fresh

News from AVRDC – The World Vegetable Center

26 November 2012

www.avrdc.org

GCARD II: Improving smallholder livelihoods with foresight and innovation

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31st IVTC: Trainees visit an okra packing shed: another link in the vegetable value chain

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Promoting best postharvest practices

The new Postharvest Services and Training Center offers tools and knowledge to protect the quality, nutritional value, and shelf life of fresh produce

(left-top): Tomato dryer.

(left-bottom): Evaporative cooler.

(right): Demonstrating a selection of harvesting tools to farmers at the Postharvest Training and Services Center.

In sub-Saharan Africa, 30–80% of horticultural crops are lost after harvest, in part due to a lack of awareness about good harvesting and packing practices and a lack of storage facilities. Improper postharvest handling also can cause the nutritional value, quality, and shelf life of fresh produce to decline, and may compromise the safety of the food supply. To assist people involved in different aspects of horticultural

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Participants in the Horticultural Postharvest Training Course, AVRDC's Regional Center for Africa, Arusha, Tanzania, 7-13 October 2012.

production to evaluate and address postharvest losses, the University of California - Davis and the Postharvest Education Foundation in collaboration with AVRDC – The World Vegetable Center organized two **Horticultural Postharvest Training Courses** at AVRDC's Regional Center for Africa in Arusha, Tanzania from 7-13 October and 14-20 October 2012.

The Training of Trainers (ToT) course aimed to develop the skills and knowledge of horticultural professionals (university faculty, agriculture ministry staff, entrepreneurs, producers, etc.) from various countries in sub-Saharan Africa to reduce postharvest losses and improve market access and incomes for small-scale horticultural crop farmers, most of whom are women. The ToT sought to fill a gap: Although past projects identified appropriate postharvest technologies and recommended a variety of training, capacity building and small-scale infrastructure development activities, these recommendations had not been integrated into local situations. In 2011, the Horticultural Collaborative Support Program (HortCRSP) funded by the United Stated Agency for International Development (USAID) awarded the University of California - Davis, the World Food Logistics Organization and the University of Georgia a pilot project to develop local postharvest training activities and service centers to support the postharvest needs of producers. **Victor Afari-Sefa**, AVRDC Socioeconomist, is the principal investigator for AVRDC under this initiative.

Diane M. Barrett (University of California) and **Lisa Kitinoja** (Postharvest Education

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(left): Participants join in a demonstration on sorting vegetables by color to help increase sales.
(right): PTSC trainers explain how easy-to-construct zero energy cooling chambers can protect vegetables from rapid deterioration.

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Participants in the second training course, held from 14-20 October 2012.

Foundation) led the Training of Trainers workshop activities. **Amanda Crump** (HortCRSP), **Lizanne Wheeler,** a volunteer with the Postharvest Education Foundation, and **Bertha Mjawa,** an independent postharvest consultant from Tanzania, participated as instructors. **S.K. Roy** (Amity International Centre for Postharvest Technology & Cold Chain Management) constructed a zero-energy cool chamber and demonstrated how storing fresh produce at slightly lower temperatures in the chamber can extend shelf life. **Ngoni Nenguwo**, AVRDC's Postharvest Specialist, and **Radegunda Kessy**, a research associate in Agribusiness and Socioeconomics, helped to conduct the two-week training event.

Prior to the Arusha course, the 36 agricultural professionals attending from Benin, Ethiopia, Ghana, Kenya, Rwanda, Uganda and Tanzania participated in online training in advanced postharvest technology sponsored by USAID through HortCRSP in conjunction with the Postharvest Education Foundation. The online participants then completed their training in person during the ToT.

The participants also had a chance to put their training into practice by officially opening the first **Postharvest Training and Services Center (PTSC)** on 12 October. Located at AVRDC's Regional Center for Africa, the PTSC is a one-stop shop where growers, farmers' associations, and marketers can find materials and assistance, offered at cost, for all the steps that occur from the moment produce is harvested to the moment it is eaten. Among other services, the PTSC:

- offers reusable crates and packaging supplies to protect produce
- stores produce at the correct lowest safe temperature so it lasts longer, giving producers time to sell at a higher price
- arranges cool transport for fresh produce
- provides training for producers on how to build a reputation for quality products, opening access to new markets and premium prices

About 60 farmers from Arusha visited the PTSC during the launch and the trainees gave the farmers on-site demonstrations of some of the tools and supplies the center offers.

Equipped with the knowledge needed to design and demonstrate simple postharvest handling technologies, the trainees were encouraged to establish new PTSCs that will provide similar training and services in their own countries.

The Center in the news

Roland Schafleitner, AVRDC's Head of Molecular Genetics, discussed the value of having the full tomato genome available to identify genes associated with important traits, and to spot variations to use as signposts for breeding programs with Sharon Schmickle, a reporter with the **MinnPost** USA news website. The article was reprinted on the **Biosciences for Farming in Africa** (B4FA) website.

Biosciences for Farming in Africa (B4FA)
http://www.b4fa.org/opinion/revealing-tomatos-secrets/

Warwick Easdown, Regional Director, South Asia, spoke to reporter Gayatri Jayarman of **LiveMint** about the importance of indigenous vegetables to supplement nutrient-deficient diets in India.

LiveMint
http://www.livemint.com/Leisure/ni4E7qKKvjBWdnvQ5IblSO/The-new-organic.html

SciDev Net reported on the launch of the **Association of International Research and Development Centers for Agriculture (AIRCA),** of which AVRDC – The World Vegetable Center is a part. The nine AIRCA member institutions aim to find a productive balance between livelihood improvement for small-scale farmers and long-term environmental sustainability.

SciDev Net
http://www.scidev.net/en/agriculture-and-environment/farming-practices/news/global-alliance-to-strengthen-research-farmer-links.html

IHC 2014 indigenous vegetables symposium

The **29th International Horticultural Congress** ("Sustaining Lives, Livelihoods and Landscapes") sponsored by the International Society for Horticultural Science will be held in Brisbane, Australia from 17-22 August 2014. AVRDC Director General **Dyno Keatinge** and Plant Pathologist **Jaw-Fen Wang** will convene a **symposium on indigenous vegetables** during the congress. Professional germplasm specialists, breeders, agronomists, postharvest specialists, agricultural economists, home economists and human nutritional specialists from countries and regions where indigenous vegetables are a focus of agricultural research and development are invited to attend the symposium.

Call for Abstracts opens
1 April 2013

Call for Abstracts closes
1 November 2013

Registration opens
30 September 2013

IHC 2014

http://www.ihc2014.com/

GCARD II

AVRDC Director General **Dyno Keatinge** represented the Center at the second **Global Conference on Agricultural Research and Development** (GCARD II) in Punta del Este, Uruguay from 29 October - 1 November 2012. The event brought together 658 participants from 101 countries—and more than 1000 people on-line—to explore foresight and partnership for innovation and impact on smallholder livelihoods. Sessions addressed diverse perspectives and realities around delivering change in these key agendas. The parallel sessions built from existing programs, finding synergies and connections to lead to large-scale and tangible outcomes, owned by all involved. At GCARD II, participants:

- Considered how agricultural research for development (AR4D) systems can align with major national and global development policies.
- Repositioned women farmers' needs firmly at the center of AR4D processes.
- Directly engaged the voices of youth into consideration of the issues involved.
- Developed and agreed collective actions that will bring together diverse foresight analyses, to better understand future needs and priorities and help us all to shape the future we desire, particularly exploring the future for smallholder farming.
- Highlighted innovative agricultural research-for-development agendas: household nutrition, gender-based needs, attracting young people into agriculture, meeting the needs of communities shattered by protracted crises, linking farmers to markets, adapting to climate change, and fostering community-centered innovation.
- Set out what is required for action to track and stimulate investments and returns and make these more effective and comprehensive, linking public, private and civil mechanisms.

(above): Sarah Simons, CABI, at the AIRCA booth.

(bottom): AVRDC Director General Dyno Keatinge with AIRCA members at the GCARD II conference.

The **Association of International Research and Development Centers for Agriculture (AIRCA)** made its debut at the conference. AVRDC is a member of this nine-institution consortium that aims to balance livelihood improvement for small-scale farmers and long-term environmental sustainability. Other AIRCA members: CABI, Tropical Agricultural Research and Higher Education Center (CATIE), Crops for the Future (CFF), International Center for Biosaline Agriculture (ICBA), International Centre for Integrated Mountain Development (ICIMOD), African Insect Science for Food and Health (*icipe*), IFDC, and the International Network for Bamboo and Rattan (INBAR).

Open Sorghum Day

Amaranth '2004'

Sorghum graciously shared the limelight with vegetables and trees during **Open Sorghum Day** at the International Crops Research Institute for the Semi-Arid Topics (ICRISAT) Samanko Station, Mali on 7 November 2012. About 100 participants attended the event, including farmers from Mali and Burkina Faso, representatives from women's and men's associations, and staff from partner institutions including Mali's National Seed Service, Helen Keller International (HKI), Association malienne d'Éveil pour le Développement Durable (AMEDD), and Mouvement Biologique Malien (MOBIOM).

During the field day, staff from ICRISAT, AVRDC – The World Vegetable Center and the World Agroforestry Centre (ICRAF) guided visitors to research plots for a closer look at improved varieties of sorghum, groundnuts and vegetables. Participants also joined in discussions on nutrition and seed certification.

Team AVRDC promoted improved varieties developed from the Center's lines, including pepper 'Nisondia,' African eggplant 'L10,' amaranth '2004,' okra 'Sasilon' and 'Batouma,' stevia, processed orange tomato 'Bebi yere,' and dried okra, cabbage and tomatoes. Samples of processed vegetables at the AVRDC booth attracted much attention; some visitors inquired about the processing practices and the shelf life of the products, and others wanted to know how processed vegetables contribute to nutrition. AVRDC staff also fielded questions on home gardening methods, vegetable production, and availability of seed.

Visitors engaged in discussions about the role of improved sorghum varieties and vegetables in improving nutrition, particularly for children. A simple vegetable soup adapted to children's needs and tastes was prepared during a cooking demonstration. Mali's national television station, ORTM, reported on the event, and a local radio station aired an interview about nutrition.

(clockwise from top left): Fresh and processed vegetables attract attention at the AVRDC stand; getting ideas for growing vegetables in containers in the mobile garden; reviewing new vegetable lines in the demonstration field.

Raising incomes in the humid tropics

A project to improve agricultural production systems and livelihoods in the hot and wet areas around the equator

AVRDC – The World Vegetable Center will participate in **Humidtropics**, a major new research for development program launched on 15 November 2012 that aims at increasing average farm income by 50% with 25% of poor households lifted above the poverty line in the humid tropics in the next 15 years. Research leading to production system intensification will boost yields of staple crops such as cassava, yam, banana and maize, integrate nutritious vegetables into production systems, and help to reduce the number of malnourished children by 30%.

"Humidtropics helps farm families to make better decisions about making their living and living their lives while caring for the environment they cultivate," said Dr. Ylva Hillbur, Deputy Director General Research with the International Institute of Tropical Agriculture (IITA), the lead research center for the program.

The humid tropics are the vast hot and wet areas around the equator that are home to about 2.9 billion people living on 3 billion hectares of land. Agricultural systems span the humid tropics from integrated tree crops-based systems such as cocoa in West Africa, banana-based systems in East and Central Africa, to intensive-mixed systems in Asia and vulnerable integrated crop-livestock systems in Central America and the Caribbean. Intensifying agriculture in these areas has the best potential to reduce poverty, especially among women and other vulnerable groups. The bulk of the rural poor reside in the humid tropics, which are also associated with poor household nutrition and soil fertility depletion. Even so, the humid tropics are critical to global food supplies and meeting world food demand, central to the maintenance of global biodiversity, and vital to the mitigation of greenhouse gases.

An initial 3-year investment of US$144 million by the CGIAR Fund and other donors in Humidtropics, an innovative 15-year research program, will help poor farm families, mostly led by women, to boost their agricultural productivity while conserving the land for future generations. This is the largest single investment in a consolidated effort by research-for-development partners to solve the extreme hunger and poverty problems that poor and vulnerable people in the humid tropics face.

Humidtropics will also serve as a model to other agencies seeking to link agricultural systems research to developmental impact.

The initial program participants include the International Center for Tropical Agriculture (CIAT), International Livestock Research Institute (ILRI), World Agroforestry Centre (ICRAF), International Potato Center (CIP), Bioversity International, International Water Management Institute (IWMI), International Centre of Insect Physiology and Ecology (*icipe*), Forum for Agricultural Research in Africa (FARA), AVRDC – The World Vegetable Center (AVRDC), and Wageningen University. Representatives from these institutes met from 18-21 November 2012 in Ibadan, Nigeria to develop a plan to widen participation and to firm up the road map that will advance the implementation of what possibly will become the largest multi-stakeholder initiative to tackle development challenges in the humid tropics.

Humidtropics
www.humidtropics.org

Walking off diabetes

AVRDC headquarters staff marked **World Diabetes Day** on Wednesday, 14 November 2012 with a walk around campus to promote awareness of the value of exercise and a healthy, balanced diet in controlling type 2 diabetes.

The fat, liver, and muscle cells of people with type 2 diabetes do not respond correctly to insulin, a hormone that helps to move blood sugar into cells, where it is stored and used for energy. As a result, blood sugar does not get into these cells. When sugar cannot enter cells, high levels of sugar build up in the blood.

A lack of physical activity, poor diet, and excess body weight around the waist increase the risk of developing the disease. Most people with type 2 diabetes are overweight when they are diagnosed, as increased fat makes it harder for the body to use insulin in the correct way.

Eating a well-balanced diet that includes at least 400 grams of vegetables and fruit each day, combined with daily exercise, can help prevent this chronic noncommunicable disease.

Studies with animals and humans suggest bitter gourd (*Momordica charantia* L.; whole fruit, juice, or extract) has a role in diets for diabetes control. The antidiabetic effect of bitter gourd results from the complex action of multiple compounds in the fruit. AVRDC and partners are studying this vegetable to develop evidence-based recommendations for using bitter gourd to help manage type 2 diabetes.

Bitter Gourd Project

http://www.bitter-gourd.org

International Diabetes Foundation

http://www.idf.org

Seminars

One man who knows how to balance diets is **Jimmy Smith**, Director General of the International Livestock Research Institute (ILRI), who spoke to AVRDC staff about ways "Meat and Vegetables Go Together" on 19 November 2012. Dr. Smith discussed how livestock and vegetable researchers are natural partners in working for the well-being of the world's poor, and noted many common attributes meat and vegetable production activities share: perishability, food safety and public health, conservation of indigenous genetic resources, the need to prevent the use of banned or inappropriate pesticides and use of polluted water for irrigation—all issues that must be addressed if small-scale producers are to be included in markets demanding increasingly stringent food quality, safety and uniformity standards. ILRI's research covers more than 30 disciplines and about 50% of its research is conducted for sub-Saharan Africa. Livestock production and marketing are essential for the livelihoods of almost 1 billion people, of which about two-thirds are women, and nearly 1.3 billion people are employed in livestock value chains globally. Dr. Smith mentioned the importance of manure—in the poorest countries, livestock manure comprises more than 70% of soil fertility amendments. IRLI is looking to a future in which livestock and rangeland owners will receive payments for the ecosystem services they provide. Dr. Smith's visit was the fourth in a series entitled *Networking to Enhance International Cooperating Vegetable Research and Development* sponsored at AVRDC headquarters by Taiwan's Ministry of Foreign Affairs (MOFA).

Martha Mutschler, Professor in the Department of Plant Breeding, Cornell University USA, introduced AVRDC staff to her research in **"**Developing an Acylsugar-Based System for Control of Insects and Viruses in Tomato" on 14 November 2012. Acylsugars affect a range of insect pests, including virus vectors such as whitefly. The highest levels of acylsugars are found in wild tomato (*Solanum pennellii)*. Transferring acylsugar production genes from *S. pennellii* to cultivated tomato could provide an effective form of insect control and reduce the need for pesticides. Tomato lines combining acylsugar production and virus resistance genes are being used to create hybrids; AVRDC is testing the new lines to confirm pest resistance and determine the impact of acylsugar lines with/without virus resistance on pest-vectored viruses.

Jacqui Wright Kami, a consultant for agricultural development in the Pacific Islands, spoke about her experiences in the region on 7 November 2012 at headquarters. Jacqui's background encompasses work for the Australian Centre for International Agricultural Research (ACIAR), AusAid and the Papua New Guinea-Australia Agricultural Research & Development Support Facility (ARDSF).

Trap crops can help farmers lure pests away from valuable crops. In a presentation on 1 November 2012 entitled "Why do *Helicoverpa armigera* mothers lack smart decisions in the presence of *Solanum viarum*? The story of a potential trap crop" AVRDC Entomologist **Srinivasan Ramasamy** reviewed the possibilities of using Tropical Soda Apple (*S. viarum*) as a trap crop to tempt the cotton bollworm (*H. armigera*), an insect that feeds on and damages many crops including tomato, cotton, pigeon pea, chickpea, sorghum and cowpea. His research shows a significant increase in egg laying in female moths of *H. armigera* provided with *S. viarum*, which gives off volatile pheromones that attract the insects. *S. viarum* leaves of any age have either lethal or sublethal effects on the growing larvae of *H. armigera*.

Welcome

Bharath Krishnan is the Center's new Manager for Information Technology Services, and will take up his position on 29 November 2012 at AVRDC headquarters in Taiwan. Bharath brings extensive experience in the design and development of software and IT architecture to the post. He has held senior IT systems positions at Techbooks International and at the International Maize and Wheat Improvement Center (CIMMYT) in New Delhi, India where he was responsible for a range of IT infrastructure activities, including network and database management, project deployment, and IT policy development.

Vegetable Breeder **Fekadu Dinssa** rejoins AVRDC on 1 December 2012 in Arusha, Tanzania. From 2008-2010 Fekadu worked as a tomato breeder on AVRDC's "Vegetable Breeding and Seed Systems for Poverty Reduction in Africa" project funded by the Bill & Melinda Gates Foundation. He is currently the Technical Coordinator & Wheat Breeder for the East Africa Agricultural Productivity Project (EAAPP) at the Wheat Regional Center of Excellence (WRCoE) in Ethiopia. Fekadu holds a Ph.D in Agricultural Resources and Environment with a specialization in Breeding/Genetics from the University of Jordan.

AVRDC East and Southeast Asia welcomes **Katrin Stippich**, a Master's student of English and Geography at the Albert-Ludwigs-University Freiburg, Germany, who will stay in Bangkok for three months to collect data for her thesis on community resilience and food security within the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) funded project, "Understanding urban and periurban vegetable production and marketing systems through GIS-based Community Food Mapping in Greater Bangkok, Thailand." Katrin's particular interest is sustainable development, and she is excited about the prospect of going beyond theories into practical work. Her stay in Bangkok is supported by a grant from GIZ's Advisory Service on Agricultural Research for Development (Beratungsgruppe Entwicklungsorientierte Agrarforschung, BEAF).

Farewell

AVRDC Africa will say goodbye to Regional Administrative and Finance Officer **Philip Ndung'u** on 30 November 2012. Philip capably guided the regional office through the daily challenges of allocating and tracking budgets, and assisted his colleagues in the use of Maconomy, the Center's enterprise resource planning system. His careful and conscientious work will be greatly missed. Philip and family look forward to a new life in Canada. Good luck, Philip!

Suz Neave, AVRDC Project Coordinator for the Solomon Islands, is exchanging one island for another: After three years with the Center, Suz will join CABI in the United Kingdom as a Project Development Officer in December. Suz initiated partnerships with government ministries, nongovernmental organizations, and other research institutes to improve local livelihoods by establishing home gardens and increasing vegetable production. Among other activities, she participated in a market analysis of fresh vegetables in the Solomons, engaged local input vendors to test insect netting, and worked with a local drama group to develop an educational play and song about vegetable consumption. She also taught composting at the Center's annual International Vegetable Training Course in Thailand. We wish her well as she returns to the UK.

Gomathi Kannusamy, Ph.D candidate in nutrition, returned to Avinashilingam University for Women in Coimbatore, India after three months of developing nutritious bitter gourd recipes and evaluating the antidiabetic effects of the dishes at AVRDC HQ. Colleagues will miss her lively smile and tasty recipes!

Drawing a bead on an innovative drying method

(r to l): **Johan Van Asbrouck**, Managing Director, Rhino Research Group, Thailand with HRH **Princess Sirindhorn**, **Poon** and **Assoc. Prof. Vudtechai Kapilakanchana**, President, Kasetsart University.

Robert Holmer, Regional Director, East and Southeast Asia, presented a paper on leveraging technologies for food and nutrition security at the Drying Beads International Showcase, a workshop organized by the United States Agency for International Development (USAID) Horticulture Collaborative Research Support Program (HortCRSP) Center of Innovation at Kasetsart University, Thailand, the University of California (UC) Davis, and the Rhino Research Group on 25-26 October 2012 in Bangkok. HRH **Princess Sirindhorn** opened the event, and welcomed delegates from USAID HortCRSP, the Food and Agricultural Organization (FAO) and other international organizations as well as representatives from more than 15 embassies. Other keynote speakers were **Johan Van Asbrouck** (Rhino Research Group), **Mark Bell** (USAID HortCRSP), and **Dahal Peetambar**, UC Davis.

Drying Beads® provide a simple, inexpensive and widely adaptable method for drying seeds and other commodities. Delivering improved seeds to smallholder farmers in the developing world is an efficient and sustainable method of increasing crop yields and quality, but seed storage can be a problem because the majority of the world's poor countries are located in the tropics, where the combination of high temperature and high relative humidity causes rapid deterioration of seed quality.

The beads are made from a novel zeolite desiccant. When placed in inexpensive hermetic containers with the material to be dried, the beads reduce the moisture content in seeds and food, prolonging seed viability and shelf life. After absorbing water to their capacity, the beads can be reactivated by heating and can be reused multiple times.

In addition for drying and storing seed, this innovative technology can be used to dry fruits, vegetables, nuts, herbs, or medicinal plants, purify oils, and for other applications in which the removal of water is desired.

More information:
http://dryingbeads.com/

Vegetables Go to School

(l): Students at Klongpaklak School, Prawet District, Bangkok prepare beds for their next vegetable crop.

(r): A group of Vegetables Go to School workshop participants in the Klongpaklak School Garden.

More than 30 participants from Bhutan, Burkina Faso, Germany, Indonesia, Nepal, Philippines, Switzerland, Tanzania, Thailand and AVRDC – The World Vegetable Center gathered in Bangkok from 14-16 November 2012 for a planning workshop to develop a project entitled **"Vegetables Go to School: Improving Nutrition by Agricultural Diversification."**

With support of the Swiss Agency for Development and Cooperation (SDC) and building on earlier AVRDC initiatives as part of an overall international movement to improve nutritional security, the proposed project intends to enhance the evidence base that agricultural diversification—particularly growing vegetables in school environments—can contribute to the alleviation of malnutrition in children.

"Schools are targeted as an entry point because they offer an ideal setting to familiarize children with health-promoting values and

habits," said **Robert Holmer**, Regional Director, AVRDC East and Southeast Asia, and project manager. "School-based programs have the potential to link resources for education, health, nutrition, and sanitation at one venue and increase the likelihood of long-term sustainability."

To see a school garden in action, workshop participants visited Klongpaklak School, Prawet District, Bangkok—a public school that is part of an organic agriculture project sponsored by the city government. In about 30 raised beds and planters around the school grounds, Klongpaklak's 1242 students help the school gardener cultivate the soil, sow seed and plant seedlings, weed, harvest and sell the produce. Leafy, fast-growing vegetables including brassicas and kangkong thrive in the beds, along with papaya trees. The students also raise edible frogs in cement tanks and have a mushroom chamber where the fungi "bloom" from spawn contained in plastic bags. About 50% of the food produced is used in school lunches in the school canteen, and 50% sold to the local community and to other schools.

School gardens can be as varied as the countries they are located in, so project participants are seeking ways to establish common baselines for monitoring and evaluating project activities and impacts. In brainstorming and discussion sessions, the group began mapping out the roles and responsibilities for partners, recommending indicators for nutrition and health, and proposing ways that the agriculture, health and nutrition sectors of national governments can find synergy in school gardens. The final proposal will be submitted in December.

31st International Vegetable Training Course continues

(left): Module 2 participants are happy to receive their certificates during the closing session from AVRDC Vegetable Breeder **Narinder Dhillon**.
(right): **Narin Senapa** *(l)*, AVRDC Research and Training Assistant, talks to participants at the Farmer Field School.

Module 2 ("From Harvest to Table") of AVRDC's 31st International Vegetable Training Course (IVTC) ended on 2 November 2012. The course equipped the trainees with knowledge and skills on efficient harvesting and postharvest technologies within the framework of Good Agricultural and Manufacturing Practices (GAP/GMP), and provided a better understanding of the economics of vegetable production and marketing. Particular emphasis was placed on interventions for improved nutrition and health of rural and urban consumers through increased awareness, access, and consumption of nutritious, diverse, and safe vegetables. The highlight of this module was a field trip to the Royal Project at Doi Angkang in northern Thailand, where the trainees had the opportunity to see upland sustainable agriculture farms and interact with farmers and other participants along the vegetable value chain.

All trainees presented their Development Action Plans to panelists **Narinder Dhillon**, Vegetable Breeder - Curcubits and **Sheila de Lima**, Administrative and Training Officer. Narinder Dhillon and **Narin Senapa**, Research and Training Assistant, then presented the trainees with certificates to mark the completion of Module 2.

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(left): Plant protection management systems on display at Bhuping Palace, Chiang Mai.

(right): Learning how to package okra for export at the Chatchawal Company.

(...continued from page 13)

(top): Module 2 participants visit Bhuping Palace IPM project, Chiang Mai.

(left): **Nomin Bayasgalanbat**, Technical Officer for Nutrition Policies and Programmes of the Food and Agriculture Organization of the United Nations (FAO) Regional Office for Asia and the Pacific, Bangkok, Thailand, lectures on sustainable development Issues and global challenges during the Module 3 opening session.

Module 3 ("Vegetables for Sustainable Development") commenced on 5 November with 16 participants hailing from Bangladesh, Cambodia, India, Indonesia, Lao PDR, Myanmar, the Philippines, Taiwan and Vietnam. **Nomindelger Bayasgalanbat**, Technical Officer for Nutrition Policies and Programmes of the Food and Agriculture Organization of the United Nations (FAO) Regional Office for Asia and the Pacific, opened the module with a session on sustainable development issues and global challenges.

Module 3 outlines how vegetable research and development contributes to achieving the UN Millennium Development Goals. It explores how vegetables link with other sectors and complement different development initiatives. Participants will be equipped with the necessary knowledge and skills to conceptualize and implement research and development activities. Participants will attend sessions on community development approaches, environmental approaches to enhance the climate resilience of vegetable growers and conserve natural resources, project proposal making, monitoring and evaluation, development communication and development action planning.

Comments from Module 2 participants:

I learned various postharvest handling systems and proper handling of vegetables and fruits, and nutrition. The participation in the farmer field school together with the local members of the community is great. AVRDC staff, lecturers and facilitators are kind and friendly. Module 2 is a memorable and educative experience for me. -- **R. Sigit Soebandiono**, Indonesia

I really appreciate the schedule of Module 2. Many of the postharvest technologies presented are absolutely useful and helpful to me. I have met lots of experts in the specific subject areas who provided me with perfect lectures and actual demonstrations. It is really an honor for me to join in this training. Lastly, I would like to appreciate all AVRDC staff for their warm welcome and assistance to all participants and making us feel at home for one month in Thailand. -- **Theavy Srey**, Cambodia

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31st International Vegetable Training Course
Module 3: Vegetables for Sustainable Development

	Name	Country	Designation and Organization
	**Mohammad Mazharul Karim**	Bangladesh	Scientific Officer Bangladesh Agricultural Research Institute
	**Md. Rabiul Islam**	Bangladesh	Scientific Officer Bangladesh Agricultural Research Institute
	**Taslima Jahan**	Bangladesh	Scientific Officer Bangladesh Agricultural Research Institute
	**An Vannak**	Cambodia	Researcher Kbal Koh Vegetable Research Station, Department of Horticulture and Subsidiary Crop
	**Tilak Gajmer**	India	Deputy Director Department of Horticulture and Crops Development Government of Sikkim
	**Yusuf Dawam**	Indonesia	Head, Horticultural Cultivation Division Regional Agriculture Office, Kediri East Java
	**Putu Bagus Daroini**	Indonesia	Research and Dissemination Staff Assessment Institute for Agricultural Technology, East Java
	**Akber Maulad**	Indonesia	Staff, Food Safety Division Center of Dietary Diversification and Food Safety Food Security Agency, Ministry of Agriculture

	Name	Country	Designation and Organization
	**Haris Akhmad**	Indonesia	Staff, Food Safety Division Center of Dietary Diversification and Food Safety Food Security Agency, Ministry of Agriculture
	**Phathana Seng Ounkeo**	Lao PDR	Researcher Horticulture Research Center Haddokkeo Village Hadchaypong District, Vientiane
	**U Thein Neng**	Myanmar	Assistant Director Department of Industrial Crops Development
	**Tin Tin Wai**	Myanmar	Assistant Officer Department of Agriculture Ministry of Agriculture and Irrigation Nay Pyi Taw
	**Juan Araojo, Jr.**	Philippines	Officer in Charge Health and Nutrition Center Department of Education
	**Angeline Calatan**	Philippines	Medical Officer/ Coordinator National Greening Program (NGP) Division of Benguet, Cordillera Autonomous Region (CAR) Department of Education
	**Wei-chen Tang**	Taiwan	Specialist Department of Science and Technology Council of Agriculture, Executive Yuan
	**Khuyen Thi Bui**	Vietnam	Researcher Fruits and Vegetables Research Institute

Visitors

Masayoshi Saito, Program Director Rural Livelihoods and **Kazuhiko Nakahara**, Senior Scientist Postharvest Science and Technology Division of the Japan International Agricultural Research Center for Agricultural Sciences (JIRCAS), recently visited AVRDC East and Southeast Asia in Bangkok, Thailand. They discussed with Regional Director **Robert Holmer** JIRCAS's present research priorities in Southeast Asia and received an update on a joint project to document indigenous small-scale vegetable fermentation processes and practices in different regions of Thailand.

(l to r): **Kazuhiko Nakahara**, **Robert Holmer** and **Masayoshi Saito**.

AVRDC headquarters staff welcomed **Hiroshi Miyazaki**, General Manager, Microbiology & Fermentation Laboratory and **Toki Nishiyama**, Researcher from **Calpis Co., Ltd.** Japan on 22 November 2012. The visitors were accompanied by **San-Nei Huang**, former Director General of the **Tainan District Agricultural Improvement and Extension Station** and staff from **Ginmax Co., Ltd.** Taiwan. The visitors toured the Demonstration Garden and Genebank, and met with **Chin-hua Ma**, AVRDC Soil Scientist. Calpis manufactures fermented milk drinks for global markets.

Representatives from the **Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development** (PCAARRD) visited AVRDC headquarters from 21-22 November 2012 for meetings and tours of the Demonstration Garden, Genebank, and laboratories. **Patricio S. Faylon**, Executive Director; **Leah Buendia**, Director, Policy Coordination and Monitoring; and **Edna Anit**, Assistant Director, Crops Research Division of PCAARRD discussed areas of potential collaboration and partnership opportunities with Pepper Breeder **Sanjeet Kumar**, Plant Pathologist **Jaw-fen Wang**, and Nutritionist **Ray-yu Yang**. **Didit Ledesma**, AVRDC Biometrician and a fellow Filipina, accompanied the visitors to a local evening market.

A group of nine students in the **International Master Program of Agriculture** from Taiwan's **National Chung-Hsing University** led by Assistant Professor **Chifumi Takagi** visited HQ on 19 November 2012. The students received a briefing and tours of the Demo Garden, Genebank, and Virology Screen House.

Visitors

Gregory Yep, Senior Vice President for Research & Development and **Thomas Lee**, Director of Long-term Research from **PepsiCo USA** met with AVRDC Director General **Dyno Keatinge** and staff during a visit to HQ on 16 November 2012. The global conglomerate aims to create snacks, beverages and foods that deliver nutrition, hydration and enjoyment for different needs, lifestyles and geographies, and is seeking ways to grow more crops with less water, manufacture with less waste and energy, and serve the needs of consumers worldwide.

Ten visitors from fruit and vegetable industries in Beijing and Gueizhou, China visited AVRDC's headquarters campus on 14 November 2012. They received a briefing from Deputy Director General – Administration & Services **Yin-fu Chang** and toured the Demonstration Garden.

On 20 November 2012, seconded Pepper Breeder **Myeong-Cheoul Cho** introduced a group of 14 students, 2 professors and 1 interpreter from **Gyeongnam Agricultural Meister College**, Korea to AVRDC's global activities, headquarters campus, and pepper fields. Myeong-Cheoul is a pepper breeder with Korea's Rural Development Administration.

Also on November 14, **Martha Mutschler**, Professor in the Department of Plant Breeding, Cornell University USA, met with AVRDC Tomato Breeder **Peter Hanson**, Pepper Breeder **Sanjeet Kumar**, Head of Molecular Genetics **Roland Schafleitner**, and Entomologist **Srinivasan Ramasamy** to learn more about the Center's breeding programs.

Esther van der Knapp *(center)* and **Eric Joself Stockinger** *(left)*, Associate Professors from the Department of Horticulture and Crop Science, The Ohio State University USA, visited AVRDC headquarters on 5 November 2012, accompanied by **Kai-Yi Chen**, Assistant Professor, Department of Agronomy, National Taiwan University. The visitors engaged in discussions with AVRDC plant breeders and toured the Center's germplasm collection with Genebank Manager **Andreas Ebert.**

Fresh, 26 November 2012

Fresh is published bi-weekly by

AVRDC – The World Vegetable Center
P.O. Box 42, Shanhua, Tainan 74199
Taiwan

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