FNCA
Forum for Nuclear Cooperation in Asia
Newsletter
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Contents

The 13th FNCA Ministerial Level Meeting
Novemver 24th, 2012, Jakarta Indonesia

(Left) The Hon. Mr. Shinkun HAKU, the then-Senior Vice-Minister, Cabinet Office, Government of Japan (Right) The Hon. Prof. Dr. Gusti Muhammad HATTA, The State Minister for Research and Technology, The Ministry of Research and Technology

A scene of the meeting

The 13th FNCA Ministerial Level Meeting (MM) was held at Le Meridien Jakarta, Indonesia on November 24, 2012, and organized by the Japan Atomic Energy Commission (JAEC) and the Cabinet Office of Japan (CAO), and National Nuclear Energy Agency (BATAN), Indonesia.The Meeting was attended by ministerial level representatives (3 ministers, 2 vice ministers, the Directors of the Nuclear Administrative Agencies, and others) from 12 member countries: Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, Philippines, Thailand, and Viet Nam

(1) Opening

The Hon. Prof. Dr. Gusti Muhammad HATTA, the State Minister for Research and Technology, the Ministry of Research and Technology of Indonesia, delivered the opening welcoming remarks, in which he expressed welcome to all the participants, and emphasized the importance of regional cooperation through FNCA. The Hon. Mr. Shinkun HAKU, Senior Vice-Minister of Japan (at the time of meeting), delivered the address as Co-chair in which he mentioned appreciation for joining FNCA MM meeting and introduced the current status of Japanese nuclear policy in light of the experience at the TEPCO'S Fukushima Daiichi Nuclear Power Station (hereafter called "the Fukushima Daiichi accident").

(2) Country Reports

Each of the 12 participating countries delivered their Country Report, focusing on national energy policy, nuclear R&D/nuclear power plan, international cooperation, and expectation to FNCA activities (See pages 3-5 for the reports summary).

(3) Reports of FNCA Activities

① **Project Activities**

Dr. Sueo MACHI, FNCA Coordinator of Japan, reported the current status and future plan of FNCA projects. He highlighted tangible achievements of project in the area of agriculture, human health and infrastructure development including nuclear safety. He also reported the recommendation of 13th Coordinators Meeting on nuclear HRD.

② **Report of the 4th Panel Meeting**

Dr. Akira OMOTO, the then-Commissioner of JAEC, reported the summary of the meeting of "the 4th Study Panel on Infrastructure Development for Nuclear Power" held in Bangkok in July 2012 (See page 17 for the meeting summary).

(4) Round Table Discussion "Role of FNCA"

FNCA's significance of existence was discussed and examined, taking note of the situation that many countries have re-examined the energy and nuclear policy after the Fukushima Daiichi accident. The Hon Mr. HAKU, the then-Senior-Vice Minister, delivered lead speech, in which he indicated that based on the reports delivered in the previous sessions, and the discussions, opinions were requested on the points of role of FNCA, necessity of effective operation, new projects, achievements of the Study Panel. In response, the importance of enhancing the social-economic effects, and public information through the activities of FNCA were expressed by many countries. The representatives have shared the recognition that FNCA has been playing an important role as both a promoter and a coordinator of development of various thematic areas in nuclear science and technology including tackling issues such as public relations after the Fukushima Daiichi accident with regional cooperative ways. The importance of dissemination of FNCA achievement was shared.

(5) Meeting Resolution & Summary

Dr. Shunsuke KONDO, Chairman of JAEC introduced a draft resolution of the 13th FNCA Ministerial Level Meeting and it was adopted. The draft of the MM Summary was also confirmed. The followings are the points of the Meeting Resolution.

- Continuing to share the experience and lessons learned from the Fukushima Daiichi accident, in order to ensure the highest level of nuclear safety and better public acceptability towards nuclear energy in Asian region, such as considering the possibility of cooperation in the region for emergency preparedness and response, public information and risk communication
- Encouraging the creation of networks between the nuclear applications sector and end-users for the practical use and enhanced visibility of FNCA achievements,
- Collaborating in the conduct of assessments of the socio-economic impact of nuclear applications
- Assuring the visibility of project activities and outcomes to relevant ministers in member countries to sustain ongoing support

(6) Closing Session

The closing remark was delivered by the Hon. Prof. Dr. HATTA. After the meeting, press conference was held.

Delegates of Member Countries

Summary of Country Reports

Presented at the 13th Ministerial Level Meeting

Australia

The Australian government recently announced plans to construct a low enriched uranium export scale nuclear medicine manufacturing plant and collocated Synroc waste treatment plant (which can treat intermediate level waste and other challenging and intractable wastes) at ANSTO. The project has important implications for the future security of the supply of Mo-99 globally and significant export potential through the demonstration of Australian Synroc technology to international counterparts.

Australia's strength lies in its robust research program in nuclear science and technology, which that is being driven significantly by our OPAL research reactor, with its world class neutron beam facilities, and through the Centre for Accelerator Science. While our research program makes heavy demands on our limited human resources, we have been pleased to continue active participation in the FNCA program as part of our national, regional and international commitment.

Ms. Nadia LEVIN
General Manager, Government, International and External Relations, Australian Nuclear Science and Technology Organisation

Bangladesh

Our government also realizes that the availability of electricity has to be increased rapidly for facilitating achievement of goals of socio-economic development of the country. The government is committed to achieve "Universal Electrification" by 2021. Due to lack of indigenous energy resources, nuclear energy is considered as a key constituent to our energy mix in our Policy Document. Implementation of the nuclear power project has been identified to be a viable option for Bangladesh. Our government has already taken initiatives to implement Rooppur Nuclear Power Project for generation of 2000 MW (e) by 2020 and addition of another 2000 MW (e) by 2030.

We consider the FNCA is a powerful tool to promote and coordinate research and development activities to answer national problems through utilizing the experience, expertise and resources available within the region. Bangladesh is confident that FNCA would continue to promote regional capabilities and expertise, in different thematic areas like health, agriculture, industry and environment, research reactor and radioactive waste management and radiation protection.

The Hon. Mr. Yeafesh OSMAN
State Minister,
Ministry of Science and Technology

China

China has the biggest scale of nuclear new builds in the world. The number of units under construction account for 40% of the world total. The Nuclear Safety Plan and the Medium- and Long-term Nuclear Power Development Program, which was passed in the standing meeting of the State Council on October 24, 2012, further makes clear the objectives and tasks for the next stage of nuclear power development in China. China will keep the development pace rationally, raise the access threshold for new builds, and adopt the most advanced proven technologies to advance nuclear power construction steadily and orderly.

FNCA has passed 13 years of splendid journey. In retrospect, with mutual trust and assistance, we actively carried out exchanges and cooperation centering around the demands of member states, and made great contributions to the economic and social development in the Asian region. Looking into the future, Asia will be the most active region in the world for nuclear power development, which is full of vitality and prospect. Therefore, FNCA is promising and well worth doing.

Mr. CHEN Qiufa
Chairman,
China Atomic Energy Authority

Indonesia

The contribution of nuclear technology have been proven in supporting our national development facing the global challenges nowadays. Through the Forum for Nuclear Cooperation in Asia, utilization of nuclear technology are enhanced and monitored. The application of nuclear technology could give contributions to 'food, health, human resources development, and environment' – these fields indeed are supported by our Ministry seventh research focus areas.

Current challenges in the utilization of nuclear science and technologies (NST) is to maintain, to add the quantity of the qualified Human Resources which are specialized in NST. However, this condition also stimulates other opportunities of cooperation with other International organization. HRD requirement and fulfillment has been shared through the Asian Nuclear Training and Education Program (ANTEP) of the FNCA.

In addition, increase of utilization of the research reactor with the support of improvement of the facilities, the infrastructure as well as the human resource development, among the member countries of the FNCA, can be one of the priority for future FNCA programs.

The Hon. Prof. Dr. Gusti Muhammad HATTA
The State Minister for Research and Technology
The Ministry of Research and Technology

Japan

Japan established the Nuclear Regulation Authority on 19 September as a new independent regulatory organization that is responsible for "3S", namely Safety, Security and Safeguards.

Japan sincerely hopes that the FNCA will continue to formulate various cooperative projects that will promote mutually beneficial cooperative activities among scientists and engineers who want to devote to the development of the welfare of the people in the region and will build lasting links among organization and peoples responsible for the research and development of nuclear energy in the region.

In conclusion, Japan will continue the safe use of nuclear energy, while pursuing a greener and healthier society. Japan will also continue to cooperate with the FNCA countries to advance the safe use of nuclear energy as well as the nuclear science and technology for social and economic development in each country, in the spirit of prospering together, saving a green Asia and protecting human lives.

Dr. Shunsuke KONDO
Chairman,
Japan Atomic Energy Commission

Kazakhstan

Agency of Atomic Energy of the Republic of Kazakhstan was formed in accordance with Presidential Decree in May 2012. According to Cabinet Decree it is a central executive body, implementing guidance and regulation in the field of nuclear energy application, provision of nuclear and radiation safety, physical protection of nuclear materials and installations, nonproliferation and cross-sectoral coordination in atomic sphere. The first object of the Agency is the formation of the state policy in the field of nuclear energy application and the provision of the implementation of its main directions.

This year specialists of our country have been carrying on big activity in the frames of FNCA projects. Two specialists are on training according to MEXT program.

FNCA Workshop "Radiation Processing of Natural Polymers" which was held in Almaty at the beginning of October had attracted a great interest from our specialists.

Kazakhstan will continue its policy for the development of peaceful application of nuclear energy and international collaboration in nuclear sphere.

Dr. Shaiakhmet Bakievich SHIGANAKOV
Director,
Science & Technical Development Department,
Atomic Energy Agency of the Republic of Kazakhstan

Korea

Currently, in Korea, there are twenty-three nuclear reactors in operation and five reactors under construction. Nuclear power supplies about 30 percent of the nation's total electricity needs.

In order to promote the peaceful use of nuclear energy, Korea has been actively investing in R&D activities such as development of SMART, a small and medium-sized reactor for multi-purpose use, R&D on a closed nuclear fuel cycle system, and future nuclear power systems. I hope that Korea's development experience in SMART will be of great use to FNCA member countries in the future.

Currently, Korea is participating in 10 FNCA projects and playing a leading role in RCA activities, and carrying forward various projects with countries in the Asia and Pacific region.

Korea, as a devoted member of the Forum, will fulfill its role and responsibility in FNCA activities, firmly believing that the FNCA will continuously contribute to the promotion of peaceful use of nuclear energy and international cooperation.

Dr. YANG Sung-Kwang
Assistant Minister for Research and Development Policy,
Ministry of Education, Science and Technology

Malaysia

Malaysia is currently undergoing its Economic Transformation Programme. we need to look into diversifying our energy mix to ensure security of supply. In this regard, we proposed to have various projects related to energy under our ETP, particularly in intensifying oil and gas exploration activities, enhancing depleted fields recovery, developing marginal fields, increasing gas imports, improving energy efficiency, increasing renewable energy generation and building capacity for the nuclear option.

To ensure a comprehensive development of power and non-power applications of nuclear technology, Malaysia strongly believes that human capital development is the important aspect in the overall planning and preparation, especially for a new comer country for nuclear power. In this regard, Malaysia is in the opinion that the Japanese leadership in NPP and Non-NPP through the FNCA is very much appreciated and need to be continued.

The Hon. Dr. Maximus Johnity ONGKILI
Minister,
Ministry of Science, Technology and Innovation

Mongolia

Mongolia believes that nuclear technology application for civilian uses is one of the important aspects of the industry that effectively contributes to the development of a country.

As the issues of safety and security are important for all countries, especially for those pursuing nuclear power programs or other peaceful uses of nuclear energy, Mongolia is interested in working closely with the FNCA and its member states to strengthen regional and international cooperation.

Mongolia is a developing country with ample natural resources but with limited infrastructure, human resources, who is striving to build stronger and safer nuclear technology industry. We would like continue our close cooperation with the FNCA and with Member Countries in capacity building, development of skilled and experienced human resources and establishing infrastructures necessary for nuclear activities.

Prof. Dr. Manlaijav GUN-AAJAV
Director, Nuclear and Radiation Regulatory Authority,
Nuclear Energy Agency of the Government of Mongolia

Philippines

Our stand on nuclear power has not changed. We are taking the necessary technical studies and based on the results of these studies, we are formulating recommendations and options from which a national position may be made. Towards this end, we pursue our work in the following priority areas: 1) appropriate energy scenarios for the country, 2) establishment of a separate and independent nuclear regulatory body, 3) human resources development, and 4) stakeholders' 'involvement.

Philippine participation in the FNCA projects have allowed us to enhance our efforts in the various fields of application of nuclear science and technology. It is our deep conviction that the utilization of nuclear science and technology for national development should continue to be expanded. It is also our deep conviction that the FNCA is a strong and effective mechanism for regional cooperation in nuclear science and technology and will even be a stronger one in the succeeding years.

The Hon. Dr. Carol M. YOROBE
Undersecretary,
Department of Science and Technology

Thailand

As for the national nuclear power programme, Thailand seeks to ensure that our safety measures comply with the IAEA's standards. Following the unfortunate accident at TEPCO's Fukushima Daiichi Nuclear Power Station (the Fukushima Daiichi accident) last year, our Government has postponed the decision to build a nuclear power plant for a few years. Meanwhile, Thailand has developed many curricula for children and the youth to enhance public awareness and promote better understanding of nuclear technology.

On our part, we are willing to share its experiences and best practices on nuclear technology for peaceful purposes with our friends. At the same time, we should see to it that peaceful uses of nuclear technology is also being undertaken in a manner that helps promote nuclear safety, safeguards and nuclear security, which benefits all nations, and consistent with the NPT and other relevant multilateral conventions.

In closing, may I reiterate Thailand's full support for FNCA. I am confident that the cooperation among the FNCA countries as well as its synergy to other multilateral arrangements dealing with nuclear matters will contribute to the sustainable development in our region that is peaceful and stable.

Mr. Nirut KUNNAWAT
Advisor to the Minister of Science and Technology,
Ministry of Science and Technology

Vietnam

The accident at TEPCO's Fukushima Daiichi Nuclear Power Station (the Fukushima Daiichi accident) has had a significant impact on nuclear energy policy in some countries. However, Vietnam has decided to continue its nuclear power program. Currently, Vietnam, in cooperation with Russia and Japan, has been conducting feasibility studies for Ninh Thuan 1 and Ninh Thuan 2 Nuclear Power Projects. With a view that "Nuclear safety and security must be ensured at the highest level", the Government of Vietnam has been actively preparing necessary conditions and will decide to start construction of these Nuclear Power Plants only when national infrastructure and human resources adequately developed according to the IAEA guidance and international experiences.

With satisfaction, Viet Nam notes that the projects and activities under the FNCA framework have been being integrated into Viet Nam's nuclear energy program bringing significant contribution to the implementation of nuclear power projects and applications of radiation and radioisotopes in the country.

Prof. Dr. VUONG Huu Tan
Director General,
Vietnam Agency for Radiation and Nuclear Safety

Introduction of 10 On-going FNCA Projects

Radiation Utilization Development
Industrial/Environmental Utilization

Mutation Breeding Project

The goal of this project is to contribute to the increase of food production and improvement of food quality in Asian countries by promoting the use of radiation breeding technology such as gamma rays and ion beams to develop new mutant varieties of key crops such as rice, bananas, orchids, soybeans and sorghum that are more resistant to drought, insects and disease. Past outcomes of this project, such as a Mutation Breeding Manual and Achievement Report for each activity, have been provided on the FNCA website (http://www.fnca.mext.go.jp/english/mb/e_introduction.html).

Recent Project Achievement

An activity on Disease Resistance in Banana began in the 2004 fiscal year. Its aim was to develop new varieties of banana that are resistant to the fusarium wilt disease and banana bunchy top disease that had seriously damaged banana production. The subproject was successful in producing new mutant lines that are resistant to these diseases, and was concluded in 2010. It is expected that the mutant plants will be disseminated in the Philippines' banana industry, especially for small-scale growers and farmers, in the near future. Furthermore, special propagating and culturing techniques for banana were developed through research activities, and technologies were successfully transferred to private companies in Malaysia.

Workshop Outline

■Period: February 26 to March 1, 2013
■Venue: Kajang (Malaysia)
■Number of Participants: 20
(from Bangladesh, China, Indonesia, Japan, Korea, Malaysia, Mongolia, the Philippines, Thailand, Vietnam and IAEA/RCA)

On the first and second days of the workshop, the "Symposium on Radiation and Nuclear Technologies for Crop Improvement and Productivity in Sustainable Agriculture", an open seminar cohosted with the Malaysian Nuclear Agency, was held. This was attended by around 150 participants from the Malaysian Nuclear Agency, agricultural institutes, universities, research institutes, companies and FNCA member countries.

Activity on Composition and Quality in Rice (2007 - 2012) is concluded this March and final reports were given by the participating countries. It was confirmed that each country has obtained useful mutant lines and some of them will be registered in the near future.

An activity plan was then discussed for the next activity on Mutation Breeding in Rice for Sustainable Agriculture. This focused on varieties with a high yield/input ratio (fertilizer and pesticide), varieties with a high environment tolerance, and other varieties that allow for sustainable agriculture. Each country set target varieties and breeding objectives to meet national needs. Mongolia will target wheat and barley as they do not cultivate rice.

Open Seminar

Participants in the Open Seminar

Participants visited the Gamma Green House of the Malaysian Nuclear Agency and National Agro-Biotechnology Institute, viewing their facilities and receiving explanations from the researchers.

Technical visit to Gamma Green House

Biofertilizer Project

Soil contains a large number of microorganisms which are beneficial for plants to grow. Such microorganisms include rhizobia, which live symbiotically with plants and supply nitrogen as an essential nutrient to plants, and mycorrhizal fungi which help absorption of phosphorus. This project aims at developing biofertilizers in which carriers*1 are sterilized with radiation to remove unwanted microorganisms and then mixed with microorganisms which are beneficial for growth of plants. These biofertilizers are expected to contribute to promoting environment-friendly and sustainable agriculture in the Asian region, by increasing yields of crops while reducing the environmental burden of excessive use of chemical fertilizers.

Recent Project Achievement

To produce biofertilizer carriers using the radiation sterilization technique, it is important to establish close cooperation between a nuclear research institute having a radiation facility and an agricultural research institute studying biofertilizers. The cooperation in countries participating in this project has been augmented through discussions in workshops and proactive appeals made by participants. The carrier radiation sterilization technique is being transferred to private sectors, and biofertilizers using radiation sterilization are already in widespread use across the countries of Indonesia and Malaysia. In 2012, their commercial use has also commenced in The Philippines.

"Bio-N" produced with gamma irradiation in the Philippines

Workshop Outline

■ Period: November 6 to 9, 2012
■ Venue: Beijing (China)
■ Number of participants: 13
(China, Indonesia, Japan, Malaysia, Mongolia, The Philippines, Thailand, Vietnam)

At the workshop, summaries of the research activities in fiscal 2012 were reported by the participating countries. Subsequently, lively discussions were held on important tasks in biofertilizer research and development, namely, 1) Expansion of radiation sterilization for commercial production, 2) Development of multifunctional biofertilizers and strategies to expand their use to farmers, and 3) Evaluation of the study on synergistic effects between biofertilizers and irradiated oligochitosan*2 carried out in 2012 and its future prospect.

Workshop

Discussions were then held on future activity plans of the project. Agreements were made on: 1) Continuing efforts on expanding the use of gamma-ray radiation sterilization of carriers for commercial use, 2) Each country to prepare brochures illustrated with pictures clearly describing the benefits of biofertilizers, in order to make the importance of their widespread use readily understandable by the government, politicians, manufactures, and farmers, and 3) Proactive exchange of information with the FNCA electron Accelerator Application Project, to improve the efficiency of the study on synergistic effects between biofertilizers and irradiated oligochitosan that commenced in 2012.

The participants visited pilot farms of a cosponsoring organization Chinese Academy of Agricultural Sciences, and confirmed positive results from synergistic effects study of irradiated oligochitosan on strawberries and tomatoes. At a biofertilizer manufacturer in Beijing, the participants inspected the facility and received information about products.

Technical visit to Test Field for Tomato

Technical visit to Biofertilizer Company

*1 Carrier: A material such as peat or compost for retaining and breeding microorganisms.
*2 Irradiated oligochitosan: chitosan which was depolymerized by radiation.

Electron Accelerator Application Project

This project aims at widespread use of electron accelerators*1 and gamma-rays in the industrial field, and research activities have been conducted with the objective to promote practical application of products which bring benefits to the participating countries. Lately, research and development of plant growth promoters and super water absorbents for soil conditioning through radiation processing have been carried out. Information and experimental data from the research has been shared with the IAEA/RCA to achieve synergistic effects. In the 4th phase that commenced in fiscal 2012 (this phase will span to fiscal 2014), preparation of guidelines has been conducted in order to promote adaptation of plant growth promoters in rice plants and chili, which have high economic effects. Field tests of soil conditioning materials in arid regions have also been conducted.

Recent Project Achievement

Radiation processing of natural polymers*2 enables production of highly active plant growth promoters and super water absorbents for soil conditioning in arid regions. Through field tests conducted in respective countries, it has been confirmed that a chitosan-based plant growth promoter depolymerized by radiation improved the disease resistance of plants due to its antifungal effect, and increased yields of vegetables, soybean, rice, fruit, etc. In Vietnam, plant growth promoters derived from chitosan have already been commercialized, and are used for production of vegetables, coffee, etc. In Japan, this type of plant growth promoter has been put into practical application as plant activators, and used for production of cyclamen, etc. On the other hand, super water absorbents produced by cross-linking of natural polymers have been proven to be effective as water retaining agents for soil conditioning in arid regions.

"FNCA Guideline on Development of Hydrogel and Oligosaccharides by Radiation Processing"* published in October 2009 has received frequent updates with new results added every year. The guideline has been effectively utilized in various countries as a reference for production of high-quality materials, in order to promote their research, development and industrial use. A list of electron-beam and gamma-ray irradiation facilities in the FNCA participant countries is also posted on the FNCA's website, providing the latest information to the users.

* Can be downloaded from FNCA's website:
[http://www.fnca.mext.go.jp/english/eb/seq/eb_guideline_v1_5.pdf]

Workshop Outline

■ Period: October 2 to 5, 2012
■ Venue: Almaty (Kazakhstan)
■ Number of participants: 25
(Bangladesh, China, Indonesia, Japan, Kazakhstan, Malaysia, Mongolia, The Philippines, Thailand, Vietnam. Observers from IAEA/RCA: Myanmar, Pakistan, Sri Lanka)

In addition to participants from 10 FNCA member countries, 3 representatives from Myanmar, Pakistan and Sri Lanka, which are member countries of IAEA/RCA, participated in the workshop as observers. Presentation and discussions have been conducted on the progress of research and development of plant growth promoters and super water absorbents produced through radiation processing.

For an open seminar held prior to the workshop, there were approximately 60 participants from research institutes and the agricultural and industrial fields. The presentations held at the seminar included various topics such as the current state and future plan of the use of radiation processing on polyethylene foams and thermal contraction tapes in Kazakhstan, success in commercialization of the use of radiation processing on natural polymers used for facial beauty masks in Malaysia, the current state of radiation on food and medical products in Vietnam, and the current state of commercialization and the use of radiation on multi-purpose materials used for heat-resistant cables, radial tires, and button cells in Japan.

Open Seminar

At the workshop, the progress of field tests using plant growth promoters derived from chitosan was reported by the respective countries. It has been confirmed that plant growth promoters improved yields of plants such as tomatoes, rice and corn. The plant growth promoters were also effective in improving the quality of products, such as improved sweetness in fruit. Japan and The Philippines presented the results of the research on synergetic effects between plant growth promoters and biofertilizers, which was conducted in collaboration with the FNCA biofertilizer group. The results indicated improved disease tolerance and an increase in yields by up to 83% by using both plant growth promoters and biofertilizers on soybean and corn. It is expected that the use of plant growth promoters derived from chitosan along with biofertilizers can substitute the conventional use of chemical fertilizers in farming. Additionally, in China and Vietnam, researches have been carried out on the use of irradiation-depolymerized chitosan in the livestock industries and fishing industries.

Reports were then made on the results of pot tests and field tests carried out for super water absorbents produced by radiation processing of cellulose or starch derived from natural polymers indigenous to the respective countries. From the pot test results it was confirmed that super water absorbents possessed high water absorbability and exhibited positive effects on sprouting of seeds and growth of plants. Vietnam has been conducting pioneering research in this area, and reported field test results which indicated an increase in yields of tea and coffee plants by up to ~25% by using super water absorbents.

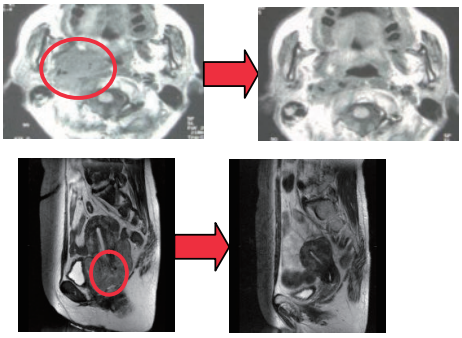
Furthermore, it was agreed to maintain the cooperative structure in the radiation processing field in order to strengthen the coordination between FNCA and IAEA/RCA.

*1 Electron accelerator: An equipment designed to acquire high-energy electron beams by accelerating electrons by applying high voltage to them. Used in radiation processing.
*2 Natural polymers: Naturally produced high-molecular compounds. Examples are: cellulose, starch, protein, chitin, chitosan.

Radiation Utilization Development
Healthcare Utilization

Radiation Oncology Project

This project aims at promoting widespread use of the radiation therapy and improvement of its quality in the Asian region, by establishing standard radiation therapy protocols through joint clinical trials on cancers predominantly observed in the region (cervical and nasopharyngeal cancers).



Disappearance of diseased area by Chemoradiotherapy
Top: Nasopharynged Cancer
Bottom: Cervical Cancer

Recent Project Achievement

Treatment protocols have been developed through international joint clinical trials for cervical and nasopharyngeal cancers by 11 participating countries in the Asian region. Improvements of treatments in the respective countries have been obtained based on the effective treatment methods that were obtained through clinical trials. The treatment results to date have been equivalent to, or superior to, those of clinical trials carried out in Europe or in the USA. Accordingly, the protocols developed in this project have been widely used in clinical practice in Asian countries.

The protocol CERVIX-III for chemoradiotherapy for cervical cancer, for which clinical trials have been conducted since 2004, has been confirmed to be effective to Asian people in the FNCA region, and has been adopted as the standard treatment method in clinical practice in Thailand and Vietnam, etc.

Workshop

Workshop Outline

■ Period: January 15 to 18, 2013
■ Venue: Bangkok (Thailand)
■ Number of participants: 27
(Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, The Philippines, Thailand, Vietnam. Observers from IAEA/RCA: Myanmar, Pakistan, Sri Lanka)

In addition to the participants from 11 FNCA member countries, one person each from 3 countries, Myanmar, Pakistan and Sri Lanka, which are member countries of IAEA/RCA, participated in the workshop as observers.

At the workshop, reports and discussions were made on clinical trial data of locally-advanced cervical and nasopharyngeal cancers collected in the respective countries. There also was a report on field survey in Vietnam on quality assurance/quality control (QA/QC) of external beam radiotherapy. Then, new protocols were proposed for future clinical trials; one was a short-course radiation therapy protocol for breast cancer (BREAST-I), and another was an image-guided brachytherapy protocol for cervical cancer (CERVIX-V). A discussion on the proposed protocols eventuated in an approval on conducting a pilot study*[1] for the first one year.

At an open seminar held as part of the workshop, lectures were given on five topics, including current status and perspective of this project, image-guided brachytherapy*[2], stereotactic body radiotherapy*[3] on lungs, particle therapy, and the CyberKnife*[4]. There were more than 60 university professionals, physicians and students attending the seminar.

The participants visited Siriraj Hospital and Siriraj Piyamaharjkaroon Hospital that are attached to the Mahidol University, and received information on the current state of radiotherapy and inspected the radiotherapy sites.

(*Right*) Open *Seminar*
(*Left*) *Radiation Therapy Machine,Linac*

*1 Pilot study: Small scale preliminary examination carried out before commencing a practical clinical trial, in order to evaluate the feasibility.
*2 Image-guided brachytherapy: A treatment method allowing a delivery of high-dose radiation to the tumor with minimizing radiation to adjacent normal tissues, which is achieved by precise localization of the tumor through CT images obtained while dummy radioactive material is left in the uterine cavity.
*3 Stereotactic body radiotherapy: A therapy method to apply high-dose radiations from several directions focused onto small cancer lesions such as lung and liver cancer. (Also known as a pinpoint target therapy)
*4 CyberKnife: An equipment with a linear accelerator (which produces x-rays) mounted in a robotic arm, permitting a delivery of high-dose radiation to the target lesion under computerized control.

Research Reactor Utilization Development

Research Reactor Network Project

Commencing in fiscal 2011, this project aims at improving skill levels of researchers and promoting mutual use of research reactors in Asian countries. These targets will be achieved by enhancing mutual understanding on features and the utilization status of research reactors in the relevant countries and by establishing a regional network. The project specifically endeavors to establish a regional network for stable supply of radioisotopes (RI)* for medical applications.

Isotope for Medical Use

Recent Project Achievement

At a workshop, presentations and discussions were made on the current status and challenges (operation, application, and management) of research reactors, plans for constructing new reactors, and on the current status of and issues in RI productions for medical and industrial applications. Reconfirmation was made on promoting establishment of a regional network for stable supply of RI for medical applications in Asia. Promotion of establishment of the national committee pertaining to production and supply of RI was agreed on by the respective countries. Bangladesh, Japan, Mongolia, The Philippines and Vietnam have already established the said committee. Australia and Thailand have already had committee which have similar function of said committee.

Workshop Outline

■ Period: November 19 to 22, 2012
■ Venue: Serpong (Indonesia)
■ Number of participants: 22
(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, The Philippines, Thailand, Vietnam)

At an open seminar held on the first day of the workshop, Indonesia, Japan, China and Korea gave lectures on the importance of research and test reactors for development of nuclear energy in Asian countries.

At the workshop, reports were made by the respective countries on the current status and challenges of research reactors, plans for constructing new reactors, the current status of productions of RI for medical and industrial applications, and on the current status of productions of silicon semiconductors. Reports were also made on the status of preparation and foundation of the national committee for establishing a regional network for stable supply of RI for medical applications, and the importance of establishment of the network was reconfirmed. A discussion was then conducted, eventuating to an agreement where the countries that haven't established the national committee pertaining to production and supply of RI will make efforts in establishing the said committee.

Open Seminar

Workshop

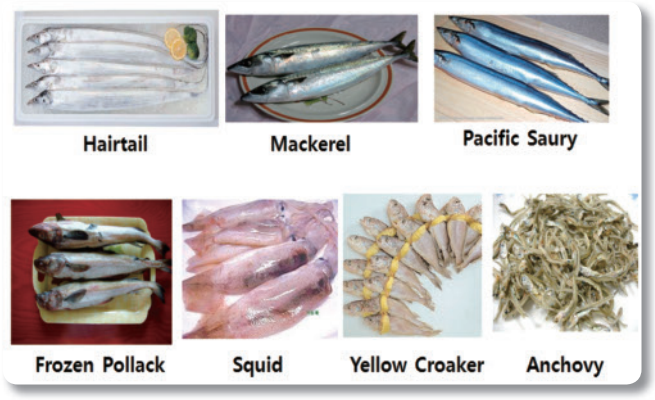
The participants visited the main facilities of the National Nuclear Energy Agency (BATAN), including a multi-purpose research reactor, the RSG-GAS, and the RI center. During the visit, the participants received information on the status of facility utilization and the details of researches being conducted.

Technical visit to BATAN

** Radioisotope (RI): An atom which emits radiation when changing from an active state to a stable state; its mass is different from, yet its chemical characteristics are identical to other atoms of the same chemical element. (Also known as radionuclide)*

Neutron Activation Analysis Project

This project aims at utilizing Neutron Activation Analysis (NAA)* for social and economic benefits through evaluation of the results from sample analyses. Currently, analyses are conducted on geochemical samples, food samples, and environmental samples.



Food samples

Recent Project Achievement

Environmental samples (e.g. airborne dusts) collected in various Asian countries for the last eight years have been analyzed using NAA, providing information on the state of environmental pollution in the respective countries. The results have contributed greatly to the environmental administration, such as formulation of environment improvement measures conducted in China and The Philippines.

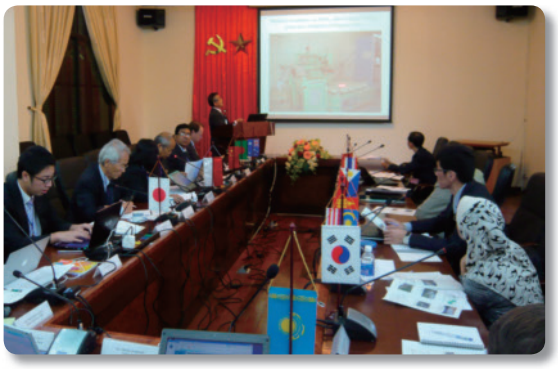
NAA of geochemical samples have been carried out for the purpose of exploring mineral resources and investigating regional pollution. Food samples were selected based on the current condition in the participating countries, and their elemental compositions were determined by NAA for the aspect of food pollution and nutrients. It is expected that the analysis results from these samples will contribute to the evaluation of and improvement to the environment and evaluation of food safety.

Sampling

Workshop Outline

■ Period: November 27 to 30, 2012
■ Venue: Hanoi (Vietnam)
■ Number of participants: 18
(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, The Philippines, Thailand, Vietnam)

At the workshop, reports and discussions were made on progress of NAA application using research reactors in the respective countries. This project is in the second year of the 4th phase commenced in fiscal 2011, and NAA has been conducted on geochemical samples, food samples, and environmental samples in succession to the 3rd phase. The discussions covered various issues of the project, namely, the objectives, targets, methods of coordination, methods of mutual cooperation, and road mapping. Ideas were exchanged focusing on promoting the effectiveness of NAA in the three areas (i.e. geochemical, food, and environmental) to potential users.



Workshop

At an open seminar, Vietnam gave a report on the prospect of nuclear energy applications, nuclear technology applications in everyday life, and on their sustainable growth. Presentations on the benefits, successful examples and roles of NAA were then made by Vietnam, Australia, and Japan.

The participants visited facilities of the Institute for Nuclear Science and Technology (INST) of the Vietnam Atomic Energy Institute (VAEI), including the Computer Center for Nuclear Science, training laboratory, and the gamma radiation dose calibration room. During the visit, the participants received information on the state of facility utilization and the details of researches being conducted.

Open Seminar

** Neutron Activation Analysis (NAA): A method to identify and quantify the elements in a sample by measuring the gamma-rays emitted from the sample after irradiating the sample with neutron.*

Nuclear Safety Strengthening

Safety Management Systems for Nuclear Facilities Project

This project was initiated by Australia in 2009, replacing the former Nuclear Safety Culture project. In order to ensure the safety of nuclear facilities and to achieve their smooth operation and utilization, it is important to maintain a widespread safety culture and excellent safety management system. This project aims at promoting improvement in nuclear safety in Asian countries. For that purpose, peer review* and information exchange are carried out to encourage participating countries to gain better understanding on the safety management systems for nuclear facilities and to achieve improvement in the safety.

Recent Project Achievement

Based on the IAEA Safety Guide,the tool for assessment of safety system has been developed by injecting the locality of Asian countries. This tool is used for peer reviews and self-assessment of the safety management systems for nuclear facilities (research reactors) in the participating counties. Three peer reviews using the present tool have been conducted to date (in Indonesia in 2010, in Malaysia in 2011, and in Korea in 2012), contributing towards improvement in the safety management systems.

Peer Review at TRIGA Mark Ⅱ Reactor in Malaysia (2011)

Workshop Outline

■ Period: October 29 to November 2, 2012
■ Venue: Daejeon (Korea)
■ Number of participants: 19
(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, The Philippines, Thailand, Vietnam)

The workshop was opened by Korea presenting a summary of its framework for nuclear research and development and for nuclear regulations. Reports were then made by the respective countries on updating information of the safety management systems applied in nuclear facilities (mainly research reactors) and on the current state of emergency preparedness and response. Japan gave a special presentation on newly-established Nuclear Regulatory Commission and the current state of formulating new safety standards. Several recommendations for improvements were made during the previous peer review conducted in fiscal 2011 for the Puspati TRIGA reactor (RTP) of the Malaysia Nuclear Agency. In response to the recommendations, Malaysia reported improvements achieved in document sharing within the organization, integration of the management systems, and in communication methods with the emergency control center.

Workshop

A peer review was conducted for the open-tank-in-pool type high-flux reactor HANARO of the Korea Atomic Energy Research Institute (KAERI). HANARO is a research reactor with the design power of 30 MW, and is utilized for radioisotope production for medical and industrial applications, neutron radiography, neutron activation analysis, irradiation research, etc. Following a report on self-assessment results made by the HANARO staff, the participants toured the facility visiting the central control room, the reactor, and the top part of the pool. A peer review was then held, resulting in 23 good examples, 19 comments, and 12 recommendations for improvement. Korea will continue to make efforts to improve the recommendations, and the progress will be reported at future workshops.

Peer Review at HANARO in Korea

** 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 improvements*

Radiation Safety and Radiactive Waste Management Project

This project aims at improving safety in handling radiation and radioactive wastes in the Asian region, by sharing information and knowledge on radiation safety and radioactive waste management acquired through experience.

Recent Project Achievement

A consolidated report which summarized the state of radioactive waste management in the respective participating countries was published in 2001, and a new version of the report was issued in 2007. In order to achieve better common understanding on radiation safety by the participating countries, "Consolidated Report on Radiation Safety" was compiled in fiscal 2010 and published on the FNCA's website in March 2011. Furthermore, "Radiation Safety and Radioactive Waste Management Newsletter" has been prepared every year, sharing the latest information on radiation safety and radioactive waste management among the participating countries. These newsletters are also published on the FNCA's website, providing the world with the information.

FNCA Radiation Safety and Radioactive Waste Management Newsletter
** Available on the FNCA Website http://www.fnca.mext.go.jp/english/rwm/e_newsletter.html*

Workshop Outline

■ Period: July 10 to 13, 2012
■ Venue: Manila (The Philippines)
■ Number of participants: 16
(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Malaysia, Mongolia, The Philippines, Thailand, Vietnam)

An open seminar was held on the first day of the workshop. The seminar was entitled "The Progress of Radiation Safety Control and Radiation Emergency Response in Asia", and was attended by approximately 40 participants from governmental institutes such as the Philippine Nuclear Research Institute (PNRI), Food and Drug Administration, Philippine Atmospheric, Geophysical and Astronomical Services Administration, Philippine Army, and the Bureau of Fire Protection. The host country The Philippines gave a presentation on radiation emergency responses in The Philippines, which included national radiation emergency plan, training program for radiation emergency response, and response to the Tokyo Electric Power Company Fukushima Daiichi accidents. Japan made a report on lessons learnt from the Fukushima Daiichi accidents, providing various monitored data collected after the accidents and an overview on the System for Prediction of Environmental Emergency Dose Information (SPEEDI)*. Australia reported radiation safety control and emergency response in Australia. Indonesia presented the state of approval and authorization in the health care, industry, and research fields and the safety assessment on various sectors of nuclear facilities. Lastly Vietnam presented the current state of radiation safety in Vietnam and information on the structure and regulation system of the Vietnam Agency for Radiation and Nuclear Safety and Control.

Open Seminar

At the country report session, the respective countries made reports based on the "Consolidated Report on Radiation Safety" which was drafted in 2011, providing the latest information on framework of regulations in the radiological protection field and on radiation safety controls at nuclear facilities. Information on activities aiming at reducing occupational exposures in respective countries was also presented.

At the "Discussion on Safety and Security of Disused Sources" session, The Philippines, Malaysia, and Japan delivered lead speeches, followed by a presentation on the current state of safety and security of disused sources at PNRI made by The Philippines. The presentation included detailed information on regulation of radioactive waste management, classification of disused sources, and the recent activities in the radiation safety and waste management areas.

The participants visited various facilities of PNRI, which included the Emergency Response Centre, Nuclear Analytical Techniques laboratory, Co-60 Irradiation Facility, waste management facility, Secondary Standard Dosimetry Laboratory and the Environmental Monitoring Laboratories. After the visit, participants had a discussion for further improvement of radiation safety and radioactive waste management at PNRI and nuclear facilities in participating countries.

Workshop

** System for Prediction of Environmental Emergency Dose Information (SPEEDI): A system which promptly predicts environmental impacts such as atmospheric concentration of radioactive materials and exposure dose in the surrounding environment in an emergency where a large amount of radioactive material is or may be released from a nuclear power station or the like, based on the information on the release source, meteorological conditions and topographic data.*

Nuclear Infrastructure Strengthening

Human Resources Development Project

Power / non-power application of nuclear energy requires extremely wide-ranging knowledge and skills, such as handling of radioactive materials, operation of nuclear facilities, risk communication, adaptation of international standard…, as well as human resources familiar with these, of course. Human resources development (HRD) is essential for nuclear application. This project intends to discuss on effective HRD and appropriate ways of international cooperation, sharing experiences, strategies, challenges on HRD in member countries. And also, needs for HRD and available HRD programs in member countries are surveyed, in order to seek possible mutual cooperation. Through these activities, this project aims at strengthening the infrastructure of nuclear technology in Asian region.

Recent Project Achievement

Based on the "Recommendations on HRD" adopted at the 13th FNCA Coordinators Meeting held in March 2012, each member country was encouraged to establish national HRD network composed of nuclear related organizations, and to designate the national focal point (a single contact point for international HRD cooperation), as well as national hub of the network, in each country. Most of member countries achieved these tasks.

Database on needs and programs of nuclear HRD, so called Asian Nuclear Training and Education Program (ANTEP) *[1], has been updated and improved.

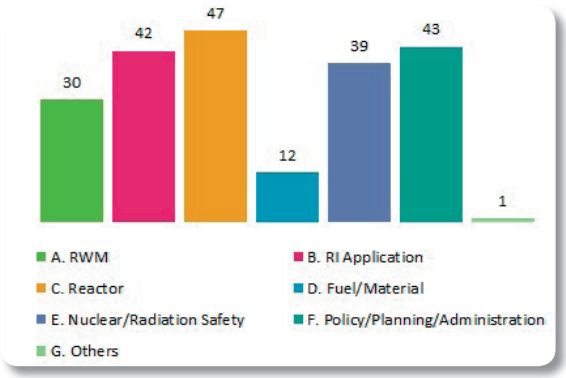
Workshop Outline

■ Period: September 12 to 14, 2012
■ Venue: Shenzhen (China)
■ Number of participants: 19
(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, The Philippines, Thailand, Vietnam)

At an open seminar held on the first day of the workshop, attended by around 40 participants, nuclear power programs and HRD systems in China were introduced. Japan made a lecture on the prospect of nuclear technology development in Japan and in the world, and Japan's nuclear HRD programs for supporting Asian countries. At the workshop, country reports on HRD were made by each member country. The topics included national scheme and budget for HRD, roles and cooperation among research institutes, universities and electric power companies, etc. The reports also included progress on establishment of a national HRD network. An emphasis was placed on the importance of network establishment for effective and efficient nuclear HRD. Subsequently, reports were made on the survey results of ANTEP conducted in fiscal 2012 and on the implementation

Workshop Participants

status of Nuclear Researchers Exchange Program (NREP)*[2] related to ANTEP.



Number of ANTEP Needs (by Fields)

Bangladesh, Indonesia, and Vietnam made presentations on HRD strategy for nuclear power programs. Presentations on HRD strategy for radiation application technology were made by Australia, Malaysia, and The Philippines. China shared their experience on HRD when the first nuclear power plant was launched in China.

The participants visited the technical training center, simulation training center, engineering training center, and exhibition hall of Daya Bay Nuclear Power Plant.

Technical visit to Simulator Training Center of Daya Bay Nuclear Power Base

*1 ANTEP: A database developed for matching 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 Ministry of Education, Culture, Sports, Science and Technology (MEXT) to invite nuclear researchers in Asia to Japanese research institute and universities and to send Japanese specialists to nuclear-related institutes in Asia. Its plan is determined in reference to the survey results of ANTEP.

Nuclear Security and Safeguards Project

In order to promote peaceful use of nuclear power in Asian countries, it is important to improve and maintain nuclear safety, nuclear security*1 and safeguards*2. This project commenced in fiscal 2011 aiming at enhancing nuclear security and safeguards in the participating countries through the awareness raising on the importance of nuclear security and safeguards, exchange of information, human resources development(HRD) opportunities, and promotions of research and development.

Recent Project Achievement

An open seminar was held in conjunction with the Asia-Pacific Safeguards Network (APSN), a network of safeguards-related organizations in the Asia-Pacific region, led by Australia, in order to share experiences in the implementation of the IAEA Additional Protocol (AP)*3. Additionally, information on the regulatory authorities for nuclear safety, safeguards, and security of nuclear material and radioactive sources has been collected, compiled and disseminated to participating countries in search of a method to enable better management of nuclear 3S (Safety, Safeguards, and Security) which is vital for peaceful use of nuclear energy.

Workshop Outline

■ Period: December 18 to 21, 2012
■ Venue: Hanoi (Vietnam)
■ Number of participants: 27
(Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, The Philippines, Thailand, Vietnam, IAEA)

First, the state of progress on activities for nuclear security and safeguards in the respective countries was reported. In the subsequent individual sessions, reports and discussions were conducted on international developments and initiatives towards enhancing nuclear security regime, summary of the 2nd Nuclear Security Summit, necessary infrastructure for effective State System of Accounting for and Control of Nuclear Material (SSAC), and on national regulatory capacity building efforts for safeguards. Round-table discussions were then conducted on nuclear 3S and capacity building for nuclear security and safeguards, and opinions were exchanged about methods to achieve interface among 3S and possible ways to establish an effective network for HRD programs. On the last day of the workshop an open seminar was held in conjunction with the APSN. At the beginning of the seminar IAEA gave presentations on the importance of the AP, declaration of the AP, and Complementary Access

Workshop

(CA)*4. Countries which implemented the AP then reported their experiences and efforts in AP implementation, followed by sharing of good practices of the AP and discussions on assistance necessary for countries which are going to ratify the AP in the future.


Open Seminar

Workshop Participants

*1 Nuclear security: Measures taken to prevent the threat of illegal use of nuclear materials and radioactive sources by terrorists, etc.
*2 Safeguards: Measures taken to ensure that nuclear materials are used only for peaceful purposes and not for nuclear weapons, etc.
*3 Additional Protocol (AP): An agreement concluded between a country and the IAEA, complementary to the country's safeguards agreement with the IAEA
*4 Complementary Access (CA): Access to certain additional locations by the IAEA inspectors for specific reasons as provided by the AP, in order to assure the absence of undeclared nuclear material and activities, etc.

The 13th FNCA Coordinators Meeting (March 7 to 9, 2012, Fukui)

Meeeting Participants

The 13th FNCA Coordinators Meeting was held on March 7-9, 2012, in Fukui, 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 and the Fukui Prefectural Government. The Meeting was attended by delegates from 12 member countries: Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, the Philippines, Thailand, Viet Nam, and RCA Regional Office.

In the Opening Session, Dr. Shunsuke KONDO, Chairman of JAEC made the opening remarks and thanked the Fukui Prefectural Government for hosting the 13th FNCA Coordinators Meeting in Fukui. Mr. Issei NISHIKAWA, Governor of Fukui Prefecture, gave a hearty welcome to all participants.

○Current Status of Activities after the Accident of TEPCO's Fukushima Daiichi Nuclear Power Plant

Dr. KONDO provided an update of on-site and off-site activities and the governmental responses concerning the accident at the TEPCO Fukushima Daiichi Nuclear Power Station (Hereafter called the Fukushima Daiichi accident) in sharing Lessons Learned (LL) and other information.

○Relations between Nuclear Power and Local Communities

Fukui Prefecture presented The feature of Fukui prefecture with its many nuclear power plants (NPP) and preparedness in relation to nuclear safety. Subsequently, they introduced the Energy Research and Development Centralization Plan of the Fukui Prefectural Office.

○FNCA Project Activities

Each Project Leader reported on the ongoing 10 projects. Each of them reviewed and evaluated the activities and also reported on the future plan and challenges. Subsequently, Director of RCA Regional Office made a presentation on RCA. In his presentation the importance of information exchange was stressed for strengthening cooperation between the FNCA and the RCA. In addition, the meeting discussed Action Plan for Recommendations of the 12th Ministerial Level Meeting. The meeting noted that the FNCA projects on the promotion of applications of nuclear technology, such as medical, agricultural and industrial fields and have remarkable and tangible results with significant socio-economic impact. Furthermore, the meeting recognized that further effort is needed for improving the outreach of FNCA activities and achievements for more utilization by end-users.

○Public Information (PI) and Human Resources Development (HRD)

It was emphasized to restore public trust and confidence in nuclear power as the first step after the TEPCO's Fukushima Nuclear Accident. It was also pointed out that knowing the characteristics of receivers of information on nuclear issues is important. Next presentation on HRD drew a high interest from the participating countries and special recommendations on nuclear HRD was drafted.

○Study Panel (Panel meeting)

The meeting agreed to hold the 4th Study Panel on the Approaches toward Infrastructure Development for Nuclear Power, in Thailand in July, 2012, focusing on sharing experiences and LL from TEPCO's Fukushima Nuclear accident, PI, and Emergency Preparedness and Response.

The Conclusions and Recommendation drafted and agreed are as follows.

Conclusions and Recommendation

1. With regards to the Fukushima Daiichi accident, Japan should fully share lessons learned from the accident, which is useful for improving their assurance of nuclear safety.
2. The Fukui Prefecture is a good model of successful stakeholder involvement and the development of a local community hosting nuclear power stations and relevant facilities for HRD.
3. The FNCA projects for developing infrastructure, such as nuclear safety management, radiation safety and waste management, research reactor network, nuclear security and safeguards, and human resource development are contributing to strengthening infrastructure in the development of atomic energy utilization with a high level of safety.
4. Human resources are essential for sound and safe utilization and development of nuclear energy and radiation applications.
5. The establishment of the regional network for improving the assurance of the supply of medical isotopes should be promoted with the endorsement of government. The coordination of the production network and distribution network, and of the maintenance schedules of research reactors among the FNCA member countries, is important for the stable supply and price of RI. Besides the assurance of the RI supply, collaboration on the design of new research reactors to meet demands in the member countries is also important.
6. FNCA projects on the promotion of applications of nuclear technology, such as radio-therapy for cancer, mutation breeding, electron beam processing, bio-fertilizer, and neutron activation analysis have remarkable and tangible results with significant socio-economic impact. Every effort should be made to enhance application of the outcomes of the FNCA projects in achieving the socio-economic benefits in collaboration with relevant ministries and potential end-users in each country.
7. Further effort is needed for improving the outreach of FNCA activities and achievements to the international community through mechanisms such as the IAEA , scientific and industrial journals, the internet, and open seminars and symposia.

○International Meeting on HRD for Nuclear Energy in Asia

On the 3rd day, March 9, the International Meeting on HRD for Nuclear Energy in Asia was held, which was hosted by the Fukui Prefectural Government and Fukui International Human Resources Development Center. Subsequently, the delegations visited the Wakasa Wan Energy Research Center, Kansai Electron Beam Co., Ltd, Nuclear Power Training Center Ltd, and the Mihama Offsite Center to share knowledge and information about radiation applications and nuclear power with the member countries.

The 4th Panel Meeting of "Study Pane on the Approaches toward Infrastructure Development for Nuclear Power" July 26 to 27, 2012, Thailand

(Left) Dr. Akira OMOTO, the then-Commissioner,JAEC (Right)Dr. Kurujit NAKORNTHAP, Deputy Permanent Secretary, MOE

The 4th Meeting of "Study Panel on the Approaches toward Infrastructure Development for Nuclear Power" was held on July 26th and 27th, 2012, in Bangkok, Thailand, co-hosted by Cabinet Office (CAO), Japan Atomic Energy Commission (JAEC), Ministry of Energy (MOE), Energy Policy and Planning Office (EPPO) of MOE, Ministry of Science and Technology (Thailand) and Thailand Institute of Nuclear Technology (TINT).11 FNCA member countries namely Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, the Philippines, Thailand and Vietnam participated in this meeting, and Dr. Akira OMOTO, the then-Commissioner of JAEC , and Dr. Kurujit NAKORNTHAP, Deputy Permanent Secretary, Ministry of Energy took the co-chairs. At the 12th Ministerial Level Meeting, it was mentioned in the resolution that FNCA member countries should enhance cooperation in the field of nuclear safety, and share knowledge about effective management of natural hazards and lessons learned from the accident at the TEPCO's Fukushima Daiichi Nuclear Power Station (hereafter called "the Fukushima Daiichi accident").

(1)Update of the Fukushima Daiichi accident, Lessons Learned, and Future of Japanese NE Policy

Member countries were briefed on updated status of onsite and offsite situation. Key Lessons learned were explained along the line of defense in depth; namely, (Level 1-3: Design), (Level 4: Accident Management and Prevention of large release), and (Level 5: Emergency Plan and Crisis Management). Although the Japanese Government had decided on reduced reliance on nuclear power by 2030, the exact extent is yet to be determined based on public consultation.

(2)Emergency Preparedness and Response (EPR)

Relevant to the Fukushima Daiichi accident, a Japanese presentation discussed the timeline of release and of protective action taken and the results of evaluation of exposure. Based on the experience of the accident, it was emphasized that there is a need to establish more effective arrangements for nuclear EPR.

(3)Site Characterization

Japan explained recommended coverage in a feasibility study (using IAEA NS-R-3) including site characterization on earthquakes and surface faulting etc. Also, current status of site evaluation by regulation was briefed from Japan. Current concerns in China include protection of water resources, population distribution. Vietnam reported the current status of regulation in the country on siting. Bangladesh shared information on the current status of Site Evaluation Report (reviewed by the IAEA) for the planned Rooppur NPS site.

(4)Risk Communication

Japan shared its experience of risk communication on radiation by the Health Physics Society after the Fukushima Daiichi accident and practical examples of Q&A with the public, received mostly from mothers with small children. Indonesia discussed experiences from crisis communication and lessons learned from it. Malaysia and the Philippines discussed experience of risk communication during the accident at the Fukushima-Daiichi NPS including issuance of information bulletins. Recognized key issues about crisis communication are a) credibility and trust of risk communicators, and b) how to respond to the rumors and how to avoid spread of rumors preemptively by release of accurate and credible information at an early time.

(5)Nuclear Liability

Japan outlined the nuclear liability scheme. With regards to the Convention of Supplemental Compensation (CSC), Japan touched on the need to amend domestic law before joining, although she recognizes the value of convention. Based on Fukushima experience, the presenter raised several points for consideration by newcomer countries

(6)Human Resources Development (HRD)

Each of the member countries of FNCA reported current national activities for HRD in mind of recommendations to the 13th Ministerial Level Meeting. This panel recognized that "each country organized a national network for HRD and identified a focal point" and "here remains significant challenge for development of necessary professionals to launch and support nuclear power programme" etc. China reported how the country is responding to meet demand for nuclear professionals; 47 universities offer nuclear related courses. China also announced that the international training center on nuclear power construction established in cooperation with IAEA is open to all IAEA member states.

(7)Project Management and Funding

The presentation by an expert in financing discussed "Concerns of the financial community surrounding nuclear power projects and the classic risks associated with them" etc. Finally, the presentation noted that a project must be considered at two levels: first, "How will the lenders get paid back?", and second, "Lender concerns about 'Reputational Risk'".

(8)Next Study Panel

For the upcoming panel, the following candidate topics were discussed.

- Continued dialogue on infrastructure necessary for assuring nuclear safety and relevant regional cooperation
- Legal arrangement with focus on security and safety
- Risk communication and stakeholder involvement

A scene of the meeting

Message from Dr. Sueo Machi FNCA Coordinator of Japan

Dr. Hatta, Minister of Indonesia for Science, Technology and Research opened the 13th FNCA Ministerial Level Meeting (13 MM) in Jakarta 24 November 2012. By the opening speech he emphasized that the FNCA is the excellent cooperation among Asian countries achieving tangible results to benefit the member countries.

Mr. Haku, the then Senior Vice-MinisterDeputy Minister of Japan for National Strategy stated that Japan will restart operation of existing nuclear power plant after the approval of the Nuclear Regulatory Authority, and increase renewable energy.

One of the major agenda of the 13MM was the policy of human resource development (HRD) for nuclear power and nuclear application. Recommendation of 13th FNCA Coordinators Meeting on HRD was adopted by the Ministerial Meeting to strengthen HRD by increasing national budget and international cooperation.

In order to use tangible achievements of FNCA projects for socioeconomic development in the fields of agriculture, human health, and radiation processing in commercial sectors, it is agreed to set up networks between nuclear organizations and sectors of potential end-users in each member countries.

The Projects of Radiation Therapy of Cancer has developed the new protocol for the treatment of advanced uterine cervix cancer by chemo-radio therapy, which brings about higher survival rate of patients. This protocol should be more widely used in hospitals as a standard protocol in the member countries.

FNCA Study Panel on nuclear energy was held in Bangkok in 2012 focusing on lessons learned from the nuclear accident of Fukushima Daiichi NPS. Nuclear liability, emergency preparedness and response issue, and the funding strategy for nuclear power plant construction were also discussed.

FNCA projects for infrastructure building, such as Nuclear Safety Management System, Nuclear Security and Nuclear Safeguards and Nuclear Security, and Radiation Safety/Waste Management were implemented successfully.

In coming years possible synergy and collaboration among different FNCA projects should be explored and materialized. For example, between Project on Radiation Processing of Natural Polymers to produce plant growth promoter and Project on Bio-fertilizer, and between Nuclear Safety Management System and Nuclear Security and Nuclear Safeguards.

In conclusion, I would highly appreciate the member countries for excellent contribution of relevant experts and officers which bring about remarkable outcome of all activities benefiting the Member Countries for development and welfare.

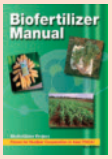
Outcomes of Project Activities

Reports

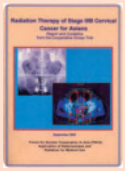
〈Radiation Utilization Development〉

Mutation Breeding Manual

Achievement Report in Soybean/ Sorghum, Orchid and Banana



Biofertilizer Manual



Radiation Therapy of Stage IIIB Cervical Cancer for Asians

Handbook in Brachytherapy Physics

〈Nunclear Safety Strengthening〉

Radiation Safety & Radioactive Waste Management Newsletter

Task Group Reports and Consolidated Reports on Radioactive Waste Management/ Radiation Safety

Commercialized Products

Biofertilizer Products in Malaysia

Plant Growth Promoter "T&D 4DD" (Vietnam)

Beauty Face Mas "Esllon" (Malaysia)

Hydrogel Wound Dressing "Cligel" (Korea)

Enrichment of Websites

ANTEP Website

Mutation Breeding Database

FNCA Activities in JFY 2012

Activity		Schedule	Host Country
The13th Ministerial Level Meeting		November 24th, 2012	Indonesia
The 4th Panel Meeting of "Study Panel on the Approaches toward Infrastructure Development for Nuclear Power		July 26-27th, 2012	Thailand
The 14th Coordinators Meeting		March 11-12th, 2013	Japan
Radiation Utilization Development	Mutation BreedingWorkshop	February 26-March 1st, 2013	Malaysia
	Biofertilizer Workshop	November 6-9th, 2012	China
	Electron Accelerator Application Workshop	October 2-5th, 2012	Kazakhstan
	Radiation Oncology Workshop	January 15-18th, 2013	Thailand
Research Reactor Utilization Development	Research Reactor Network Workshop	November 19-22nd, 2012	Indonesia
	Neutron Activation Analysis Workshop	November 27-30th, 2012	Vietnam
Nuclear Safety Strengthening	Safety Management Systems for Nuclear Facilities Workshop	October 29-November 2nd, 2012	Korea
	Radiation Safety and Radioactive Waste Management Workshop	July 10-13th, 2012	The Philippines
Nuclear Infrastructure Strengthening	Nuclear Security and Safeguards Workshop	December 18-21st, 2012	Vietnam
	Human Resources Development Workshop	September 12-14th, 2012	China

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, Korea, Malaysia, Mongolia, The Philippines, Thailand and Vietnam, IAEA (Observer)

Ministerial-Level Meeting

The ministerial-level representatives of each country holding jurisdiction over nuclear activities discuss cooperation measures and nuclear related policies. On the day before the ministerial-level meeting, the senior administrative officials meeting is to be held.

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.

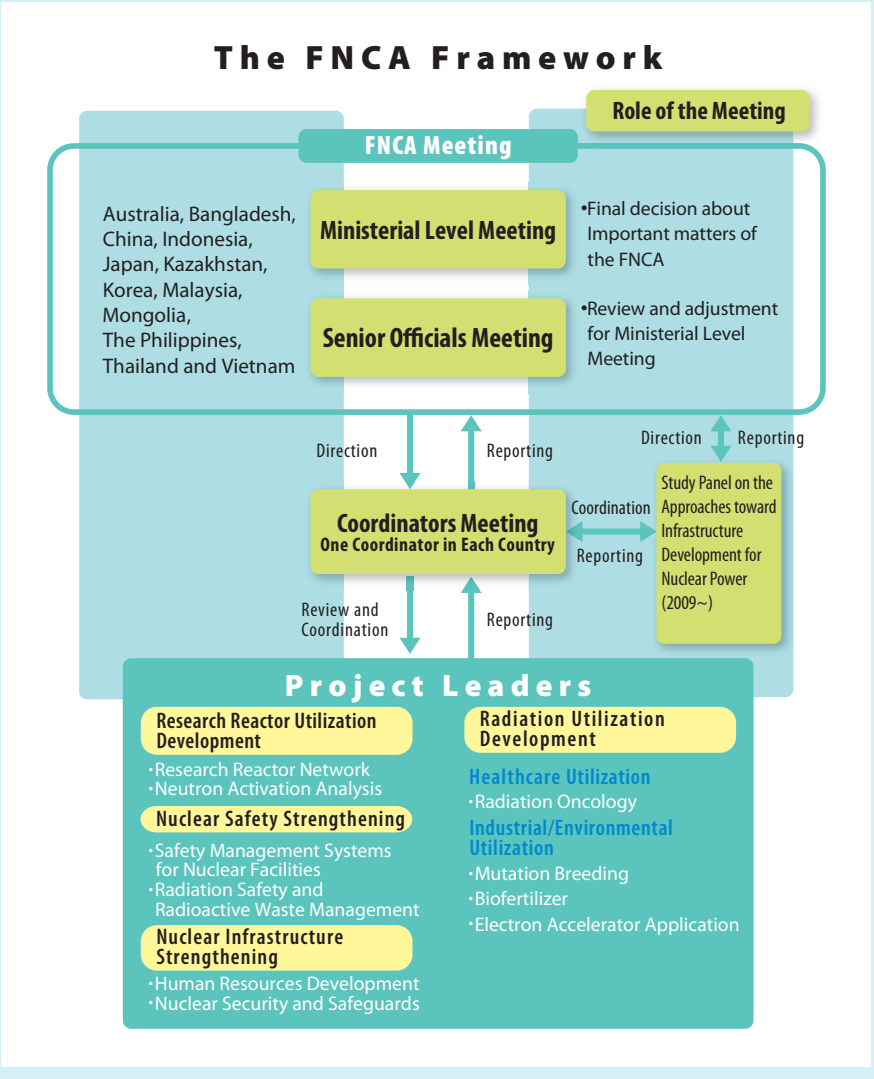
Panel Meeting

To examine & evaluate the role of nuclear energy, and also study problems related to the introduction of nuclear power generation. A new study panel on the Approaches toward Infrastructure Development for Nuclear Power started in 2009.

Project

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

The FNCA Framework



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