SEED INFO

Official Newsletter of the WANA Seed Network

ICARDA

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EDITORIAL NOTE

Seed Info aims to stimulate information exchange and communication among seed staff in the Central and West Asia and North Africa (CWANA) region. The purpose is to help strengthen national seed programs, which supply quality seed to farmers.

In this edition of *Seed Info* we include a SeedQuest editorial 'The Power of Seeds' by Dr Norman E. Borlaug, father of the Green Revolution and Nobel Peace Prize Laureate reproduced from *Plant Breeding News* of 30 April 2006.

Environmental safety is a key issue in the introduction of genetically modified (GM) crops. Genetic Use Restriction Technologies (V-GURT), dubbed 'terminator technology' in the popular press, is now promoted because of its value in biologically containing GM crops. In the **NEWS AND VIEWS** section, Niles Louwaars and Jan Nap from Wageningen University and Research Center discuss the potential use of V-GURT. In their article, 'Genetically modified plants with non-GM pollen as an alternative to achieve biosafety' the authors show how this approach can prevent adventitious presence of transgenes in non-GM crops or related wild species, and serve as a biological containment tool for the deployment and management of coexistence practices to support consumer choice. For more details, read the article in the Plant Biotechnology Journal (2006, vol. 4, page 445).

We bring you news on harmonization of seed policy and phytosanitary regulations in the Andean Community of Nations (CAN), a sub-regional organization, with international legal status, whose members are Bolivia, Colombia, Ecuador, Peru and Venezuela. There is also news from the International Service for the Acquisition of Agri-biotech Applications, International Seed Federation, International Seed Testing Association, and the Asia Pacific Seed Association.

The section on **SEED PROGRAMS** includes news from Afghanistan, Ethiopia, Iran, Pakistan, Tajikistan and Uzbekistan. The news from Afghanistan focuses on the DAI project under the Alternative Livelihoods Program, being implemented by ICARDA. The program is establishing village-based seed enterprises in Kunar, Laghman and Nangarhar provinces in eastern Afghanistan. Also from Afghanistan: a potato seed project implemented by CIP and ICARDA; and a seed industry development project by FAO. The news from Ethiopia and Iran focuses on efforts by ICARDA and Wageningen International to strengthen human resources and research capacity at national and regional levels. Other stories describe the Tailor Made Training Program to strengthen farmer-based seed production and supply in Ethiopia; and an international training course on "Plant genetic resources and seeds: policies, conservation and use" in Iran. There is also news about PVP workshop in Tajikistan and in-country training in Uzbekistan.

In the **HOW TO** section, Abdoul Aziz Niane discusses the practical application of control plots in seed certification schemes. We invite our readers to contribute to this section and share their practical experience.

The **RESEARCH** section aims to capture information on adapted research or issues relevant to seed program development in the region and beyond. Asrat Asfaw from the Southern Agricultural Research Institute in Ethiopia shares experiences with farmer-based seed production of common beans, potato and maize in southern Ethiopia.

Seed Info encourages the exchange of information to broaden our understanding of issues that affect the national, regional, and global seed industry. We encourage our readers to share their views with colleagues through this newsletter. Your contributions are most welcome in Arabic, English, or French.

Happy New Year.

Zewdie Bishaw
Editor

WANA SEED NETWORK NEWS

This section presents information on the WANA Seed Network, including network activities and reports of the meetings of the Steering Committee and the WANA Seed Council.

Second International Seed Trade Conference for CWANA Region

Preparations for the Second International Seed Trade Conference (ISTC2007) are progressing well. The National Organizing Committee

(NOC) and International Organizing Committee (IOC) were constituted under the leadership of the National Seed Council of Egypt. The NOC is composed of representatives from the Egyptian Seed Association, Egyptian Seed Industry Association, Egyptian Seed and Pesticide Traders Association, Central Administration for Seed Certification and Testing, and Central Administration for Seed Production. A national Steering Committee was formed to assist the NOC in conference organization. The IOC includes representatives from the International Seed Federation, Asia Pacific Seed Association, International Seed Testing Association, FAO, UPOV, Turkish Seed Industry Association, and ICARDA. A website and program of the conference are being developed.

The conference aims at promoting seed trade within and between Central Asia, West Asia and North Africa and the rest of the world. A major event at the conference will be seed trade and exhibitions by seed companies, seed equipment manufacturers, agricultural input suppliers, and agricultural machinery manufacturers. Companies who wish to participate in the conference or exhibit their products should contact the Conference Secretariat. The conference will be held from 19-21 November 2007 in Cairo, Egypt. *Zewdie Bishaw, Seed Unit, ICARDA, P.O. Box 5466, Aleppo Syria. E-mail z.bishaw@cgiar.org*

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First Regional Workshop on Harmonization of Seed Regulations in ECO Countries

The Food and Agriculture Organization of the United Nations, in response to requests from member countries and the Economic Cooperation Organization (ECO), made available a regional TCP project for Strengthening Seed Supply in the ECO region. The project is being implemented by ICARDA in close collaboration with the ECO Secretariat in Iran and FAO. The main output of the project will be harmonization of regulations with particular emphasis on variety release mechanisms, seed certification schemes, quarantine procedures and international seed trade. Under the project a series of consultation meetings will take place in 2007 and 2008, involving stakeholders from ECO member countries: Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Turkmenistan and Uzbekistan.

The ECO Secretariat, ICARDA and FAO are organizing the First Regional Workshop on Harmonization of Seed Regulations, to be held on 17-19 January 2007 in Islamabad, Pakistan. The workshop will focus on variety release mechanisms and plant quarantine/phytosanitary measures in ECO member countries, and opportunities for harmonization. Senior staff with in-depth knowledge of variety testing/release schemes, plant variety protection systems and plant quarantine/ phytosanitary measures in their respective countries have been invited to participate. *Zewdie Bishaw, Seed Unit, P.O. Box 5466, Aleppo Syria. E-mail z.bishaw@cgiar.org*

NEWS AND VIEWS

News, views, comments, and suggestions on varieties and seeds are included in this section. It is a forum for discussion among professionals in the seed sector.

The Power of Seeds

A *SeedQuest* editorial by Dr Norman E. Borlaug, father of the Green Revolution and Nobel Peace Prize Laureate

During my lifetime, seed technology has been the catalyst that has averted mass starvation on planet Earth. At today's 6.4 billion, the world's population is four times the 1.6 billion people who lived when I was born in 1914. How many more can the earth feed without destroying the forests and wildlife habitat? The answer hinges on the extent of a continuing stream of ever-more-powerful seeds, based on focused research, until population stabilizes.

Of course, we all know that to stay ahead of the 'population monster' requires more than seeds alone. It requires essential policy changes at the highest levels of governments plus improved production technologies: mineral was well as organic fertilizers, better tillage practices, more efficient irrigation, and weed control. But, without the catalyst – the power of seeds – better policies and production technologies will not be enough.

Let me describe a few examples of positive results from focused research. I first started serious work on seed technology in 1944 as a

Rockefeller Foundation scientist with the cooperative Government of Mexico-Rockefeller Foundation agricultural research program. Even with imported foodgrains at the time, many Mexicans were hungry. Based on the wheat and maize (corn) varieties that we developed, and while population continued a brisk increase, Mexico became self-sufficient in foodgrains by the mid 1950s.

In the mid 1960s, India and Pakistan were experiencing hunger, and two provinces in northeast India suffered famine, even while millions of tons annually of food aid, mostly wheat, were imported. Malthusian thought was re-awakening. Two widely read books at the time contended, in effect, "Let's write off India, it's hopeless; let's only provide our food aid to countries that have a chance." With the power of the high-yielding seeds and production technologies that we introduced, together with improved policies, Pakistan in 1968 and India in 1974 became self-sufficient in foodgrains and they have essentially remained so.

Though few people outside the country knew it, China during the Cultural Revolution experienced widespread hunger and famine. Many millions starved. At the time of my first trip to China, in 1974, universities were closed, food was rationed, things were miserable. On my more than 12 trips, I witnessed remarkable progress. Although population has increased by nearly 50 percent, to 1.3 billion, most Chinese today are well fed and enjoy a much higher standard of living, thanks to the power of seeds as the catalyst. In the early 1970s, China acquired from Pakistan some of our 'Mexican' short-strawed, high-yielding wheat seeds. China also benefited from improved varieties of rice provided by the International Rice Research Institute in the Philippines. But China's overall success resulted from sound national research that provided a continuous stream of better seeds and production technologies, accompanied by a set of policies to support increased production.

The positive experiences in Mexico, India, Pakistan and China result, largely, from the catalytic power of three seeds: wheat, rice and maize. Many other countries of Asia, the Middle East and Latin America also benefited from these improved seeds. But what about Africa?

Sub-Saharan Africa is my greatest worry. In most of the area, maize is more important than either wheat or rice. High-yielding, disease-resistant quality protein maize, based on research, is an important development for many African families who have little milk, eggs or meat because of animal diseases and poverty. The protein quality of QPM is close to that of skim milk, resulting in improved health.

What is required for sub-Saharan Africa, in addition to better seeds of wheat, rice and maize, I believe, is focused research to enhance yields and quality of some of the 'orphan' crops that are important in the diets of Africans: cassava, sweet potatoes, sorghum and millet, lentils and cowpeas, among others.

More generally, for planet Earth's growing population, both conventional and biotechnology research on food crops and livestock, both private- and public-sector funded, is absolutely essential to provide ever-more-powerful seeds as well as a continuing stream of improved technology to energize the catalytic power of seeds. *Source: Plant Breeding News Edition 166, 30 April 2006*

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Genetically Modified (GM) Plants with non-GM Pollen as an Alternative to Achieve Biosafety

Environmental safety is key issue in the introduction of genetically modified crops. Genetic Use Restriction Technologies (V-GURT), dubbed 'terminator technology' or 'terminator' in the popular press, is now promoted because of its value in biologically containing GM-crops. V-GURT pollen produces sterile seeds, if they cross with neighboring crops. However, pollen and sterile seeds still contain the transgenes. Opponents point out that these transgenes can still enter the food chain, although they may not spread in the environment. 'Terminator' is, however, criticized much more because it provides a biological protection mechanism that is much stronger than any patent or breeder's right (see *Seed Info* 29), which may force farmers to depend only on formal seed suppliers.

Researchers at Wageningen University and Research Centre in the Netherlands have developed a different approach for dramatically increasing environmental biosafety: GM-plants that produce non-GM pollen. In principle, the system removes all transgenes from the genome

of the modified plant, but only during early pollen production. As a result, the transgene(s) of interest, which may confer insect or disease resistance, or is involved in the production of specialty chemicals, is active in the GM plant, but it is not present in pollen. When there is out-crossing with neighboring non-GM crops or wild relatives in natural ecosystems, the cross produces non-GM seeds. This novel mechanism is achieved by adding a combination of a highly pollen-specific promoter with the Cre-lox recombination system to the transgene of interest in such a way that all material, including the recombination system, is removed. The pollen ends up with only 34 base pairs of foreign DNA. Any gene can be inserted within the region that is going to be removed – genes that regulate pest or disease resistances, specific metabolic pathways, etc.

The biosafety value lies in the fact that transgene dispersal to neighboring non-GM crops or crossable relatives (either weeds or plants in natural ecosystems) is eliminated. The advantage compared to V-GURT is that the transgene is not present in pollen and seeds; this might be considered a food safety advantage when the (industrial) crop pollinates a food crop. A disadvantage of the new approach is that spillage of seed from GM plants may produce fertile GM plants outside the cropped field. The further spread of that plant and its transgenes will be slow, because in each generation the transgenes will be removed from the pollen. The approach has some similarities to the strategy of chloroplast transformation: in most crop plants pollen does not contain chloroplasts.

The commercial possibilities of this method are being discussed. Some seed production issues need to be resolved, since a variety will always produce 50% GM and 50% non-GM offspring after self-pollination. The method is readily applicable for vegetatively propagated crops, such as potato, fruit trees and roses, but it may have to be combined with a seed selection method in order to become economic in seed crops. The additional work on breeding and seed production should be cost-effective in high-value crops and depends largely on the added value of the transgene-encoded trait. The new approach seems particularly useful for specialty crops, such as the production of fine-chemicals in tobacco. It could, however, also work for disease resistance, where 50% of resistant plants in the field may significantly reduce disease incidence and reduce the need to plant special catch crops such as non-Bt cotton strips in insect-resistant cotton fields.

This new method can be an interesting approach to biosafety, as it does not imply the biological protection of 'Terminator'. Any farmer can reproduce the seed and any breeder can use it in further breeding, subject to the national seed laws and intellectual property rights system. In this sense, the non-GM pollen approach could be considered a different and attractive alternative to 'Terminator'. For those with a subscription to the journal, the full scientific article entitled 'Directed microspore-specific recombination of transgenic alleles to prevent pollen-mediated transmission of transgenes' by L. Mlynárová, A.J. Conner and J.P. Nap is available from the Plant Biotechnology Journal or can be obtained from the last author. *Niels Louwaars, Centre for Genetic Resources, WUR, the Netherlands, E-mail niels.louwaars@wur.nl and Jan-Peter Nap, Applied Bioinformatics, Plant Research International, WUR and Hanze University Groningen, the Netherlands, E-mail janpeter.nap@wur.nl*

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Harmonization of Seed Policy and Phytosanitary Regulation in Andean Community of Nations

The Andean Community of Nations (CAN) is a sub-regional organization with international legal status, composed of five countries: Bolivia, Colombia, Ecuador, Peru and Venezuela. The key objectives are to promote balanced, harmonious and equitable development of the member countries to boost growth through economic integration and social cooperation, with a view to the progressive formation of a Latin American common market, and to strive for a steady improvement in people's standard of living.

In 2003, the American Seed Trade Association funded a project for harmonization of seed policies and phytosanitary regulations in the CAN to enhance seed trade in the region. The Iowa Seed Science Center coordinated this project.

All five countries participated in a series of six workshops conducted in the region through their national plant protection offices, seed departments and seed industry. Based on

phytosanitary scientific information and the tools of process management, consensus was reached for regional harmonization of seed policies and phytosanitary regulations for selected seed crops: rice, maize, sorghum, field beans, soybean, potato and cotton.

The project was completed in September 2005 with the following accomplishments:

- Elimination of unnecessary quarantine pests from national lists. The list of 379 quarantine pathogens was reduced to 112.
- Development and approval of common seed certification standards for field and seed of the seven selected crops.
- Development and submission of an Andean Community Seed Law, to the CAN Secretariat, to amend CAN Decision No 193 of 1981 with a modern law that regulates variety release, seed production and certification, and will serve as an umbrella for the Andean countries.
- Development of phytosanitary accreditation manuals for seed export for each country (except Peru), describing in detail the procedures for the accreditation system for seed export. Phytosanitary accreditation is the official recognition by the National Plant Protection Office that accredits organizations to carry out their own phytosanitary field inspections and/or seed health testing. Accredited entities are any public or private organization or individual that meet the requirements established in the accreditation system.
- Development of seed certification accreditation manuals for the five countries. The manuals allow the accreditation of seed companies to carry out their own seed certification.
- Development and submission of a proposed 'CAN Decision' on phytosanitary accreditation and seed certification accreditation. This will serve as a general framework for approval by the countries through the Andean Community Secretariat
- Development of three models of quality manuals based on process management, for use in training staff from the private seed sector: Quality manual for seed companies; Quality manual for seed testing laboratories; and Quality manual for seed certification agencies.

All public and private sector country representatives agreed on the way forward on the implementation of the agreements to enhance seed trade in the region and with other trading partners. *Source: Iowa Seed & Biosafety, Spring 2006.*

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Global Status of Commercialized Biotech/GM Crops in 2006

ISAAA Brief 35 characterizes the global status of commercialized genetically modified (GM) crops in 2006, now more often called biotech crops. The focus on developing countries is consistent with ISAAA's mission to assist developing countries in assessing the potential contribution of biotech crops to food security and alleviation of poverty and hunger.

In 2006, the global biotech crop area continued to increase as the 100 million ha barrier (250 million acre) was breached, when for the first time 10.3 million farmers in 22 countries planted 102 million ha of biotech crops, up from 90 million ha planted by 8.5 million farmers in 21 countries in 2005. This unprecedented high adoption rate is testimony to the trust and confidence of millions of small and large farmers in crop biotechnology in both industrial and developing countries.

During the last 11 years (1996 -2006) farmers have consistently increased their plantings of biotech crops by double-digit growth rates every single year since biotech crops were first commercialized in 1996. The global biotech crop area increased more than sixty-fold in the first 11 years of commercialization, making biotech crops the fastest adopted crop technology in recent history. The global area of approved biotech crops in 2006 was 102 million hectares (ver 250 million acres) up from 90 million ha (220 million acres) in 2005. The increase of 12 million ha (30 million acres) between 2005 and 2006, was the second highest in the last five years, and equivalent to an annual growth rate of 13% in 2006. It is noteworthy that more than half (55% or 3.6 billion people) of the global population of 6.5 billion live in the 22 countries where biotech crops were grown in 2006 and generated significant and multiple benefits. Also more than half (52% or 776 million ha of the 1.5 billion ha of arable land) of the cropland in the world is in

the 22 countries where approved biotech crops were grown in 2006.

In 2006, 22 countries grew biotech crops, 11 developing countries and 11 industrial countries; they were, in order of hectarage, USA, Argentina, Brazil, Canada, India, China, Paraguay, South Africa, Uruguay, Philippines, Australia, Romania, Mexico, Spain, Colombia, France, Iran, Honduras, Czech Republic, Portugal, Germany, and Slovakia. In 2006, the US followed by Argentina, Brazil, Canada, India and China were the six principal adopters of biotech crops globally, with India for the first time replacing China at number five in world ranking by planting more Bt cotton than China. The US retained its number one position globally with 54.6 million ha (53% of global biotech area), followed by Argentina 18.0 million ha, Brazil 11.5 million ha, India 3.8 million ha and China 3.5 million ha. Of the 54.6 million ha in the US, approximately 28% were stacked products containing two or three biotech traits in a single variety. The stacked products, currently deployed in the US, Canada, Australia, Mexico, South Africa and the Philippines, are an important and growing future trend which is more appropriate to quantify as "trait hectares" rather than hectares of adopted biotech crops. Accordingly, number of "trait hectares" globally in 2006 was 117.7 million ha compared with 102 million ha of biotech crops globally, a 15% variance.

The largest absolute increase in biotech crop area in any country in 2006 was in the US at 4.8 million ha, followed by India 2.5 million ha, Brazil 2.1 million ha, with Argentina and South Africa with 0.9 million ha each. India had the largest year-on-year proportional increase, with almost a three-fold or 192 % increase from 1.3 million ha in 2005 to 3.8 million ha in 2006, followed by South Africa at 180% from 0.5 million ha in 2005 to 1.4 million ha in 2006, and the Philippines with over a 100% increase from approximately 0.1 million ha in 2005 to 0.2 million ha in 2006.

Soybean continued to be the principal biotech crop in 2005, occupying 58.6 million ha (57% of global biotech area), followed by maize (25.2 million ha at 25%), cotton (13.4 million has at 13%) and canola (4.8 million ha at 5% of global biotech crop area). Herbicide tolerant alfalfa, the first perennial biotech crop to be introduced globally was planted on 80,000 ha in the US and RR® Flex herbicide tolerant cotton was introduced on over 800,000 ha in the US and Australia. Virus resistant papaya, a fruit/food crop, was recommended for commercialization by China's National Biosafety Committee in the last quarter of 2006.

In 2006, herbicide tolerance, deployed in soybean, maize, canola, cotton and alfalfa continued to be the most dominant trait occupying 68% or 69.9 million ha followed by Bt insect resistance at 19.0 million ha (19%) and stacked traits occupied 13.1 million ha (13%). Stacked traits were the fastest growing trait group between 2005 and 2006 with 30% growth, compared with 17% for insect resistance and 10% for herbicide tolerance.

Biotech crops were grown by approximately 10.3 million farmers in 22 countries in 2006, up from 8.5 million farmers in 21 countries in 2005. Notably, 90%, or 9.3 million of the beneficiary farmers were small resource-poor farmers from developing countries, whose increased incomes from biotech crops contributed to the alleviation of their poverty. In 2006, approximately 9.3 million small resource-poor farmers (up from 7.7 million in 2005) benefited from biotech crops – the majority were in China with 6.8 million, 2.3 million in India, 100,000 in the Philippines and several thousand in South Africa including many women Bt cotton farmers, with the balance in the seven developing countries, which grew biotech crops in 2006.

During the period 1996 to 2006, the proportion of the global area of biotech crops grown by developing countries increased every year. More than one-third (40%) of the global biotech crop area in 2006, equivalent to 40.9 million hectares, was grown in developing countries where growth between 2005 and 2006 was substantially higher (7.0 million hectares or 20% growth) than industrial countries (5.0 million hectares or 9% growth). The increasing collective impact of the five principal developing countries (China, India, Argentina, Brazil and South Africa) is an important continuing trend with implications for the future adoption and acceptance of biotech crops worldwide.

Global accumulated impact of biotech crops for the decade 1996 to 2005, in terms of net economic benefits to biotech crop farmers, was $27 billion ($13 billion for developing countries and $14 billion for industrial countries). The

accumulated reduction in pesticides from 1996 to 2005 was 224,300 MT of active ingredient, equivalent to a 15% reduction in the associated environmental impact of pesticide use on these crops.

There is cause for cautious optimism as the unprecedented growth in biotech crops, witnessed in the first decade of commercialization 1996 to 2005, continues in 2006, the first year of the second decade of commercialization 2006 to 2015. Indeed growth between now and 2015 may well surpass that in the first decade, as more biotech crops will be developed in mega-investment projects to meet ambitious biofuel targets. It is evident that biotechnology offers very significant advantages for increasing efficiency of biofuel production in both industrial and developing countries and will be a major factor in biofuel development in the future. Adherence to good farming practices, such as rotations and prudent management of insect resistance for biotech crops will remain critical, as it has been during the first decade. Continued responsible stewardship must be practiced, particularly by the countries of the South, which will be the major deployers of biotech crops in the coming decade.

Source: CropBiotech Special Edition, ISAAA Brief *No. 35-2006, 18 January 2007*

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ISF Position Papers on Intellectual Property Rights

The use of proprietary parental lines of hybrids

ISF members consider that proprietary parental lines of hybrids must not be used by third parties for the purpose of breeding, except when agreed upon by the owner. Proprietary parental lines include, for instance, parental lines protected by patent, plant breeder's right, trade secret, contract, or any other relevant legal mechanism.

Seed of proprietary parental lines may incidentally happen to be included in bags of commercial hybrid seed. Proprietary parental lines may also incidentally happen to be present in fields in which hybrids are grown. In both cases, this presence results from technicalities in producing and processing hybrid seed and does not reflect the owner's intent to make its parental lines available to the public. ISF considers that it is contrary to generally accepted ethical standards of commercial morality in the seed industry to take advantage of this presence by using those proprietary parental lines for further breeding.

To protect themselves against the unauthorised use of proprietary parental lines, for the purposes of breeding, breeders may use any relevant legal mechanisms including bag tag warnings and/or shrink-wrap agreements.

Use of DNA markers for DUS testing, essential derivation and identification

ISF has already stated that it opposes the use of DNA markers alone for DUS testing before important issues have been adequately addressed, such as (i) definition of minimum distances for distinctness, (ii) impact on the concepts of uniformity and stability, and assessment of these criteria, (iii) public availability of informational markers.

ISF recommends that answers to those important questions must be obtained and until such time reaffirms its opposition to the use of DNA markers as decisive characteristics for granting protection compliant with UPOV. This use would put at risk the essence of the plant breeder's right, by possibly reducing the minimum distance for distinctness to a difference of only one base pair, or by leading to impractical standards for uniformity or stability.

In contrast, ISF considers that DNA markers may be used for the identification of an already-protected variety, in particular in case of alleged misuse of that variety or misuse of a parental inbred line in the case of a hybrid variety. DNA markers may also be used to define genetic similarity trigger points for starting a dispute resolution process in cases of alleged essential derivation, or to determine the presence or absence of a specific gene or mutation whose expression or lack of expression is responsible for an essential characteristic of the variety. For more information, visit the ISF website at: www.worldseed.org/ positions.htm.

International Seed Testing Association (ISTA) Accredits its 100th Seed Testing Laboratory

Since the introduction of the ISTA Quality Assurance Accreditation Program for seed testing laboratories in the early 1990s, the number of participating laboratories from the public and the private sector has increased continuously. The NCVESC Seed Testing Laboratory in Hanoi,

Vietnam, became the 100th accredited laboratory of ISTA in June 2006. The aim of the ISTA accreditation program is to harmonize the performance of ISTA-accredited seed testing laboratories on a high level worldwide. With the two pillars of the program, the ISTA International Proficiency Test Program and the ISTA International Audit Program, ISTA can assure the trueness and reproducibility of test results on international level; an important precondition for smooth international seed trade. Recent studies show that ISTA-accredited laboratories perform better in proficiency tests than non-ISTA accredited laboratories. *Source: ISTA News Bulletin No 131, April 2006*

ISTA also announced the 8th ISTA Proficiency Test on GMO testing on soybean (*Glycine max*). Since GMO testing has been introduced in the ISTA Accreditation Program, participation in the ISTA proficiency tests on GMO testing is compulsory for laboratories which have included GMO testing methods in their scope of accreditation. The ISTA proficiency test on GMO testing is also open to any laboratory involved in GM seed testing. The participating laboratory can select the method appropriate to detect the presence or absence of GM seeds and to quantify their presence in samples of conventional seeds. Laboratories interested in participating in the proficiency testing should send their registration form to the ISTA Secretariat as soon as possible. More details are available on the website www.seedtest.org.

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Asian Seed Congress in Kuala Lumpur a Success

The Asia and Pacific Seed Association (APSA) held a successful Asian Seed Congress in Kuala Lumpur, Malaysia, 12-16 November 2006. The Malaysian Agricultural Research and Development Institute led the local organizing committee in co-hosting the Congress. The conference attracted over 700 delegates and guests from 39 countries, including business executives, scientists, academics, policy makers and government officials involved in the seed industry.

The events included a pre-Congress UPOV workshop. Technical sessions on the Malaysian seed industry, the maize seed industry in Asia, public-private sector partnerships, and the latest trends in seed technology involved distinguished experts in each field. The conference also saw a change in APSA leadership from Past President Mr Kazuo Hatsuda to 2006/07 President Mr Mengyu Zhang from China, who promises an even more successful congress in 2007, to be held in Manila, Philippines.

APSA president Mr Zhang Mengyu, (left) gives an award of recognition to Past President Mr Kazuo Hatsuda

Meanwhile, APSA's Executive Committee has appointed Dr. Sampan Campiranon as Acting Director of the Association. Dr Sampan will take full responsibility in managing the APSA Secretariat in its implementation of all programs and policies.

Dr. Sampan brings with him extensive experience in agriculture and biotechnology, both as an academician and a private sector business executive. He holds a PhD in plant physiology and master's degree in botany (both from University of Minnesota) and master's degree in agronomy (Kasertsart University, Thailand).

Dr Sampan also has a strong research background, with 18 years of experience in product and marketing development, biotechnology, government affairs and international management systems. He has variously served as Monsanto's Senior Product Development Manager; Associate Dean Faculty of Science of Khon Kaen University; and taught plant physiology and botany at Kasertsart University. He authored a textbook 'Biotechnology in agriculture' which is used by several universities in Thailand. He also writes articles on agriculture for magazines. *Beth Erlano, Managing Editor, APSA, Bangkok, Thailand; E-mail publications@apsaseed.com*

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Monsanto Acquires Delta & Pine Land Co.

Monsanto Company signed an agreement with Mississippi-based Delta and Pine Land Company for the former to acquire the largest and longest global running private cotton breeding and seed program. Monsanto reports that Delta and Pine Land's strong cotton genetics will enhance the company's goal of providing high quality cotton varieties for farmers. DPL Co's extensive plant breeding programs, including its diverse base of international germplasm, has enabled the development of cotton varieties for the last 90 years. Both companies believe the merger will strengthen both domestic and international cotton seed business by enhancing efforts to produce second-generation biotech trait offerings. For more information see the press release at www.monsanto.com/monsanto/layout/media/06/08-15-06.asp. *Source: CropBiotech Update 18 August 2006*

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FAO Initiative Widens Literature Access to Developing Countries

Over 100 poor countries will now get access to leading food and agriculture journals at little or no cost, with the launch of the second phase of the Global Online Research in Agriculture (AGORA) initiative. AGORA is a public-private partnership between FAO, 37 leading science publishers, and other key partners including the World Health Organization and Cornell University. Introduced in 2003 and providing access to 69 low-income countries, AGORA today serves universities, colleges, research institutes and government ministries and NGOs in an additional 37 lower-middle-income countries.

Under the second phase of AGORA 37 countries with per capita GNP of between $1000 and $3000 will be eligible. Institutions wishing to register will have a three-month free trial period before they are asked to pay an annual subscription of $1000. FAO will invest all subscription income into local training initiatives to help increase awareness and usage of AGORA amongst librarians and scientists.

AGORA is making an important contribution to the achievement of the UN Millennium Development Goals by providing essential information to improve the livelihoods of those who need it most. For more information contact Alison Small, Media Relations, FAO, Rome, Italy; E-mail alison.small@fao.org

CONTRIBUTIONS FROM SEED PROGRAMS AND PROJECTS

In this section we invite national seed programs, projects, universities, and regional and international organizations to provide news about their seed-related activities.

News from Afghanistan

Alternative Livelihoods Program, Eastern Afghanistan

Under the Eastern Afghanistan Alternative Livelihoods Program (ALP-E), USAID has provided funding through Development Alternatives Inc to improve Afghan agriculture and increase the incomes of rural households. Work focuses on three components: adaptive research, technology transfer through demonstration, and village-based seed enterprises. Project implementation has begun, particularly on adaptive research and demonstrations since late 2005 in three target provinces of Kunar, Laghman and Nangarhar. The seed component of the project aims at establishing 12 new village-based seed enterprises (VBSEs) in these provinces over the next two years. It will also support five existing VBSEs in Nangarhar, established under the USAID-funded RAMP project. The project has already established six new VBSEs in the three provinces, which have begun wheat seed multiplication. The VBSEs are responsible for seed production and marketing within and beyond their communities. At the end of the project each VBSE will produce and commercialize quality seed in a sustainable manner. *Javed Rizvi, ICARDA-Kabul, P.O. Box-1355, Kabul, Afghanistan, E-mail j.rizvi@cgiar.org*

FAO and Ministry of Agriculture launch new seed project

FAO and the Ministry of Agriculture and Irrigation (MAI) have concluded an agreement with the European Commission (EC) for funding the Afghanistan Variety and Seed Industry Development project for a period of five years up to December 2011. The project will be implemented as part of the five-year Master Plan

for Agriculture and Food of the MAI. It builds on an earlier four-year seed project, also funded by the EC and implemented by FAO. The first phase has enhanced national capacity in seed production by implementing partners, mainly in the public and NGO sectors; and has distributed quality seeds of new varieties nationwide.

The overall objective of the second phase is 'contributing to higher productivity of major staple crops in Afghanistan and to higher food security, particularly in rural areas'. The immediate objective is 'improving access of farmers to quality certified seeds and planting material of major staple crops (wheat, rice, vegetables, etc.)'. Outputs are expected in four key areas: (i) strengthening the Agricultural Research Institute of Afghanistan to effectively develop new varieties and produce breeder seed; (ii) enhancing the capacity of the Improved Seed Enterprise to produce foundation seed of newly released and popular existing varieties; (iii) establishing a National Seed Board with affiliated bodies (Variety Release Committee, Seed Certification Agency and Seed/Plant Health Inspectorate) for coordinating seed industry functions; (iv) putting in place an appropriate system for commercializing certified seed to farmers.

H.E Obaidullah Ramin, Minister of Agriculture and Irrigation (third from right) during the signing ceremony

It is expected that at the end of the project there will be clear evidence that:

- Policy and regulatory reforms have helped strengthen an institutional environment conducive for sustainable release of new varieties by public research
- The capacity of public and private sectors is strengthened to produce breeder and foundation seed on a sustainable basis
- Private enterprises will continue to participate effectively in certified seed production and marketing
- The seed industry is well regulated, ensuring that producers, sellers and buyers of seed are aware of the seed policy and seed law and abide by them
- An increasing proportion of farmers are willing to pay commercial prices for quality seed
- Capacity building of government counterpart staff has resulted in a cadre of capable and experienced seed professionals in the Ministry of Agriculture.

Sam Kugbei, FAO, Kabul, Afghanistan, E-mail samuel.kugbei@fao.org

Potato seed production in Afghanistan

Over 3000 tons of healthy potato seed have been produced in Afghanistan: significant progress towards an efficient and sustainable seed production and marketing system.

Potato is the third most important food crop in Afghanistan, but good quality seed is scarce due to absence of formal sector and an ineffective informal sector limiting the potential to increase area and productivity and improve quality of the produce.


The CIP-ICARDA program aims to strengthen potato seed production in Afghanistan

The International Potato Center (CIP) and ICARDA, with funding from RAMP (Rebuilding Agricultural Markets Program), have recently completed a project in Afghanistan to produce good quality potato seed for resource-poor farmers by developing in-country seed

production programs. An integrated approach was used to achieve self-sufficiency in seed potato and to ensure its availability throughout the potato producing regions of Afghanistan.

Using a 'flush out' approach, CIP initially created a sustainable seed system in Nangarhar province. Potato seed imported from India and Pakistan was planted by 25 CIP-trained farmers. The seed produced was used in the RAMP-funded project, along with fresh supplies from the region, to replace the existing unhealthy material farmers were using. Since 2002, project workers have been disseminating improved location-specific technologies for seed production, multiplication and maintenance at farm level, and training staff of the Ministry of Agriculture and Irrigation and farmers to use these technologies. Linkages are being developed to sell good quality seed in zones that do not produce their own seed. This approach is expected to increase potato production and farm income substantially by enhanced productivity of quality potatoes.

Thirty-five country stores, each with a capacity of 20 tons, were built to improve seed potato storage. Through various training activities, over 20,000 farmers, extension workers, village elders, and staff of other agencies have directly benefited from the project. Three radio programs on potato production and marketing were produced in collaboration with ICARDA's Communications Unit and broadcasted through 50 local radio stations reaching over 15 million listeners. CIP and ICARDA are jointly working to achieve a targeted production of 54,000 tons of potato seed by 2009 in Afghanistan. *Source: www.cipotato.org/ news_more.asp?cod=27*

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Tailor Made Training Program Launched in Ethiopia

The Ethiopian Seed Enterprise (ESE), Wageningen International (WI) and ICARDA have launched the 'Tailor Made Training Program (TMTP) on Improvement of farmer-based seed production scheme and revitalizing informal seed supply in Ethiopia'. The TMTP is a one-year training project supported with funding from NUFFIC (Netherlands Organization for International Cooperation in Higher Education). It aims to strengthen the capacity of the ESE, other federal institutions, and agencies from four regional states: Amhara, Oromia, Southern Nations, Nationalities and Peoples (SNNP) and Tigray. The participating institutions also include Regional Agricultural Research Institutes, Regional Bureaus of Agriculture and Rural Development, and NGOs implementing farmer-based seed production and marketing schemes.

Participants of the first TMTP course in Ethiopia

The TMTP program involves seven major components. Components 1 and 2 are the two halves of the first training course, held in October 2006 in Awassa. Components 3 and 4 will help synthesize the lessons learnt; diagnose and assess seed problems in each region; develop, refine and agree upon appropriate action plans for all four regions. This phase will be completed in March 2007, with inputs from a broad range of stakeholders. This will allow the teams to adjust their workplans to the specific context in their respective regions, and based on problems identified, formulate recommendations to support farmer seed production and informal seed supply.

Components 5 and 6 are two thematic workshops to be held in June 2007, on crop genetic diversity issues and plant genetic resource policies, as they relate to informal seed supply. Finally, Component 7 is a regional workshop in August 2007, in which participants from Ethiopia and other East African countries will discuss the outcomes of previous components and share experiences on seed production schemes.

The first training course, 16-28 October 2006, was conducted in Hawassa University, Awassa. The program comprised two one-week modules. The first module introduced the theory and concepts of participatory approaches, participatory plant breeding, genetic diversity and

informal seed supply. The second component focused on farmer-based seed production and institutional support required, technical aspects of farmer-based seed production, and small-scale seed enterprise development. Both modules included field work in participatory seed system analysis and designing market-oriented local seed production and marketing enterprises.

Training participants work with communities in participatory seed system analysis (top) and seed demand survey (bottom)

There were 27 participants, four each from Amhara and Tigray, five from SNNPR, eight from Oromia and six from federal institutions, representing a wide range of institutions. Resource persons from WI, ICARDA, CIMMYT, ESE, SARI and Mekelle University led the training program. *Abdurahman Beshir, Ethiopian Seed Enterprise, P. O. Box 5466, Addis Ababa, Ethiopia, E-mail abdubeza@yahoo. com*

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International Training Course on Plant Genetic Resources and Seeds in Iran

ICARDA and Wageningen International (WI), in collaboration with the Generation Challenge Program (GCP) and the Agricultural Research and Education Organization (AREO), conducted a regional training course on 'Plant genetic resources and seeds: policies, conservation and use'. It was held during 11-29 November 2006 in Karaj, Iran. The course was organized with the Seed and Plant Certification and Registration Institute (SPCRI) and Seed and Plant Improvement Institute (SPII). The training program consisted of three one-week modules addressing three key areas: (i) support of local seed supply and small-scale seed enterprises, 11-15 Nov; (ii) genetic resources, rights and institutional policies, 18-22 Nov; (iii) ex-situ and in-situ conservation strategies, 25-29 November. Participants could attend any or all the components, but each component was designed to be independent and comprehensive.

The first module focused on alternative seed delivery mechanisms: establishing small-scale seed enterprises involving farmers and communities, use of decentralized seed production and marketing to improve seed supplies in less favorable or isolated areas. The workshop concluded with the design of plans to support local seed production or small-scale seed enterprise development.

Participants of the regional training course in Karaj, Iran

The second module focused on how institutions deal with international agreements such as CBD, ITPGRFA and TRIPS; and the practical application of these policies at the institutional level in issues related to biotechnology, plant breeding and conservation. The workshop was structured around a GCP distance learning module on international PGR

policies. The workshop concluded with the design of institutional policies on inbound and outbound intellectual property and genetic resources.

The third module discussed the theoretical background and technical and strategic tools available for *ex situ* and *in situ* conservation programs to combat the loss of crop genetic diversity. The workshop concluded with the design of management plans for complementary conservation strategies.

Participants during class work on participatory seed system analysis

The training program targets countries in the CWANA region. The participants were mainly from the NARS and national seed programs, while some were from outside CWANA. In all, there were 45 participants from Armenia, Azerbaijan, Ethiopia, Iran (DARI, SPII, SPCRI, NGOs), India, Morocco, Oman, Kenya, Sudan, Tanzania, and Uganda; representing, national research agencies, genebanks and seed programs; universities; and NGOs. *Samad Mobasser, SPCRI, P.O. Box 31535-1516 Karaj, Iran, E-mail: sa_mobasser@yahoo.com*

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Private Sector Wheat Seed Production in Pakistan

Government policy in Pakistan strives towards the delivery of high quality seeds of improved varieties at affordable prices, through the public and private sectors. It also encourages transparent market practices to ensure that seed producers get a fair return on their investment.

In the 2005/06 rainy season, an estimated 999,520 tons of wheat seed was required. The public and private sector supplied 166,541 tons (17%) of seed (Table 1). Private seed companies are playing a major role in wheat seed supply in all four provinces, distributing 126,633 tons (76%) of wheat seed supplied during the season. This indicates that the right enabling policy environment is an incentive for the private sector to produce and supply seed of self-pollinated crops such as wheat, which are traditionally considered high-volume and low profit crops.

Table 1. Wheat seed demand and supply in Pakistan

Province	Potential demand ('000 t)	Quantity distributed (t)		Total supply ('000 t)	Private sector (%)
		Public	Private		
Punjab	762	31	85	116	73
Sindh	106	1.6	35	36	96
NWFP	92	6.1	6	12	49
Balochistan	40	0.6	0.7	1	56
Total	1000	39.3	126.7	165	76

Since the 1990s, Pakistan enacted a national seed policy and encouraged private sector participation in the seed industry. At the end of 2005, there were 586 large, medium and small national seed companies operating in the country. About 60% of these companies produce volumes ranging from 2 to 2000 tons of various seed crops. In addition, there are four multinational companies: Monsanto Pakistan Agritech, Syngenta Pakistan, ICI Pakistan Seeds, and Pioneer Pakistan Seeds. The multinationals mostly import and distribute seed of various hybrid crops (maize, sorghum, sunflower), although some produce hybrid maize seed and small quantities of cotton seed locally. *Source: Seed News, vol. 8 no. 2, July-December 2006*

Workshop on Plant Variety Protection (PVP) in Tajikstan

The 2nd West and Central Asia Regional Workshop on Plant Variety Protection was organized by the International Union for the Protection of New Varieties of Plants (UPOV) in cooperation with the Ministry of Agriculture of the Republic of Tajikistan and the Swedish International Development Cooperation Agency, with financial assistance from the Ministry of Agriculture, Forestry and Fisheries of Japan. The workshop was held from 15-18 September 2006 in Dushanbe, Tajikistan. It aimed to create awareness on plant variety protection and its role in seed sector development. The workshop covered various topics including the UPOV Convention, PVP benefits and their organization,

technical aspects of DUS testing, and experiences from selected countries.

The main resource persons for the workshop were Rolf Jördens and Makoto Tabata from the UPOV Secretariat, Geneva, Switzerland. In addition, Mrs Beate Rücker (Bundessortenamt, Germany), Kiyofumi Nakamura, (Ministry of Agriculture, Forestry and Fisheries, Japan), Yuri A. Rogovskiy (State Commission for Selection Achievements, Russian Federation), Ms Nuria Urquía Fernandez (FAO), Zewdie Bishaw, (ICARDA) and Ayhan Elçi (Turkish Seed Industry Association) made presentations.

Participants of the PVP workshop with H.E. Dr Voris Madaminov, Minister of Agriculture (fourth from left) in Dushanbe, Tajikistan

There were 36 participants from the host country, representing agricultural research, universities, seed projects, public and private seed sector, and various departments of the Ministry of Agriculture. Another 14 participants came from Afghanistan, Azerbaijan, Iran, Jordan, Kyrgyzstan, Mongolia, Pakistan, Turkey, and Uzbekistan. The participants made presentations on the status of PVP in their respective countries. Among the participating countries from WCA region Azerbaijan, Jordan, Kyrgyzstan and Uzbekistan are full-fledged members of UPOV. *Makoto Tabata, Senior Counsellor, UPOV, 34, Chemin des Colombettes, 1211 Geneva 20, Switzerland, E-mail makoto.tabata@upov.int*

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ICARDA-FAO Seed Course in Uzbekistan

In Uzbekistan, new seed processing machines and laboratory seed testing equipment have been imported through the FAO TCP Project. However, proper operation and management of seed processing and laboratory facilities would be important to maximize the efficiency of cleaning operations, minimize operational costs and maintain seed quality and health standards before marketing. The CGIAR Project Facilitation Unit for Central Asia and the Caucasus and the Seed Unit of ICARDA organized the course, held during 4-14 September 2006 in Tashkent, Uzbekistan.

The course comprised three modules: (i) General seed technology and management of seed processing; (ii) Quality assurance in seed testing; (iii) Seed health testing. Participants stayed together for the first module and then split into two groups for the second and third modules for an in-depth practical training at the Sate Seed Quality Control and Certification Center and Uzbekistan Quarantine Center.

Participants of the training course in Tashkent, Uzbekistan

There were 21 participants from five institutions: Uzbek Quarantine Center, Uzbek Research Institute for Irrigated Cereal and Legume Crops, Uzbek Rice Research Institute, Tashkent State Agrarian University, and Samarkand Agricultural Institute. *Aziz Nurbekov, ICARDA-PFU, P.O. Box 4546, Tashkent, Uzbekistan, E-mail a.nurbekov@cgiar.org*

New Lentil Varieties Released in South Asia

Bangladesh, India, Nepal, and Pakistan produce about half the world's lentil. Given that lentil is a major source of dietary protein in these countries, the national research programs are paying serious attention to increase productivity and nutritional quality of the crop.

India

The Vivekananda Parvatiya Krishi Anusandhan Sansthan in Almora, India, recently released 'VL Masoor-507' lentil variety for the North Hills Zone of the country. The variety was developed through single plant selection from an ICARDA breeding line ILL 7978. It is semi-erect, and matures in 140 days like the local varieties, but outyields them by 37%. It has a yield potential of 2.5 t/ha, and has wide adaptability, high wilt resistance and large seeds – traits that consumers like. The variety is spreading fast among farmers in hilly areas of northern India.

Lentil variety VL Masoor 507 in Almora, India

Pakistan

The Nuclear Institute of Agriculture and Biology, Faisalabad, Pakistan, recently released 'Masoor-2006' lentil variety, produced by irradiation with -rays of an ICARDA line ILL 2580. Farmers like the variety because of its high yield potential (> 2 t/ha), large seeds, and improved disease resistance. Large-scale seed multiplication is underway in Punjab province. *Source: The Week at ICARADA No. 940, 28 Sep 2006*

HOW TO

This section provides technical/practical information for technical staff involved in seed production and quality control.

How to No. 34: Control Plots in Seed Quality Assurance

Definition

Control plots are small plots sown by the seed certification agency with samples collected from seed lots produced and certified in a previous cropping season. A control plot can be used as pre-control or post-control in a seed certification scheme. If a control plot is used to monitor the quality of seed being produced in the same crop season it is called a pre-control plot. If it is used mainly to monitor the performance of the previous crop season it is called a post-control plot.

Uses of control plots

Control plots are useful tools for:

- Monitoring the accuracy of field inspection procedures applied on seed lots approved the previous season
- Evaluating the performance of field inspectors who conducted inspection of seed lots approved the previous season
- Monitoring the quality of seed lots harvested during the current season for approval by seed certification agency
- Training of field inspectors on characters of existing and/or newly released varieties or any anticipated potential contamination
- Identifying seed production fields planted with low quality seed as revealed through early inspection of control plots.

Procedures for control plots

According to OECD Seed Schemes, the 'standard sample' of a variety is the official standard against which all other seed samples of the variety will be compared. The sample must not differ significantly in any character from seed used for official tests on which the variety is accepted.

Sample size

Seed samples of appropriate quantity, determined based on the seed rate of a given crop and the certification standards to be enforced, are collected from the seed lots to be controlled after processing and treatment. The sample should contain three times the number of plants in which one contaminant is allowed in the certification standard for a given seed category. For example, in a seed category with 99.9% (1:1000) minimum varietal certification standard, a sample of 3000 plants is required (note OECD Seed Scheme requires 4n). In other words, a wheat variety with 1000-kernel weight of 40 g may require 120 g seed sown at the seed rate of 100 kg/ha for a plot, whereas a chickpea variety with a 1000-kernel weight of 1 kg, requires a 3 kg plot size at a seeding rate of 100 kg/ha.

Intensity of control plots

The intensity of control plots depends on seed category and availability of resources. It is essential to control all seed lots used for further multiplication and a smaller proportion of seed lots sold for commercial grain production. It may be necessary to control 100% for pre-basic and basic seed and only 30% for certified seed.

Planting procedures

Plots should be planted on land free of weeds and other contaminants to produce a clean standing crop. Similar varieties and generations should be grouped together with one standard sample for every 15 plots. The plots should be sown earlier than actual planting time, irrigated for early and even germination, and adequately managed similar to that used for seed production.

Taking observations

The plots should be examined throughout the growing season. Observations should be made to ensure varietal identity and purity in terms of the presence of offtypes and other varieties based on varietal characters and presence of seed-borne diseases.

Reporting results

The number of plants per plot should be estimated to calculate the percentage varietal purity. In some countries, pre-control plot results can be used to approve the seed lots based on the certification scheme. *Abdoul Aziz Niane, Seed Unit, ICARDA, P.O. Box 5466, Aleppo, Syria, E-mail: a.niane@cgiar.org*

RESEARCH NOTES

Short communications on practical research or relevant information on agriculture or seed technology are presented in this section.

Farmer-based Seed Production: Experiences of the South Agricultural Research Institute in Ethiopia

Asrat Asfaw[1]

1. Introduction

Formal research on development and promotion of new varieties and production technologies in Ethiopia began in the early 1930s. By December 2005, the national agricultural research system had developed and released 385 varieties for 49 crop species (Table 2). At present, the Ethiopian Seed Enterprise (formal sector) is producing seeds of 80 varieties of 20 crops (Yonas Sahlu, personal communication). Despite efforts in crop improvement, technology transfer and seed supply, most farmers have not adopted these released varieties. Small-scale farmers predominantly use local varieties and farm-produced seed except in a few major crops (McGuire, 2005; Bishaw, 2004). The informal sector supplies much of the seed used nationally. The efforts of the formal sector to supply seed of new varieties are limited by insufficient production capacity and late delivery.

Different staretgeis were attempted to increase the availability of quality seed for use by small-scale farmers. The government has encouraged private investment through free access to crop varieties and hybrids developed by public sector research. The private sector is also encouraged to either produce or import seed of crop varieties that meet the national variety release requirements. Despite the establishment of a few private companies with small market shares, there is little success in improving seed availability and access for small farmers.

The participation of farmers in seed production was sought as an alternative strategy. This approach was first attempted in the late 1980s, under the strategic area seed reserve project. Local landraces were identified, collected, characterized and multiplied for distribution to farmers in drought-prone areas, particularly in North Shewa and South Wollo. The project eventually evolved into on-farm germplasm conservation, enhancement and seed prodcution assisted by NGOs. The Ethiopian Seed Enterprise also involved farmer cooperatives for contract seed production where they are encouraged to retain 10% of the seed for local exchange. These were some of the first attempts to make seed available to farmers within their locality.

In the late 1990s, recognizing the limited capacity of the formal sector to meet national demand, the government launched a farmer-based seed production and marketing project (McGuire,

[1]*Awassa Agricultural Research Center, South Agricultural Research Institute, P.O. Box 6, Awassa, Ethiopia*

2005) which sought to organize large numbers of smallholder farmers to produce and market seed within their communities. The intention was to double national seed production, while making seed readily available to farmers by virtue of the decentralized approach, as the seed is sold directly to district agricultural and rural development offices and reaches neighboring farmers through sale or informal exchange. The anticipated impact from the program was constrained by seed pricing and marketing problems. Building strong partnerships among different stakeholders including research, extension, NGOs and farmer's cooperatives unions, etc. could help solve the problems of price and marketing of seed produced by small farmers.

Table 2. Crop varieties released as of 2005

	No. of crops	No. of varieties released
Cereals	11	143
Pulses	9	92
Oilseeds	7	43
Root and tubers	4	41
Vegetables	6	18
Fruits	1	6
Coffee	1	20
Cotton	1	13
Forages	9	9
Total	49	285

Source: Crop Variety Register 2005, Issue No. 8

The South Agricultural Research Institute (SARI) is one of the regional agricultural research institutes involved in technology generation and dissemination in the South Nations, Nationalities and People's Regional State. It conducts research at Awassa, Areka, Bonga and Jinka agricultural research centers. SARI, as a part of the national research system, has released a number of crop varieties, but not all are available to farmers. The SARI research centers were involved in on-station seed multiplication and dissemination to farmers and other technology transfer activities. However, the effort is inadequate because of limited production capacity and lack of sufficient effort in promoting and popularizing the varieties. The institute went through structural changes in research and dissemination activities, focusing more on impact orientation. In the 1990s, participatory research was initiated as part of this re-orientation. SARI management encourages breeders to look beyond variety release and use all possible means to promote their varieties to farmers. The participation of farmers and other stakeholders in seed multiplication and dissemination is an alternative strategy to increase seed availability and adoption of varieties by farmers.

2. Objectives of farmer-based seed multiplication

The main goals of seed production with farmers are to:

- Improve adoption and diffusion of new varieties by farmers
- Improve availability and accessibility of seed to farmers
- Create impact on the livelihood of small farmers

3. Farmer seed production models

SARI used different seed multiplication and dissemination models, which are discussed below.

3.1 Individual farmers

In this model researchers directly work with farmer seed producers to improve seed availability within the communities. Box 1 summarizes the steps involved.

Box 1. Steps in individual farmer seed production model

Variety and seed need assessment

- How?
  - participatory variety trial (PVS)
  - adaptation trial/variety validation trial
  - participatory rural appraisal (PRA)

Identification/ selection of variety for multiplication

- How?
  - PVS
  - community meeting

Identification of farmer seed producers

- How?
  - community meeting
  - seed multiplication and marketing

Common bean: Seed production with farmers was started in 2003 after PVS trials at Boricha *woreda*, Sidama zone. Two communities were selected in the *woreda* for implementation. Meetings were

organized with the communities to discuss PVS results, interest on getting seed of varieties evaluated, limited capacity of research in providing seeds, and seed marketing issues like the willingness to buy or get seeds through social networks if multiplied by farmers in the community. The community selected varieties and farmers capable of producing seed of these varieties. Variety selection was based on seed color, market demand, and on productivity witnessed by PVS farmers. Land and labor availability and standing in the community were used as criteria to select the seed producers. Nine farmers from the two communities were selected to multiply seeds of four varieties.

The following procedures were followed for seed production:

- Farmers were trained (on-farm training) in seed production
- Researchers supplied the initial seed and fertilizers
- Farmers provided land, labor, and performed all agronomic management
- Research staff with experts from Bureau of Agriculture monitored the seed production
- Researchers supplied bags and pesticides to facilitate seed packaging and storage by farmers
- Farmers were advised to sell the seed as they liked.

Within a year nine farmers in the two communities multiplied nearly 900 kg seed of four varieties. On average each farmer sold to or exchanged with at least 10 farmers within the community and sold as seed in local markets. An estimated 90 farmers got access to seed of modern bean varieties through wider farmer-to-farmer seed diffusion of red mottled varieties, which are new in the area.

Irish potato: In 2002 and 2003, the seed production was started with 12 farmers from six *woredas*. First, farmers and experts from the *woreda* were trained at Holeta Research Station on potato seed production, diffused light store (DLS) construction and ware potato storage. Individual farmers then started seed multiplication with initial seed supplied by researchers. The 12 farmers collectively multiplied 7,350 kg and 19,480 kg potato seed tubers in 2002 and 2003, respectively. Nearly 60 farmers benefited from the scheme through farmer-to-farmer seed exchange in the first year (Table 3).

Table 3. Potato seed multiplication in 2002 and 2003

Woreda (Zone)	1	2	3		4	5
			2002	2003		
Bule (Gedio)	2	2	1750	5900	20	965
Boditi (Wolayta)	2	2	600	2050	3	800
H/selam (Sidama)	2	2	2900	9600	14	1552
Lemo (Hadiya)	2	2	600	600	-	-
Gumer (Gurage)	2	2	600	530	4	-
Chencha (Gamogofa)	2	2	900	800	6	-
Total	12	2	7400	19500	57	

Source: ARC progress report 2003

1 = No. of farmers; 2 = No. of varieties; 3 = Amount of seed produced (kg), 4 = No. of farmers obtaining seed through farmer-to-farmer exchange, 5 = Money obtained through sale of 2002 production (Eth Birr). USD 1 = 8.65 Birr

3.2 Social networks

In 1999 and 2002 social networks (e.g. church) were tried for common bean seed production and dissemination in Areka. The church was supplied with initial seed and backstopped by research in technical aspects of seed production. This approach proved to be effective because seed could easily be exchanged among members without any fear of marketing problems and more seed was produced compared to individual farmers.

3.3 Farmer research groups

Farmers' research groups (FRGs) were organized around testing sites of Awassa and Areka Research Centers. The FRGs were used for technology evaluation and demonstration. The demonstration plots with FRGs were used for popularization and technology validation and also as source of seed for preferred varieties. FRGs are now involved in micro level seed production of some crops.

3.4 Cooperatives

This is part of a wider impact strategy involving large numbers of stakeholders. The steps used to make this model effective were as follows:

- Assessment of possible and potential stakeholders/partners and commodity(ies)
- Assessment of market outlets/potential markets and requirement for potential commodity(ies)
- Facilitation of partners' meeting/stakeholders forum (research extension advisory council or seed partners meeting). The strengths, weaknesses, potentials and possible threats for the commodity were analyzed in these meetings. Crops and varieties were selected based on market demand and potential adaptation. The roles and responsibilities of each partner were determined (Table 4) and a memorandum of understanding prepared.
- Organization of promotion campaigns (field days) to create awareness and markets for seeds and commodities.

The Awassa Research Center, Bureau of Agriculture and Rural Development of Sidama and Gurage zones, Farmers' Cooperative Unions (Sidama ELTO and Walta), Self-help Development International Capacity Building Project (NGO) and farmers were identified as potential partners. The partners identified potato, onion, wheat, and soybean as potential crops. Activities began in 2004 in two zones (Sidama and Gurage) with the intention of improving the livelihood of smallholder farmers by enhancing productivity and market access. Because of the acute seed shortage of the selected crops, seed was multiplied by some cooperatives in order to ensure seed availability and self sustainability.

Field day on promotion of soybean seed production under the cooperative model

Table 4. Roles and responsibilities of partners in the cooperative based model

Awassa Research Center • Facilitate availability of basic seed • Technical backstopping • Provide training and information • Monitoring and evaluation	*Elto and Walta Farmer Cooperative Unions* • Target cooperative and farmer selection • Facilitate provision of fertilizers and agro-chemicals • Facilitate marketing
Bureau of Agriculture and Rural Development • Target farmer selection • Farmer training • Follow-up of activities • Market information and identifying customers • Facilitate input provision and supply	*NGO (Self-help)* • Provide budget for activities • Prepare workplan • Monitor progress and give feedback • Facilitate market outlet

This approach is better than all other models because the seed produced was used within the cooperatives. This system made seed available within a short distance and overcame the problem of marketing as the seed was purchased by the cooperatives and sold back to farmers at planting time. The buyers in turn produced grain demanded by agro-industries, consumer cooperatives and wholesalers with guaranteed market.

4. Lessons learnt and the way forward

Participation of farmers in seed production with different approaches revealed that seed marketing and storage were major problems with the individual farmers. The model may work for root and tuber crops provided a farmer specializes and is recognized as a seed producer by stakeholders who guarantee a market for the seed produced. The social networks were better for seed diffusion as the church has many followers who will buy seed produced by church. The bean seed production at Areka indicated that social networks are better in improving seed availability compared to the individual farmer approach. The cooperatives are good for they are promoting adoption of technologies and providing well-organized credit system and market outlets for

seeds produced via cooperative unions. In general, while attempting seed production with farmers linkages with neighboring communities, traders and cooperatives are essential to create a market for the seed produced. The seed provision strategy of SARI is the distribution of small packets to many farmers, encouraging local seed multipliers (and linking them to markets) and catalyzing much larger multipliers (NGOs, cooperatives, and private sector).

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MEETINGS AND COURSES

Announcements of meetings, seminars, workshops and training courses appear in this section. Please send us announcements for national, regional, or international workshops, seminars and training courses organized in your country for inclusion in the next issue.

28th ISTA Congress, 5-11 May 2007, Iguassu Falls, Brazil. For more information, visit the website or contact ISTA, Zurichstrasse 50, 8303 Basserdorf, Switzerland; Fax: ++41-44-8386001; E-mail seedsymposium@ista.ch; Website: www.seedtest.org.

7th AFSTA Annual Congress 2007, 27-30 March 2007, Livingstone, Zambia. For more information visit the website www.afsta.org.

Annual ISF World Seed Congress 2008, 21-23 May 2007 in Christchurch, New Zealand. For more information visit the website at www.worldseeda.org

6th International Herbage Seed Conference, 17-23 June 2007 Norway and Denmark. The International Herbage Seed Group (IHSG) is an international research group that focuses on encouraging cooperation between workers engaged in herbage seed production research. The IHSG arranges international herbage seed conferences every four years.

The scientific program includes oral and poster presentations within the following themes:

- Herbage seed for the future: biodiversity, GMOs and the role of seed yield capacity in herbage breeding programs
- Seed production of warm-season herbage species
- Seed crop establishment: rotations, cropping systems, cover crops, sowing times, row spacing, sowing rate, control of weeds and volunteer grasses, effects of seed dormancy and seed vigor
- Optimizing input factors in herbage seed production: crop fertility, plant protection, and environmental impacts
- Harvest and post-harvest issues: harvest timing and methods, straw management, seed drying, seed cleaning and storage

For more details, visit the website http://cropandsoil.oregonstate.edu/ihsg/conference2007.

Seed Ecology II 2007, 13-19 September, Perth Western Australia. The conference is sponsored by the International Society for Seed Science and will focus on seeds and the environment. For more information visit the website at http://www.seedecology2007.com.au. General enquiries: University of Western Australia, 35 Stirling Highway, Crawley WA 6009. Tel: +61 8 6488 6000; Fax: +61 8 6488 1380; Email: general.enquiries@uwa.edu.au; Website: www.universityclub.uwa.edu.au.

8th African Crop Science Society Conference, 27-31 October 2007, El-Minia, Egypt. The conference is organized by the African Crop Science Society (ACSS) and Faculty of Agriculture, Minia University, Minia, Egypt. Abstracts should be submitted by 28 February 2007. Upload abstracts, register, view program and obtain more information at the conference website www.acss2007.org.

Courses

Plant Genetic Resources and Seeds: Policies, Conservation, and Use, 17 September to 12 October 2007, Awassa and Debre Zeit, Ethiopia. The overall objective of the training program is to enhance participants' capabilities to deal with contemporary issues in the management of genetic resources and seeds. The program pays special attention to relevant policies and participatory and market-oriented approaches. Participants and facilitators will exchange experiences and work together to explore practical applications for the conservation and sustainable use of plant genetic resources in agriculture.

The training program is designed for project coordinators, senior staff, managers, trainers, program leaders and other professionals who aim to promote the conservation and use of PGR for agriculture from a policy, research, education or development perspective. Participants are employees of research institutes, public/private seed sector, universities, NGOs or other agricultural development oriented organizations and government institutes. Applicants should have at least a BSc or the equivalent in training and be proficient in English. They should also have at least three years of professional experience in a relevant field, they should work in dry areas.

Four two-week courses are offered as part of two parallel programs. Each two-week course provides independent and comprehensive training. Based on their professional interests and institutional needs, participants can combine two courses into a program.

Awassa Week 1 and 2 (17-28 September 2007)

- Market and chain development for genetic resources and seeds
- Participatory approaches in genetic resources management and plant breeding.

Debre Zeit Week 3 and 4 (1-12 October 2007)

- Conservation strategies and plant genetic resources policies
- Design of plant breeding programs addressing drought

Partners: The training program is organized by Wageningen International (www.wi.wur.nl) and the Centre for Genetic Resources, the Netherlands (CGN, www.cgn.wur.nl), in cooperation with ICARDA (www.icarda.org), the International Plant Genetic Resources Institute (www.ipgri.cgiar.org), the Ethiopian Institute for Agricultural Research (www.eiar.org), and other national and international organizations.

Fellowship: A limited number of fellowships are available from the Netherlands Fellowship Program (NFP) for nationals of certain countries. Contact Wageningen International for a list of eligible countries. Candidates who wish to apply for fellowships should begin the application procedure as soon as possible. Candidates must first apply to Wageningen International for admission to the course. Acceptable candidates will receive letters of provisional acceptance from Wageningen International. They can then apply for an NFP fellowship through the Netherlands Embassy or Consulate in their own country. Please note that NFP fellowships are available for **a four-week training program only.** Applications for fellowships should be submitted to Wageningen International before 1 February 2007. For additional information on fellowships, see www. courses.wur.nl (under 'Fellowships').

The admission deadline for application with funding other than a NFP fellowship, is four weeks before the start of the training program. For additional information and to download application forms, go to www.courses.wur.nl (click on 'Courses Wageningen International', and then on the course of your interest). Application forms, including an attached CV, should be submitted to Wageningen International. You can also submit an application online.

LITERATURE

Literature, books and journal articles of interest to readers are presented here. Please send information on seed publications on policy, regulation, and technology to the Editor for inclusion in *Seed Info*.

Books

Mazoyer, M. and L. Roudart. 2006. A history of world agriculture: from the Neolithic age to the current crisis. At the start of the 21st century, roughly half the human population lives in

poverty. In a world where most of the world's hungry people are peasant farmers, the gap between those with the best and those with the most rudimentary agricultural technology is becoming wider. *A history of world agriculture* is both a challenge to the conventional global food system, and an interesting history of agriculture and agrarian culture. Eight chapters are dedicated to agrarian systems and heritage, from early slash-and-burn agriculture through the Inca agrarian system, to the mechanization and monocropping of the 20th century. Each system is considered in its wider social and political context. The authors argue that the world continues to be made up of agrarian systems with different inherited characteristics, which cannot be regulated by the current homogenous and competitive global system.

In explaining the origins, transformation and role of agriculture in the evolution of humanity, the authors arrive at a key message, that the 'international agricultural price war' must stop. They propose a new organization of international agricultural trade, with objectives such as agrarian reform, and international agreements on the average price of agricultural produce. Trade distortions created by low international market prices for agricultural produce are, they argue, the root cause of income inequality, pushing peasants further into poverty. The concluding chapter places the current crisis of developing countries within a more general agrarian crisis: protecting peasant agriculture is seen as key to solving the current poverty crisis. According to the authors, "Agricultural and food products are not commodities like others. Their price is that of life, and, below a certain threshold, death." The book offers a challenging and stimulating analysis that will be of primary interest to an academic audience. Published by Monthly Review Press (www.monthlyreview.org). 480pp; ISSN 1-58367-121-8; Price: USD 35.

Halberg, N., H.F. Alroe, M.T. Knudsen and E.S. Kristensen (eds.) 2006. Global development of organic agriculture: challenges and prospects. In the North, conversion from conventional to organic farming is increasingly being undertaken for economic as much as ethical or ecological reasons. Premium prices for organic produce, the rising cost of fuel and other inputs, and ongoing changes in subsidy regimes are just some of the factors that are making many conventional farmers take a careful look at organic alternatives. In the South, however, premium prices and environmental subsidies are seldom part of the economic picture. And in this context, an initial fall in yields, often attributed to organic conversion, is commonly cited as a critical objection to the spread of organic farming.

So what is the global potential of organic agriculture? Focusing primarily on the developing world, and covering both certified and non-certified organic production, this recent publication offers a wide ranging and in-depth study. The opening chapters take on some of the big, background issues, including the place of organic farming in the context of ecological economics and ecological justice – a concept developed contrary to globalization and sustainable development. Then follows a reappraisal of what organic farming offers to developing country farmers, which makes the point that for the majority, who generally convert from a low-yielding conventional approach, adopting organic practices brings an increase in productivity. Other chapters focus on the role of organic farming in the context of soil fertility depletion in sub-Saharan Africa, the impact of organic farming on food security from a regional and global perspective, and possibilities for closing urban-rural nutrient cycles. Published by CABI (www.cabi-publishing.org/bookshop). 384pp; ISBN 1-84593-078-9; Price: £55 (USD100).

Marange, T., M. Mukute and J. Woodend (eds.) 2006. Beyond participatory tools: field guide. The tools of participatory development can be applied too rigidly, so that the effectiveness – and indeed the essence – of the approach may be lost. *Beyond participatory tools* addresses this potential problem, by examining and explaining the principles behind participatory techniques. The hope is that practitioners, armed with this understanding, can adopt a more flexible approach, developing and adapting the tools to their situation and needs. Rather than a detailed 'how to' guide, it offers a framework within which participatory research can be developed and implemented.

Mainly based on experiences in Africa, the book is loosely structured around 'participation as a journey' and each step, and the links between them, are explored. Community organization receives additional focus as a neglected area, and gender is also given high priority. This will be a

useful book for anyone working directly with communities, to use alongside more traditional guides to participatory techniques. Published by Sound Age Management Consultancy Services/Crop Post-Harvest Program. 76pp, ISBN 0-7974-3119-5. A pdf version can be obtained from Tafadzwa Marange (E-mail tafadzwa @ecoweb.co.zw).

ISF. 2006. Patent protection of plant-related innovations: facts and issues. Proceedings of the International Seminar (CD ROM). The seminar examined the role of patents in relation to plant-related innovations such as enabling technologies, breeding techniques and genetic traits, and the impact of extending such protection to plants and plant varieties. Presentations by experts stimulated an in-depth discussion on patents and their application to plant-related innovations. For more details visit www.worldseed.org/bookshop.html

Useful Internet Websites

Database of agricultural researchers
An information database on agricultural researchers in the Western Asia subregion (Iran, Pakistan, and Turkey) has been released online. This is useful in facilitating information exchange among researchers in the subregion. Scientists can still fill out forms at www.aarinena.org/database/form.htm or access the database at www.aarinena.org/database/index.htm.

CGIAR Virtual Library
The CGIAR Information Managers and ICT/KM Program announce the new CGIAR Virtual Library, available at http://vlibrary.cgiar.org. The Virtual Library offers instant access to research on agriculture, hunger, poverty, and the environment. Users can tap into leading agricultural information databases, including the online libraries of all 15 CGIAR Centers. Use the Virtual Library to discover resources, go directly to the full text of thousands of publications, and stay current on CGIAR research. For more information visit http://vlibrary.cgiar.org or contact CGVlibrary@cgiar.org.

FAO research and extension portal
This portal offers free access to publications and databases covering topics related to policies, capacity building, human development, and methodologies. It also integrates material from different databases on technology; funding for research and extension; and on contacts in research institutions worldwide. Visit the website at www.fao.org/sd/sdrr/portal/ (available in English, French and Spanish). Send your comments and suggestions to: sdrr-portal@fao.org.

Second Announcement

Second International Seed Trade Conference 2007 in CWANA Region (Second ISTC2007)

The National Seed Council of Egypt, the Turkish Seed Industry Association (TURKTED) and ICARDA will organize the Second International Seed Trade Conference 2007 in CWANA Region, to be held from 19-21 November 2007 in Cairo, Egypt.

The conference aims at promoting seed trade within and between the CWANA region and the rest of the world. The conference will not only provide opportunities for seed trade, but also contribute to dialog between the private and public sectors on harmonization of regulatory frameworks to promote seed trade in the region. A major focus of the conference will be trade exhibitions by seed companies, seed equipment manufacturers, agricultural input supply companies, and agricultural machinery manufacturers. Companies interested in participating in the conference or exhibiting their products should contact the conference secretariat.

Conference Venue

The conference will be held at Mena House Oberoi, Cairo. Surrounded by 40 acres of scented gardens, the historic palace hotel, built in 1869, is only 700 meters from the Pyramid of Cheops. The hotel is located in Cairo's Giza district, 15 km from the city center and 35 km from the airport.

Conference Information

More information on the conference will be provided shortly on two websites: www.icarda.cgiar.org (ICARDA) and www.seedcouncil.eg (National Seed Council)

Conference Secretariat

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