

## Summary Report of 16th FNCA Coordinators Meeting [Final]

The 16th FNCA Coordinators Meeting held on March 4-5, 2015, in Tokyo, Japan, was officially 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. Chairperson of the Meeting was Dr. Sueo MACHI, FNCA Coordinator of Japan.

The Meeting was attended by delegates from 12 member countries and an international organization; Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Republic of Korea, Malaysia, Mongolia, the Philippines, Thailand, Viet Nam, and the RCA Regional Office.

The summary of the eleven sessions of this Meeting is as follows:

### Session 1: Opening Session

Mr. Masaaki TAIRA, State Minister of Cabinet Office, made a welcome address, in which he expressed heartfelt welcome to all the participants. He recognized FNCA's contribution to research and development in agriculture, medical care, and other field as well as nuclear power development in Asia. Mentioning about drastic change in the Asian region during 15 years since the establishment of FNCA, he encouraged the participants to start discussion of the FNCA's future, in order to maintain FNCA's contribution to the socio-economic development in Asian region, by better utilization of nuclear technology.

Then Dr. Yoshiaki OKA, Chairman of JAEC, delivered an opening address, in which he appreciated Dr. MACHI's long contribution, recognizing 15th anniversary of FNCA as a great mile stone. He encouraged redesigning of FNCA's activities so as to meet priorities of the region with flexible and constructive manner. He also expressed continuous support to FNCA. After the self-introduction by each participant, the Meeting agenda was adopted without amendments.

### Session 2: Summary Report of the FNCA Meetings in 2014

Mr. Jarrod POWELL, Australia, reported on the 15th Ministerial Level Meeting which covered strategy for application of multi-purpose research reactor as round table discussion. He also mentioned major decisions in the Ministerial Resolution, i.e. strengthening of Ministerial leadership/ project linkages/ efforts on shared access to research reactors. Dr. Nobuyasu ABE, Japan, reported on the 6th Study Panel held in Hanoi, Vietnam, in August 2014. In relation to stakeholder involvement, questions

and answers on prospect for public acceptance of nuclear power in Japan were conducted.

### Session 3: Development of Radiation Application-Part-1

Dr. Hirohiko TSUJII, Japan, reported on the progress of Radiation Oncology Project, especially the successful example where the 5-year overall survival and local control rates of chemo-radiotherapy for locally advanced cervical cancer (CERVIX-IV) were 68% and 91%, respectively. Dr. Miriam Joy C. CALAGUAS, the Philippines, presented the impact of FNCA studies in Radiation Oncology in the Philippines.

Dr. Hirokazu NAKAI, Japan, gave a presentation on the current status of Mutation Breeding Project which works toward the development of new varieties of rice with resistance to various environmental stresses, and with adaptability to low input sustainable agriculture.

Dr. Sobri Bin HUSSEIN, Malaysia, presented experience on mutation breeding in Malaysia, showing promising features of mutant lines originated from MR 219 rice seeds irradiated with carbon-ion beam in JAEA, Japan.

### Session 4: Strengthening of Nuclear Safety and Nuclear Infrastructure

Prof. Toshiso KOSAKO, Japan, reported on the activities of Radiation Safety and Radioactive Waste Management Project, including information exchange in the workshop, drafting consolidated report on Nuclear/Radiological Emergency Preparedness and Response and Publication of RS&RWM newsletter. Mr. Yevgeniy TUR, Kazakhstan, made presentation on the challenges of the radiation safety and radioactive waste management in Kazakhstan, namely remediation of the legacy sites, and efforts to solve the problems on radioactive wastes, such as updating the law on nuclear energy.

Mr. Peter McGLINN, Australia, presented overall achievement that the Safety Management Systems for Nuclear Facilities Project has accomplished at the past workshops and peer reviews. He announced the Project was approved to be extended by 2 years with some improvement in project activities, in terms of process of country report and peer review, and accessibility to project learning.

Dr. Md. Abdus SALAM, Bangladesh, reported on safety management systems (SMS) of BAEC research reactor, as well as the results of BTRR SMS peer review. He introduced

that, based on the recommendation of the peer review, BAEC is working to improve the SMS of BTRR, i.e. implementation of fully integrated management system, emergency planning and preparedness, strengthening of QA related documents, and so on.

Mr. Masao SENZAKI, Japan, outlined workshop of Nuclear Security & Safeguards Project. He mentioned a potential collaboration, such as co-hosting of an open seminar on nuclear security culture and safeguards awareness with APSN.

Mr. LEE Young Wook, Korea, delivered a presentation on activities of nuclear security and safeguards in the Republic of Korea, in which he provided the experiences on ASTOR meeting and IPPAS mission, and also introduced training courses conducted by International Nuclear Security Academy (INSA).

Dr. Kiyonobu YAMASHITA, Japan, reported on the outcomes of the workshop of Human Resources Development Project, which includes a proposal on the new scheme of workshop. He explained that the workshop on HRD policy should be held every 3 years with the participation of high level officials responsible for the national HRD policy, and the workshops in between should focus on specific topics such as nuclear communication strategy and small and modular reactor. The meeting proposed “nuclear communication strategy” as the topic of the workshop in 2015.

Ms. TSERENDORJ Munkhjargal, Mongolia, made a presentation on nuclear human resources development in Mongolia, in which she introduced the latest plan of structural change of Nuclear Energy Agency, and identified international law, public relations, advice to governmental policy and on the job training as immediate needs to train specialists.

#### Session 5: Development of Research Reactor Application

Dr. Mitsuru EBIHARA, Japan, reported on the results of the workshop of Neutron Activation Analysis Project where all participating countries reported the current situation on establishing the linkage to end-users. He summarized the progress of three sub-projects. He reported the consensus of the workshop participants to continue the project, starting new sub-projects on the analysis of suspended particular matter (SPM) and exploration of rare earth elements.

Dr. HO Manh Dung, Vietnam, reported achievement of neutron activation analysis in Vietnam, mentioning that through the introduction of  $k_0$  method and implementation of quality assurance system, NAA was successfully applied to the study on air pollution, analysis of human hair and marine sediment, archaeological artifacts, etc.

Dr. Masanori KAMINAGA, Japan, reported the outcomes of the workshop of Research Reactor Network Project. With an understanding that the FNCA region will be self-sufficient in Mo-99 supply after 2018, the meeting recommended that the workshop in 2015 should focus on the policy of international cooperation for sharing multi-purpose research reactors in the region. Mr. Chanatip TIPPAYAKUL, Thailand, introduced the plan and progress situation of new research reactor in Thailand.

#### Session 6: Development of Radiation Application-Part-2

Dr. Shotaro ANDO, Japan, reported on the results of Biofertilizer Project, such as the application of radiation for sterilization of the carrier of bio-fertilizer, synergistic effect between biofertilizer and irradiated oligochitosan, and publication of guidelines for quality analysis of biofertilizer. Dr. Khairuddin Bin ABDUL RAHIM, Malaysia, reported the current status of commercialization of biofertilizer in Malaysia. He presented the effects of radiation sterilization for carrier production and introduction of various biofertilizer products developed by Nuclear Malaysia using radiation sterilization.

Dr. Masao TAMADA, Japan, summarized the major output of Electron Accelerator Application Project, including the successful experience that foliar spray of Plant Growth Promoter (PGP) bringing about 30 - 60 % increase in production yields of rice, chili, maize, potato, etc. Dr. Darmawan DARWIS, Indonesia, made a presentation on the successful achievement in Electron Accelerator Application Project in Indonesia, where the use of Super Water Absorbent (SWA) and PGP produced excellent results in terms of yield, disease resistance and so on.

#### Session 7: Perspectives and Strategy for Application of Radiation Technology

Dr. Tomoko M NAKANISHI, Japan, delivered a lead speech, in which she mentioned that radiation application and radioisotope market size is comparable to that of the nuclear power market in Japan. Representatives of the member countries delivered country reports on their governmental strategy, challenges, ongoing projects, and achievements of radiation application. The meeting recognized that nuclear applications in the areas of agriculture, health care, and industry were developing while environmental preservation was a priority for some countries. The participants noted

the report from the Philippines on SIT for dengue mosquito. The meeting agreed that the Research Reactor Network Project may discuss sharing the utilization of the region's research reactors including Serpong Reactor.

#### Session 8: Follow-up on Recommendations of the 15th Ministerial Level Meeting

##### (1) How to enhance commercialization of FNCA R&D achievement

Indonesia, Kazakhstan and Thailand made lead speeches on activities and strategy towards commercialization of R&D achievement. Dr. Anhar Riza ANTARIKSAWAN, Indonesia, reported their government-initiated activities to disseminate the R&D achievement, especially in the field of public information. Dr. Erlan BATYRBEBKOV, Kazakhstan, reported infrastructures including "Park of Nuclear Technologies" which takes charge of promotion of commercialization. Ms. Nipavan PORAMATIKUL, Thailand, talked about the efforts of commercialization of R&D achievement in Thailand, referring to the Business and Development Unit of TINT which has constructed pilot plants for the production of PGP and SWA.

##### (2) Discussion on the themes of the 4th Phase Study Panel

Dr. Sueo MACHI, Japan, delivered introductory speech on 4th phase study panel on nuclear energy, proposing six possible agenda items. Following the statements by member countries on preferable agenda items, it was concluded that the date and agenda of 4th phase Study Panel would be finalized by Cabinet Office and FNCA Coordinator of Japan, and the decision would be reported to member countries asking for their agreement.

#### Session 9: IAEA/RCA Activities Reports and the Cooperation between RCA and FNCA

Mr. CHOI Kun Mo, Director of RCA Regional Office, made a presentation of the organization and current activities of RCA, as well as the areas where the cooperation between FNCA and RCA has been conducted. Dr. MACHI presented possible synergy by cooperation between FNCA and RCA, and encouraged RCA countries to participate in identified project workshops of FNCA, as well as information exchange between both. It was mentioned that Neutron Activation Analysis Project of FNCA could be complementary with RCA program on air pollution monitoring.

#### Session 10: Future FNCA Activities

Dr. MACHI gave his review of Biofertilizer Project and Electron Accelerator Application

Project, the phases of which will expire in this March and Neutron Activation Analysis (NAA) Project which was extended by one year pending development of end users' linkage. Coordinators or the representative of each country gave comments on these three projects, and then agreed that Biofertilizer Project and Electron Accelerator Application Project were extended by three years and that NAA Project was extended by one year and reviewed at the Coordinators Meeting in JFY2015.

Dr. MACHI proposed host countries of FNCA Project Workshops in JFY 2015, and the proposal was agreed except Indonesia which will inform official agreement as early as possible.

#### Session 11: Closing Session

Dr. MACHI provided the Conclusion and Recommendations. After discussion and some changes, the Conclusion and Recommendations (as attached) were accepted by the meeting.

Lastly, Dr. MACHI gave his closing remarks, and officially closed the meeting.

## **FNCA16th Coordinators Meeting**

March 4-5, 2015, Tokyo, Japan

### **Conclusion and Recommendation**

Drafted by S. Machi

1. The meeting was welcomed by Mr. Taira, State Minister of Cabinet Office and Prof. Oka, Chairman of Japan Atomic Energy Commission, who encouraged FNCA to start discussions on new activities in order to contribute to new socio-economic development in the region.
2. The meeting appreciated that the FNCA activities were effectively implemented in JFY 2014 to have achieved significant outcomes benefiting member countries.
3. The Meeting appreciated the excellent results in the Project on Radiation Oncology in terms of survival rate of 68% for uterine cervix cancer patients 5 years after radiotherapy, and 80% for head/neck cancer patients 3 years after treatment, and noted good synergy between RCA and FNCA radiotherapy activities in the Philippines.
4. The meeting encouraged that the Project on Mutation Breeding should enhance collaboration with the Projects on Radiation Processing of Natural Polymers for effective application of oligo-chitosan and on Biofertilizer.
5. The meeting suggested that the Project Workshop on Radiation Safety and Radioactive Wastes should focus on a specific issue rather than diversified topics, and inform the Coordinators of the focused topic well in advance of the workshop in order to nominate the most appropriate experts to participate.
6. The meeting appreciated the successful implementation of the Project on Safety Management Systems of Nuclear Facilities in the peer review by the expert team of Member Countries in Bangladesh in JFY 2014, and noted that BAEC has improved safety management by following the recommendations of the peer review.
7. The meeting appreciated that the Project on Safety Management Systems of Nuclear Facilities has been extended for two years to have workshop/peer review in remaining countries, such as Vietnam, Japan, Kazakhstan, and Thailand.
8. The meeting appreciated the important training program provided by JAEA ISCN and KINAC Korea for Member Countries on nuclear security. China reported that it plans to carry out an IPPAS mission within the next two years.
9. The meeting agreed that the HRD WS in JFY 2015 focuses on the development of HRD strategy on nuclear communication in good coordination with the

IAEA/ANSN program, and that the participants should be senior officials responsible for HRD strategy in Member Countries.

10. The meeting noted that the FNCA region will be self-sufficient in Mo-99 supply after 2018 through the increase in production capacity at ANSTO and the new production reactor operated by KAERI. With such understanding, the meeting recommended that the workshop on Research Reactor Network in JFY 2015 should focus on the policy of international cooperation for sharing multi-purpose research reactors in the region, and sharing experiences on design of such reactors.
11. The meeting recognized that nuclear applications in agriculture, health care, and industry are developing in all Member Countries, contributing to sustainable socio-economic development.
12. The meeting noted that Indonesia, Kazakhstan and Thailand have government and/or institutional schemes to enhance technology transfer from research institutes to relevant commercial sectors.
13. The meeting suggested that decision makers in government, and others at all levels in the nuclear sector should make best efforts to establish enhanced linkages with potential end-users.
14. The meeting agreed to launch the new Phase 4 of the Study Panel on nuclear energy from JFY 2015 with the proposed scope and objectives. It was agreed that the proposed agenda meets the interests of Member Countries, and that the agenda on 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 sustainable development are the most appropriate topics for the first meeting in 2016.
15. The meeting pointed out that the timing of the 1<sup>st</sup> meeting of the 4<sup>th</sup> Study Panel should be held before COP-21 in Dec. or Nov. 2015 and noted CAO of Japan may consider an alternative meeting before the 16<sup>th</sup> Ministerial Meeting and COP-21.
16. The meeting agreed that FNCA continues the cooperation with RCA/IAEA on the projects on mutation breeding, radiation processing of natural polymers and radiation oncology for synergy and sharing experiences and information with non-FNCA RCA Member States.
17. The meeting reviewed 2 projects, Radiation Processing of Natural Polymers and Biofertilizer, after 3 years of implementation and took note of the following points: (Notes: Mutation Breeding should be reviewed in JFY 2015 and the

other 7 projects in JFY 2016)

(1) Radiation Processing of Natural Polymers (Electron Beam)

- i. Significant effect of the oligo-chitosan has been proven in field tests in terms of crop yield increase and enhanced crop disease resistance for a variety of crops, including rice, red chili, tomato, potato, carrot, cucumber, and cyclamen
- ii. Commercial application of the products has been achieved in Vietnam, Malaysia, Thailand and Japan. In Indonesia oligo-chitosan is in the process of registration as PGP for commercialization
- iii. Field tests of SWA in Vietnam and Thailand, as well as semi-field tests in Indonesia, have demonstrated a definite increase in crop yield under drought conditions and in sandy soils
- iv. The importance of SWA as a soil conditioner for drought areas to increase global food production is well recognized
- v. Further tests on a variety of crops in specific areas, as well as cost benefit analyses, should be carried out to demonstrate the benefit of SWA

(2) Biofertilizer

- i. The Project demonstrated the longer shelf life and better quality of biofertilizers produced by using carriers sterilized by radiation than those sterilized by high temperature steam, in Malaysia, the Philippines, Indonesia, Thailand, China and Vietnam.
- ii. Nuclear Malaysia has succeeded in the commercial production of biofertilizers using radiation technology to sterilize carriers in collaboration with a biofertilizer manufacturer. Field tests in plots have been carried out under the management of Muda Agricultural Development Authority (MADA) of the Ministry of Agriculture
- iii. The BIOTECH, UPLB in the Philippines has successfully used radiation sterilization of carriers to produce Bio-N for commercial production.

18. The meeting agreed to extend the two projects with the following comments:

(1) Radiation Processing of Natural Polymers

- i. The collaboration with the agricultural sector should be further enhanced in order to promote commercial application
- ii. Registration of the PGP, which is mandatory in some countries, should be supported by the Coordinators
- iii. Commercial application of oligo-chitosan in the remaining countries should be achieved within 3 years
- iv. New Application of Electron/Gamma Radiation should be studied before

JFY 2017

(2) Biofertilizer

- i. Closer collaboration with nuclear institutes for the irradiation of carriers in agricultural sectors is urgently needed to achieve commercial applications within three years.
- ii. The synergistic effect of biofertilizers and oligo-chitosan PGP should be confirmed for specific crops under specific stress conditions.

19. The meeting reviewed the Project of Neutron Activation Analysis (NAA) following the conclusion of the 15 CDM, making the following comments:

(1) Newly agreed targets of NAA application, namely ① analysis of PM 2.5 to study source apportionment of air pollution and ② exploration of mineral resources, are rational with the engagement of end-users in some countries. The activities on analysis of PM 2.5 should be complemented with the outcomes of the RCA Project on air pollution.

(2) Further project extension after JFY 2015 should be again reviewed by the CDM in JFY 2015 based on the level of end-user engagement

20. The meeting agreed to consider that the project workshops would be hosted by respective member governments as shown in Annex 1 in JFY 2015. Prospective host Governments will confirm their availability as soon as possible.