Nanotechnology to revolutionize agricultural productivity

Nanotechnology (nanotech) has the potential to revolutionize agriculture and food systems, changing the way food is produced, processed, stored, packaged, transported, and consumed. Nanoagriculture incorporates the basic principles of nanotech into agricultural sciences to evolve processes and products, deliver inputs, and promote crop productivity without associated environmental impacts. Nanoagriculture encompasses inputs (seeds, fertilizers, herbicides, insecticides) for enhanced use efficiency, nanopheromones for pest control, nanofood systems (packaging and encapsulation of functional foods), and nano-based diagnostic kits for early detection of diseases, pests, and nutrient deficiencies. Nanotech can result in breakthroughs in livestock productivity, agricultural waste management, and soil and water contaminant removal. In most APO countries, nanotech applications in agriculture are an emerging area.

To create greater awareness of nanotech applications in agriculture and review actual examples, the APO in collaboration with the Council of Agriculture Executive Yuan, National Ilan University (NIU), and China Productivity Center organized a workshop on Nanotechnology Applications for Boosting Agricultural Productivity at the NIU, Yilan, ROC, 3–7 September. NIU President Dr. Han-Chieh Chao inaugurated the program, which was attended by 23 participants from nine member economies.

The workshop comprised interactive lead presentations by resource persons, sharing of experiences by participants, group exercises, and observational visits. Participants identified problems in promoting nanotech applications in the agriculture and livestock sectors and formulated action plans for the government, organization, and individual levels. They also made voluntary commitments to follow-up actions. To observe nanotech applications in the host country, participants visited the NIU's Center for Nanotechnology; King Car Biotechnology Industrial Co., Ltd.; Nanotechnology Research Center of the Industrial Technology Research Institute; and Research Institute of Kuang Chuan Dairy Co., Ltd.

Participants at Kuang Chuan Dairy examining fresh milk with nano-scale calcium carbonate, which speeds up calcium absorption to make milk more nutritional.

The workshop received wide local media coverage. "The workshop had a very good selection of participants with reasonably diverse backgrounds, which was essential to draw interesting conclusions on multidisciplinary applications," commented APO Expert Dr. Joydeep Dutta, Chair in Nanotechnology at the Water Research Center, Sultan Qaboos University, Oman. Dr. Lucille V. Abad from the Philippines pledged, "I will conduct echo seminars for nanotech groups and my NPO." Dr. Maryam Hashemi from IR Iran stated, "I will utilize my learning by reporting to the Iranian Nanotech Initiative Council as well as my institute, and… develop nanotech-based products in agriculture." Indian participant Dr. Kizhaeral S. Subramanian said, "I learned a lot about nanotech commercialization and nanofood systems and will translate every aspect of that knowledge into action."