SEED INFO

Official Newsletter of WANA Seed Network

ICARDA
Science for Better Livelihoods in Dry Areas

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EDITORIAL NOTE

Seed Info aims to stimulate information exchange and regular communication among seed staff in the Central and West Asia and North Africa (CWANA) region and beyond. Its purpose is to help strengthen national seed programs and thus improve the supply of high quality seed to farmers.

The WANA Seed Network provides information on activities relating to global and/or regional cooperation and collaboration to facilitate the development of a vibrant regional seed industry. In this issue of *Seed Info*, we report on the activities of the FAO-SEC (FAO Sub-Regional Office for Central Asia) project 'Seed Sector Development in Countries of the ECO', funded jointly by the FAO-Turkey Partnership Program (FTPP) and ECO (Economic Cooperation Organization). The project aims at fostering regional seed sector development of ECO member countries by developing a harmonized regulatory framework and regional seed policy. We also report on the ECO Regional Seed Association (ECOSA) Seed Congress held during 10–11 January 2014 in Istanbul, Turkey along with the Turkish Seed Trade and Fairs and organized by the Turkish Seed Union (TÜRKTÖB).

In the **NEWS AND VIEWS** section, Niels Louwaars from the Dutch Seed Association, Plantum, presents an article entitled *Special Crop Protection Rules for the Seed Sector*. The article highlights the important role of seed treatment technology in crop disease management. Most countries have quite strict rules for the approval of crop protection chemicals. It is important that they are aware both of the contributions of seed treatment to crop protection, and at the same time recognize the needs of the seed sector, where approvals for seed treatment chemicals need to be rationalized. Other news in this section comes from regional and/or international organizations, such as the African Seed Trade Association (AFSTA), the International Seed Federation (ISF), the International Union for the Protection of New Varieties of Plants (UPOV), the International Center for Agricultural Research in the Dry Areas (ICARDA), and the International Maize and Wheat Improvement Center (CIMMYT). Moreover, highlights of the global status of commercialized biotech/GM crops in 2013 were covered, showing adoption and impact of this technology across industrialized and developing countries.

The section on **SEED PROGRAMS** includes news from Ethiopia, Pakistan, and Syria. From Ethiopia, we report on the release of rust resistant wheat varieties by two agricultural research centers from the Ethiopian Institute of Agricultural Research (EIAR) and Oromia Agricultural Research Institute (OARI). The United States Agency for International Development (USAID)-funded seed project implemented by ICARDA and EIAR is aimed at rapid deployment of rust resistant wheat varieties working with federal and regional agricultural research institutes; public and private seed enterprises and farmer seed associations; regional, zonal, and district bureaus of agriculture; and farmers. There are also reports on the release of wheat and faba bean varieties by the General Commission for Scientific Agricultural Research (GCSAR) in Syria from the productive partnerships with the international agricultural research centers such as ICARDA and CIMMYT. It is expected that seed of these new high yielding and (a)biotic stress tolerant varieties will become available to farming communities at large to realize the impact in increasing agricultural production and productivity and ensuring food and nutritional security in the respective countries.

The **RESEARCH** section of *Seed Info* captures information on adaptive research or issues relevant to developing seed programs in the CWANA region and beyond. This issue features an article entitled *Participatory Variety Selection of Hybrid Maize Varieties in North West Ethiopia* by Melkamu Elmyhun, Fentaw Abate, and Yeshitila Merene, from the Amhara Agricultural Research Institute in Bahir Dar, Ethiopia. The paper discusses participatory variety selection of hybrid maize varieties with farmer research groups in two districts of West Gojjam Zone in northwestern Ethiopia. The study identified and recommended one high yielding and two early maturing varieties for Jabitehinan and South Achefer districts.

Seed Info encourages the exchange of information between the national, regional, and global seed industries. We encourage our readers to share their views and news through this newsletter. Your contributions, in Arabic, English, or French, are most welcome.

Have a nice read

Zewdie Bishaw, Editor

WANA SEED NETWORK NEWS

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

FAO-SEC Seed Project for Member Countries of Economic Cooperation Organization

Within the framework of the regional project 'Seed Sector Development in Countries of the ECO' (GCP/INT/123/MUL) funded jointly by the FAO-Turkey Partnership Program and ECO, FAO-SEC (FAO Sub-Regional Office for Central Asia) is conducting a series of regional and national workshops for implementation of the project.

Second Regional Workshop on Review of Seed Legislation and Formulation of Seed Policy Document

The 2nd Regional Workshop was organized on 10–11 January 2014 in Istanbul, Turkey by the FAO-SEC in cooperation with the ECOSA and the TÜRKTÖB. Representatives from the Ministries of Agriculture or specialists responsible for seed sector development or designated national consultants from Afghanistan, Kyrgyzstan, Pakistan, Tajikistan, and Uzbekistan attended the workshop. FAO-SEC staff, including a project coordinator and an international seed expert, also attended the workshop as organizers and facilitators.

The main purpose of workshop was to bring together all those who will be involved in implementing the regional project for orientation and to define their respective roles. At the national level, the main activities and outputs of the project are as follows:

- A summary report prepared on the status of the seed sector
- A detailed report prepared on the regulatory framework of the seed sector
- A detailed report prepared on seed market and economic issues
- A draft seed policy (based on the above documents) prepared and discussed at national stakeholder workshops
- Workshop conclusions incorporated into a revised national policy for consideration by the Ministries of Agriculture and Governments of respective countries

A guideline on the structure of the report was also prepared and discussed during the workshop to facilitate the preparation of country reports by national consultants and their eventual compilation into a single document by the regional consultant. For the preparation of country seed-sector reports the following decisions were taken:

- Project team leader or regional coordinator, together with national consultants, should assist the countries to review the seed sector and develop national seed policy documents
- Outcomes and deadlines for submitting national seed reports, preparation of draft seed policy documents, and national stakeholder workshops agreed. The team leader or the coordinator will maintain contact with national consultants to monitor progress of the work and provide support if required
- All completed reports uploaded onto ECO, ECOSA, and/or FAO-SEC websites
- A timetable of national policy workshops prepared according to the progress of the report by national consultants

It should be noted that in countries that already have a seed policy (Afghanistan, Azerbaijan, and Kyrgyzstan), only one national consultant has been appointed. For countries yet to develop a policy (Pakistan, Tajikistan, and Uzbekistan), three consultants with separate areas of responsibility will contribute to the formulation of draft policy.

Formulation of seed policy and laws for member countries

A national workshop was organized on 18 April 2014 in Bishkek, Kyrgyzstan within the context of the project activities. Following the opening session, presentations were made on: Seed policy development concept: general introduction; Normative-legal framework regulating the seed sector of the Kyrgyz Republic – challenges and recommendations; Status and perspectives of plant breeding in Kyrgyzstan; Status and problems with protection of breeder's rights in the Kyrgyz Republic; Constraints in seed production and marketing; and Status of phytosanitary control of seed production, export, and import. At the end, participants discussed the draft seed sector development and decided on the preparation of the 'Seed Sector Strategy and Action Plan'.

The FAO TCP project in 2012 supported the Ministry of Agriculture (MoA) of Azerbaijan in drafting the seed policy. In May 2014, the MoA also requested FAO-SEC to provide technical assistance in harmonizing the national seed legislation with the international standards and preparing the amendments to the Seed Law and the Law on the Breeders' Achievement or propose draft new laws within the provisions of the regional project. FAO-SEC would facilitate the procedure by recruiting a national legislative consultant for Azerbaijan. A workshop to discuss the draft seed policy is planned for September 2014.

In Uzbekistan, a revised draft seed policy was prepared by the regional coordinator and sent to the Uzbekistan partners as a basis for preparation of the revised seed policy. A workshop to discuss the revised draft seed policy is planned for the end of June 2014.

The regional coordinator and the national consultant of Afghanistan will jointly prepare a revised draft seed policy. A 'Workshop on Discussion of the Revised Draft Seed Policy of the Republic of Afghanistan' is planned for the end of June 2014.

Draft seed policy reports for other countries will be jointly prepared by the regional coordinator and national consultants and a 'Workshop on Discussion of the Draft Seed Policy' is planned in October 2014 for Tajikistan and Turkey, and in September for Pakistan.

The Steering Committee of the project agreed on the framework for project implementation and a detailed work plan and recruitment of national consultants for preparation of country seed sector reports and revised seed policy reports. The Steering Committee also recommended organizing a high-level project meeting as soon as possible to discuss project objectives and targets at the ECO Ministerial or high-level meetings on agriculture.

Participants of the Second Regional Workshop who also attended the 6th ECOSA Seed Congress

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Sixth ECOSA Seed Congress

The 6th ECOSA Seed Trade Congress was held on 10–11 January 2013, in Istanbul, Turkey. In total, 250 delegates from 21 countries participated in the Seed Trade Congress and Fair, and the regional seed workshop participants also attended. ECOSA is a regional seed association established by ECO member countries including Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Turkey, and Uzbekistan. FAO and ICARDA are observers of the association. The TÜRKTÖB made significant contributions in organizing the congress.

Seed sector development is one of the most important areas in the ECO region and has tremendous potential for growth with an estimated annual seed trade of US$27 million. FAO and ICARDA are promoting harmonization of polices and legislation to achieve synergies and facilitate regional seed trade.

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NEWS AND VIEWS

News, views, and suggestions relating to the seed industry are included in this section, which is a forum for discussion among seed sector professionals.

Special Crop Protection Rules for Seed Sector

Plant breeding and seed technology have an important role to play in crop disease management. Quality seed, clean and healthy, for planting – preferably of resistant varieties – provide a perfect start for crop production. Seed health is one of the most important attributes of seed quality. Certified seed used for planting should be free of plant diseases and pests as they affect viability, seedling vigor, and may act as inoculum for a diseased crop. Seeds infected or contaminated with seed-transmitted diseases are a breeding ground for quick development of a disease epidemic in the field. In the absence of resistant varieties, seed treatment is the cheapest and safest method compared to conventional approaches of plant protection. This means that crop protection in seed production fields is even more important than in crop production fields. Pathogens (fungi, bacteria, nematodes, and viruses) and insect pests can attack seeds at any stage of crop growth. Seed transmission of pathogens has some special features, i.e. close association of virulent pathogen with its host, the potential for long distance spread, and a uniform distribution of inoculum throughout the crop.

Crop seeds are commonly treated to avoid the spread of harmful organisms, to promote good seedling establishment, to minimize yield loss, or to maintain and improve quality. Treatment of seeds with organic substances to ensure a good harvest has a long history and dates as far back as 50 AD. Chemical seed treatment as an efficient and economic means of control of pests and diseases spread in the early 1960s. Since then seed treatment has rapidly become a standard agricultural practice to safeguard the health of seeds and subsequent plants to achieve maximum yield and better quality. These days, biological and physical seed treatments are also used to combat seed-transmitted diseases.

The range of chemicals available for seed treatment is increasing and important improvements continually made on the equipment to ensure safe and accurate dosage. A chemical for seed treatment should be effective against pests, have low toxicity, and a formulation for safe application, storage, and transportation. A good treatment should thus be safe for operator, grower, and consumer; have minimum environmental and residual hazards; and be cost effective.

Approval of crop protection chemicals, specifically for use in seed production, should therefore be a common policy. By controlling diseases in seed fields, it is possible to maximize the effectiveness of a limited amount of active ingredient, even when the chemical has some environmental effects when used in large-scale production fields. Similarly, assuming that seed producers are more professional farmers, it may be less of a problem if the chemicals are slightly too hazardous for use by untrained farmers in crop production fields.

Seed treatment is a special type of crop protection, using minute quantities of chemical applied directly onto the seed. When applied well, this adheres to the seed – and in many cases, a film can be added around the treated seed so that even if farmers plant by hand, they do not touch the chemical. Such treatments have tremendous environmental advantages over field sprays and are often much more effective in combatting pathogens.

Most countries have quite strict rules for approval of crop protection chemicals. Moreover, plant protection research on seed treatment is rather neglected. It is important that national authorities are aware both of the contributions of seed treatment to crop protection, and at the same time of the needs of the seed sector in this respect. Authorities responsible for assessing the applicability of crop protection chemicals should be aware of these benefits and should develop different standards for seed application compared to large-scale field sprays with the same active ingredient. Supporting the seed sector means directly helping farmers to safely and effectively combat crop diseases.

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AFSTA Annual Congress 2014

The 14th AFSTA Annual Congress 2014 was held during 4–7 March 2014 at the Ramada Plaza Hotel in Tunis, Tunisia. Offering a solid framework for exchange between the major players of the African private seed sector, this key event brought together 303 delegates from 48 countries. The delegates actively participated in the congress, which proved a magnificent forum to explore seed businesses and strengthen the network among the seed stakeholders.

In an opening speech read on behalf of the Minister of Agriculture of Tunisia, H.E. Mr Lassaad Lachaal, emphasized the importance of the seed sector in attaining food security in Africa. He called on the delegates to continue deploying their efforts to deliver quality seed to farmers and to explore enormous trading opportunities. The outgoing AFSTA President, Mr Jitu Shah, during his opening speech, noted that huge opportunities exist for expanding agriculture and boosting employment as well as foreign currency earnings in Africa. He added that AFSTA has a large and important role to play in this pursuit.

The congress discussed various important items for the African seed industry with a view to analyzing the current situation and charting out the way forward for development of the seed sector. The following topics were addressed during the congress:

- An overview of the seed market in countries of North Africa region
- Developing the African seed industry with reference to the Alliance for African Green Revolution (AGRA)
- Mobilizing the seed stakeholders for collaborative actions to fight against fake seed
- Highlights on the International Treaty on Plant Genetic Resources for Food and Agriculture and the Nagoya Protocol and its impact on the African seed industry
- Current status, trends, and impacts of the Maize Lethal Necrosis Disease in East Africa
- Progress in the control of cereal foliar diseases through advanced seed treatment
- Access to agricultural technologies for better food security in Africa

Opening ceremony of AFSTA Annual Congress, 2014

Several representatives of regional and international organizations attended the 2014 congress: the ISF, the International Seed Testing Association (ISTA), Organization for Economic Cooperation and Development (OECD), UPOV, Asia Pacific Seed Association, Food and Agriculture Organization, Common Market for East and Southern Africa, West and Central African Council for Agricultural Research and Development, and USAID.

The AFSTA General Assembly 2014 chaired by the outgoing President, Mr Jitu Shah, elected the AFSTA Board with 13 members that will serve until the next General Assembly in March 2015. Mr Nicholas Goble from the South African Seed Organization was elected AFSTA President, and Mr Denias Zaranyika of the Zimbabwe Seed Trade Association became Vice President. The General Assembly also approved nine new members who are Ultravetis East Africa Ltd. and Bayer East Africa (Kenya), The Lane Trading (Angola), Known-You Seed Co. Ltd. (Taiwan), Euralis Semences, ICS and LimaGrain Group (France), Seed Processing Holland B.V. (The Netherlands), and Centum (India).

The congress was preceded by a half-day workshop on 'International systems to develop an enabling environment to provide food security and economic development by strengthening the seed sector' jointly facilitated by the ISTA, UPOV, and OECD in which over 80 delegates participated.

The next congress will be held during 3–5 March 2015 in Victoria Falls, Zimbabwe. For more information contact or visit the AFSTA website at hhtp://www.afsta.org

ISF World Seed Congress 2014

The ISF concluded its annual World Seed Congress in Beijing on 28 May, with 1398 delegates from over 60 countries and high ranking representatives of international organizations in attendance.

Mr Wang Yang, Vice Premier of the People's Republic of China, welcomed the delegates and spoke of the wide influence of ISF and the positive role it played since its establishment in eliminating trade barriers and promoting the international movement of seed. The ISF President highlighted 'the constant commitment of ISF to facilitating the international movement of seed and increasing the ability of companies to innovate'.

The General Assembly approved an industry-wide position paper on the implementation of national policies for LLP (low level presence) of genetically engineered varieties (see www.worldseed.org/isf/on_trade.html). The paper stresses the importance of science-based, practical, and transparent LLP policies that governments should adopt. The Congress also presented an opportunity to mobilize support for the draft *International Standard on Phytosanitary Measures* that provides guidance to assist national plant protection organizations to identify, assess, and manage the pest risk associated with the international movement of seeds. Guidelines on assessing essential derivation in maize were adopted (see www.worldseed.org/isf/edv.html).

The concept of essential derivation has drastically decreased plagiarism in plant breeding, and ISF actively promotes international agreed-upon professional rules in order to assess essential derivation and resolve disputes. In addition, four Technical Guidelines for the correct and safe use of seed-applied technologies and proper handling of treated seed were also approved.

Opening Ceremony of the ISF World Seed Congress 2014

The General Assembly unanimously elected Mr Alvaro Eyzaguirre from Chile as President. He underlined in his acceptance speech "the need for a strong collaboration between the seed industry, farmers, governments, associations, non-governmental organizations, and universities to respond to the unprecedented challenges of increasing food production and climate change". In the face of an increasingly regulated environment, he urged delegates to work together with ISF in enhancing the image of the seed industry and promised that under his presidency ISF would continue to promote the seed business.

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ISTA Annual Meeting 2014

This year's ISTA Annual Meeting was hosted by the Science and Advice for Scottish Agriculture (SASA), a Division of the Scottish Government. The event took place in the centre of Edinburgh's World Heritage site from June 16 to 19, 2014.

The ISTA Annual Meeting always provides an excellent opportunity to meet other seed experts and to exchange experiences. The Annual Meeting program started with a Seminar on Seed Sampling, followed by presentations of the ISTA Technical Committees on the next days. The aim of the meeting was to discuss and decide on proposals for changes to the ISTA International Rules for Seed Testing, and business items of the Association, with the international participation of ISTA delegates and representatives from both the seed industry and governments, including experts in seed technology, scientific research and laboratory accreditation.

More than 200 participants from 54 countries attended the ISTA Annual Meeting.

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News from UPOV

Draft ARIPO Protocol for Protection of New Varieties of Plants

The Council of the UPOV at its thirty-first extraordinary session, held in Geneva on 11 April 2014, took a positive decision on conformity of the African Regional Intellectual Property Organization (ARIPO) Draft Protocol for the Protection of New Varieties of Plants with the provisions of the 1991 Act of the UPOV Convention. The Draft Protocol, once adopted with no changes and in force, would allow the Contracting States to the Protocol and ARIPO, in relation to the territories of the Contracting States bound by the Protocol, to deposit their instruments of accession to the UPOV Convention.

OAPI becomes second intergovernmental organization to join UPOV

The African Intellectual Property Organization (OAPI) became the second intergovernmental organization and the seventy-second member to join the UPOV when it deposited the instrument of accession of OAPI to the UPOV Convention with the Secretary-General of UPOV on 10 June 2014. OAPI operates a plant variety protection system covering the territory of its 17 member states. OAPI headquarters is in Yaoundé, Cameroon (see http://www.oapi.int/).

UPOV now has 72 members and the UPOV Convention applies to 91 states. For more information on UPOV member organizations and countries visit the website at: http://www.upov.int /members/en/index.html.

Working group on biochemical and molecular techniques (BMT), and DNA-profiling

The fourteenth session of BMT will be held during 10–13 November 2014 in Seoul, Korea. The ISTA, the OECD and UPOV will organize a joint workshop in conjunction with the fourteenth session of the BMT, on 12 November 2014.

Experience of members of the Union in examination of new plant varieties

The number of genera and species for which members of the Union indicated their practical experience in the examination of distinctness, uniformity, and stability (DUS) increased by 27.7% from 2589 in 2013 to 3305 in 2014. Information on members of the Union with practical experience in DUS examination is freely accessible via the GENIE database (http://www.upov.int/genie/en/).

Test Guidelines

The UPOV Technical Committee adopted six new and nine revised (four partially revised) Test Guidelines for the Conduct of Tests for Distinctness, Uniformity, and Stability (Test Guidelines). UPOV has now developed 301 Test Guidelines, all freely available on the UPOV website (http://www.upov.int/test_guidelines/en/).

International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

In response to an invitation by the Governing Body of the ITPGRFA to identify possible areas of interrelations among the international instruments of the ITPGRFA, World Intellectual Property Organization, and UPOV, the UPOV Council decided to explore the idea of a joint publication on interrelated issues regarding innovation and plant genetic resources and other suitable initiatives.

Frequently asked questions

UPOV has recently published comprehensive answers to the frequently asked questions (FAQs) about the organization and its functions, plant variety protection, plant breeder's rights and their implementation, UPOV convention and its relationship with international treaties (Convention on Biological Diversity, IT-PGFRA), and many more. For detailed information, you may please visit FAQs at http://www.upov.int/about/en/faq.html

For more information about UPOV, please contact the UPOV Secretariat: Tel: +41-22-3389155; Fax: +41-22-7330336; E-mail: upov.mail@upov.int; Website: www.upov.int

News from Royal Botanical Garden, Kew

Global Seed Conservation Challenge

The Global Seed Conservation Challenge is a new partnership program developed between Botanic Gardens Conservation International (BGCI) and the Millennium Seed Bank Partnership (MSBP) of the Royal Botanic Gardens, Kew. The program aims to address the challenge of achieving Target 8 of the Global Strategy for Plant Conservation by 2020 (75% of threatened species conserved in *ex situ* collections). The program will focus on engaging the global plant conservation community in the conservation of species not already in secure *ex situ* collections. BGCI is presently recruiting a coordinator for the program. More information at: http://www.bgci.org/resources/job/0625/

New conservation partnership for threatened trees

A new partnership between the Global Trees Campaign and the Royal Botanic Gardens Kew's MSBP will step up conservation for some of the world's most threatened tree species. Through a four-year project supported by the Garfield Weston Foundation, the Global Trees Campaign and the MSBP will work with existing and new partners around the world to deliver seed collection training and establish *ex situ* seed collections for threatened tree species. Seed collections will be established in the country of origin of the threatened species, and backup collections will be established in the Millennium Seed Bank, a secure underground vault in West Sussex, UK. Find out more here: http://www.bgci.org/resources/news/1114/.

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Fostering Seed Security Responses That Work for Vulnerable Farmers

Having access to seed can make or break farmers' ability to recover after drought, flood, earthquake, or the chronic shocks now linked to climate variability. Ensuring access to the right seed can be especially empowering as stressed farmers themselves can then produce food, generate revenue, and plan for seasons to come. Seed aid and seed sector development consumes over US$30 billion a year. Are farmers in crisis getting the kinds of assistance they want and need? Are the world's vulnerable and poor being supported with responses which build their seed security for generations to come?

This new website, SeedSystem.org, is unique in the humanitarian, livelihood, and seed sector spheres. It focuses squarely on smallholder, poor, and vulnerable farmers, and aims to jumpstart and improve the seed systems farmers use, across crops and farming systems. The site builds from rapid seed security advances in the last 5–10 years. Field evaluations show seed security issues as somewhat distinct from food security concerns; seed systems are proving more resilient than common wisdom has suggested; and some of the dominant aid responses may be doing more harm than good. Overall, the website benefits from a 'rethink' about what seed aid can or cannot accomplish and from exploration of novel approaches to bolster seed system functioning.

- More concretely, what does the site provide? Tools and resources to help donors, program managers, and front-line practitioners decide how best to respond to seed system constraints in emergency, recovery, chronic stress, and developmental contexts.
- Practical advice briefs give guidance on themes needing real-time response. Should we introduce new varieties just after a disaster (and what about hybrids)? How can we support and not undermine the local seed markets? Is seed quality an issue?
- Assessment tools help field staff identify seed security constraints and opportunities for the upcoming agricultural season and several to come.
- Field assessments and evaluations serve as guides for action planning and as baselines against which to measure aid effectiveness.
- Policy resources tackle the emerging issues in seed security program design. How should system resilience be promoted? How can seed security response be linked to nutritional gains?

The site promotes some cutting-edge thinking, but is also practical. With specific toolkits and policy aid, it aims to meet 21st-century needs for evidenced-based seed system responses. With many SSSAs (Seed System Security Assessments) conducted in the world's ongoing disaster hot spot areas – Eastern Congo, Haiti, South Sudan, and the Horn of Africa – strategies put forward should have repeated applicability.

A recent SSSA conducted in drought-prone eastern Zambia suggests how powerful targeted assessments can be. Field research found that only three crops (maize, groundnut, and cotton) accounted for 95% of the total seed sown. Few farmers could access any new variety of legumes – nutrient-dense crops critical for a region where stunting rates hover at 45%. Additionally, storage losses were very high, over 40%, with farmers using toxic cotton pesticides to control the problem.

Using the SSSA recommendations, USAID's Mawa Project, funded under Feed the Future, implemented Diversity for Nutrition and Enhanced Resilience fairs, making seed accessible through vouchers to 1800 vulnerable households in eastern Zambia. While private seed companies focused on maize and groundnut seeds, Mawa specifically included local seed producers to expand access to diverse seed: pigeon peas, soybeans, cowpeas, and other mixed beans. In 2014, the Mawa Project will work with the Zambian Agricultural Research Institute, the Seed Control and Certification Institute, and others to foster further formal and informal seed system integration. Improved storage methods will also be tested to ensure that farmers' gains are safeguarded from one season to another.

SeedSystem.org is a collaboration among national and international organizations aiming to improve seed security in high-stress and vulnerable areas across the world. Founding partners are: International Center for Tropical Agriculture/ Pan-African Bean Research Alliance (contact: l.sperling@cgiar.org); USAID/Office of U.S. Foreign Disaster Assistance (jmarch@usaid.gov); University of East Anglia School of International Development (s.mcguire@uea.ac.uk); and Catholic Relief Services (geoffrey.heinrich@crs.org). For more information, e-mail: info@seedsystem.org or visit http://seed system.org

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ICARDA Launches Research Platform and Partnerships in Sub-Saharan Africa

ICARDA launched a sub-Saharan research platform, moving into a new phase of expanded partnerships and a growing role in the region. The new platform, inaugurated in Addis Ababa, builds on ICARDA's 35-year partnership with the EIAR, providing a foundation on which to serve a bigger global and regional role – applying scientific solutions to improve agricultural productivity and raise incomes throughout East Africa and the Horn of Africa.

The launch also coincided with the initiation of ICARDA's regional program for sub-Saharan Africa – the two-day event set the stage for a targeted science agenda to take shape for the region, bringing together the heads and members of National Agricultural Research Systems (NARS) in Ethiopia, Kenya, South Sudan, Tanzania, Somalia, and Djibouti. NARS discussed their national priorities and challenges, and the support required from key agricultural organizations active in the region, such as the Forum for Agricultural Research in Africa (FARA), the Association for strengthening Agricultural Research in Eastern and Central Africa (ASRAECA), and the African Forum for Agricultural Advisory Services. These and other regional bodies were present at the meeting, included the Intergovernmental Authority on Development (IGAD), and the Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA).

International organizations active in Africa also attended: USAID, the FAO, the Department for International Development (DFID), and the United Nations Development Program (UNDP).

The sub-Saharan Africa platform is a promising development in the region as ICARDA's 'systems approach' experience in dryland productivity brings complementary expertise to the region, where several CGIAR centers have already been active for several years. The platform and regional program will be hosted at the International Livestock Research Institute in Addis Ababa, Ethiopia.

The active participation of all countries in discussing their expectations, requirements, and vision for partnerships with the newly launched platform demonstrated signs of new vitality and hope among all stakeholders for research and scientific solutions capable of bringing large-scale impacts.

Inauguration of ICARDA's research platform and sub-Saharan Africa Program

Moving forward, NARS in regional countries will discuss their priorities and set preliminary strategies and objectives before initiating further consultations to finalize their plans.

Source: What is new at ICARDA, Issue No 13 June 2014

New International Partnership Aims to Increase Wheat Yields

The International Wheat Yield Partnership (IWYP), a group that aims to increase wheat yields by 50% in 2034, was launched at the Borlaug Summit on Wheat for Food Security in Ciudad Obregón, Mexico. The program brings together research funders, international aid agencies, foundations, companies, and major wheat research organizations to serve as a unique vehicle for new discoveries and their speedy incorporation into wheat crops grown in different parts of the world. It also aims to stimulate new research and make scientific discoveries available to farmers in developing and developed countries. It is a collective global approach to make more wheat available; and IWYP members will enable scientific breakthroughs that are out of reach via existing mechanisms.

The partnership's initiators include the UK's Biotechnology and Biological Sciences Research Council (BBSRC), CIMMYT, the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food of Mexico (SAGARPA), and USAID.

For more information about this new partnership, read the news release at: http://www.bbsrc.ac.uk/news/food-security/2014/140326-pr-international-partnership-wheats-potential.aspx

Global Status of Commercialized Biotech/GM Crops: 2013

The highlights of ISAAA Brief 46, 'Global Status of Commercialized Biotech/GM Crops: 2013' are presented below:

Biotech crops increase in 2013

A record 175.2 million ha of biotech crops were grown globally in 2013, at an annual growth rate of 3%, up 5 million from 170 million ha in 2012. The global area of biotech crops has increased more than 100-fold from 1.7 million ha in 1996 to over 175 million ha in 2013, making it the fastest adopted crop technology in recent history.

From 1996 to 2013, millions of farmers in ~30 countries worldwide adopted biotech crops at unprecedented rates. There is one principal and overwhelming reason that underpins the trust and confidence of risk-averse farmers in biotechnology – biotech crops deliver substantial, and sustainable, socioeconomic and environmental benefits. The comprehensive EU 2011 study conducted in Europe confirmed that biotech crops are safe.

Twenty countries grew biotech crops in 2013

Of 27 countries that planted biotech crops in 2013, 19 were developing and eight were industrial countries. Each of the top 10 countries, of which eight were developing countries, grew more than 1 million ha providing a foundation for continued and diversified growth in the future.

Eighteen million farmers benefit from biotech crops

In 2013, a record 18 million farmers, compared with 17.3 million in 2012, grew biotech crops – remarkably, over 90% were risk-averse small, poor farmers in developing countries. In China, 7.5 million small farmers benefited from biotech cotton and in India there were 7.3 million beneficiary farmers.

The latest economic data available for the period 1996–2012 indicates that farmers in China gained US$15.3 billion and in India US$14.6 billion. In addition to economic gains, farmers benefited enormously from at least a 50% reduction in the number of insecticide applications, thereby reducing farmer exposure to insecticides, and importantly contributed to a more sustainable environment and better quality of life.

Developing countries planted more biotech crops than industrial countries

Latin American, Asian, and African farmers collectively grew 94 million ha (54% of the global 175 million ha of biotech crops versus 52% in 2012) compared with industrial countries at 81 million ha or 46% (versus 48% in 2012), thereby almost doubling the area gap from ~7 to ~14 million ha between 2012 to 2013, respectively. This trend is expected to continue.

During the period 1996–2012 cumulative economic benefits in industrial countries were US$59 billion compared to US$57.9 billion generated by developing countries.

Stacked traits occupied 27% of global biotech crops

Stacked traits continued to be an important and growing feature of biotech crops. Thirteen countries planted biotech crops with two or more traits in 2013, of which 10 were developing countries. About 47 million ha equivalent to 27% of the 175 million ha were stacked in 2013, up from 43.7 million ha or 26% of the 170 million ha in 2012; this steady and growing trend of more stacked traits is expected to continue.

The five lead developing countries in biotech crops in the three continents of the South are China and India in Asia, Brazil and Argentina in Latin America, and South Africa in Africa. They collectively grew 82.7 million ha (47% of global area) and together represent ~41% of the global population of 7 billion.

Biotech crops' contribution to food security, sustainability, and climate change

From 1996 to 2012, biotech crops contributed to food security, sustainability and climate change by: increasing crop production (valued at US$116.9 billion); providing a better environment (saving 497 million kg a.i. of pesticides); reducing CO_2 emissions (26.7 billion kg in 2012 alone); conserving biodiversity (saving 123 million ha of land); and alleviating poverty by helping over 16.5 million small farmers (including over 65 million household members).

Biotech crops are contributing to sustainability in the following five ways:

- Contributing to food, feed, and fiber security and self sufficiency
- Conserving biodiversity as biotech crops are a land-saving technology
- Contributing to the alleviation of poverty and hunger
- Reducing agriculture's environmental footprint
- Helping mitigate climate change and reducing greenhouse gases

In summary, the five thrusts above have already demonstrated the capacity of biotech crops to contribute to sustainability in a significant manner and to mitigate the formidable challenges associated with climate change and global warming, and the potential for the future is enormous.

Regulation of biotech crops and labeling

The lack of appropriate, science-based, and cost/time-effective regulatory systems continues to be the major constraint to adoption. Responsible, rigorous, but not onerous regulation is needed, particularly for small and poor developing countries, who are 'locked out' completely because of the high cost of developing and gaining approval of a biotech crop.

Global value of biotech seed in 2013

Global value of biotech seed alone was ~US$15.6 billion in 2013. A 2011 study estimated that the cost of discovery, development, and authorization of a new biotech crop/trait is ~US$135 million. In 2013, the global market value of biotech crops, estimated by Cropnosis, was US$15.6 billion (up from US$14.6 billion in 2012); this represents 22% of the US$71.5 billion global crop protection market in 2012, and 35% of the ~US$45 billion commercial seed market. The estimated global farm-gate revenues of the harvested commercial 'end product' are more than ten times greater than the value of the biotech seed alone.

Future prospects

In 2013, as expected, growth continued to plateau for the principal biotech crops in industrial countries and in mature biotech crop markets in developing countries where adoption rates are sustained at an optimal rate of ~90%, leaving little or no room for expansion. Growth in adoption in less mature biotech crop markets in developing countries, such as Burkina Faso (>50% growth) and Sudan (>300% growth) was very strong in 2013; and for the fifth consecutive year, Brazil posted an impressive 3.7 million ha increase, equivalent to 10% growth between 2012 and 2013.

There is cautious optimism that biotech crops, including both staple and orphan crops, will be increasingly adopted by society, particularly by developing countries, where the task of feeding their own people is formidable, given that the global population, most of whom will be in the South, will exceed 10 billion by the turn of the century in 2100. For more details on ISSA Brief 46-2013, visit http://www.isaaa.org/resources /publications/ briefs/46/infographic/default.asp

Source: Crop Biotech Update April 2, 2014 (excerpts from ISAAA Brief 46-2013: Executive Summary)

CONTRIBUTIONS FROM SEED PROGRAMS

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

Ethiopia Releases Rust Resistant Bread Wheat Varieties

Ethiopia is the largest wheat grower and producer in sub-Saharan Africa. However, wheat rusts remain one of the major constraints to wheat production in the country. Historically a number of rust epidemics were reported in the country. For example, in 2010 yellow rust epidemics caused by *Puccinia striformiis* f. sp. *tritici* wiped out the two most popular and productive bread wheat varieties (Kubsa and Galama) which were widely adopted across major wheat producing regions of the country. The epidemics happened due to breakdown of resistance in both varieties, which was based on the Yr27 gene. The yellow rust epidemics, and prevalence of Ug99 in the country, led to intensive efforts to promote and disseminate seed of rust resistant varieties. This resulted in rapid and widespread adoption of new rust resistant varieties. However, a new stem rust race, TKTTC has defeated a major gene in a recent mega variety, Digalu, resulting in a serious stem rust epidemic in the Bale Zone during the 2013/14 main cropping season.

For the last couple of years, Ethiopia has been at the forefront of a battle against wheat rusts – particularly yellow and stem rusts. In order to avert the risks associated with the cultivation of susceptible bread wheat varieties, the Ethiopian National Wheat Research Program based at Kulumsa Agricultural Research Centre (KARC) have been carrying out research on breeding resistance varieties in collaboration with the international agricultural research centers such as CIMMYT, ICARDA, and ASARECA (Association of Agricultural Research in East and Central Africa).

In 2013/14, 12 candidate varieties were submitted for release by three agricultural research centers (ARC); namely Kulumsa ARC (5) from EIAR, Sinana ARC (5) from OARI and Adet ARC (2) from AARI. In May 2014, the Ethiopian National Variety Release Committee released two bread wheat varieties each from KARC and SARC.

KARC submitted five promising candidate lines, among which two (ETBW 5879 and ETBW 6095) bread wheat varieties were officially released. ETBW 5879 is adapted to high rainfall areas whereas ETBW 6095 is for dry areas with short rainfall.

The ICARDA-EIAR project supported by USAID contributed to the off-season seed multiplication of some of these newly released wheat varieties; and about 1.75 tons of ETBW5879 and 1 ton of ETBW6095 will enter immediate accelerated seed multiplication in the 2014/15 main cropping season.

The project also supports the National Wheat Research Program in: (i) identifying wheat elite lines with rust resistance combined with better agronomic performance both for rainfed and irrigated conditions; (ii) fast track testing, release and popularization of new varieties; (iii) popularization and demonstration of new improved wheat varieties to create awareness and demand for seed; (iii) popularization and demonstration of new improved wheat varieties to create awareness and demand for seed; (iv) accelerated pre and post-release early generation (breeder, pre-basic and basic) seed multiplication of improved wheat varieties by NARS; (v) partnering with public and private sector including farmer seed producer associations for certified seed production of new improved wheat varieties to ensure adequate seed supply; (vi) targeted direct small-pack seed distribution to smallholder farmers for on-farm seed production and to assist informal varietal diffusion; and (vii) strengthening NARS and seed producers capacity through training and provision of critical equipment.

With the support from the international donor community such as the World Bank, AfDB (African Development Bank), and USAID, Ethiopian NARS are not only developing but also deploying wheat rust resistant varieties to tackle emerging threats to global food security.

Agronomic performance of bread wheat varieties released in Ethiopia

Items	Wheat varieties and agronomic characteristics			
Research centers	KARC	KARC	SARC	SARC
Varieties	ETBW 5879	ETBW 6095	Sanate	Mandoyu
Pedigree and selection history	NJORO SD-7	PASTOR//HXL7573/2*BAU/3/WBLL1	14F/HAR 1685	WORRAKATTA/PASTOR
Stripe (yellow) rust	5S	0	Moderately resistant/ tolerant to three rusts and Septoria	Moderately resistant/ tolerant to all three rusts and Septoria
Stem (black) rust	15MR	30MS		
Leaf (brown) rust	5MR	-		
Days to heading	64.6	58.2	71	68
Days to maturity	102.3	105.7	141	139
Plant height (cm)	91.9	89.5	102	85.3
1000 kernel weight (g)	31.2	37	39.5	36.2
Grain color	White	White		
Adaptation (masl)	High altitudes	Medium to low altitudes	2300–2600	2200–2600

Note: R= resistant; S= susceptible; MR/MS= moderately resistant/moderately susceptible

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Syria Releases Bread Wheat and Faba Bean Varieties

The Syrian National Variety Release Committee met on 8 June 2014 to review reports submitted to the committee for consideration to release bread wheat and faba bean varieties. H.E. the Minister of Agriculture and Agrarian Reform, chaired the meeting, which was attended by the representatives of the Departments of MoA, GCSAR, universities, and regional and international organizations. During the meeting, variety release reports were presented and a decision was made to release two bread wheat and two faba bean varieties.

A bread wheat variety from CIMMYT was released as Bouhouth10 (CHEN/AEGILOPS SQUARROSA(TAUS)//BCN/3/2*KAUZ,

CMSS93B01856M-040Y-43Y-010M-010Y-010M-1Y-0M-2KBY). Bouhouth10 is suitable for irrigated areas in the Governorates of Aleppo, Damascus, Hassakeh, Idleb, and Raqaa. The new variety is significantly more productive than Bouhoth8, Cham8, and Cham10. Similarly another bread wheat variety from ACSAD was released as Douma6 (Snb's'//shi#4414/crow's' /3/Mon's'/crow's'Acs-W-9678-23 IZ—2 IZ-OIZ). Douma6 was released for rainfed areas in Zone A of Aleppo, Hama, Idleb, and Kameshli Governorates. The new variety is significantly more productive compared to Julan2 and Bouhoth6 in rainfed areas of Zone A, and highly resistant to yellow rust.

In addition, two faba bean varieties i.e. Hama2 (HBP/S0-EM-Lat/2000) and Hama3 (HBP/S0-MSR-TH/2000), both of ICARDA origin, were also released during the National Variety Release Commiette meeting. Hama2 has large seed size and Hama3 has medium seed size. Both varieties were approved for release for the Governorates of Alghab, Aleppo, Hama, Homs, and Idlib. The two faba bean varieties are more productive than Hama1, which has relatively small seed size.

ICARDA Organizes Seed Courses in Nigeria and Sudan

Background

The AfDB is funding a project 'Support to Agriculture Research for Development on Strategic Crops (SARD-SC)' such as maize, wheat, rice, and cassava to ensure greater food security and economic growth in the limited income African countries in sub-Saharan Africa. The project has three main components including generation of new agricultural technologies, dissemination of existing and new technologies, and strengthening NARS capacity. ICARDA is implementing the wheat project and has developed a framework for fast-track testing and accelerated seed multiplication through formal and informal approaches to make seed of newly released varieties available to farmers.

Within the context of strengthening NARS capacity, ICARDA is organizing specialist courses in seed technology in promoting accelerated seed multiplication by NARS, public and private seed companies, and with farmers. To strengthen NARS capacity in the partner countries, three regional seed courses were planned in the hub-countries among which two have already occurred in Nigeria and Sudan and are reported here.

Course objectives and contents

The main objective of the course was to provide participants with theoretical knowledge and hands-on practical skills focusing on two modules: (ii) wheat variety identification and maintenance and quality seed production; and (ii) community-based seed production and marketing for facilitators and farmers at Innovation Platform (IP) sites.

The technical staff of NARS and partner institutions acquired the knowledge and skills in variety release, variety identification, variety maintenance, and accelerated seed production; and partner institutions at IP sites (development offices, extension services, and farmers) learnt the concept of community seed production, its establishment, and operation. Theoretical lectures were followed by hands-on practical sessions and visits to fields and/or laboratories with the aim of providing a better understanding and acquiring the necessary skills.

The course started with an overview of seed program components and functions and seed quality components and their measurements and significance in crop production. This was followed by detailed presentations on the principles, procedures, and techniques of wheat variety identification and variety maintenance as well as pre-basic, basic, and certified seed production for technical staff from partner institutions. During the course, the participants visited different stages of variety development (from crossing blocks to handling of segregating populations) and different stages of national wheat yield trials including verification trials for release purposes. Moreover, participants visited different variety maintenance plots for hands-on practical training.

During the last two days, emphasis was given to community seed production and marketing, where the first group was joined by farmer seed producers from different IP sites. The concept of farmer-based seed production was introduced, including the feasibility and sustainability of local seed businesses. Moreover, the principles and techniques of quality seed production were covered and followed by open discussions with farmers. Participants visited seed production sites, farmer field schools, and participatory variety selection and variety verification trials. During the course, all participants and partners attended an organized field day.

Course participants

The course aimed at training participants from NARS dealing with agricultural research and breeder seed production, public and private seed companies involved in certified seed production, quality assurance agencies, extension and agricultural development officers, and facilitators and farmers from IPs.

Nigeria: In Nigeria, the course was organized for the West Africa-hub countries: Mali, Mauritania, Mali, Niger, and Nigeria. Thirty-three technical staff from Mali (2), Mauritania (2), Niger (1) and Nigeria (28) attended the course (i.e. 10 from research, eight from extension services, three from seed companies, and seven from other institutions in Nigeria). In addition, 15 farmers involved in on-farm seed multiplication in wheat IPs in Nigeria attended the course.

Participants in the wheat seed course in Nigeria: opening ceremony (top) and field visits (bottom)

Sudan: In Sudan, the course was organized for the lowland-hub countries, which include Eritrea, Ethiopia, and Sudan. A total of 20 technical staff from Eritrea (one each from National Agricultural Research Institute and Extension Department, MoA) and Sudan (18) attended the course: from ARC (3), Gezira Scheme (2), New Halfa Agricultural Corporation (2), public and private seed companies (4), Seed Administration (4), financial institutions (2), and MoA (1). Of the participants, four (20%) were women, and all were involved in key components of the national seed system: agricultural research, seed production, and quality assurance. In addition, 22 farmers involved in on-farm seed multiplication in five wheat IPs in Sudan attended the course [Gezira Scheme (3), Northern State (1), and River Nile state (1)].

Participants in the wheat seed course in Sudan: closing ceremony (top), field visits (middle), and seed production fields at IP sites (bottom)

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Pakistan Organizes Workshop on Capacity Building in Seed Technology

A workshop on 'Capacity building in seed technology' was held at the University of Agriculture Faisalabad (UAF) on 7 June 2014 under the Pakistan Seed Academy (PSA). Of the total of 225 participants, about 60 key stakeholders representing the public and private sectors such as Seed Association of Pakistan (SAP), Crop Life Pakistan (CLP), Federal Seed Certification and Registration Department (FSCRD), the Farmers' Association of Pakistan, and country representatives from ICARDA and FAO.

The PSA has the objective of invigorating the public–private partnership in seed innovations and human resource development. It aims at bringing foreign investment into the seed sector and linking with other international seed academies to start joint training workshops in the country. PSA will equip seed industry participants with updated and innovative seed technologies to expand their seed business at the international level.

PSA is an initiative of the UAF and FSCRD joined by the Punjab Seed Corporation, SAP, CLP, and the Farmers' Association of Pakistan. It brings together stakeholders from public and private sector national and multinational seed companies and farmers' associations under one umbrella to discuss their concerns and suggest innovations for the development of the national seed industry.

During this workshop, SAP, FSCRD, and CLP agreed with UAF to organize the first Pakistan seed congress under the umbrella of the PSA to attract foreign delegates and provide a forum for interaction with national seed entrepreneurs. This will strengthen the linkage of the Pakistan seed industry with international organizations and provide opportunities to identify international seed markets, develop international collaborations, and improve research in seed science and technology.

Technical sessions covered different topics such as Seed Amendment Bill, plant breeders' rights, variety registration and seed certification systems, sanitary and phytosanitary measures for seed import, and plant genetic resources and gene bank management. The participants appreciated the efforts of UAF in organizing this event, which is the first step toward strengthening capacity of seed sector stakeholders.

Participants in the seed workshop in Faisalabad, Pakistan

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RESEARCH NOTES

This section contains short communications on practical research or relevant information on agriculture or seed science and technology.

Participatory Varietal Selection of Hybrid Maize Varieties in North West Ethiopia

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Abstract

Maize (Zea mays L.) is one of the principal food crops in the Amhara region of Ethiopia. A SIMLESA project is aimed at increasing the range of maize varieties available for smallholders through accelerated variety development in the Amhara region. The objective of this study was to obtain farmers' and breeders' input to identify and recommend well adapted, high yielding, and stress tolerant maize varieties in the region. Farmers evaluated eight improved maize hybrids across six environments of Jabitehinan and South Achefer districts. A direct matrix ranking method was used to evaluate the varieties with farmers, and agronomic data was recorded and analyzed for yield and yield components. Farmers in both districts selected BHQPY545 and AMH851 as first and second most suitable hybrids, respectively. Combined analysis of variance for grain yield across test environments indicated that the mean squares for environments, genotypes, and genotype by environment interaction were highly significant and accounted for 66.73, 5.04, and 12.17% of treatment combination sum of squares, respectively. Hybrids AMH851 (Jibat), BH-661, and PHB3253 (Jabi) were the three top hybrids based on mean grain yield across six environments.

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GGE biplot analysis identified that AMH851 (Jibat) was the most stable and desirable hybrid followed by BH661 and PHB3253. BHQPY545 and PHB3253 took 156 and 149 days, respectively, to mature – matching farmers' preferences and indicating their earliness compared to other hybrids. Therefore, AMH-851(Jibat) was recommended as a potential variety, and BHQPY545 and PHB-3253(Jabi) as early maturing varieties, for Jabitehinan and South Achefer districts.

Introduction

Maize (*Zea mays* L.) stands first in production and yield among main cereals in Ethiopia and second in the Amhara region (CSA 2013). It is grown on 440,000 ha by 2,652,933 smallholders in the Amhara region, with the total production of 1.26 million tonnes annually and productivity of 2.9 tonne/ha. Maize plays a central role in reducing food insecurity, providing more than half the daily calorie and protein intake of the population in Amhara.

West Gojjam Zone is the largest maize producer with 560,000 tonnes annually and productivity of 3.2 t/ha in the Amhara region (CSA 2013). However, in West Gojjam, especially in Jabitehinan and South Achefer districts, maize is mono-cropped, leading to problems of diseases and insect pests, soil depletion, and low yield. To tackle this challenge, the Sustainable Intensification of Maize–Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) project aimed at increasing the range of maize and legume varieties available to smallholders through accelerated variety development for intercropping and conservation agriculture. Although public research and private seed companies have released more than 40 improved maize varieties in Ethiopia, the lack of well-adapted varieties, low adoption of existing varieties, poor utilization of inputs (fertilizer), improper crop management, and less affordability of quality hybrid seed are major maize production constraints in the Amhara region.

Participatory varietal selection (PVS) is an effective approach that addresses varietal preferences and adoption of improved varieties, particularly with resource-poor farmers. Witcombe *et al.* (2003) stated that PVS attempts to exploit variation found in released varieties or in genotypes at advanced stages of testing by selecting them jointly with farmers. PVS provides alternatives and allows farmers to test and identify varieties that match their criteria, increase their awareness of new varieties, and enable them to save and exchange the seed of those that they prefer and adopt. PVS increases on-farm agricultural biodiversity by providing choice of varieties and promotes better knowledge about the main attributes of selected varieties in relation to the local agro-ecological and socioeconomic circumstances, resulting in increased crop productivity and production.

A PVS program has four stages: participatory surveys to identify farmers' criteria in a variety; a search and procurement process for suitable new varieties; experimentation by farmers, in their own fields, with the new varieties; and wider dissemination of farmers' preferred varieties. The success of PVS is directly dependent on accuracy of the cultivar search process that most closely meets requirements of farmers. To this end, eight new and old improved hybrid maize varieties released at national level were collected from public agricultural research centers and a private seed company to conduct PVS trials. The objective of these trials was to obtain farmers' input on the selection, identification, and recommendation of well adapted, high yielding, and stress tolerant hybrid maize varieties

Materials and methods

A PVS of maize was carried out during 2012 and 2013 cropping seasons in Jabitenahin and South Achefer districts of Western Gojjam Zone (Table 1), where maize mono-cropping is very commonly practiced. A multidisciplinary team of researchers from Adet Agricultural Research Center visited the two districts and explained the aim of the experiment to agricultural experts, developmental agents, *kebele* leaders, and farmers. A group discussion was held with stakeholders and farmers' research groups (FRGs) were established based on the voluntary participation of farmers. Both male and female farmers were included in the composition of FRGs.

Eight improved hybrid maize varieties were used for the experiments (Table 2): two quality protein maize (QPM) varieties (BHQPY542 and BHQPY545) and three non-QPM (BH660, BH661, and BH670) from Bako ARC, one non-QPM from Pioneer Hi-bred Ltd (PHB3253), and two non-QPM from Ambo ARC (AMH850 and AMH851). The hybrids varied in their adaptation, in the range of 1600–2600 m above sea level (masl): hybrids from Ambo ARC were adapted to 1800–2600 masl, whereas those from Bako ARC to 1000–2400 masl. The hybrids were evaluated using a randomized complete block design with three replications on the selected farmers' fields in five sites (two sites in each district in 2012 cropping season and three sites each in each district in 2013 cropping seasons) of Jabitenahin (1700–1800 masl) and South Achefer (1800–1948 masl).

The experiments were planted on a plot size of 19.125 m² (5.1 m × 3.75 m), in five rows with 75 cm inter-row, 30 cm intra-row spacing, and spacing between the two adjacent blocks of 1 m. Recommended seed rate (25 kg/ha) and fertilizer rates (138/180 kg/ha P and N) were used in the experiment. The whole amount of Di Ammonium Phosphate was applied at planting, while urea was split into half at planting and the remaining half at knee-high stage.

The performance of hybrids on plant height, cob length, cob number, days to maturity, drought tolerance, and disease tolerance were evaluated by FRGs at flowering and maturity stages using a direct matrix ranking method.

In both districts, 105 male and 21 female farmers participated during PVS. Finally, field days were organized and experts from bureaus of agriculture, seed enterprises, bureaus of cooperatives, and universities participated. In total, 208 male and 29 female farmers obtained knowledge and experience in PVS, including those who participated during the field day.

Grain yield data, collected from the three central rows of each plot, was subjected to analysis of variance using SAS version 9.0. The least significant differences were calculated to identify differences among treatments. Decomposition of genotype by environment (GE) interaction and stability analysis were conducted using GGE biplot software.

Table 1. Locations and altitudes of experimental sites in 2012 and 2013 cropping seasons

Cropping season	Districts	Locations	Altitude range of test sites (masl)	Environments
2012	Jabitenahin	Mekelamo	1700–1800	E1
		Tikurwuha	"	E2
	South Achefer	Aferefida	1800–1948	E3
		Sibit	"	E4
2013	Jabitenahin	Mekelamo	1700–1800	E5
		Tikurwuha	"	E6
		Leza	"	E7
	South Achefer	Aferefida	1800–1948	E8
		Sibit	"	E9
		Sefera	"	E10

Table 2. Description of hybrid maize varieties tested and their adaptation

Code	Hybrids	Maize type	Source	Altitude for adaptation (masl)
G1	BHQPY542	QPM	Bako ARC	1000–1800
G2	BHQPY545	QPM	Bako ARC	1000–2000
G3	BH660	Non-QPM	Bako ARC	1600–2200
G4	BH661	Non-QPM	Bako ARC	1600–2200
G5	BH670	Non-QPM	Bako ARC	1700–2400
G6	PHB3253	Non-QPM	Pioneer Hi-bred PLC	1000–2000
G7	AMH850	Non-QPM	Ambo ARC	1800–2400
G8	AMH851	Non-QPM	Ambo ARC	1800–2600

Note: QPM = Quality protein maize

Results and discussion

Farmers' evaluation of hybrid maize varieties

Farmers evaluated the hybrid maize varieties using their own criteria such as number of cobs per plant, cob size, maturity, drought tolerance, ear height, disease tolerance, and yield (Table 3). BHQPY545 (Kello1) was identified as the first choice of farmers both in Jabitehinan and South Achefer districts due to its early maturity (drought escape), bearing 2–3 cobs per plant, drought tolerance, and disease tolerance. Farmers also selected AMH851 (Jibat) as a second choice because of its drought tolerance, having good cob size and disease tolerance compared to other hybrid maize varieties. BH661 was the third choice due to its large cob size, good disease tolerance, higher ear placement to protect the cobs from animals, and as source of animal feed and fuel.

Breeder's evaluation of hybrid maize varieties

Yield and yield components of hybrid maize varieties: Assessment of grain yield may be one of the reliable measures for varietal performance.

The grain yield of eight hybrid maize varieties across 10 environments of Jabitehinan and South Achefer districts is presented in Table 4. In Jabitehinan the highest mean grain yield of 6.51 t/ha was for by AMH851 and the lowest of 3.93 t/ha for BH542. BH661 was identified as the second highest yielding with mean grain yield of 6.28 t/ha. BHQPY545 was the third highest-yielding hybrid with better number of cobs/plant, good disease tolerance, and early maturity which is a safeguard for farmers against risks of climate uncertainty (moisture stress at the end of cropping season).

Similarly, in South Achefer there were significant differences in grain yield among the hybrid maize varieties. BH670 gave the highest yield of 9.46 t/ha and BH542 the lowest of 7.41 t/ha. Hybrids BH670, PHB3253, AMH850, AM-851, and B-660 were the five top yielding hybrids with no significant differences in mean grain yield.

Table 3. Farmers' variety selection criteria and scores in South Achefer and Jabitenahin districts in 2012 and 2013

Variety	South Achefer								Jabitenahin							
	Farmers' selection criteria and scores								Farmers' selection criteria and scores							
	CN	CL	DT	DM	EH	DrT	Total	Rank	CN	CL	DT	DM	EH	DrT	Total	Rank
BH542	21	20	7	12	48	30	138	8	24	40	8	15	48	8	143	8
BHQPY545	3	4	2	2	24	5	40	1	4	25	1	6	24	4	64	1
BH660	15	24	3	14	18	15	89	5	20	20	5	21	6	12	84	5
BH661	12	16	4	4	6	25	67	3	16	5	2	18	12	14	67	3
BH670	6	12	5	16	12	35	86	4	8	10	4	24	18	16	80	4
PHB3253	24	28	8	10	36	20	126	6	28	30	6	12	36	6	118	6
AMH850	18	28	6	8	36	40	136	7	32	35	7	9	42	10	135	7
AMH851	9	8	1	6	30	10	64	2	12	15	3	3	30	2	65	2

Note: CN = Cob number, CL = Cob length, DT = Disease tolerance, DM = Days to maturity, EH = Ear height, and DrT = Drought tolerance

Table 4. Mean grain yield (t/ha) of eight hybrid maize varieties in 2012 and 2013 cropping seasons

Variety	Jabitenahin			South Achefer			Mean grain yield across test environments
	2012	2013	Mean	2012	2013	Mean	
BH542	3.90	3.94	3.93	5.54	8.65	7.41	5.67
BHQPY545	7.33	4.83	5.83	8.85	8.19	8.46	7.14
BH660	5.03	4.21	4.54	7.51	9.72	8.84	6.69
BH661	5.99	6.48	6.28	7.51	9.27	8.57	7.43
BH670	4.60	4.74	4.69	6.59	11.37	9.46	7.07
PHB3253	5.19	5.80	5.56	6.67	11.02	9.28	7.42
AMB850	4.76	6.25	5.66	6.63	10.63	9.03	7.35
AMB851	5.62	7.10	6.51	6.84	10.60	9.10	7.80
Mean	5.30	5.42	5.33	7.02	9.93	8.77	7.07
CV	18.0	17.7	17.95	19.31	12.02	13.14	15.03
LSD (0.05)	1.13	0.91	0.70	1.59	1.13	0.84	0.54
R^2	0.73	0.85	0.83	0.71	0.76	0.87	0.91

Combined analysis of yield and yield components of hybrid maize varieties:

The combined analysis of variance for grain yield showed highly significant differences among environments, genotypes, and GE interaction with a contribution of 66.73, 5.04, and 12.17% of the total variation, respectively (Table 5). Similar results were reported by Munawar et al. (2013) and Muungani et al. (2007). This indicates that the test environments were highly variable and had a high influence on yield performance of the tested hybrid maize varieties. The significant GE interaction indicated that a particular genotype may not exhibit the same phenotypic performance under different environmental conditions or that different genotypes may respond differently to a specific environment.

Combined mean grain yield value of the maize hybrids indicated the presence of non-significant performance in grain yield among the first four high yielding hybrids: AMH851, BH661, PHB3253, and AMH850 with mean grain yield of 7.80, 7.43, 7.42, and 7.35 t/ha, respectively (Table 4). BHQPY545, a QPM maize, yielded 7.14 t/ha, which was not significantly different from hybrids BH661, PHB3253, and AMH850. Among these hybrids, PHB3253 and BHQPY545 were early maturing with 149 and 156 d, respectively (Table 6), which would suit maize growing areas that commonly experience terminal moisture stress. AMH851 and BH661 were the best fit for maize growing areas with adequate rainfall throughout the growing season.

Table 5. Combined mean yield components of hybrid maize varieties in Jabitenahin and South Achefer districts in 2012 and 2013

Variety	PH (cm)	EH (cm)	DT	DS	DM	Plant Aspect	Ear aspect	Disease score (%) in 2013					
								Jabitenahin			South Achefer		
								G	B	R	G	B	R
BH542	210.8	93.4	84.5	87.3	154.0	2.8	2.69	31.1	41.1	12	14	28	-
BH545	208.4	100.0	84.4	87.7	156.0	2.47	2.75	23.3	25.5	8	6	12	-
B-660	265.9	159.2	95.1	100.8	174.0	3.55	3.16	20.0	26.7	6	8	14	-
BH661	268.4	151.5	97.5	102.1	178.7	2.44	2.83	22.2	26.7	8	6	8	-
BH670	273.4	166.1	96.5	100.9	174.7	2.6	2.83	24.4	27.8	10	10	22	-
PHB3253	221.9	101.6	77.6	81.1	149.3	2.16	2.31	28.9	36.6	8	10	26	-
AMB850	197.5	93.1	89.2	92.9	169.1	2.33	2.27	25.6	34.4	8	10	24	-
AMB-851	227.0	113.2	86.4	90.4	171.6	2.22	2.19	27.8	26.7	6	10	20	-
Mean	234.2	122.3	88.9	92.9	165.9	2.46	2.63	25.4	30.7	8.3	8.5	19.3	
CV	6.45	9.37	2.67	2.01	1.03	17.13	15.24	20.6	17.0	17.0	25.6	28.1	
LSD (0.05)	7.70	5.84	1.21	0.95	0.87	0.27	0.26	4.9	4.9	4.1	5.2	6.3	
R^2	0.90	0.93	0.96	0.98	0.99	0.65	0.86	0.72	0.79	0.58	0.58	0.71	

Note: PH = Plant height, EH = Ear height, DM = Days to tasseling, DS = days to silking, DM = days to maturity, G = Gray leaf spot, B = blight, and R = rust

Table 6. Combined analysis of variance of grain yield of eight hybrid maize varieties

Source	2012		2013		2012 and 2013 (across environments)	
	DF	MS	DF	MS	DF	MS
Genotypes (G)	7	1157.9**	7	1660.7**	7	13328561.5**
Replication (R)	2	3931.1**	2	14.4ns	2	4932750.2**
Location (L)	3	3152.9**	5	1919.3**	5	116505974.9**
Year (Y)	-	-	-	-	1	571076485.4**
L × G	21	59.2ns	32	274.8**	35	1985477.1**
L × Y	-	-	-	-	3	140235413.6**
G × Y	-	-	-	-	7	6324263.6**
G × L × Y	-	-	-	-	21	1931711.9**
Error	62	156.7	94	116.6	133	1009852
Total	95	382.9	143	896.5	239	177799.5

Note: ns and ** are non-significant and highly significant, respectively

GGE biplot analysis of hybrid maize varieties for yield and stability

The principal component (PC1) explained 45.47% of total variation, while PC2 explained 37.25% and thus they collectively accounted for 82.72% of the total variation for grain yield (Figure 1). These results suggest that the biplot of PC1 and PC2 adequately approximated the environment-centered data. GGE biplot graphically displays GE interaction of a multi-environment trial and facilitates visual genotype evaluation and mega-environment identification (Yan et al. 2000). The analysis for grain yield of eight hybrids was represented by a polygon with five hybrids on vertices while the rest are inside the polygon (Figure 1). These vertex hybrids were the most responsive since they had the longest distance from the biplot origin (Yan and Rajcan 2002).

Responsive hybrids are either the best or the poorest at one or all locations. The GGE biplot also identified the existence of three distinct mega-environments (MEs): ME1 includes environment (E) E1, E2, E3, and E4; ME2 includes E5, E6, E7, and E9; and ME3 includes E8 and E10. Therefore, hybrid AMH851 (G8) was the highest-yielding hybrid in ME2, while BHQPY545 (G2) and PHB3253 (G6) were the best performing hybrids in ME1 and ME3, respectively. However, hybrid BH542 (G1) was low yielding in all or some locations. Moreover, BH542 did not fall within any environment indicating that it was not the best in any of the environments.

The average environment coordinator (AEC) or performance line passed through the biplot origin, with an arrow indicating the positive end of the axis, and ranked the genotypes based on their mean performance across all environments (Figure 2) The average yield of the hybrids is estimated by the projections of their markers to the AEC X-axis (Yan and Tinker 2005). Thus, hybrid AMH851 had the highest mean grain yield followed by BH661 and PHB3253, while the lowest mean grain yield was for BH542. The AEC Y-axis or the stability axis passes the plot origin and perpendicular to the AEC X-axis. The stability of the hybrids is measured by their projection onto the AEC Y-axis. The greater the absolute length of the projection of a hybrid, the less stable it is (Yan et al. 2010). Therefore, hybrids AMH851 and BH661 were the most stable with high gain yield; while BH545, AMH850, BH670, and PHB3253 were the most unstable hybrids. Among the unstable hybrid maize varieties, BH545, AMH850, and PHB3253 showed high yield above the mean grain yield of the tested hybrids. In addition, BH542 and BH660 were the most stable hybrids with average grain yield below the grand mean.

An ideal hybrid is one that has both high mean grain yield (PC1) and less GE interaction (high stability). The center of the concentric circles represents the position of an ideal hybrid (Figure 3), defined by a projection onto the mean-environment axis that equals the longest vector of the hybrids with above-average mean yield and by a zero projection onto the perpendicular line (zero variability across environments). A hybrid is more desirable if it is closer to the ideal hybrid. Although such an ideal hybrid may not exist in reality, it can serve as a reference for evaluation of tested hybrids (Yan and Kang 2003). Hence, hybrid AMH851 which was closer to the center of concentric circles was an ideal hybrid. BH661 and PHB3253 were the second and the third most desirable hybrid maize varieties, respectively

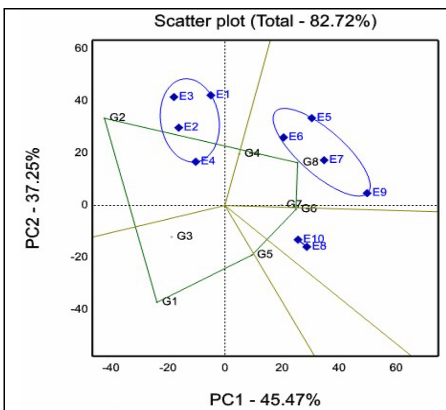

Figure 1 Polygon view of GGE biplot based on grain yield of eight maize genotypes tested in ten environments (for environment or variety code see Tables 1 and 2)

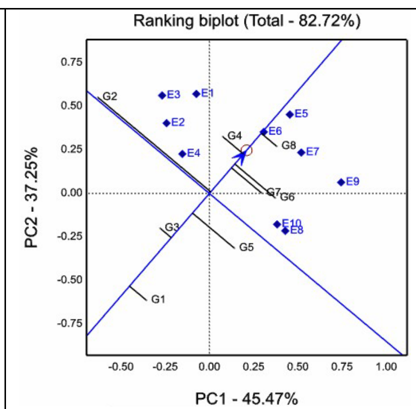

Figure 2 AEC views of GGE-biplot based on genotype-focused scaling which shows the mean yield performance and stability of genotypes

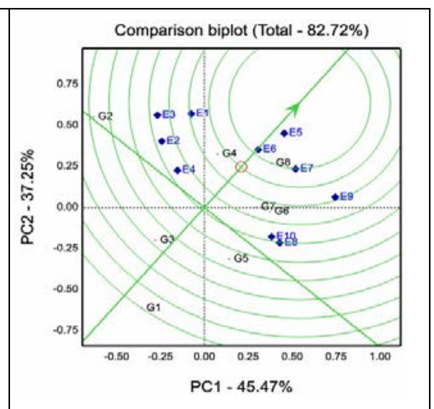

Figure 3 GGE-biplot based on genotype-focused scaling for comparison of genotypes with the ideal genotype

Conclusion and recommendation

The PVS clearly shows the role of farmers in crop improvement and varietal preferences. Farmers used a number of criteria to select a given maize variety. Farmers selected BHQPY545 (Kello) and AMH851 (Jibat) as their first and second choice, respectively. AMH-851 (Jibat), BH661, and PHB3253 were the three best performing hybrids in terms of grain yield across maize growing areas of Jabitenahin and South Achefer districts.

Combined analysis of variance indicated that the grain yield was greatly influenced by the environment, while genotypes and GE interaction contributed the least phenotypic variation. The GGE biplot analysis showed that AMH851 and BH542 were the most desirable and undesirable maize hybrids, respectively. Besides, the GGE biplot analysis identified the existence of three distinct MEs: ME1–ME3. The GGE biplot showed that AMH851 was the best performing hybrid in ME2; while BHQPY545 and PHB3253 were as the best performing in ME1 and ME3, respectively. Therefore, hybrid AMH851 was recommended for maize growing areas of Jabitehinan and South Achefer districts and other areas with similar agro-ecology. BHQPY545 and PHB3253 were recommended as early maturing varieties. Further testing of these maize hybrids in more seasons could enhance breeding efficiency with reference to genotype stability and adaptation across environments.

Acknowledgments

The authors gratefully acknowledged CIMMYT and Australian Center for International Agricultural Research (ACIAR) for financial support through the SIMLESA project to reduce the problem associated with mono-cropping. The Adet maize research team is appreciatively acknowledged for their active participation in trial management, follow up, and data collection. The authors are also indebted to Amhara Agricultural Research Institute and AARC for providing technical assistance during the work.

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MEETINGS AND COURSES

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

Conferences

EUCARPIA International Symposium on Protein Crops V Meeting

Because of the high protein content of their seeds, grain legumes, pseudocereals (amaranth and quinoa) and other minor crops (flax/linseed, cannabis, and caraway), are attractive candidates for lowering the deficiency in plant protein production worldwide. However, there has been little improvement in breeding and farming practices over the last few decades to enhance production of these important protein crops. Moreover, despite their value, many of these crops have still not been adequately assessed and many species are underutilized. Special attention has to be paid to genetic diversity of many species and their rational use for food and agriculture as well as to the limiting factors affecting yield, with water deficiency and other abiotic and biotic stresses among the key factors. This will assist in obtaining more stable, reliable, and sustainable crop production through genetic improvement of varieties.

This symposium will be an opportunity for breeders and researchers to meet with agronomists and geneticists, and discuss ways to improve production of protein crops. The Protein Crops Working Group of the European Association for Research on Plant Breeding (EUCARPIA), Oil and Protein Crops Section (OPC), and the Misión Biológica de Galicia (MBG) of the Spanish National Research Council (CSIC) are organizing the Symposium in Pontevedra, Spain, with the cooperation of national and internationally recognized scientific organizations.

Relevant dates

- Preregistration deadline: 1 October 2014; and Registration deadline: 2 February 2015
- Abstract submission deadline: 15 December 2014; and Two-page paper submission deadline: 2 February 2015

Registration

The pre-registration and registration forms can be downloaded in word format from the symposium website (under construction). The forms must be sent by e-mail to: info@symposiumprotein crops.org. For more information contact: Prof Antonio M. De Ron; E-mail: amderon@mbg. csic.es; antonio.de.ron@gmail.com

AFSTA Congress 2015

AFSTA Congress 2014 will take place during 3–5 March 2015 in Victoria Falls, Zimbabwe. For more information, kindly contact the AFSTA Secretariat; E-mail: afsta@afsta.org

2015 ISF World Seed Congress

The 2015 ISF World Seed Congress will take place on 25–27 May 2015 in Kraków, Poland. Registration will open on 6 Jan 2015 at 11.00 h (GMT). Please visit www.worldseedcongress 2015.com for more information.

ISTA Annual Meeting 2015

ISTA Annual Meeting 2015 will be held on 15–18 June in Montevideo, Uruguay. Please visit www.seedtest.org for more information.

Courses

ICARDA courses

ICARDA organizes both short- and long-term courses in thematic areas related to its research portfolio on biodiversity and integrated gene management, integrated water and land management, diversification and intensification production systems, and socio-economics and policy research. For more information on the ICARDA annual training program, you may contact Dr Charles Kleinermann, Capacity Development Unit, ICARDA, Amman, Jordan; E-mail: c.kleinemann@cgiar.org

UPOV course

Advanced Distance Learning Courses (DL-305 A and DL305-B

UPOV launched two advanced distance learning courses: DL-305-A Administration of Plant Breeder's Rights (February/March 2015) and DL-305-B DUS Examination (April/May 2015). Detailed information concerning the course content and on-line registration will be provided on the UPOV website: http://www.upov.int /resource/en/training.html).

Distance Learning Course DL-205

On-line registration for the UPOV Distance Learning Program 'Introduction to the UPOV System of Plant Variety Protection under the UPOV Convention' is from 7 July to 7 September 2014. The course is available from 6 October to 9 November 2014. The categories of participants for the DL 205 and DL 305 courses are as follows:

Category 1: Government officials of members of the Union endorsed by the relevant representative to the UPOV Council (*No fee)*

Category 2: Officials of observer states/ intergovernmental organizations endorsed by the relevant representative to the UPOV Council (*one* *non-fee paying student per state/intergovernmental organization; additional students: CHF 1000 per student)*

Category 3: Others (*Fee: CHF 1000)*

Please note that registration of participants in categories 1 and 2 must be accompanied by an endorsement from the representative to the UPOV Council of the UPOV member or observer, as appropriate, formally nominating the participant. More detailed information concerning the course content and on-line registration is available on the UPOV website: http://www.upov.int/resource/en/dl205_training.html.

For further information about UPOV, please contact the UPOV Secretariat: Tel: (+41-22) 338 9155; Fax: +41-22-733 0336; E-mail: upov.mail@upov.int; Website: www.upov.int

ISTA training workshops

We have the pleasure in drawing your attention to a number of upcoming ISTA workshops:

Quality Assurance Workshop for Advanced Laboratories, 9–12 September 2014, Álvares Machado-SP, Brazil
This workshop aims to improve the quality assurance practices in Seed Testing Laboratories according to ISTA Accreditation Standard. The workshop will provide theoretical and practical exercises for better learning and as preparation of a seed testing station for an ISTA Audit. Registration deadline is 31 July 2014. More information is found on the website: https://www.seedtest.org //stream/nl-l---1--%40a3a28d620689--423.html

ISTA Workshop on Seed Sampling and Quality Assurance in Seed Sampling, 30 September – 03 October 2014, CFIA Seed Laboratory, Saskatoon, Canada
The aim of the workshop is to provide an overview of seed sampling and aspects of quality assurance in relation to seed sampling for a range of species. The workshop will provide a forum to discuss seed sampling in general as well as specific questions relating to seed sampling methodologies. The workshop will focus on practical exercises, providing an opportunity to use different sampling equipment, and will include discussion on the monitoring of seed samplers. All workshop attendees will have the opportunity to take part in the practical sessions. Registration deadline is 31 July 2014. More information is found on the website: https://www.seedtest.org//stream/nl-l---1--%40a3a28d620689--424.html

ISTA Hands-on Seminar on Seed Image Analysis, 14–17 October 2014, Angers, France
The ISTA Advanced Technologies Committee (ATC), and GEVES (French laboratories in Angers, France) are organizing an ISTA Hands-on Seminar on Seed Image Analysis. The participants will learn and discuss (basics of) different imaging technologies that are or may be applied in seed analysis. Hands-on experience with the available equipment will be an essential part. Focus will be on imaging technologies and image analysis that are already commercially available and practically applied in research and seed evaluation. Registration deadline is 29 August 2014. More information is found on the website:
https://www.seedtest.org//stream/nl-l---1--%40a3a28d620689--425.html

ISTA Seed Health Testing Training Course, 10–14 November 2014, Depok, Indonesia
Kindly note that the registration deadline for the ISTA Seed Health Testing Training Course is closing soon: 15 August 2014. For more information, visit the website: https://www.seedtest.org//stream/nl-l---1--%40a3a28d620689--427.html

For the latest information on all upcoming ISTA events, please consult the ISTA website:
https://www.seedtest.org//stream/nl-l---1--%40a3a28d620689--428.html.
For more information contact: ISTA, Zurichstrasse 50, 8303 Bassersdorf, Switzerland; Tel: +41 44 838 6000; Fax: +41 44 838 6001; E-mail: ista.office@ista.ch; Website: www.seedtest.org

LITERATURE

Books, journal articles, and other literature of interest to readers are presented here. Please send information on agriculture-related publications – seed, policy, regulation, and technology – to the Editor for inclusion in *Seed Info.*

Books

Arnold van Wijk and N.P. Louwaars. 2013. Framework for the Introduction of Plant

Breeder's Rights–Guidance for practical implementation

Published by Naktuinbouw, ISBN 978-90-815169-0-7; (Hb); 208 pp; Price: €24.95; E-mail: plantenrassen @naktuinbouw.nl; Website: www.naktuinbouw.com

The book describes the various areas that need to be developed for an effective Plant Breeder's Rights scheme in countries considering developing such a system. Plant Breeder's Rights provide an exclusive right to the breeder over the commercialization of the variety that (s)he developed. Granting Plant Breeder's Rights is an important tool for governments to support agricultural development and food security.

This book deals with the various components of developing a Plant Breeder's Rights system. It starts with an overview of the history and objectives of Plant Breeder's Rights, followed by an explanation of the UPOV Plant Variety Protection system. After an introduction on the plant variety development chain the policy, legal, and institutional options are discussed, followed by the administrative and technical mechanisms of the application and granting processes. The human resources issues are highlighted, from awareness by the various stakeholders to institutional capabilities, from administrators through to the judiciary. Finally, legal options and the relationship between Plant Breeder's Rights and international obligations based on biodiversity policies are discussed.

The authors have a long track record in Plant Breeder's Rights and its implementation in a range of countries, each with their own specific policy, institutional, human, and technical resources conditions. The background of 15 years of sharing knowledge and experiences in the annual International Course on Plant Variety Protection (PVP Course), organized in Wageningen, the Netherlands, contributed to this work.

The book contains the following chapters:

- History and objectives of protecting the breeders' interests
- UPOV Plant Variety Protection System
- The Plant Variety Development Chain
- Examination of the new variety
- Institutional arrangements
- Steps toward the implementation of a Plant Breeder's Rights system
- Challenges in implementing DUS examination
- Cost aspects of a Plant Breeder's Rights system
- Using Plant Breeder's Rights: commercial aspects
- Acceptance of a Plant Breeder's Rights system
- Legal issues and options
- Relationship between Plant Breeder's Rights and international obligations on biodiversity

Waithaka, M., G.C. Nelson, T.S. Thomas and M. Kyotalimye. 2013. East African Agriculture and Climate Change: a Compressive Analysis

Published by IFPRI, Washington DC, USA; ISBN 978-0-89629-205-5; 402 pp. Website: www.ifpri.org, free to download (http://www.ifpri.org/publication/east-african-agriculture-and-climate-change-0)

Arable farmers in East Africa are under severe pressure to increase productivity to feed a rapidly growing population for whom food insecurity is already serious. *East African Agriculture and Climate Change* examines the food security threats of ten countries (Burundi, Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, South Sudan, Tanzania, and Uganda) and explores how climate change will increase the difficulty of achieving sustainable food security throughout the region.

Through the use of hundreds of scenariomaps, models, figures, and detailed analysis, the editors and contributors of *East African Agriculture and Climate Change* present plausible future scenarios that combine economic and biophysical characteristics to explore the possible consequences for agriculture, food security, and resources management to 2050. They also offer recommendations to national governments and regional economic agencies already dealing with the vulnerabilities of climate change and deviations in environment.

Each country is covered by a separate chapter, in which modeling and data are used to develop future scenarios and explore potential climate change consequences for agriculture, food security, and resource management. The book states that with adaptation to climate change, including investment in agricultural technology and new varieties, maize yields could increase by 50% across the region by 2050.

New Journals

Climate Change

Climate change is a global phenomenon with long-term societal implications, demanding close interaction between physical and life scientists, economists, sociologists, and policy-makers.

The journal is

- An important new forum to promote cross-disciplinary discussion of a global phenomenon with long-term societal implications
- Published in association with the Royal Meteorological Society and the Royal Geographical Society (with IBG)
- An authoritative, encyclopedic resource addressing key topics from diverse research perspectives
- Now indexed by TRSI (formerly ISI) and Scopus
- Publishes special collections including Forests and Vegetation and Coasts, Islands and Climate Change, and China National Climate Change Program Collection
- For more information, visit the website at: http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1757-7799

Websites

SeedSystem.org

An international coalition of partners launched a new public resource website, SeedSystem.org, which is unique in the humanitarian, livelihood, and seed sector spheres. It focuses squarely on smallholder, poor, and vulnerable farmers – it aims to jumpstart and improve the seed systems farmers use, across crops and farming systems. The site builds from rapid seed security advances in the last 5–10 years. Field evaluations show seed security issues as somewhat distinct from food security concerns; seed systems are proving more resilient than common wisdom has suggested; and some of the dominant aid responses may be doing more harm than good. Overall, the website benefits from a 'rethink' about what seed aid can or cannot accomplish and from exploration of novel approaches to bolster seed system functioning. SeedSystem.org is a collaboration among national and international organizations aiming to improve seed security in high-stress and vulnerable areas across the world. For more information, e-mail: Info@seedsystem.org or see (*SeedSystem.org*)

ISF (www.worldseed.org)

ISF is a non-political, non-profit organization resulting from the merger of two highly respected international organizations: FIS (the Fédération Internationale du Commerce des Semences) established in 1924, and ASSINSEL (Association Internationale des Sélectionneurs pour la Protection de Obentions Végétales) established in 1938. The mid-1970s saw significant changes in the plant breeding and seed industry with mergers, consolidations, and 'integration' of the whole seed chain. Plant breeders and seed producers became a single entity. After two years of intensive talks and negotiations, they merged during the annual Congress in Chicago in 2002 to become ISF. ISF continues the work of FIS and ASSINSEL and retains the high regard of organizations in the international arena.

Newsletters

UPOV Gazette and Newsletter

Plant Variety Protection Gazette and Newsletter is distributed to subscribers worldwide. The magazine contains the news about membership and accessions to UPOV conventions, notification of list of genera and species to which UPOV conventions apply in respective countries and the legislation on plant variety protection of member countries. UPOV annually publishes *Plant Variety Protection Gazette and Newsletter* every year.

Note to Subscribers

Subscribers are encouraged to play a proactive role in making this newsletter a useful platform for information exchange. Contributions are most welcome on the broad areas of seed system development; meetings, courses and electronic conferences; books and reviews; websites of special relevance to the seed sector; funding opportunities; requests to other readers for information and collaboration; and feature articles or discussion issues brought by subscribers. The Editor always welcomes suggestions on format and content, sent by e-mail to z.bishaw@cgiar.org