

# Seed Info

Official Newsletter of WANA Seed Network

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## Editorial Note

*Seed Info* aims to stimulate information exchange and regular communication between 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.

**WANA Seed Network News** provides information on activities relating to global or regional cooperation and collaboration in facilitating the development of a vibrant regional seed industry. In this issue of *Seed Info*, we report on the *Community Seed Production and Business Management* training course organized by the International Center for Agricultural Research in the Dry Areas (ICARDA) under the project *Provision and Multiplication of Cereals and Legumes Varieties in Syria and Improving Access to Knowledge at Community Levels*. The project is being implemented by ICARDA, under the Food and Agricultural Organization of United Nations (FAO), with the support of the United Kingdom's Department for International Development (DFID).

In the **News and Views** section, the article “*Sowing the Seed of Growth in Myanmar*” has been reproduced from an opinion piece written by Jose Ricardo Silva, senior private sector specialist, finance, competitiveness and innovation, at the International Finance Corporation [(c) June 17, 2019 *Myanmar Times*]. It is a lesson on seed sector reform for developing countries. Other news in this section comes from regional and/or international organizations, such as the African Seed Trade Association, International Seed Testing Association (ISTA) and the International Union for the Protection of New Varieties of Plants (UPOV).

The section on **Seed Programs** presents news from Ethiopia, Iran, and Syria. From Ethiopia, we describe the reforms and state of the national seed sector. We cover the changes that have taken place since this sector began in the 1940s and its performance in terms of policy and regulatory frameworks, institutional, and organizational arrangements, and technical operations at federal and regional levels. The national seed sector has become more diversified, with a multinational seed company, some large parastatal seed corporations, several small-to-medium private seed companies, and numerous farmer-based seed production and marketing schemes operating in the country. Moreover, the volume of seed supplied increased substantially, reaching almost 1 million quintals. We report on Iran's membership of Organization for

Economic Co-operation and Development (OECD) Seed Schemes and a joint meeting between seed companies from Iran and Turkey.

From Syria, we report on the ongoing efforts to rehabilitate the agricultural and seed sector to enhance the capacity of crop production to achieve food and nutritional security in the country under the Food and Agricultural Organization of the United Nations project supported by Department for International Development (DFID) of the United Kingdom.

We also report on a recent meeting in West Africa assessing the progress made in implementation of harmonized seed regulation in the region. Harmonization of seed regulations was first suggested in the 1990s during the meeting to establish the West Asia and North Africa Regional Seed Network, spearhead by ICARDA. Since then, advances have been made among different economic block in Africa, the Americas, and Asia, facilitating international seed trade.

The **Research** section of *Seed Info* captures information on research activities or issues relevant to the development of seed programs in the CWANA region and beyond. This issue features an article by Yetsedaw Aynewa and colleagues from ICARDA, Ethiopia, “*Identification of farmers' preferred linseed (Linum usitatissimum L.) varieties adapted to southern Ethiopia*”. The paper discusses the participatory variety selection carried out in Lemo district, Kembata Zone, in southern Ethiopia. Farmers identified their preferred high-yielding and well-adapted linseed varieties. These were then used in local seed production.

*Seed Info* encourages the exchange of information between 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. Take time to share and contribute to your newsletter.

Enjoy your read!

*Zewdie Bishaw, Editor*





## WANA Seed Network News

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

### ICARDA Organizes Training Course on Seed Production and Business Development

#### Background

Syria has hosted ICARDA for over 40 years. Collaborations between ICARDA and national research and development partners have generated and disseminated improved crop, livestock, and natural resource management technologies, with global impact in dry areas. These improved technologies have been widely adopted in Syria, making the country self-sufficient in major food security crops, such as wheat, with surplus for export. However, the recent conflict has disrupted research, affecting agricultural production and productivity and making the country more vulnerable to food and nutritional insecurity.

ICARDA, under a Letter of Agreement from the FAO and with the support of DFID, is implementing the project *Provision and Multiplication of Cereals and Legumes Varieties in Syria and Improving Access to Knowledge at Community Levels*.

Under the project, ICARDA is expected to contribute to the FAO's Strategic Objective 5 (Increase resilience of livelihoods to threats and crises), Organizational Outcome 4 (Countries and regions affected by disasters and crises prepare for and manage effective responses) and Organizational Output 3 (Strengthening capacities of national authorities and stakeholders in crisis response). The project aims to rehabilitate the productive capacity of the agricultural sector by providing access to improved crop technologies and developing the capacity of agricultural professionals and farmers.

#### Course organization

A training course on *Community-based Seed Production and Business Development* was organized on May 20–22, 2019, at the ICARDA experimental station in Terbol, Lebanon. The goal was to enhance the knowledge and skills of the agricultural professionals who are members of the Syrian Agricultural Engineering Syndicate and

staff of FAO–DFID Innovation Platforms. Nineteen staff, who are supporting the project, attended the course. The trainees will organize follow-up practical courses for the farmers engaged in community-based seed production.

#### Themes covered

The course covered several themes, including the principles, procedures, and practices of seed production and quality assurance, as well as seed business development and management:

- National seed system components and functions
- Basic seed quality components and their relevance and measurements
- Principles and procedures of seed production (variety maintenance, early generation seed production, certified seed production)
- Standard operating procedures in crop management to produce good quality, healthy seed
- Standard operating procedures in quality assurance and certification
- Standard operating procedures in seed processing and storage
- Basic concepts of seed business development, operation, and management

#### Training methodology and materials

The training was practical: short introductory lectures were followed by demonstrations, guided learning by doing, and technical visits to variety maintenance, seed production fields, seed processing and storage facilities, and seed quality and health testing laboratories.

Copies of all presentations with explanatory notes in Arabic were provided to the participants. Moreover, manuals on cereal and legume seed production and seed business management were also distributed to the trainees.

#### Course outputs, outcomes, and impacts

Enhanced skills and knowledge of quality seed production and business management will enable participants to assist communities in producing market-quality seed, ensuring availability and access at local levels, and generating income from seed businesses.

The course will contribute to increasing the resilience of the crisis-affected target farming communities. Long-term impacts will include greater food security and sustainable rural livelihoods.



*Participants in training course on community seed production and business management*



*Field visits to wheat variety maintenance*



*Field visits to chickpea variety maintenance plots*

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## News and Views

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

### Sowing the Seeds of Growth in Myanmar

Agriculture continues to be vital to Myanmar's economy, contributing almost 38 percent of the  
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gross domestic product. The sector provides employment to about 53 percent of the labor force and a source of livelihood for about 70 percent of the rural population.

Myanmar's farms are well diversified, with most farms producing paddy rice during the monsoons and other crops such as beans, pulses, oilseeds, and maize, during the cool and dry seasons. Yet, agricultural productivity is low, a key reason why farm profits are among the lowest in Asia.

This low productivity is due to the lack of quality seeds and enabling environment for the private sector, which could stimulate domestic seed production or seed imports. For example, the supply of certified rice seed is estimated to meet less than 10 percent of the demand. In addition, ensuring quality control or promoting quality seed of new varieties is challenging within the limited legal framework. This limits the sector's capacity to reduce poverty and contribute to the country's prosperity.

Provision of variety registration, certification, and licensing regulations is needed to provide the country's farmers with quality seeds. This will also attract private sector investment in increasing production of selected certified seeds, which will create jobs. Quality seeds can produce bigger and better harvests, resulting in increase of farmers' income and access to new markets.

The Ministry of Agriculture, Livestock and Irrigation, through the Department of Agriculture, is attempting to ensure that Myanmar can boost its agricultural productivity. Acknowledging that seeds are a crucial factor behind increasing yields and farmers' income, the government is keen to facilitate private sector investment in seed production.

'The Road Map for Myanmar's Seeds Sector: 2017–2020' is a significant step in this direction. The report estimates that less than 10% of farmers have access to certified rice seed and 1 percent to certified seeds of other crops. In response, in 2017, the government passed a new regulation, allowing 100% foreign ownership of seed businesses (previously the limit was 40%).

Further, with technical support from the International Finance Corporation, a member of the World Bank Group, a series of regional and national consultations were conducted. Key stakeholders from the public and private sector, along with development partners, discussed and

proposed recommendations to improve Myanmar's seed sector.

Subsequently, the National Seeds Committee (NSC) approved 10 regulatory and administrative recommendations that emerged from the consultations. The main reforms being implemented are

- Issuance of only three types of seed business licenses: field, horticulture, and industrial crops. Earlier, one business license for every single seed variety was mandatory, accounting for over 900 different licenses.
- Regular meetings of the NSC, which now meets four times a year, instead of an average of every 15 months since its formation in December 2000. About 71 applications are analyzed by the NSC per meeting and approximately 47 new varieties are registered. This is a faster and more efficient process, reducing the cost and time private firms wait to get a new variety registered and marketed.
- Exemption of field testing for four priority crops: potato, papaya, onion, and cucumber. In addition, the requirement to test varieties during one entire season in three different geographical locations has been removed.
- Inclusion of a private sector representative in the Technical Seeds Committee to ensure that the industry is consulted and is aware of government policies and actions in the seed sector.
- Establishment of a one-stop shop and automation of all seed-related processes and procedures, including seed business licensing, variety registration, and seed imports and exports. This will be launched later this year.
- Establishment of a holistic Myanmar Seed Information Portal. This facility—launched in December 2018—allows the public to consult a list of registered varieties and provides relevant information, including forms, etc., to anyone interested in Myanmar's seed sector.

With these reforms, the country will create a more favorable business environment for foreign and domestic seed companies. These changes also balance efficient markets and effective regulations, enabling the public and private sector to work together.

Developing high-quality and climate-resilient varieties and making the seeds available on the market under a strong legal framework will benefit farmers significantly. At the same time, it will also bolster Myanmar's agriculture sector.

This will prepare the sector to respond to global market opportunities and better participate in value chains. A vibrant and competitive seed sector will contribute to the nation's food security and economic growth.

Source: [Myanmar Times](#) (June 17, 2019) via *Pulse Pod Weekly Update*, GPC 2019

## India Seed Sector Analysis: Growth, Trends, and Forecast (2019–2024)

### Market overview

The Indian seed market was valued at US\$2.21 billion in 2018. It is projected to register a compound annual growth rate of 6.4 percent during 2019–2024. The drivers of the seed sector growth are

- Stagnating growth in arable land and an increasing population. The per capita arable land is declining. These factors, along with poor crop productivity, will put pressure on food supply in the country.
- Increasing seed replacement rate in the country and the adoption of hybrid and biotech crops. Rising concerns over genetically modified (GM) seeds, long GM approval timelines, and excessive government regulations are market restraints.

### Scope of the report

The report defines the market in terms of end users, who procure seeds for sowing: farmers and institutional buyers operating in agricultural production. Market estimations are based on seeds for sowing, not for human or animal consumption. The future analysis and segmentation, by crop type, are also presented.

### Key market trends

#### Adoption of hybrid seeds

Hybrid seed adoption significantly increased in the country during and after the Green Revolution, due to the increasing pressure for high crop production for food security. The hybrid seed sector has grown by 15–20 percent per year over the past decade. This is due to the increased adoption of Bt cotton hybrids, single-cross maize hybrids, and hybrid vegetables. This increased demand for hybrid seeds has boosted the market for commercial seeds. Aggressive promotion has increased demand and production of hybrid seeds in the country. Farmers are adopting and using more hybrid seeds, because of their disease and pest resistance, which reduces losses and cost of production.

### Analysis by crop type

The Indian seed market is segmented by crop type and further divided into sub-segments, row crops,



and vegetables. The market share of row crops is 80 percent and the remainder by vegetables.

Cotton contributes the most to revenue, when the market is segmented by row crop. The large-scale adoption of Bt cotton seed in India has been the driving force behind this.

Vegetables and maize also have many hybrids and high seed replacement rates, and hence represent a large share.

### Competitive landscape

The seed market is highly fragmented with the top eight companies accounting for more than 25 percent of the market, the rest comprises small domestic companies. Many recent acquisitions and mergers have led to changes in the overall market share of companies in the national seed market.

Source: [Industry Research](#)

### International Move to Streamline Phytosanitary System for Seed

The Commission of Phytosanitary Measures is developing a systems approach for seed as an Annex to [ISPM 38](#) on the International Movement of Seed. The decision was made on 5 April 2019 during the Commission's meeting in Rome, Italy. The American Seed Trade Association has long advocated an international systems approach for seed and welcomed the decision, stating that "Adoption of the international seed standard is a major step forward for the global seed industry."

The seed industry is becoming a global enterprise. The volume and number of seed shipments has increased significantly, as have the number of seed varieties traded. It is estimated that over 300 species and 65,000 varieties are commercially traded internationally. In 2011–2016, total world exports of seed for sowing increased from 2.75 million metric tons to 4.43 million metric tons ([https://www.nappo.org/files/9915/5311/3907/2018\\_TOPIC\\_NAPPO - ISPM 38-International Movement of Seeds-Annex 1-Design and use of systems approaches for phytosanitary certification of seeds.docx.pdf](https://www.nappo.org/files/9915/5311/3907/2018_TOPIC_NAPPO_-_ISPM_38-International_Movement_of_Seeds-Annex_1-Design_and_use_of_systems_approaches_for_phytosanitary_certification_of_seeds.docx.pdf)). Likewise, the global seed market was US\$66.9 billion in 2018 and is expected to reach US\$98.1 billion by 2024 (<https://www.imarcgroup.com/prefeasibility-report-seed-processing-plant>).

In another development, the [Forum for Agricultural Research in Africa \(FARA\)](#) has called for the implementation of sanitary and phytosanitary (SPS)

programs in Africa, in line with the World Trade Organization's (WTO) Sanitary and Phytosanitary Measures (SPS Agreement). The call was made during a consultative meeting of the Africa Continental SPS Committee on 20 March 2019 in Geneva, Switzerland. The SPS Committee guides the coordination and implementation of SPS matters at the continental level, promoting and mainstreaming SPS issues (food safety, plant and animal health) into the implementation of the Comprehensive Africa Agricultural Development Program and other agriculture, trade-related, health and environmental initiatives and frameworks.

FARA is committed to providing technical support for the science-policy nexus necessary to inform decision-making for a coherent SPS strategy in tandem with the Africa Continental Free Trade Area (AfCFTA).

With the launch of the AfCFTA negotiations, the African Union has demonstrated commitment to a level playing field for food businesses, promoting consumer protection, and animal health and welfare. The WTO-SPS Agreement enjoins governments to base their SPS measures on international standards developed by international standard organizations (FAO, WHO, and Codex Alimentarius Commission).

For more information, visit [www.faraafrica.org](http://www.faraafrica.org).

### Improving Access to Seeds for Smallholder Farmers

Food insecurity and malnutrition could be reduced the world over if smallholder farmers had access to good seeds, but research shows that the global seed industry reaches only 10 percent of the world's smallholder farmers.

To improve the availability of the best seeds and varieties to smallholder farmers, the [Access to Seeds Index](#) measures and compares the efforts of the world's leading seed companies to enhance the productivity of smallholder farmers and highlights best practice.

Smallholders produce 80 percent of all food consumed in Africa and Asia. Helping these farmers increase their yields and produce more nutritious crops is key to achieving global food security and ending hunger. Climate change is making food production more challenging; farmers need to adapt to changing climate conditions and protect crops from new pests and diseases.

Each year, hundreds of millions of dollars are poured into research on breeding new varieties, but getting the new seeds to farmers requires partnerships with private companies supporting smallholder productivity.

The [Access to Seeds Index 2019](#) evaluates seed companies who are taking the lead in supporting smallholder productivity by breeding climate-resilient varieties for smallholder farmers, improving accessibility by reaching farmers in remote villages, and ensuring affordability. A number of seed companies offer farmer training and weather-based crop insurance.

According to the latest figures the signs are good. Access to good seed is increasing, but is still limited in emerging economies, especially in Western and Central Africa. The report calls on the global seed industry to do more to address diversification, as companies tend to focus on a select number of crops and varieties, largely neglecting legumes (other than soya bean) and local crops.

Global seed companies focus on the main field crops—rice, maize, wheat, millets, sorghum, sunflowers, potatoes, and sesame—and on vegetables—tomatoes, cabbages, sweet peppers, onions, cucumbers, hot peppers, carrots, squashes, cauliflowers, pumpkins, eggplants, okra, lettuces, green beans and green peas, and cucurbit fruits (melons and watermelons).

Breeding for climate-resilient varieties is increasing, but breeding for nutritional value is not yet a high priority. Increased yield, tolerance to abiotic stresses (climate and weather), tolerance to biotic stresses (pests and diseases), and shelf-life still take priority over nutrition, local tastes, and cultural preferences. Vegetable seed companies, however, are emphasizing the importance of vegetables in a nutritious diet and increasingly seeking to support dietary diversity by including local vegetables in their range of vegetable seeds.

*Source: Plant Science News from Centre for Agriculture and Bioscience International (CABI) (May 2019)*

### **AFSTA Congress 2019 Held in Mombasa, Kenya**

The Government of Kenya urged regional economic blocs to finalize a tripartite agreement on easing cross-border trade in seeds in the opening ceremony of the AFSTA Congress 2019 which ended on March 7, 2019.

The Principal Secretary for Agricultural Research in Kenya's Ministry of Agriculture, Livestock, Fisheries and Irrigation, said that once the tripartite agreements are finalized, farmers across the region would have improved access to quality and certified seeds.

"The agreement should ensure that we maintain excellent seed trade and movement by protecting intellectual property alongside phytosanitary matters," he said as he officially opened the congress in Mombasa.

Held in Mombasa, Kenya, the congress saw 400 delegates from 60 countries attend the most successful gathering of seed business people on the continent.

While welcoming the delegates to the congress, AFSTA President, said, "The AFSTA Congress continues to grow year after year because we, the seed people, ably use it as a forum to sow relationships, which have led us to harvest prosperity in our work as we promote quality seed trade in Africa."

He added that AFSTA continues to believe that a developed agricultural sector is key to the economic prosperity of African nations, for which seed has played a critical role.

This, he noted, had led AFSTA to make continuous efforts to improve the environment for the seed business through its Five-Year Strategic Plan. The plan will promote the transformation of agriculture into an attractive, modern, and sustainable livelihood option for communities throughout the continent.

The congress, primarily a gathering of top seed traders and producers, traditionally covers a wide spectrum of issues in the seed value chain.

This year, the congress addressed regional and international seed issues that have scientific and technological bearing on seed production and trade, including biotechnology, plant breeding innovation, seed treatment, phytosanitary measures, strengthening vegetable production through quality seed trade in Africa, and updates on technologies for agricultural transformation in Africa.

The congress was preceded by a half-day workshop on seed treatment which discussed management of the fall armyworm.

Several representatives of regional and international organizations participated in the congress, namely, the African Union, ISF, the ISTA, UPOV, and the Common Market for Eastern and Southern Africa (COMESA).

Two changes to the AFSTA Board were announced during the congress. Two new board members, Mr. Ibrahim Abdullahi, from Nigeria, and Mr. Given Mudenda, from Zambia, replaced Mr. Richard Olafare, from Nigeria, and Mr. Benson Zulu, from Zambia, whose terms had ended.

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### **AFSTA Participates in Meetings of Ad Hoc Technical Expert Group on Farmers' Rights**

#### **Background**

During its Seventh Session, through Resolution 7/2017, the Governing Body of the International Treaty for Plant Genetic Resources for Food and Agriculture (IT-PGRFA) decided to establish an Ad Hoc Technical Expert Group (AHTEG) on Farmers' Rights (FRs). The group would produce an inventory of national measures to be adopted, best practices, and lessons learned from the realization of FRs, as set out in Article 9 of the International Treaty. It would also encourage, guide, and promote the realization of FRs as set out in Article 9 y.

The African Seed Trade Association (AFSTA) is a member of AHTEG-FR representing the African seed sector. AFSTA was represented at the meetings by its Technical Officer Ms. Grace Gitu.

#### **AHTEG-FR meetings**

Two AHTEG-FR meetings were held on September 11–14, 2018 and May 20–23, 2019, at FAO headquarters in Rome.

The first AHTEG-FR meeting held preliminary discussions on the structure and content of the inventory of FRs. It recommended that the structure should be simple, concise, and useful to users, while including relevant information. The Group discussed options for encouraging and guiding realization of FRs and developed a template based on information received from Contracting Parties on national measures and practices to realize FRs. The AHTEG-FR asked the PGRFA Secretariat to publish the template on the website and to collect further submissions by inviting inputs from Contracting Parties and interested stakeholders.

During the second meeting, the Expert Group continued its work on developing an inventory and options to realize FRs, as follows.

#### **a. Inventory of national measures, best practices, and lessons learned from the realization of FRs**

The Expert Group reviewed the recommendations from the first AHTEG-FR meeting and agreed that

- The main purpose of the inventory is to produce a catalog of measures and practices for the realization of FRs that had been or were in the process of being implemented, to share, among the Contracting Parties and relevant stakeholders, experiences.
- The Inventory will include a disclaimer, clarifying that the Expert Group did not evaluate or assess whether any measure or practice contributes to the realization of FRs.
- The template for collecting information would be revised, and the Secretary would use the updated template on the website of the International Treaty for further submissions.
- Only submissions containing the mandatory information for the template would be included in the Inventory.
- The categories would be included in the rows of the structure, to assist users in navigating the Inventory, based on similarity of submissions.
- All Contracting Parties and stakeholders that made submissions would be invited to update theses by July 31, 2019, and have the submission included in the updated version of the draft Inventory to be presented to the Governing Body at its Eighth Session as an information document.
- An online version of the Governing Body approved Inventory would be established by the Secretariat to enable ease of access and use.

#### **b. Options for encouraging, guiding, and promoting the realization of FRs**

The Expert Group agreed

- The options should have a concise and user-friendly structure, adopting the same categories as the Inventory;
- Under each category, there should be options to encourage, guide, and promote the realization of FRs.
- The options should be described by name, what the option is about, and what type(s) of measures may typically be involved (technical, administrative, legal, etc.).
- The elements that should be covered in the introduction, such as background and rationale, objective, nature and scope, and intended users and target groups. Several proposals were made on enhancing the introduction, but more time will be needed to finalize this.



- The report of the Expert Group to the Governing Body should contain an outline for developing the options to encourage, guide, and promote the realization of FRs, as set out in Article 9 of the International Treaty. The Expert Group is committed to continue its constructive work based on this outline.

### Africa Group Meeting

AFSTA coordinated a meeting of the delegates from African countries to discuss the realization of FRs in the continent. The African delegates represented Benin, Madagascar, Malawi, Mali, Morocco, Sudan, and Zambia.

The representative from UPOV joined one of the sessions to clarify the utilization of protected varieties by smallholder farmers.

### Discussions

Discussions covered

- Development and implementation of FRs as the responsibility of national governments
- Gaps in recognition of FRs by national governments
- Indigenous knowledge as crucial to conservation and sustainable use of genetic resources in Africa
- International regulations and standards on conservation and use of plant genetic resources in policy development and implementation in Africa
- Formal and informal seed systems, and the dominance of informal systems in all countries
- Collaboration with all stakeholders in the development of FRs at national and regional levels
- The African Union's position on FRs
- The role of the seed industry in the development of FRs.

### Way forward

The following issues were agreed upon with the assigned responsibilities on the way forward

- Increase all stakeholders' awareness of FRs at national and regional levels in Africa (responsibility of national and regional institutions, particularly those participating in the AHTEG workshops)
- Collaborate with all stakeholders in the development of FRs at national level (national focal points)
- Encourage the seed industry to work closely with national governments to develop FRs (Seed Associations and focal points)
- Hold a regional meeting to sensitize African stakeholders on the need for a common

understanding in the development and implementation of FRs in Africa (African Union through the Zambia representative before next IT-PGFRA General Assembly in November 2019)



*Participants of the meeting of AHTEG on FRs*

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### ISTA Website: Restructured Content and Rebranded

ISTA (International Seed Testing Association) has started the year with a more visual and optimized content website structure. The website is not just more visually appealing, but more importantly, the content has been organized hierarchically to provide a better user experience.

We understand that the overall layout creates the first impression of a website, but ISTA users visit the website because of the useful information available. Therefore, the association aims to upgrade the platform, making it easier to find information and complete tasks. A good site structure, with logical and easy navigation creates good user experience, which builds trust among our users.

Furthermore, the restructured website has been branded with ISTA corporate colors, orange and green, with orange at the main color. ISTA Orange certificates are well known throughout the seed testing industry. They are issued when both lot sampling and testing of the sample are carried out by an ISTA accredited laboratory. This helps to make us distinctive. Green is associated with nature, growth, life, and safety, which relates to seed testing and the message ISTA wants to send the community.

We have incorporated the ISTA slogan "Seed Quality Assurance" which defines ISTA's objective in three simple words.

If you still haven't reviewed the ISTA website [www.seedtest.org](http://www.seedtest.org), we invite you to visit it now and enjoy the new user experience.

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## News from UPOV

### UPOV membership

The mission of the International Union for the Protection of New Varieties of Plants (UPOV) is to provide and promote an effective system of plant variety protection. Its aim is to encourage the development of new varieties of plants, for the benefit of society. UPOV membership is up and continues to increase. It is an intergovernmental organization based in Geneva and has 75 members, covering 94 states.

The members of UPOV (as of June 2019) are: (i) two regional organizations, the Community Plant Variety Office of the European Union (CVPO) and the African Intellectual Property Organization (OAPI), and (ii) 73 member countries, from Africa (Kenya, Morocco, South Africa, Tanzania, Tunisia); Americas (Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, México, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, USA, Uruguay); Australia (Australia, New Zealand); Asia (Azerbaijan, China, Israel, Japan, Jordan, Kyrgyzstan, Georgia, Oman, Korea, Singapore, Turkey, Uzbekistan, and Viet Nam); and Europe (Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Montenegro, Netherlands, Norway, Poland, Portugal, Moldova, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Macedonia, Ukraine, and the United Kingdom).

### Ratification of Belgium of 1991 UPOV Convention

The Government of Belgium deposited its instrument of ratification of the 1991 Act of the International Convention for the Protection of New Varieties of Plants on May 2, 2019.

Belgium, which is already one of the 75 members of UPOV, is the first member to be bound by the 1991 Act of the UPOV Convention. The 1991 Act entered into force in Belgium on June 2, 2019, one month after the deposit of its instrument of ratification.

### UPOV PRISMA PBR Application Tool

The UPOV PRISMA Plant Breeders' Rights (PBR) Electronic Application Tool is available online at <http://www.upov.int/upovprisma>.

#### Why use it?

- Quick and easy transmission of application data for PBR
- Currently covers 33 participating authorities [representing 72 countries with the two regional organizations, CVPO and OAPI].

#### How does it work?

- Online tool to apply for PBR via UPOV website
- Easy access to PBR application forms in one place
- Read forms in range of languages
- Much of the information automatically translated
- Copy relevant data into subsequent applications

Use of UPOV PRISMA is free until December 2019.

### Videos on the benefits of the UPOV system

The following videos have been published on the UPOV website at:

[http://www.upov.int/about/en/benefits\\_upov\\_system.html](http://www.upov.int/about/en/benefits_upov_system.html).

- *Tsuyahime*: A new rice variety bringing increased income for farmers in Japan
- Using the UPOV system to benefit custodians of native wild germplasm in Argentina
- UPOV system bringing benefits for agriculture in Colombia

Contributed by Philippe Benjamin Rivoire (e-mail: [ben.rivoire@upov.int](mailto:ben.rivoire@upov.int)), Head of Seed Sector Cooperation and Regional Development (Africa, Arab Countries), Business Focal Point for UPOV PRISMA from UPOV.

For more information, please contact the UPOV Secretariat; tel: +41 22 338 9155; fax: +41 22 733 0336; e-mail: [upov.mail@upov.int](mailto:upov.mail@upov.int); website: [www.upov.int](http://www.upov.int)

### World Food Prize 2019 for a Seedsman

Simon N. Groot of the Netherlands will receive the 2019 World Food Prize for his transformative role in empowering millions of smallholder farmers in more than 60 countries to earn greater incomes through enhanced vegetable production. This has benefitted hundreds of millions of consumers, giving them greater access to nutritious vegetables for healthy diets. As founder and leader of East–West Seed, his initiative over the past four decades has developed a dynamic, smallholder-centric tropical vegetable seed industry, starting in Southeast Asia and spreading through Asia, Africa, and Latin America.

Groot, a sixth-generation seedsman, founded East–West Seed in 1982 in the Philippines, with the idea that a good vegetable seed could change the lives of the poor. Having observed the many challenges facing poverty-stricken smallholder farmers in Southeast Asia, Groot set out to establish the first market-oriented vegetable seed-breeding company with smallholders as the main client base.

Source: [World Food Prize](#)

### Iron-rich GM Wheat Set to Undergo Field Trials in Australia and UK

Wheat is one of the most widely grown staple crops in the world. It is the second most important food crop in the developing world after rice. It provides about 20 percent of daily protein and food calories for 4.5 billion people. With a predicted world population of 9 billion by 2050, the demand for wheat is expected to increase by 60 percent. To meet this demand, annual wheat yield increases must rise from the current level of below 1 percent to at least 1.6 percent. All countries share the need to increase wheat yield and tolerance to abiotic and biotic stresses, as well as to improve input use efficiency for more sustainable wheat production. Improved agronomic practices and development of innovative cropping systems are also a priority. Any technological innovation in wheat will have a significant impact on global food and nutrition security. [GM](#) wheat is one such innovation. In *SeedInfo* No. 56, we reported that Argentina is about to commercialize GM wheat. Here, we report on the development of iron-rich GM wheat and the authorization of field testing in Australia and the United Kingdom.

#### Australia

Australia's Office of the Gene Technology Regulator (OGTR) issued license [DIR 165](#) to the University of Melbourne for the limited and controlled release (field trial) of wheat that has

been genetically modified to alter its iron uptake, transport, and bioavailability.

The field trial will take place between April 2019 and December 2023 at sites in New South Wales, Victoria, and Western Australia. In the first year, it will be conducted at up to two trial sites, with a maximum combined area of 4 ha. In the remaining four years, up to 10 trial sites per year, with a maximum combined area of 20 ha per year, will be used. The trials will gather research and regulatory data under field conditions. However, GM wheat grown in field trials will not be used in human food or animal feed.

The Risk Assessment and Risk Management Plan (RARMP) and the license were finalized after consultation with the public, state and territory governments, Australian government agencies, the Minister for the Environment, the Gene Technology Technical Advisory Committee, and local councils.

The finalized RARMP, a summary, a set of questions and answers on this decision, and a copy of the license are available online from the [DIR 165 documents page](#) on the OGTR website

Source: *Crop Biotech Update* (April 24, 2019)

#### United Kingdom

The John Innes Centre received permission from the UK government to perform field trials of GM wheat biofortified to produce high-iron white flour. The three-year field trial (from 2019 to 2022) will be carried out under confined conditions at the Centre between April and September each year.

Using genetic engineering, the researchers were able to transport one gene and activate it in the endosperm, the central part of the wheat seed. The endosperm is used to produce white flour and normally has a low iron content. At present, white flour is fortified with iron powder or iron salts to regulation levels of 16.5 µg g<sup>-1</sup>. If the field trials are successful, the new wheat variety will have an increased iron content of 20 µg g<sup>-1</sup>.

According to a project leader, the team prioritized the development of white flour to encourage people to eat wholemeal products. 'By producing high-iron white flour we can reach more people and make the biggest impact on public health,' she added. Since it is a publicly owned project, breeders and farmers can openly access and use the crop, subject to GM regulations.



For more information, read the news article from the [John\\_](#)

*Source: Crop Biotech Update (May22, 2019)*

### Ethiopian Women in Biosciences Trained in Science Communication

Ethiopian women scientists have identified effective [science communication](#) as key to stimulating informed pro-science policy decisions and public trust. This was discussed during Ethiopia's inaugural Women for Bioscience communication training session held in Addis Ababa on May 8–9, 2019.

Opening the two-day workshop, the Director General of the Ethiopian Biotechnology Institute (EBTi), stressed the role of effective communication in galvanizing public acceptance of biotech products.

Participants learned the importance of simplifying scientific terminology when communicating with non-technical audiences, effective media engagement strategies, and stakeholder mapping. The Director of International Service for the Acquisition of Agri-biotech Applications (ISAAA) *AfriCenter* challenged participants to tell stories about what they do and not to let others miscommunicate their work. This, she noted, allows misrepresentation of scientific facts and miscommunication, further widening the gap between science and society.

Participants acknowledged that skills acquired from this session will help them engage different stakeholders. The training was part of a concerted effort by African Women for Biosciences, ISAAA *AfriCenter*, and EBTi to equip Ethiopian women in biosciences with communication skills to translate bioscience initiatives into viable enterprises for a vibrant bioeconomy.

*Source: Crop Biotech Update (May22, 2019)*

### GARDIAN: New Search Tool Unlocking Agricultural Innovation

Unlocking digital innovation in agricultural development requires the ability to aggregate data from various sources and disciplines. [GARDIAN](#), the first pan-CGIAR search engine for agricultural data, allows users to find agricultural information quickly and easily across the more than 30 data and publications platforms of the 15 CGIAR Centers and 11 Genebanks.

It currently includes approximately 100,000 publications and 3,000 data sets. The tool will soon also link to resources beyond CGIAR.

Some key enhancements are

1. GARDIAN allows findable, accessible, interoperable, reusable (FAIR) data discovery. A [section](#) is now devoted to analytics with clear guidelines on FAIR metrics to see how FAIR scores are calculated, and how these can be improved.
2. This year we will enable wider discoverability of agriculture resources from our partners and other non-CGIAR sources. We have recently added PubMed Central, the European Nucleotide Archive, and the UK's Research for Development Outputs repository.
3. An early prototype of a "GARDIAN Labs" feature has been developed. This will include services such as an ontology annotation tool, easy metadata entry, and a machine-learning enhanced method for detecting personally identifiable information before it is published. These features are being tested for integration into an "upload FAIR resources" workflow this year. They will also be released as stand-alone tools that can be employed by CGIAR and our partners to facilitate FAIR data assets.
4. Geospatial view capabilities have been improved. These include the ability to obtain summary crop production data by country or by bounding box. This will be further enhanced with more recent crop production data (from the Spatial Production Allocation Model) with features to easily visualize temporal changes. The ability to map georeferenced data discovered through GARDIAN will also be tested later this year.

### 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.

### Continuing Reforms and the State of the Ethiopian Seed Sector

The organized seed sector in Ethiopia has been through many changes since it began in the 1940s.

Accordingly, we recognize at least three stages of seed sector development in the country: (1) emergence of formal sector characterized by ad hoc seed production and delivery (1940–1978); (2) establishment of a formal sector and consolidation of the public sector (1979–1990); and (3) diversification and expansion of the formal sector with the entry of the private sector (since 1991). Currently, the seed sector is a key agricultural transformation agenda of the government and, as such, a national seed system development strategy has been prepared by the Agricultural Transformation Agency through broader consultation of stakeholders

The Ethiopian seed system is well documented in the seed sector strategy. Three sub-sectors have been identified: formal, intermediate, and informal. The formal sector comprises public and private sector seed suppliers. The intermediate seed sector comprises several forms of farmer-based seed production and marketing schemes (communities, cooperatives, etc.). Both are subject to national policies and regulations.

This article summarizes the gradual reforms and major developments that have taken place to create the current diverse seed system. We present the policy and regulatory frameworks, institutional and organizational arrangements, and technical operations that define the current national seed system that evolved over time from one decree that established one seed producer and one seed supplier in the late 1970s.

### Seed system strategy

The Ethiopian seed system strategy was finalized in 2013, following validation workshops with a range of partners and stakeholders. It was submitted to the Ministry of Agriculture and endorsed in December 2017. It is reference document for development partners to contextualize their interventions and has encouraged some to enter the seed market. The implementation of the strategy, however, is still very slow, due to limited awareness and delayed endorsement and acceptance as a binding strategy.

### Policy and regulatory frameworks

The laws and regulations governing the seed system include Seed Proclamation (No. 782/2013, main seed law), Farmers and Community Rights Proclamation (No. 482/2006), Plant Breeders' Rights Proclamation (No 481/2006, revised as No. 1068/2017) and Biosafety Proclamation (No. 655/2009, revised as No. 896/2015), the latter two being revised in line with recent developments. Moreover, there are regulations for implementation of these laws such as Seed Regulation No. 375/2016

and Seed competency and related service regulation No. 361/2015. There are also several directives such as Quality Declared Seed System, Certificate of Competency (CoC), Tracking and Exclusion of Rejected Seed, Seed Marketing and Issuance, and Administration of CoC of One-Stop-Shops for Agricultural Inputs.

Currently there are 119 standards for field crops, horticultural crops (vegetables and fruits), root and tuber crops, forage, spices, and coffee. There are also QDS standards for 35 priority food, horticultural, and feed crops. Lack of stakeholder awareness and poor enforcement are key challenges to implementation.

A national seed industry policy was developed in 1993 to guide seed sector development, paving the way for the entry and participation of the private sector. Currently, a new draft national seed policy is being developed through consultation with key partners and stakeholders, pending endorsement by the Ethiopian government.

### Coordination of seed sector

Nationally, the seed sector is coordinated by the Ministry of Agriculture (MoA), supported by its Seed Unit and Core Groups/Seed Units of Regional Bureaus of Agriculture and the National Seed Advisory Group (NSAG), appointed by the MoA. NSAG comprises 14 qualified professionals delegated by the MoA to provide voluntary advice. It advises the MoA on the national seed industry and reports to the State Minister. MoA's Seed Unit temporarily serves as a secretariat that coordinates seed operations among key partners and stakeholders.

The Regional Seed Core Team manages seed issues in the region. The Regional Seed Unit is a group of experts from seed sector partners. It regularly monitors the seed sector and provides technical support. Both coordination structures are led by Deputy Heads of Bureaus of Agriculture (BoAs). The ad hoc arrangement of these coordination structures affects their ability to transform a sector where legally sanctioned governance is critically required.

### Variety release system

The Plant Variety Release, Protection and Seed Quality Control Directorate (PVRPSQC) of MoA coordinates variety release. The Directorate lacks its own experimental fields and laboratory for national performance tests (value for cultivation and use) and registration tests (distinctness, uniformity, and stability). Evaluation of varieties for release is carried out during variety verification trials by

National Performance Trial Committee members, drawn from the federal Ethiopian Institute of Agricultural Research (EIAR) and regional agricultural research institutes. The final approval is made by the National Variety Release Committee composed of 11 members mostly from the National Agricultural Research System (NARS). Of the total 1,198 released crop varieties, 49 percent have been released during the last 8 years, with the remaining being released during the previous 40 years. More than 85 percent of the varieties that have been released are owned by the public sector. Though there are many varieties listed in the registry, the proportion of varieties under commercial production is below 10 percent. Key challenges include the lack of a mechanism for removing obsolete varieties from the registry, lack of strong popularization and commercialization of released varieties, lack of ICT-supported system for disseminating information, lack of independence and impartiality of release committee members, and lack of regular releases of an adequate number of varieties.

### Variety protection

Ethiopia enacted the PBR Law (No 481/2006) in 2006 and parliament endorsed the revised PBR Law (No 1068/2017) in 2018. However, no varieties have been protected so far due to the lack of established mechanisms to manage the plant variety protection rights.

### Seed production

**EGS production:** NARS is responsible for early generation seed (EGS; breeder, pre-basic, and basic seed) production of public varieties. However, its roles and responsibilities at the federal and regional levels are unclear. Contract-based EGS production began in 2014, when the regional BoAs became responsible for signing contract agreements on behalf of seed companies or cooperatives. It focuses on planning, contract agreement, and production, but neither party is accountable if the terms of the contracts are not honored. In 2018, the MoA introduced new terms for contracts. Agreements are made and enforced among producers, both at regional and federal level. Key challenges in EGS production are the limited supply of EGS for newly released and preferred varieties, limited access to land by NARS, and an inability to enforce contract-based production.

**Certified seed production:** Currently, large-scale certified seed production is mainly organized through out-grower schemes (about 60 percent nationally) and some seed company farms. There are 5 federal and regional public seed enterprises, over 40 small-to-medium private seed companies, and 14 seed unions supplying certified seed in the country.

Moreover, there are about 300 primary seed producer cooperatives providing seed at community level, both certified seed and QDS as stand-alone enterprises or linked to public and/or private (seed companies and unions) sectors.

The annual total area allocated for certified seed production is between 60 to 70 thousand hectares. Inspectors estimate that annual total seed production is almost 2 million quintals. Of this, on average, around 1 million quintals per year is collected for processing by the seed companies. The contribution of the federal public sector (Ethiopian Agricultural Business Corporation) and private sector (Ethiopia Pioneer Hybrid Ltd) is about 30 percent. The rest of the total raw seed supply is contributed by regional public seed companies, the private sector, and unions.

Key challenges include low seed recovery rates from the out-grower schemes, poor access to finance to purchase produced seed, and declining land ownership for multiplication by seed companies.

### Seed marketing

Previously, seed production and seed marketing were centralized. Seed producers were given a quota to produce and the seed produced was allocated and distributed through unions and cooperatives. The seed marketing system is gradually being relaxed to be governed by market forces, demand and supply. In 2011, the government allowed direct seed marketing (DSM) to be piloted where the seed companies will take full responsibility for selling seed directly to farmers through agents or their own shops, in designated districts.

In 2018, an estimated 768,000 quintals of certified seed was marketed by the formal sector in the country. According to an Agricultural Transformation Agency unpublished report, about 460,310 quintals (60 percent of total annual sales) worth Br 1.7 billion (Ethiopian birr) of DSM were sold across more than 228 districts. Almost all seed supplied to DSM districts was sold (97 percent) in 2018. Eight crops were sold through DSM, mostly wheat (53 percent) and maize (45 percent). The report also documented that the share of DSM sales reached 60 percent compared to the centralized marketing through cooperatives (40 percent) of the total volume of seed sold during the same year.

The seed-marketing directive was endorsed in March 2019 by the MoA. The ministry is raising the awareness of various partners and stakeholders. Key challenges in seed marketing include poor extension or promotion, lack of special credit access for seed, farmers' shifting demand for different varieties,



weak private investment in the seed sector, and a lack of strategic seed reserves to fill the demand gaps.

### Seed certification

There are primarily two seed certification schemes operating in the country: the compulsory (conventional) and the QDS schemes. The emergency seed class becomes operational when the MoA declares a shortage of seed supply due to an emergency. This is governed as a separate certification scheme that meets the standards prescribed in the regulations. The PVRPSQC Directorate of the federal ministry is responsible for providing guidance and advice on policy and regulatory matters of variety release, protection, seed quality control and certification in the country. It is expected to manage the variety release and protection activities. Seed certification activities are decentralized and are the responsibility of BoAs in the regional states. Amhara, Oromia, and Southern Nations, Nationalities and Peoples (SNNP) have reformed their seed regulatory agency elevated to an authority, which provides seed certification services in the regions.

The federal state and Tigray Regional State have not yet made any reforms. Efforts to establish the Federal Seed Regulatory Authority as an independent agency, reforming the PVRPSQC, are ongoing.

Annually, the four regions certify almost 60 thousand hectares of seed production fields at the ratio of one vehicle for 8,000 ha and one inspector for 4,000 ha. A total of 10,000 seed samples of new production and carryover seed are tested by 14 seed laboratory staff per year. About seven control plot testing stations are currently operational in Amhara and SNNPR, serving as demonstration sites to show the level of contamination of seed lots across seed companies. The plots are also used by seed laboratories as learning sites for morphological identification of varieties.

Regional agencies are also providing services, such as issuing COCs, pre-basic and basic seed certification of research centers and universities, inspection of market outlets, inspection of vegetable shops, domestic quarantine services, and QDS certification for fruit/tuber/cuttings. All charge a fee for their services. The federal and regional seed certification authorities have established a National Platform for Seed Quality Control to share experiences, harmonize operations, conduct inspections, and exchange information.

The national seed systems are a socioeconomic and political construct of the country; and no two seed systems are exactly the same. The evolution of the seed sector in Ethiopia, to date, provides an insight into the developmental path it followed within national narratives and contexts. While some lessons can be learned and adapted from elsewhere, national aspirations and visions should be considered to build a diverse, competitive, and sustainable seed system.

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### A Chickpea Revolution in Ethiopia

An initiative in the Ethiopian Highlands is pioneering mechanized chickpea production. Previously neglected because of the crop's dependence on traditional farming practices and high labor costs, new higher-yielding and machine-harvestable varieties are gaining popularity and laying the foundations of a lucrative export-oriented farming system.

Chickpea is a versatile crop with multiple benefits for integrated crop–livestock smallholder farming systems. It is an important source of protein and micro-nutrients; improves soil fertility and health through nitrogen fixation; has a low carbon footprint and aids climate change mitigation; and is easily incorporated into crop rotations—often with wheat and teff—to ensure the sustainability of farming systems. It can also be significant contributor to household income and, in international markets, can secure reserves of foreign currency.

In Ethiopia, in response to the introduction of improved varieties and crop management practices, chickpea is becoming increasingly popular. Large-seeded Kabuli varieties and those resistant to ascochyta blight—a severe disease that affects most chickpea-growing regions of the world—have increased domestic production and fueled international exports. The crop is now cultivated by almost 0.7 million households on an estimated 242,703 ha of land. In 2018, total production reached 499,426 metric tons, with an average productivity of 2.058 tons ha<sup>-1</sup>. Chickpea has emerged as the country's third most important legume export crop, generating about US\$61 million annually.

Despite this progress, however, productivity and land area continue to fall short of the crop's potential. Estimates suggest chickpea could be grown on 2 million hectares of highly suitable land

and could generate up to 5 tons ha<sup>-1</sup>. One area that could benefit is the Bale Highlands, a region in the southeast of Ethiopia. Largely dependent on the mono-cropping of wheat, farmers here are accustomed to mechanized production and tend to neglect chickpea because it requires manual planting and harvesting, and therefore incurs high labor costs.

#### Promoting mechanized chickpea production

In order to reverse this situation, ICARDA and the Debre Zeit Agricultural Research Center (DZARC), with support from USAID, initiated efforts to mechanize chickpea production, and develop and disseminate machine-harvestable chickpea varieties. Initially, researchers piloted machine planting and harvesting at two locations in the Oromia region: Gonde Basic Seed Farm, owned by the Ethiopian Seed Enterprise, and Kulumsa Agricultural Research Center. Two chickpea varieties were introduced: “Dhera”, a high-yielding and erect variety of Kabuli chickpea, and “Naatoli”, a high-yielding and early-maturing Desi chickpea. Performance overall was positive (see picture), although the results suggested that planting dates should be adjusted from late July to early August to avoid soil crusting due to high levels of soil moisture.



*Mechanized planting of Naatoli (top) and Dhera (bottom) chickpea at Gonde Basic Seed Farm*

#### Accelerated scaling efforts

Encouraged by the demonstration trials, the initiative subsequently demonstrated the viability of large-scale chickpea production systems, partnering with Bale Green, a private enterprise estate farm, in two districts, Ginir and Goro. Some 269 farmers, including 30 female farmers, were given 22.5 tons of chickpea source seed, of the varieties Areti and Habru. This was planted over an area of 172 ha.

Bale Green provided agricultural farm services—planting, spraying, and harvesting—and another business, Dejen Gebremeskel Import and Export Company, provided inputs such as biofertilizers and agrochemicals, and sponsored field days to promote the varieties. External support was also provided: Fintrac provided training for farmers under the USAID “Feed the Future—Ethiopia Value Chain” initiative. The Bale Zonal Bureau of Agriculture provided overall coordination.

Some 602 tons of chickpea were harvested in February 2019, yielding an average 3.5 tons ha<sup>-1</sup>. The harvested crop was delivered to exporters at a negotiated price, providing an assured market for farmers. “Linking farmers with markets is what matters most,” explained Dr. Zewdie Bishaw, principal investigator of the initiative. “Markets are drivers of adoption and therefore increased production.”

Approximately 22.5 tons of the total production is expected to be set aside as part of a revolving seed scheme, increasing seed production for next year’s cycle, facilitating dissemination, and expanding the cultivated area.



*Chickpea production fields at flowering and pod setting stages in the Bale Highlands*



Mr. Nigusie Girma, a breeder and national coordinator of the Chickpea and Lentil Program at the EIAR, commenting on the initiative's progress, said: "The success of this initiative has demonstrated that large-scale chickpea mechanized production systems can flourish in regions that have previously neglected the production of this crop. By building on this model, we can extend the benefits of chickpea to farmers throughout Ethiopia, thereby strengthening food and nutritional security, enhancing soil fertility, and generating additional income."

Mr. Million Bogale, general manager of Bale Green stressed that "the demand for improved chickpea is exponential" and referred to the initiative as a "rewarding and overwhelming experience," claiming that thousands of farmers were already requesting access to the new varieties. These sentiments were shared by Mr. Nigusie Tola, a member of the Chefe Mana Keble Farmers Association, an organization from Goro district that also participated in the initiative: "All farmers are happy with the introduction of the chickpea varieties into their farming systems." He continued: "Apart from its multiple benefits, chickpea productivity could equal, or even surpass wheat, in terms of economic returns. We believe that farmers will want to continue and expand chickpea production in the future".



*Mechanical harvesting of chickpea in Bale Highlands*

Efforts to mechanize chickpea production in Ethiopia were part of a wider USAID-supported initiative entitled *Better livelihoods for small holder farmers through knowledge-based technology interventions in the highlands of Ethiopia: Increasing the productivity of chickpea in wheat-based cropping system*. This multifaceted project was implemented by ICARDA (2015–2018) in collaboration with partners and development practitioners at the federal and

regional levels, including NARS, seed suppliers, extension services, and the private sector.

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## Islamic Republic of Iran is Participating in New OECD Seed Schemes

The Islamic Republic of Iran (I.R. Iran) joined the OECD Seed Schemes in 1995. The country was a member of the Seed Schemes of Sugar Beet and Fodder Beet, Cereal, Maize, and Sorghum. Iran notified the OECD Secretariat of its wish to extend its participation in the Crucifers and other Oil or Fibre Species Seed Scheme. The Secretariat also agreed to extend membership to the Grass and Legume Seed Scheme as soybean (*Glycine max*) is covered by this scheme.

A technical document prepared and submitted by Iran contains legal and technical background information on the national seed production and certification system for rapeseed, soybean, and sunflower. The document circulated among delegates of member countries before the 2019 Annual Meeting, held in Vienna, Austria.

Delegates at the 2019 Annual Meeting were invited to discuss the participation of Iran in the Crucifers and other Oil or Fibre Species Seed Scheme and the Grass and Legume Seed Scheme.



*Mr. Samad Mobasser from SPCRI, Iran (first from left) with officials from OECD Seed Scheme*

A presentation on oil seed production and recent achievements was presented to the annual meeting



by the delegates from Iran. Delegates from member countries welcomed the presentation and approved the extension of Iran's participation in the OECD Seed Schemes.

To date, Iran is a member of six of the eight existing OECD Seed Schemes: (i) Sugar and Fodder Beet; (ii) Cereal; (iii) Maize; (iv) Sorghum; (v) Crucifers and other Oil or Fibre Species; and (vi) Grass and Legume.

These six schemes cover almost 90 percent of formal seed production within Iran and are essential for the private seed companies of the country to participate in international seed trade at the regional and global levels.

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### A Joint Meeting of Seed Companies from Iran and Turkey

The second joint meeting between seed companies from Iran and Turkey was held in Tehran, Iran, on June 28–29, 2019. This was an introductory joint meeting of the Turkish Seed Industrialists and Producers Sub-Union (Tohum Sanayicileri ve Üreticileri Alt Birliği, TSUAB) and the Society of Improved Seed Producers of Iran.

On the morning of the first day, Dr. Ahmet Yilmaz and Hamit Ayanoglu, the chairman and secretary general of the TSUAB from Turkey, and Mr. Keshavarz, deputy minister of agriculture, and Mr. Samad Mobasser, deputy head of the Seed Certification Directorate in Seed and Plant Certification Research Institute (SPCRI), from Iran, presented the challenges and opportunities for the seed industry. They discussed areas of common interest for partnership and cooperation between the seed companies of both countries.

In the afternoon, managers of the seed companies of the two countries (more than 30 companies from Turkey and about 35 companies from Iran) participated in a business to business (B2B) meeting to discuss their achievements and capabilities in seed production. Finally, an agreement was signed on technical and commercial cooperation between TSUAB and the Society of Improved Seed Producers of Iran.

On the second day, delegates from Turkish seed companies visited Pishro Kesht Alborz, a private seed company in Alborz province, near to Tehran. They also visited SPCRI. Mr. Mobasser extensively explained the history, rules, and regulations on

variety registration, protection, and commercialization; the provisions for seed imports and exports; and the seed certification process. This provided useful information for delegates interested to collaborate with Iran. Finally, a question and answer session was held with responses by colleagues from SPCRI.



*Participants of the joint Iran–Turkey meeting*

In the 2000s, ICARDA, FAO, and the [Economic Cooperation Organization](#), of which Iran and Turkey are founding members, made several efforts to bring together the seed sector of 10 member countries through harmonization of policy and regulatory frameworks for variety release and protection, seed quality control and certification, and phytosanitary measures to create regional markets and promote the seed trade. This is one step in the right direction, bringing together the seed companies from member countries of the regional organization.

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### Rebuilding the Seed System in Syria

Under the agreement of the FAO and the support of DFID, ICARDA is implementing a project entitled *Provision and Multiplication of Cereals and Legumes Varieties in Syria and Improving Access to Knowledge at Community Levels*.

Within the project implementation plan, ICARDA supplied pre-basic seeds of wheat, barley, chickpea, and lentil varieties to initiate local seed production. The aim was to mobilize, organize, and train farmers in local seed production in target regions in Aleppo province. In total, 1,450 kg pre-basic seed of bread wheat (Cham 4, Cham 6, Cham 10), durum wheat (Cham 3, Cham 7), barley (Arta, Furat 3), chickpea (Ghab 3, Ghab 4, Ghab 5) and lentil (Idleb 3, Idleb 4) were provided to the pioneer farmers. About 21 ha of wheat, barley, chickpea, and lentil was planted with an estimated basic seed production of 40 tons.

On June 10, 2019, a field day was organized at Hettani village in Al-Safireh, Aleppo province. The major agricultural research for development partners in Syria represented by the National Agriculture Syndicate and Farmers Union participated in the event. About 100 participants including researchers, academics, development practitioners, farmers, and staff from FAO and ICARDA attended the field day. The aim of the day was to create awareness and foster effective partnership among public and private actors along the cereal and legume value chains, including agricultural researchers, development practitioners, agro-industries, and end users. This major gathering was organized as part of a series of visits to project activities by key partners and stakeholders.

A field day flyer, *Quality Seed for Higher Productivity, Food Security and Better Livelihoods* was prepared in both English and Arabic and distributed. It highlighted the importance of quality seed and project objectives, achievements, and challenges.



Participants of field day: (1) Top: visits to seed production fields by N. Trabulsi and ICARDA staff; and (2) Bottom: Discussion with farmers and stakeholders (FAO Representative, Mr. M. Robson and staff)

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## West Africa Assess Progress in Implementation of Seed Regulations

Seed actors from 17 West African countries met in Dakar, Senegal, on July 9–11, 2019, to evaluate progress in the implementation of harmonized seed regulation in West Africa.

The vibrancy of the seed industry and active transboundary seed trade depend on workable regulations. In the past five years, West and Central African Council for Agricultural Research and Development (CORAF/WE CARD) has worked with nations to harmonize regulations in this sector in keeping with the agriculture policy of the Economic Community of West African States (ECOWAS).

“Harmonized rules and regulations constitute best practices that create healthy competition among seed entrepreneurs, enabling unrestricted movement of seed across boundaries, and ultimately allow farmers to access high-quality seeds.” Dr. Abdou Tenkouano, executive director of CORAF.

The fourth statutory meeting of the Regional Seed and Seedling Committee (WARSSC) was organized by CORAF and funded by the USAID, West Africa. About 70 participants attended the Dakar meeting.

### Is the tripartite accord working?

Three regional organizations, the Permanent Interstate Committee for Drought Control in the Sahel, ECOWAS, and the West African Economic and Monetary Union signed an agreement in 2014 putting in place a single Regional Seed Committee. Central to this agreement was a strategy to develop a functional regional seed market in West Africa. At the Dakar meeting, stakeholders will review national progress toward this objective.

The third statutory meeting of the WARSSC was held in Ouagadougou, Burkina Faso, in June 2017. During the Dakar meeting, stakeholders evaluated progress toward the implementation of the recommendations agreed in Ouagadougou.

### Building on the WASP momentum

During the past five years, the West Africa Seed Program (WASP) has considerably improved the availability of seed for farmers and enabled countries to adopt legislation allowing cross-border trade. While significant progress has been made in

strengthening the seed industry, work is still needed in many areas.

In 2017, [USAID renewed its collaboration with CORAF](#) in a five-year project known as the *Partnership for Agricultural Research, Education and Development in West Africa (PAIRED)*. One of the major pillars of PAIRED is to build on the achievements of WASP to complete the work on increasing production and the availability of quality agricultural inputs in West Africa.

### How to step up the game?

Many lessons were learnt from WASP. The next phase of seed work in West Africa should consider the following.

#### Enhancing implementation of seed regulation at country level

Deeper implementation of the ECOWAS Seed Regulation is needed. This can be achieved by increasing the involvement of the public sector, building and mentoring country certification teams, strengthening certification facilities, and establishing cost-effective certification procedures (see [Harmonization of the Regional Seed Regulation](#))

#### Expanding quality assurance using alternative quality control models

Alternative quality control systems, such as the quality declared system and the use of accredited private internal seed testing facilities, should be pursued to reduce the cost of seed certification and widen the benefits of seed testing to cover more crops.

#### Minimizing hindrances to cross-border seed movements

Concerted efforts are needed to minimize hindrances to cross-border trade, through training of non-traditional actors and advocacy among policymakers and other national and regional partners.

#### Clustering for advancing the seed sector

Grouping participating countries according to their degree of advancement in the seed harmonization process, particularly in terms of capacity, facilities, and results, could achieve faster overall results. Targeted interventions, addressing different needs, would lead to better results for each group.

#### Expanding agribusiness using the WASP business model

The WASP business model is a useful tool. It should be consolidated, scaled up, more widely adopted, and made more accessible to partners through promotion and sharing among [ASIWA stakeholders](#).

#### Enhancing quality seed demand

Creating a demand for quality seed needs to be improved, building on WASP. A major demand-raising component should be incorporated, involving extension, research, and private sector empowerment, to grow seed demand and strengthen the seed value chain of all target crops. This will establish a robust basis allowing the industry to thrive.

#### Financing credits and funding support to seed industry

The private sector needs to advocate improvements in credit delivery for the seed industry, as well as the full institutionalization of the Seed Sector Support Fund enshrined in the Regulation and its sustainable application to components critical to the growth of the industry.

Source: [CORAF This Month \(June 2019\)](#)

## Research Notes

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

### Identification of Farmers' Preferred Linseed (*Linum usitatissimum* L.) Varieties Adapted to Southern Ethiopia

Yetsedaw Aynewa,<sup>1\*</sup> Seid Ahmed,<sup>2</sup> and Zewdie Bishaw<sup>11</sup>

#### Abstract

Participatory variety selection (PVS) of linseed was conducted to select genotypes with better yields and other agronomic traits. The study was conducted during the 2018/19 main cropping season in Lemo district, Hadya Zone, southern Ethiopia. Seven nationally released improved linseed varieties were evaluated in four fields in Jewe and Lay Gana *kebeles* in mother trials. Based on farmer's selection criteria, genotypes were scored using a matrix ranking method. Varieties Cl-

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1525, Bilstar, and Bakalcha ranked first, second, and third, respectively. Farmers' participatory variety evaluation, based on their own selection criteria and analysis of characters, helps to explain, conserve, and access genetic diversity in farmers' fields.

**Key words:** Farmers' preference, linseed, varieties, genetic diversity

## Introduction

Linseed (*Linum usitatissimum* L.) is the second most important oilseed crop in terms of production in Ethiopian Highlands. It is used for food, income generation, agro-industry, and animal feed. The nutrient content of linseed, on average, is 40 percent oil, 28 percent carbohydrate, 21 percent protein, 7.6 percent water, and 3.4 percent other nutrients (EIAR 2007).

Participatory variety selection (PVS) has multiple advantages, such as generation, choice, and access of new crop technologies. It allows a large number of varieties to be brought to farmers, increasing choice, access, and diversity; increasing crop production to ensure food security; helping to disseminate varieties on larger-scale and so facilitating adoption; allowing varietal selection in target areas quickly and in a cost-effective way; and facilitating seed production at community level (Yadaw et al. 2006).

Overall, the aim of the PVS was to demonstrate the significance of variety selection with farmer participation to help increase cultivar diversity and seed supply in Amhara, Oromia, South, and Tigray.

The objectives were to evaluate linseed varieties through farmers' participation and facilitate seed production and the supply of selected varieties. Conventionally, the factors that affect farmers' selection of elite varieties is mostly under the control of researchers and extension agents. Farmers' own perspectives and farm conditions are not primary considerations. This study investigated the application of PVS to identify linseed cultivars that are suitable for the agro-ecology of southern Ethiopia.

## Materials and methods

The study was conducted at Lay Gana and Jewe *kebeles* (lowest administrative unit), Lemo district, Hadya Zone, in the 2018/19 main cropping season. PVS included seven improved and released linseed varieties: CI-1525, Bakalcha, Bilstar, Furtu, Kulumsa 1, Kuma, and Yadano. A mother trial was conducted on four farmer's fields in two *kebeles* (two farmers in each *kebele*). A plot size of 25 m<sup>2</sup>

was used for each variety. A seeding rate of 35 kg ha<sup>-1</sup> was used and diammonium phosphate (DAP) fertilizer was applied at planting at a rate of 100 kg ha<sup>-1</sup>.

Male and female farmers evaluated the varieties separately. The selection criteria were identified through brain-storming and ranked by groups of male and female farmers. A matrix was prepared with the criteria in the first row and the varieties in the first column.

## Results and discussion

The results are presented below, based on ranking, grain yield, and correlations.

### Matrix ranking

The evaluation results revealed that there were differences among varieties based on male and female farmers' selection criteria (Table 1). The highest mean value was recorded by male and female farmers for var. Bilstar with score of 105.5, while the lowest was for var. Furtu with 45.5. Overall farmer's varieties CI-1525, Bilstar, and Bakalcha ranked first, second, and third, respectively.

Similar results were recorded in grandmother–mother and mother trials for malt barley PVS in northwest and northern Ethiopia (Aynewa et al. 2013, 2019) and mother trials on faba bean (Aynewa et al. 2018a), lentil (Aynewa et al. 2017), and durum wheat and food barley (Aynewa et al. 2016, 2018b).

Table 1. Evaluation of linseed varieties by male and female farmers in 2018/19 crop season

Variety	Lay Gana		Jewe		Mean	Rank
	Male	Female	Female	Male		
CI-1525	169	102	55	96	105.5	1
Bilstar	195	78	70	70	103.3	2
Bakalcha	195	78	40	64	94.25	3
Furtu	65	24	45	48	45.5	7
Kulumsa 1	145	48	40	40	68.25	6
Kuma	78	30	50	120	69.5	5
Yadano	91	54	40	96	70.25	4

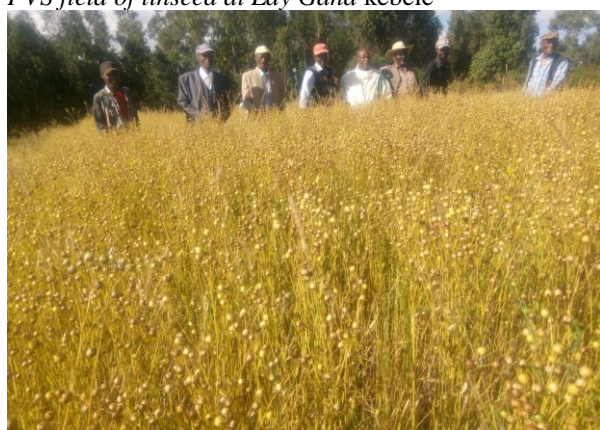
### Yield data

From the varieties evaluated, the highest grain yield was recorded for var. Yadano (1.6 tons ha<sup>-1</sup>) at Jewe while the lowest was recorded for cv. Kulumsa 1 (0.3 tons ha<sup>-1</sup>) at Lay Gana (Table 2). However, the highest mean yield was recorded for var. Yadano (1.23 tons ha<sup>-1</sup>) while the lowest was recorded for cv. Kulumsa 1 (0.59 tons ha<sup>-1</sup>). The mean yield data revealed that vars. Yadano, Furtu,

and CI-1525 gave the first, second, and third highest yield, respectively.



PVS field of linseed at Lay Gana kebele



Variety evaluation of linseed by male farmers at Jewe kebele

Table 2. Grain yield of linseed varieties at Lay Gana and Jewe in 2018/19 cropping season

Variety	Yield (tons ha <sup>-1</sup> )				Mean
	Lay Gana 1	Lay Gana 2	Jewe 1	Jewe 2	
CI-1525	0.43	0.8	0.84	1.56	0.91
Bilstar	0.8	0.7	0.88	1.2	0.9
Bakalcha	0.8	0.6	0.84	1.16	0.85
Furtu	0.4	1.1	1.16	1.6	1.1
Kulumsa1	0.3	0.4	0.76	0.88	0.59
Kuma	0.4	0.9	0.84	1.24	0.85
Yadano	0.7	1.2	1.6	1.4	1.23

### Correlation

Spearman correlation coefficient of the farmers' evaluation indicated that branching was positively associated with grain yield ( $r = 0.25$ ) while pod number per plant ( $r = -0.31$ ) and crop stand ( $r = -0.31$ ) were negatively associated with grain yield (Table 3). No association was observed between grain yield and maturity. The correlation coefficient helps to identify genotypes through indirect selection.

Table 3. Spearman correlation coefficient of grain yield with farmer's evaluation

	BR	PDN	MA	CS	GY
BR	1				
PDN	0.714286	1			
MA	0.035714	-0.07143	1		
CS	0.821429	0.928571	-0.07143	1	
GY	0.252262	-0.30632	0	-0.30632	1

Note: BR = branching, PDN = pod number per plant, MA = maturity, CS = crop stand, GY = grain yield

### Conclusion

PVS helps to diversify and disseminate appropriate technologies within a short period of time. End of season yield data analysis and farmers' varietal evaluations using their own selection criteria provide a basis for designing and developing appropriate techniques to select varieties better adapted to the environment. They provide a functional understanding of relevant systems to strengthen future crop and product development in a sustainable way.

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## Meetings and Courses

**Announcements of national, regional, or international conferences, meetings, workshops, and training courses appear in this section.**

### Conferences

#### Australian Grains Industry Conference 2019

The Australian Grains Industry Conference 2019 will be held from July 31 to August 1, 2019, at Crown Promenade, Melbourne.

This year's conference will focus on *Navigating the Future* and providing a *Roadmap for 2025* for the Australian grains industry.

The Australian Grains Industry Conference (AGIC 2019) is an industry-run conference for grain market participants and service providers. It is hosted by leading grain industry associations Grain Trade Australia, Australian Oilseeds Federation, and Pulse Australia.

Attended by approximately 850 leaders and participants, and with world-class networking opportunities, AGIC is the premier event on the grains and oilseeds industry calendar for Australian and many international industry leaders.

The conference provides unparalleled networking opportunities and is a platform for commerce and business development in the grains industry. It is undoubtedly the ultimate event to hear the latest news, outlooks, and trends shaping the industry's future.

AGIC offers exposure to

- Grain and oilseed producers, processors, importers, and exporters
- Manufacturers of food, animal feed, biofuels, and bio-based industrial products
- Suppliers of services (financial/logistical/marketing/communications) to the grain and grain-products industry

- Ports businesses, freight forwarders, shipping/ocean line companies, container companies
- Technology, equipment, and service providers
- Trade groups, government agencies, and researchers
- Industry advisers and consultants, and key policy- and decision-makers

For more information on the conference and post-conference news, visit the website at:

<https://gta.eventsair.com/agic-australia-2019>

#### 4th International Conference on Global Food Security

The 4th International Conference on Global Food Security under the theme *Achieving Local and Global Food Security: At What Costs?* will be held on June 16–19, 2020, at Le Corum, Montpellier, France. The conference will address the topic of food security at all spatial levels from local to global, and from an interdisciplinary and systemic food systems perspective. It aims to better understand environmental, nutritional, agricultural, demographic, socioeconomic, political, technological, and institutional drivers, and the costs and outcomes of current and future food security. Interactions with contextual factors, including climate change, urbanization, greening the economy, and data-driven technologies, will be central. The conference will address the triple burden of malnutrition: hunger, micronutrient deficiencies, and obesity. It will explore the current state of interdisciplinary insight, address the trade-offs that occur—and synergies that can be sought—in transforming food systems. The aim is to reconcile the competing environmental, economic, and social objectives and outcomes to achieve the Sustainable Development Goals at different levels across spatial and temporal scales.

Contributions which bridge themes or scales, foster interdisciplinarity and integration, or address interactions between science and non-academic stakeholders (civil society, private sector, and policymakers) are particularly welcome. Single discipline or specific studies are welcome in parallel sessions or as posters.

Abstract submission is now open until September 20, 2019. For more details, visit the [4th International Conference on Global Food Security](#)

#### Africa Seed Trade Association (AFSTA) Congress 2020

The [AFSTA Congress](#) will be held in Livingstone, Zambia, March 3–6, 2020. For more information,



please contact the AFSTA Secretariat at [afsta@afsta.org](mailto:afsta@afsta.org)

### ISF World Seed Congress 2020

The International Seed Federation's (ISF) World Seed Congress 2020 will be held in Cape Town, South Africa, June 8–10, 2020. Conference [registration](#) will open on January 8, 2020 at 11:00 GMT. See the [ISF World Seed Congress 2020 website for more information](#).

### ISTA Annual Meeting 2020

The ISTA Annual Meeting will be held in Verona, Italy, May 25–28, 2020. For more information, please contact: ISTA, Zurichstrasse 50, 8303 Bassersdorf, Switzerland; tel: +41 44 838 6000; fax: +41 44 838 6001; e-mail: [ista.office@ista.ch](mailto:ista.office@ista.ch); website: [www.seedtest.org](http://www.seedtest.org)

## Courses

### ICARDA Courses

ICARDA organizes both short- and long-term courses in thematic areas related to its research programs under Biodiversity and Crop Improvement; Resilient Agricultural Livelihood Systems; and Water, Land Management, and Ecosystems. For more information on the ICARDA annual training programs, please contact: Charles Kleinermann, ICARDA, Cairo, Egypt; e-mail: [c.kleinermann@cgiar.org](mailto:c.kleinermann@cgiar.org)

### UPOV Distance Learning Courses

Two sessions of each of the following UPOV distance learning courses are planned in 2019:

1. DL-205 Introduction to the UPOV system of plant variety protection under the UPOV Convention
2. DL-305 Examination of applications for plant breeders' rights
3. DL-305A Administration of plant breeders' rights (Part A of DL-305)
4. DL-305B DUS Examination (Part B of DL-305)

The timetable of Session II courses for 2019 is as follows:

- Registration: August 5 to September 13, 2019
- Study period: October 14 to November 17, 2019
- Final exam: November 11 to 17, 2019

The categories for participants are:

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 [Seed Info](#)

the relevant representative to the UPOV Council (one non-fee-paying student per state/intergovernmental organization; additional students, CHF1,000 per student).

Category 3: Others (fee, CHF1,000).

More detailed information about the courses and online registration is available on the UPOV [website](#).

### ISTA Training Videos

ISTA has released seven training videos to aid ISTA Seed Sampling Trainers. The videos are now available on the ISTA [YouTube channel](#) as well as on the Bulking and Sampling Technical Committee [website](#).

## Literature

**Books, journal articles, and other literature of interest to readers are presented here. It may contain relevant information on agriculture-related publications including seed policy, regulation, and technology.**

### Books

**Fan, S., S. Yosef., R. Pandya-Lorch (Ed.). 2019. *Agriculture for Improved Nutrition: Seizing the Momentum***

Published by IFPRI ([www.ifpri.org](http://www.ifpri.org)) and CABI ([www.cabi.org](http://www.cabi.org)); ISBN-13: 978 1 78639 931 1 (Hardback) 978 1 78639 932 8 (eBook); [Open access](#); 233 pp

Agriculture's vast potential to improve nutrition is just beginning to be tapped. New ideas, research, and initiatives developed over the past decade have created an opportunity to reimagine and redesign agricultural and food systems for the benefit of nutrition. To support this transformation, the book reviews the latest findings, results from on-the-ground programs and interventions, and recent policy experiences from countries around the world that are bringing the agriculture and nutrition sectors closer together. Drawing on the International Food Policy Research Institute's (IFPRI) own work and that of the growing agriculture–nutrition community, this book strengthens the evidence base for, and expands our vision of, how agriculture can contribute to nutrition. Chapters cover an array of issues that link

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agriculture and nutrition, including food value chains, nutrition-sensitive programs and policies, government policies, and private sector investments. By highlighting both achievements and setbacks, *Agriculture for Improved Nutrition* seeks to inspire those who want to scale up successes that can transform food systems and improve the nutrition of billions of people.

**Smyth, S.J., W.A. Kerr and P.W.B. Phillips. 2019. *GM Agriculture and Food Security: Fears and Facts***

*Published by CABI ([www.cabi.org](http://www.cabi.org)); ISBN: 9781786392244; Price: USD 144 (Hardback) and USD 58.50 (Paperback); 156 pp*

Efforts to improve food security in the developing world have been hampered due to myths surrounding GM agriculture. This book explores the theory, evidence, and rhetoric of the impact of food production on the environment, and the impact of the environment on food production. The chapters address food security and technology, expertise and opportunism, the promise of technology, the politicization of risk, industrial agriculture, the meaning of “natural”, the potential of the local food movement, food labeling, genetic diversity in the agro-industrial era, sustainability and chemical application, plant vitality, and prospects for food security. Each chapter includes a personal introduction from the authors about the issues, followed by a detailed analysis with further references. The book considers the origins of concerns and then examines the evidence around the issues, and the impacts in terms of policy, regulation, and agricultural practice. It also:

- Refutes common consumer and environmental organization myths about biotechnology
- Highlights the importance of food security in both the developing and developed world
- Provides a pro-science approach to increasing food security

This book will be of interest to students and researchers in biotechnology, food security, and public understanding of science, and also to policymakers, regulators, and industry managers.

## Websites

### SeedSystem.org

SeedSystem.org provides practical (“how-to”) guidance and strategic thinking to help professionals design seed-related assistance. It aims to foster productive, resilient, and market-oriented

seed systems, even in times of emergency and chronic stress.

The website is dedicated to strengthening smallholder farmers’ seed systems. SeedSystem.org is for practitioners, researchers, managers, policymakers, and donors working in humanitarian relief and agricultural development. Let us move forward as a Community of Practice that promotes seed system security and puts the needs of women and men farmers fully front and center. This site shares resources (tried-and-tested technical guidance!) and has three main aims:

- To improve intervention practice
- To improve assessment
- To improve strategic thinking around seed system response and seed system development

### ICRISAT-Website on Climate change Initiative

ICRISAT announced the launch of a new website dedicated to an initiative to transform food systems under a changing climate. More than 100 partners have banded together to move the initiative’s action plan forward. The plan focuses on six elements of transformation:

- Empowering farmer and consumer organizations, women, and youth
- Digitally enabled climate-informed services
- Climate-resilient and low-emission practices and technologies
- Innovative finance to leverage public and private sector investments
- Reshaping supply chains, food retail, marketing, and procurement
- Fostering enabling policies and institutions

See <https://www.transformingfoodsystems.com/>

### Access to Seeds Index

The [Access to Seeds Index](#) evaluates and compares seed companies according to their efforts to improve access to quality seeds of improved varieties for smallholder farmers. The Index seeks primarily to identify leadership and good practices, providing an evidence base for the discussion on where and how the seed industry can improve efforts.

Private sector engagement is at the heart of the Sustainable Development Goals adopted by the United Nations in 2015. By creating a better understanding of the seed industry’s performance, the Index aims to contribute to the achievement of these goals.

Based on how important stakeholders—farmers, governments, scientists, NGOs, and the industry

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itself—view the role and responsibility of the seed industry, a methodology was developed with clearly defined criteria. After publication of each Index, the methodology is reviewed and updated. Using this iterative approach, the Index aims to monitor progress over time.

The Access to Seeds Index is published by the Access to Seeds Foundation, an independent, non-profit organization based in The Netherlands. The

Access to Seeds Foundation is an ally of the [World Benchmarking Alliance](#).

### Newsletters

#### Access to Seed Index

[Access to Seed Index Newsletter](#) is published and distributed by Access to Seed Index updating information devoted to the performance of the seed sector.



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## About ICARDA

The International Center for Agricultural Research in the Dry Areas (ICARDA) is the global agricultural research organization working with countries in the world's dry and marginal areas to deliver sustainable systems solutions that increase productivity, improve rural nutrition, and strengthen national food security. ICARDA's integrated approach includes new crop varieties; agronomy; on-farm water productivity; natural resources management; rangeland and small ruminant production; and socio-economic and policy research to better target poverty issues and accelerate technology adoption. As a member of the CGIAR Consortium, ICARDA works closely with national agricultural research programs and other partners in more than 40 countries across North and sub-Saharan Africa, and Central, South, and West Asia.



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### 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 in 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 proposed by subscribers. The Editor always welcomes suggestions on format and content. Please send inputs by e-mail to [z.bishaw@cgiar.org](mailto:z.bishaw@cgiar.org)

*The views published in Seed Info are those of the contributors and do not necessarily imply the expression of any opinion on the part of the Editor, the Regional Seed Network, or ICARDA.*