the design and construction of test and research reactors.
- Continuing to share experiences and information on Mo-99 production using the (n,γ) reaction is extremely beneficial, and there were high hopes for providing assistance to training activities of young/mid-career level technicians in the field.
- Efforts began for creating a relevant platform for the mutual use of multi-purpose research reactors between member countries, and included the preparation of detailed catalogs (beam facilities and irradiation facilities (including post irradiation examination facilities)) of multi-purpose research reactors within the FNCA region.
- There were approximately 50 participants at the open seminar, where members from Malaysia, Japan, Indonesia and China presented lectures on topics related to the cooperation of multi-purpose research reactors between participating countries.
- Technical visits were arranged to the TRIGA research reactor operated by the Malaysian Nuclear Agency (Puspati Reactor) and radioactive isotope production facilities, to increase understanding of the facility usage conditions and details of research being conducted there.

Scene from the open seminar


TRIGA Research Reactor (Puspati Reactor)

^{99m}Tc generator

*1 Radioisotope (RI): an element (radioactive isotope) with identical chemical properties as ordinary isotopes, but with a different mass and that emit radiation when changing from an excited state to a stable state. Mo-99 is one of the best-known RI for medical use.
*2 AIPES: Association of Imaging Producers and Equipment Suppliers
*3 (n,γ) reaction: a method to extract Mo-99 generated by irradiating Mo-98 with neutrons. Also called the Neutron Activation method.

Neutron Activation Analysis Project

Project Overview

This project aims to utilize neutron activation analysis (NAA)* in a proactive manner for analyzing samples that meet the requirements of participating countries, assess the analysis results and apply the findings to make contributions to socioeconomic development. Activities are currently focusing on the analysis of "air pollution - suspended particulate matter (SPM)" and "mineral resources - rare earth elements (REE)."

Recent Project Achievements

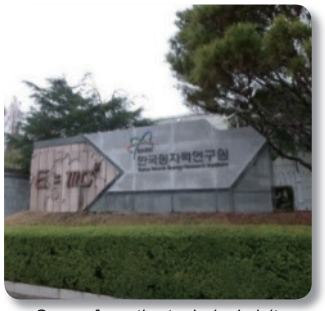
- Analysis of environmental samples: Environmental samples (such as dust suspended in the atmosphere) collected at several countries in Asia are analyzed using NAA to identify the state of environmental pollution in each country. The results were applied to environmental improvement measures in JFY2007 (in countries such as China and the Philippines).
  - ➢Publication: "Quality assessment of INAA data for small-sized environmental reference samples" Anal. Sci. (2014)
- Analysis of geochemical samples: Comparison testing between research laboratories highlighted the effectiveness of NAA, and researches began covered for mining resource exploration and regional pollution based on the collection and analysis of sediment samples. Research results were eventually applied to numerous materials analyses such as surveys for mining resources conducted in Australia.
  - ➢Publication: "A Trial Proficiency Test of Eight NAA Laboratories in Asia Using Stream Sediments" J. Radioanal. Nucl. Chem. (2012)
- Analysis of food samples: Elemental composition analysis and testing was conducted for the amount and intake of contamination in food samples such as fish and rice, with the results being demonstrated with the maximum permitted guidelines for toxic metals published by the US Environmental Protection Agency (EPA). The results found that NAA was beneficial for monitoring safety standards in day-to-day life, which was shared with each country.
  - ➢Publication: "A NAA Collaborative Study in White Rice Performed in Seven Asian Countries" J. Radioanal. Nucl. Chem. (2012)
- Each country has established linkages with appropriate end users of NAA resulted. Examples are tie-ups with the mining industry for the exploration of mineral resources in Australia, and collaboration with the National Hydrometeorological Agency for environmental monitoring in Kazakhstan.

Survey of dust suspended in the atmosphere

Workshop Overview

■ Dates: November 25 to 27, 2015
■ Venue: Daejeon (ROK)
■ No. of participants: 19
(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, ROK, Malaysia, Mongolia, Philippines, Thailand, Vietnam)

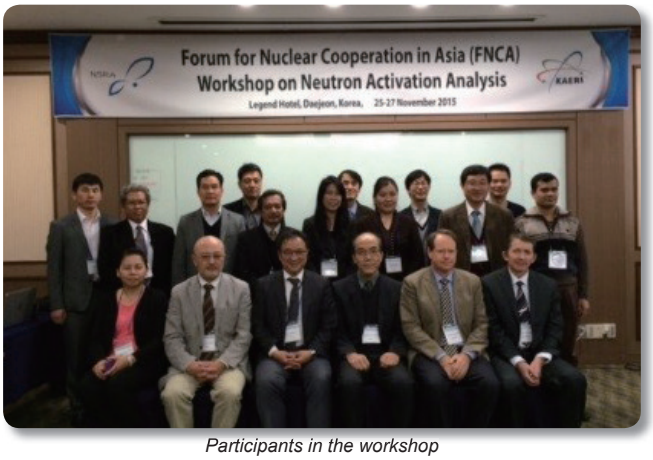
Scene from the workshop



Scene from the technical visit (Korea Atomic Energy Research Institute)

■ Topics:

- The JFY2015 workshop was the first held during the 5th research phase (from JFY2015). Two sub-projects conducting analysis covering "air pollution - suspended particulate matter (SPM)" and "mineral resources - rare earth elements (REE)" had already begun, and a progress report was presented outlining the collection and analysis of SPM samples from Vietnam.
- The topic of linkages with end users began with reports outlining collaboration with government agencies and research institutes in each country, such as Australia and Korea, and discussions were held on the future direction of the project, which led to more specific inquiries being made.
- The technical visit included tours of the HANARO research reactor, the NAA laboratory, neutron scattering facilities and radioisotope production facilities of Korea Atomic Energy Research Institute (KAERI).



Participants in the workshop

** Neutron Activation Analysis: a quantitative analysis method that involves irradiating a sample with neutrons, and measuring and analyzing the emitted gamma rays to identify the elements contained within the sample.*

Nuclear Safety Strengthening

Safety Management Systems for Nuclear Facilities Project

Project Overview

This project aims to provide nuclear facilities with assistance for making improvements to the organization, equipment, personnel and operational methods, in order to ensure nuclear and radiation safety. More specifically, "self-assessment/peer review tools" have been developed for conducting peer reviews[*1] of safety management systems at nuclear facilities (mainly research reactors) within member countries. Areas that are found to have potential for improvements in peer reviews are to be revised by the host country, with the results of improvements to be reported at the workshop the following year. This project has followed the previous nuclear safety culture project, and is initiated by Australia.

Recent Project Achievements

- "Self-assessment/peer review tools" (http://www.fnca.mext.go.jp/english/sms/self_assessment_tool.pdf) have been developed based on the IAEA Safety Guide GS-G-3.1 and the achievement of the former nuclear safety culture project.
- A total of five workshops (peer reviews) have been held until now in Indonesia, Malaysia, ROK, Bangladesh and Vietnam. Based on the results of the peer review conducted in JFY2014, the BTRR reactor in Bangladesh made improvements such as revising signs for getting more attention, introducing working schedule for executives, and adding monitoring systems. The HANARO reactor at the Korea Atomic Energy Research Institute made improvements such as increasing the number of fire extinguishers installed, clarifying radiation control areas and introducing measures against earthquakes following the results of the peer review conducted in JFY2012.

Peer review conducted at the HANARO in ROK

Peer review conducted at the BTRR in Bangladesh

Workshop Overview

- Dates: June 8 to 12, 2015
- Venue: Dalat (Vietnam)
- No. of participants: 19

(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, ROK, Malaysia, Mongolia, Philippines, Thailand, Vietnam)

- Topics:
  - Japan made presentations outlining the background, method and scope of peer reviews to improve understanding of the peer review system amongst participants.
  - Bangladesh, which is where the previous peer review was conducted, made a presentation on the improvements that had been implemented as the result of the previous peer review. The improvements include submitting safety management plans against natural disasters, revising signs throughout the facility, and adding monitoring systems.
  - Before the peer review was conducted, an outline was provided of Dalat Nuclear Research Institute (DNRI), Vietnam Atomic Energy Institute (VINATOM), as well as information on activities related to nuclear energy in Vietnam.
  - A peer review was conducted on the DNRR RI production facilities, and low level waste store and liquid effluent facility at DNRI, which resulted in 6 "Good Practices"[*2] , 40 "Comments"[*3] and 14 "Recommendations"[*4].

Peer review conducted at the DNRR in Vietnam

Scene from the workshop

**1 Peer review: A review of host facility by a team of experts from peer facilities who examine the host systems to identify good practices and areas for improvement.*
**2 Good Practice: Features that enhancing improvements to safety management systems.*
**3 Comments: Noteworthy matters relating to the topic of "self –assessment /peer review tool".*
**4 Recommendation: Areas where there is potential for improvement.*

Radiation Safety and Radioactive Waste Management Project

Project Overview

By exchanging and sharing information and knowledge acquired through experiences with radiation safety and radioactive waste management, the project helps to improve safety related to handling of radiation and radioactive waste throughout Asia.
With the main topic of "Nuclear and radiological emergency preparedness and response," activities in recent years include sharing information on nuclear and radiological accidents at research institutions and other organizations of participating countries, identifying the current state of emergency plans in each country, and creating reports outlining the nuclear and radiation emergency procedures in place in each country.

Recent Project Achievements

Reports outlining the status of participating countries and other papers have been published, and a better mutual understanding of the approach taken for radiation safety and waste management at research institutions and other organizations between countries is helping to promote a safety culture in FNCA regions.

●Consolidated report (report outlining conditions of participating countries)

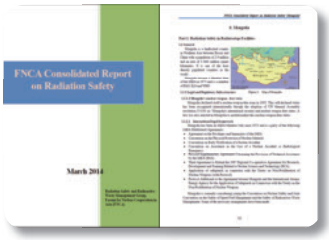
➢Consolidated report on radioactive waste management (new version) (2007)
Outlines the conditions of the legal system and low-level radioactive waste disposal sites in each country, which helped to promote mutual understanding on radioactive waste management in FNCA regions.
http://www.fnca.mext.go.jp/english/rwm/e_consolidated_004.html

➢Consolidated report on radiation safety (2014)
Outlines detailed information of each country, including the legal systems related to the state of radiation safety management at RI facilities, research reactors and nuclear power stations, as well as the state of radiation protection, which helped to promote a radiation safety culture in FNCA regions.
http://www.fnca.mext.go.jp/rwm/FNCA_RS.pdf

●Task group activity report (report by specialists in each country outlining site studies or discussions held on site related to specific topics)

➢Task group report related to decommissioning and clearance (2008)
Outlines the state of the legal system related to decommissioning and clearance in each country as well as details of discussions held on site as part of task group activities, which helped to promote mutual understanding in the fields of decommissioning and clearance in FNCA regions.
http://www.fnca.mext.go.jp/english/rwm/e_dc.html

➢Newsletters on radiation safety and waste management (regular publication outlining recent efforts made by each country for radiation protection, as well as news related to education and training in preparation for radiation emergency response)
http://www.fnca.mext.go.jp/english/rwm/e_newsletter.html



Consolidated report on radiation safety


Newsletters on radiation safety and waste management

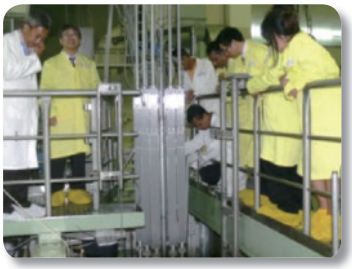
Workshop Overview

■ Dates: November 17 to 19, 2015
■Venue: Serpong (Indonesia)
■No. of participants: 17
(Bangladesh, China, Indonesia, Japan, Kazakhstan, Malaysia, Mongolia, Thailand, Vietnam)


Scene from the workshop

■ Topics:

- Presentations were made of country reports, and information was exchanged on the latest status in each country, covering areas such as nuclear policy, the framework and legal systems of regulations, and an overview of implementing emergency plans and response.
- A progress update was made on the consolidated report for nuclear and radiological emergency preparedness and response that is currently being made, with members verifying efforts for cooperation to complete the report during JFY2016.
- An open seminar related to emergency countermeasures at nuclear facilities was held by the National Nuclear Energy Agency of Indonesia, with approximately 40 local researchers and government officials participating. In addition to a lecture session related to emergency response and personnel training in each country, a panel discussion was also held covering topics such as lessons learned from the nuclear and radiation accidents occurred in participating countries, measures to protect against external events such as natural disasters, and personnel training related to emergency response.
- Technical visits were scheduled to the GA. Siwabessy research reactor and the radiation waste technical center, where participants observed the spent fuel rod pool and equipment for vaporization, volume reduction treatment, incineration and casting cement.


Observing the GA. Siwabessy research reactor


Observing the Center for Radioactive Waste Technology (CRWT)

Nuclear Infrastructure Strengthening

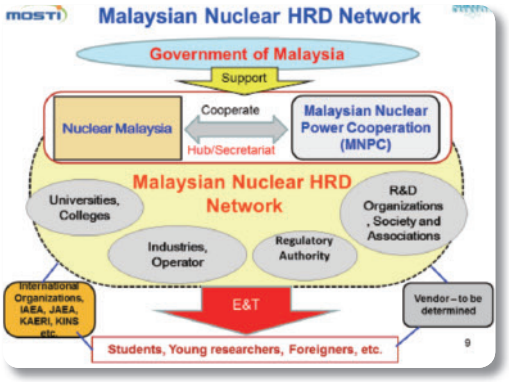
Human Resources Development Project

Project Overview

This project provides assistance to human resources development for nuclear power generation and radiation application in order to enhance the nuclear skills and management throughout Asia. Specific efforts include holding workshops where the knowledge and experience of members from each country can be shared, as well as discussion on efficient methods for human resources development strategies, and for international cooperation. Methods involving mutual cooperation are also being examined through the use of a database (Asian Nuclear Training and Education Program (ANTEP))[*1] that contains the details of international cooperation programs being run in each country related to nuclear human resources development as well as the current needs from each country.

Recent Project Achievements

●Participating countries are being encouraged to develop a domestic network for nuclear human resources development and to establish a single contact point for international cooperation, and member countries are actively implementing such activities. Notable domestic networks have been established in Japan, Bangladesh, Malaysia, Thailand and Vietnam.



●To compile information for ANTEP, international cooperation programs being run in each country related to nuclear human resources development, as well as the current needs from each country are surveyed every year, with 66 needs and 47 programs submitted in JFY2015. The results of surveys are applied to research topics covered by the Nuclear Researchers Exchange Program (NREP)[*2] of MEXT.

ANTEP website
(http://www.fnca.mext.go.jp/english/hrd/antep/)
The needs for human resources development in each country and available programs are open for browsing

Workshop Overview

■ Dates: August 19 to 21, 2015
■ Venue: Fukui City (Japan)
■ No. of participants: 25
(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Malaysia, Mongolia, Philippines, Thailand, Vietnam)
■ Topics:

- Based on the report from the 15th Coordinators Meeting (March 2014), information was shared from country report presentations outlining the stakeholder involvement of each country, and efforts for the training of nuclear communicators. There was a greater awareness that the key issue in countries rolling out new nuclear power generation is ensuring greater understanding amongst citizens. It was also noted that the importance of training nuclear communicators had increased in order to build relationships of trust with stakeholders.
- To ensure training of nuclear communicators, it was proposed that each Member State prepare education material and report practical experience of lectures using such material at schools and exchange information about them in next workshop.
- An open seminar titled "Perspectives of Nuclear Power and Radiation Application in Asia" was held with approximately 60 participants from companies, universities and other institutions in Fukui Prefecture.
- The technical visit was arranged for the "At Home", Fukui Atomic Information Center, where visitors can learn about electricity, energy and nuclear using interactive exhibits.
(Also refer to P4 for the topics of workshop.)

Scene from the open seminar

Participants at the "At Home", Fukui Atomic Information Center observing traces of radiation in a cloud chamber

*1 ANTEP: A database developed for matching the needs and existing HRD programs in order to facilitate effective and efficient HRD activities in FNCA member countries.
*2 NREP: A project led by the MEXT to invite nuclear researchers in Asia to Japanese research institutes and universities. Its plan is determined in reference to the survey results of ANTEP.

Nuclear Security and Safeguards Project

Project Overview

To promote the peaceful use of nuclear energy in countries throughout Asia, nuclear safety as well as nuclear security[*1] and safeguards[*2] will be essential. This project aims to enhance nuclear security and safeguards by developing an awareness of the importance of nuclear security and safeguards between participating countries, sharing information and knowledge of government policies relevant to the field, and cooperating with efforts in developing human resources. In recent years, topics have covered good practices for developing nuclear security culture, management of sensitive information related to nuclear security, and Nuclear Material Accounting and Control(NMAC) for Nuclear Facility Operators with a rise in the amount of information being shared and discussions being held between member countries.

Recent Project Achievements

●Sharing information between member countries utilizing the FNCA website
(http://www.fnca.mext.go.jp/nss/introduction.html)

The following information was shared via the FNCA website, and utilized as part of strategic discussions for improving nuclear security and safeguards in each member country, as well as being disseminated to other countries.

- Implementation on nuclear security and safeguards
- Information on the regulatory authorities for nuclear 3S (Safety, Safeguards and Security)
- Initiatives and best practices for developing nuclear security culture

Introducing activities related to the Nuclear Security and Safeguards Project via the FNCA website

Template of the information sharing form on nuclear security culture development

●In conjunction with the workshop in JFY2012, a joint seminar was held with the Asia-Pacific Safeguards Network (APSN), a network of organizations related to safeguards within the Asia-Pacific region, regarding the implementation of the IAEA Additional Protocol (AP)[*3] for nuclear non-proliferation, where knowledge and experience related to implementing the AP was shared between member countries. Each country developed a greater sense of awareness of the significance of the AP for nuclear non-proliferation.

●Discussions were held on managing sensitive information related to nuclear security and regulations for protecting con-fidential information, which were subsequently utilized by each country for examining ways of managing sensitive information.

●Discussions were held on information sharing and collaboration regarding activities of HRD Centers (Japan, ROK, China, others) in the fields of nuclear security and safeguards.

Workshop Overview

■ Dates: September 8 to 11, 2015
■ Venue: Semey (Kazakhstan)
■ No. of participants: 22
(Bangladesh, Indonesia, Japan, Kazakhstan, ROK, Malaysia, Mongolia, Thailand, Vietnam, observer: IAEA)

Scene from the workshop

Scene from the technical visit

■ Topics:

- Presentations and discussions were held on the topic of developing human resources in the field of nuclear security and safeguards as well as the role of the Center of Excellence (COE), management of sensitive information related to nuclear security, and computer security.
- A consensus was reached for continuing to utilize the FNCA website to share information between member countries, as well as continuing to work on areas such as management of sensitive information related to nuclear security, regulations protecting confidential information and developing nuclear security culture, and discussing new topics such as nuclear forensics[*4] and cyber security at workshops. Discussion was also held on suggestion about arranging a joint open seminar with APSN in the near future.
- There were approximately 40 participants from the National Nuclear Center of Kazakhstan at the open seminar (jointly organized by FNCA, the National Nuclear Center of the Republic of Kazakhstan and the Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (ISCN) of the Japan Atomic Energy Agency (JAEA)) held in Kurchatov City. Three presentations were made: introduction of the objectives of this project and the activities conducted to date; efforts related to nuclear non-proliferation, nuclear security and safeguards in Kazakhstan; and current developments and issues in IAEA safeguards. Presentations were also made by Bangladesh, Indonesia and Vietnam on efforts for implementing nuclear security culture, and by Japan, Kazakhstan and ROK on COE's activities for capacity building in the field of nuclear security and safeguards.
- The technical visit involved observations of the Semipalatinsk Test Sites (STS), STS Museum and Tokamak.

** 1 Nuclear security: measures put in place to prevent the potential threat of terrorists and other organizations using nuclear material or source of radiation for evil purposes.*
** 2 Safeguards: ensures that nuclear material is only used for peaceful purposes, and not reused to make weapons or other purposes.*
** 3 Additional Protocol: an agreement that brings into force additional safeguards for countries with safeguards agreements with the IAEA.*
** 4 Nuclear forensics: a technical method for analyzing and studying the nuclear material seized or collected by investigative authorities for the structure, physical and chemical properties of the radioactive materials and associated materials in order to determine the source, history, trafficking and purpose of the material.*

THE 16TH FNCA COODINATORS MEETING
MARCH 4-5, 2015, TOKYO JAPAN

Meeting Participants

The 16th FNCA Coordinators Meeting was held on March 4-5, 2015, in Tokyo, Japan, hosted by the Cabinet Office of Japan (CAO) and the Japan Atomic Energy Commission (JAEC), and co-hosted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan. The Meeting was attended by delegates from 12 member countries and the IAEA/RCA (Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology). Prior to the meeting, on March 3, the delegates took a tour of Takasaki Advanced Radiation Research Institute, Japan Atomic Energy Agency (JAEA).

● Opening Session

Mr. Masaaki TAIRA, State Minister of CAO welcomed the participants. He acknowledged that FNCA has contributed to nuclear power development in Asia through nuclear technology application. He encouraged the participants to open the discussion of the FNCA's future, mentioning drastic change in the Asian region during the past 15 years since the establishment of FNCA.

Mr Taira, State Minister of Cabinet Office

● Overview of Meeting

The results of the 6th Study Panel (Vietnam), the 15th Ministerial Level Meeting (Australia) and 10 projects' activities were reported as the JFY 2015's FNCA's activities.

Meeting participants also reviewed and discussed the development of radiation application, the follow-up on recommendations of the 15th Ministerial Level Meeting, the themes of the 4th Phase Study Panel, the cooperation between IAEA/RCA and FNCA and also future activities.

● Major points of Conclusion and Recommendation

The participants concurred that the most relevant and important topics for the new 4th phase Study Panel are (1) nuclear power policy in terms of energy security and reduction of GHG emissions in connection with the COP-21 and (2) policy and priority as well as international cooperation for the promotion of nuclear applications for a sustainable development.

The meeting participants evaluated the projects activities of the Electron Accelerator Application and the Biofetilizer and agreed to extend their activities for another 3 years.

A scene of Meeting

Message from Mr Tomoaki Wada FNCA Coordinator of Japan

The accident at the Fukushima Daiichi Nuclear Power Plant in 2011 has greatly affected the promotion of atomic energy of all Asian countries. While that effect continues there, the government officials and people concerned with the promotion of atomic energy in all FNCA countries are somehow trying to push forward the use of atomic energy and the use of radiation under severe environmental conditions. FNCA started in 2000, and since its inception, because of the great efforts taken by my former coordinator Dr. Machi (who passed away in 2015), a system in which 12 member countries will closely work together has been developed. All countries will carry out each project keeping pace with each other, and I aim to work toward enacting positive changes during these hard times.

In recent FNCA activities, significant progress has been made in the following 3 areas.

1.Real-life utilization of each radiation utilization project

A plant growth promoter and a super water absorbent developed in the Electron Accelerator Application Project are making enormous progress in terms of practical applications in all countries. Protocols developed in the Radiation Oncology Project for uterine cervical cancer and nasopharyngeal carcinoma are used in hospitals in many member countries. In addition, a new variety of rice that will withstand climatic changes, such as droughts or high temperatures, is being developed in the Mutation Breeding Project.

2.Advancement of Radiation Safety and Radioactive Waste Management Project

"Consolidated Report on Radiation Safety," which summarized radiation safety management systems and the state of each facility of each member country, was compiled in 2014. This enabled each country to understand the strengths and weaknesses of its regulation system and to improve the safety level accordingly. In addition, a plan for low-level waste disposal facilities is being pushed forward in all countries and the exchange of opinions to secure long-term safety and facilities' design will be carried out.

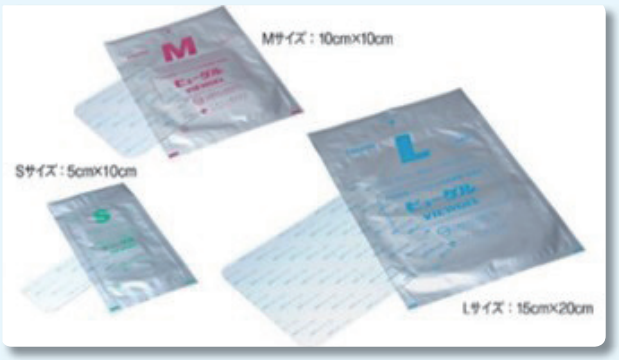
3.Advancement of Nuclear Security and Safeguards Project

Today, when acts of terrorism are occurring every month somewhere in the world, nuclear energy facilities could also become their target. We are inviting IAEA and closely exchanging information for handling the nuclear nonproliferation of the main facilities of all countries. In particular, the cyber-attacks on atomic energy facilities that occurred recently in Korea and Japan will be handled quickly and efficiently.

FNCA Activities in JFY 2015

Activity		Schedule	Host Country
The16th Ministerial Level Meeting		December 8 , 2015	Japan
The16th Senior Officials Meeting		August 4-5, 2015	Japan
Study Panel "Building trust in nuclear energy - stakeholder involvement and communication with the general public"		March 10, 2016	Japan
The 17th Coordinators Meeting		March 8-9, 2016	Japan
Radiation Utilization Development	Mutation Breeding Workshop	August 31-September 3, 2015	Mongolia
	Biofertilizer Workshop	November 24-27, 2015	Thailand
	Electron Accelerator Application Workshop	February 8–11, 2016	The Philippines
	Radiation Oncology Workshop	December 1-4, 2015	Vietnam
Research Reactor Utilization Development	Research Reactor Network Workshop	October 27-29, 2015	Malaysia
	Neutron Activation Analysis Workshop	November 25-27, 2015	Republic of Korea
Nuclear Safety Strengthening	Safety Management Systems for Nuclear Facilities Workshop	June 8-12, 2015	Vietnam
	Radiation Safety and Radioactive Waste Management Workshop	November 17-19 , 2015	Indonesia
Nuclear Infrastructure Strengthening	Human Resources Development Workshop	August 19-21, 2015	Japan
	Nuclear Security and Safeguards Workshop	September 8-11, 2015	Kazakhstan

The 15 Year History of FNC
of Projects and M

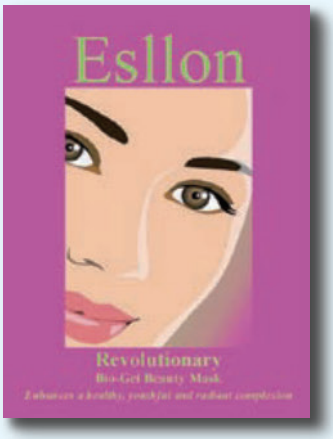


"Viewgel" commercialized , Hydrogel wound dressing developed by Japan Atomic Energy Agency (JAEA) and provided by Taiho Medicine Co. Ltd, 2004
Electron Accelerator Application Project

1st FNCA Ministerial Level Meeting, Bangkok, Thailand, 2000

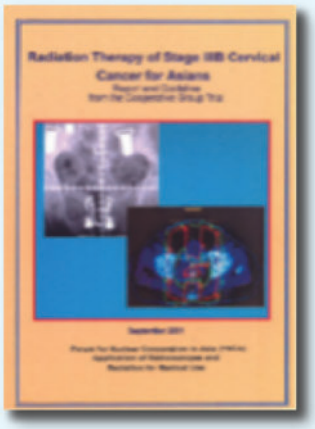
Bangladesh joins FNCA, 2006

2000 2001 2002 2003 2004 2005 2006 2007



"Esllon" commercialized,
bio-gel facial mask, Malaysian Nuclear Agency, Malaysia, 2003
Electron Accelerator Application Project

ANTEP website opened
Human Resources Developm



"Radiation Therapy of Stage IIIB Cervical Cancer for Asians"established, 2001
Radiation Oncology Project

1st Study Panel, Tokyo, Japan, 2004

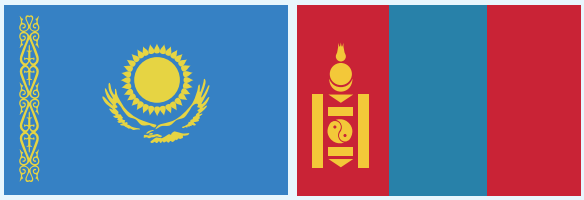
A & Outstanding Outcomes
lember Countries

"Ruikang No1" commercialized, oligochitosan animal feed additive, Shanghai Institute of Applied Physics Chinese Academy of Science, 2010 Electron Accelerator Application Project

"Bioliquifert" commercialized, biofertilizer, Malaysian Nuclear Agency, Malaysia, 2013 Biofertilizer Project

"RIZASA 3SL" commercialized, biotic elicitor oligochitosan, Vietnam Atomic Energy Institute (VINATOM), Vietnam, 2015 Electron Accelerator Application Project

Kazakhstan & Mongolia join FNCA,2010



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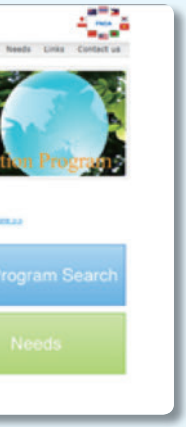
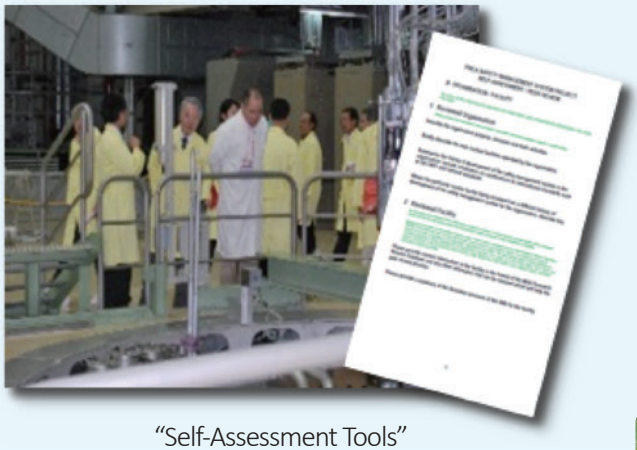


, 2007,
ment Project



"Self-Assessment Tools" developed & peer review started, 2010 Safety Management Systems for Nuclear Facilities Project

"BINA DHAN-14"(left) registered, high and early yield varieties of rice, Bangladesh,2013 Mutation Breeding Project

What is the Forum for Nuclear Cooperation in Asia (FNCA)?

Name

FNCA : Forum for Nuclear Cooperation in Asia

Participating Nations

Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Republic of Korea (ROK), Malaysia, Mongolia, The Philippines, Thailand and Vietnam,IAEA (Observer)

Ministerial Level Meeting

The ministerial and senior official level representatives of each country holding jurisdiction over nuclear activities discuss cooperation measures and nuclear related policies.

Study Panel

To examine & evaluate the role of nuclear energy, and also study problems related to the introduction of nuclear power generation.

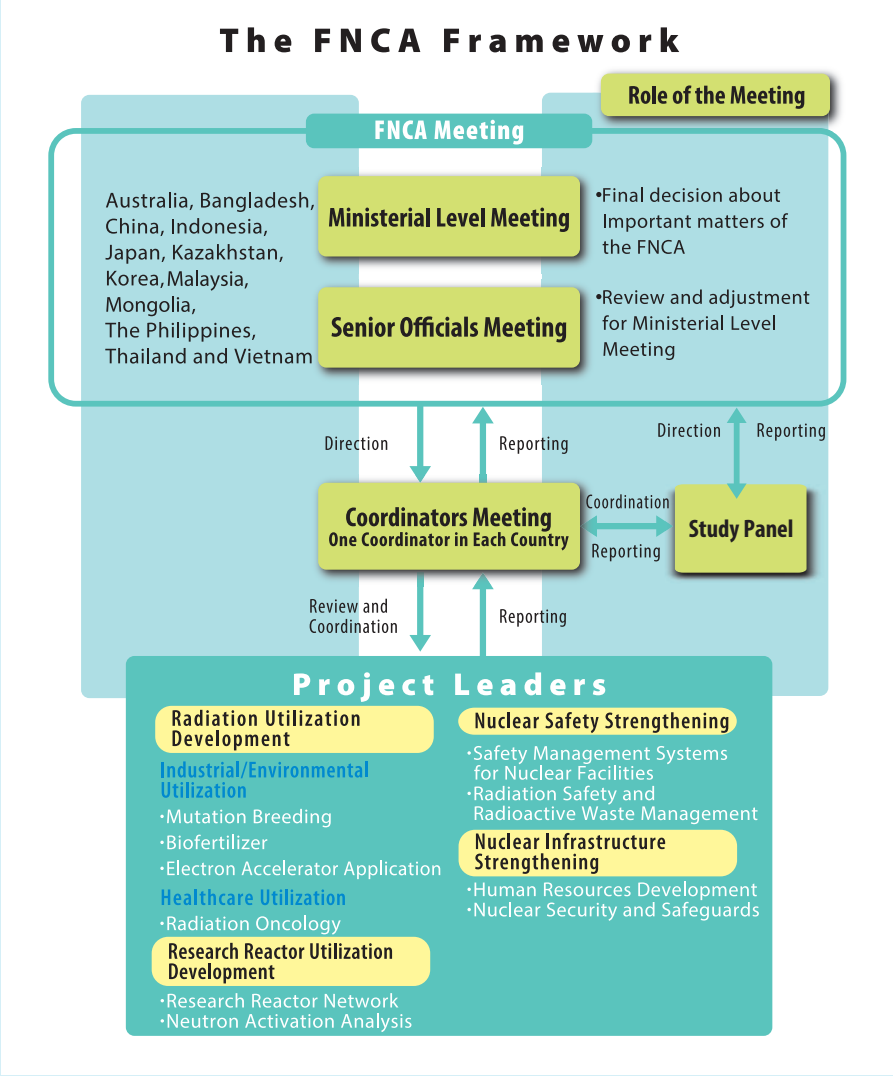
Coordinators Meeting

The Coordinators who are selected as a representative by each nation discuss several issues including introduction revision & abolishment, coordination and evaluation of cooperative projects.

Project

Each FNCA participating nation holds workshops through post rotation to discuss activity programs.

*For further information: FNCA Website: http://www.fnca.mext.go.jp/english/index.html



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