January 2019 | Issue No. 56

Seed Info

Official Newsletter of WANA Seed Network

Published by Seed Section, ICARDA, P.O. Box 114/5055, Beirut, Lebanon
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ICARDA
Science for resilient livelihoods in dry areas

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.

The **WANA Seed Network News** provides information on activities relating to global and/or regional cooperation and collaboration to facilitate the development of a vibrant regional seed industry. In this issue of *Seed Info*, we report on the launch of the Technologies for African Agricultural Transformation (TAAT) Wheat Project and the Wheat Seed Sector Consultation workshop organized by the International Center for Agricultural Research in the Dry Areas (ICARDA) and the Agricultural Research Corporation in Sudan and the Lake Chad Research Institute in Nigeria.

In the **News and Views** section, Adamu Molla and Zewdie Bishaw from ICARDA, Ethiopia, write about '*Sowing the seed of success: Ethiopia on a new path to explore global malt markets*' – a report on Ethiopia's potential in malt barley production and marketing in Africa and globally. Barley has been grown by farmers in Ethiopia for millennia for food, local beer production, and medicinal purposes. Farmers across the country's different agro-ecologies have grown barley for centuries and have developed a unique diversity of ecotypes and landraces. Today, barley is in the spotlight for its potential to boost the economy by attracting interest from international malt markets and breweries. With the entry of international maltsters and big beer brands, expanding malt barley production for domestic and international markets through public–private partnerships is a key way forward. Other news in this section comes from regional and/or international organizations, such as the 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 and Syria. From Ethiopia, we provide information on the annual general assembly of the Ethiopian Seed Association and the findings of the *assessment and identification of the policy and regulatory constraints of private seed sector development in Ethiopia*. The key challenges and suggested solutions presented during the annual meeting by the members of the association and key stakeholders of the seed sector in the country will be conveyed to the Ministry of Agriculture. From Syria, we report on the on-going efforts made to rehabilitate the agricultural research and seed sectors to enhance food production capacity in Syria to support the General Council for Scientific and Agricultural Research (GCSAR) and General Organization for Seed Multiplication (GOSM). In addition, we also report ICARDA's work on the varietal release of cereals and legumes through partnership with national agricultural research systems (NARS) in Asia and Africa.

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 Aynewa et al. from ICARDA, Ethiopia – *'Farmers preferences for malt barley (Hordeum vulgare L.) varieties adapted to northern Ethiopia*'. The paper discusses the participatory variety selection carried out at the Africa Rising project sites in the Endamehoni district of the southern zone of Tigray Regional State in northern Ethiopia. Farmers identified high-yielding malt barley varieties that were well adapted, preferred by farmers, and were introduced into 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.

Happy New Year

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.

Launch of the TAAT Wheat Project and Wheat Seed Sector Consultation Workshop on Transforming the Wheat Sector in Africa

Wheat is an important strategic food security crop in Africa, where billions of dollars are spent on imports although there is a great potential to produce the crop locally. The African Development Bank (AfDB), bolstered by the successes of the Support for Agricultural Research and Development of Strategic Crops (SARD-SC) projects, started a new initiative – TAAT. In this project, transforming wheat production is at the forefront of the Feed Africa agenda of the AfDB to ensure self-sufficiency of the continent.

ICARDA is implementing the *TAAT Wheat Project*. The project focuses on seven countries in sub-Saharan Africa (Ethiopia, Kenya, Mali, Nigeria, Sudan, Tanzania, and Zimbabwe) and seeks to transform domestic wheat production and commercialization to achieve wheat self-sufficiency in target countries.

TAAT Wheat Project Launch in Sudan

In Sudan, wheat was traditionally grown for thousands of years as a staple crop in the northern part of the country where temperatures are low. However, increased demand arising from an increased population and urbanization pushed wheat production towards the southern states with their shorter, hotter winters. The availability of heat-tolerant varieties boosted wheat production to a level of 90% self-sufficiency in the 1990s. However, inconsistent government policies led to a decline in self-sufficiency; at its lowest it was just 20%. With SARD-SC intervention, however, wheat self-sufficiency reached about 36% in the 2015/16 crop season. Local production reached about 780,000 tonnes compared to a total national consumption of 2 million tonnes.

The launch of the *TAAT Wheat Project* and the *National Wheat Seed Sector Consultation Workshop* was held 28–30 October 2018 in Khartoum, Sudan. About 50 staff from partner organizations, including NARS, public and private seed companies, and senior policy and decision makers of the Ministry of Agriculture and Forests (MoAF), attended the workshop. The opening ceremony was honored with the presence of Eng. Igbal Abdelmajid Abdelrahman, from MoAF, and Dr Abubakr Ibrahim Hussein, Director General of the Agricultural Research Corporation (ARC).

Partial view of participants at the TAAT Wheat Project launch and wheat seed sector consultation workshop, Khartoum, Sudan

TAAT Wheat Project Launch Workshop

On the first day, the key components of the project were presented. These focus on scaling-out technologies for heat-tolerant wheat varieties, best agronomic management practices for irrigated areas, strengthening the national seed sector, and capacity development. The project seeks to contribute to the transformation of the wheat sector by supporting the national wheat self-sufficiency strategy of the Government of Sudan (GoS). Presentations were made by invited speakers from ARC and MoAF on the state of the wheat sector in Sudan. It highlighted the key trends in production and consumption and the drive for wheat self-sufficiency within the GoS plan.

Wheat Seed Sector Consultation Workshop

On the third day, ICARDA gave a presentation on '*Trends in seed sector development: international experiences with a focus on wheat*.' This was followed by presentations by the MoAF on the status of the national seed policy and regulatory frameworks and the national seed sector development strategy. Also, presentations were made on the state of planning, production, and marketing of early generation seed by ARC and on certified seed by the Sudan Seed Trade Association.

Finally, two working groups discussed key issues relating to the wheat seed sector and the implementation of the project. To guide these discussions, the groups were given separate areas of focus and a list of suggested topics to consider within each area. Working Group 1 addressed the *Wheat seed value chain* while Working Group 2 considered the *Wheat grain value chain*. In the afternoon of the third day, the groups presented their findings and recommendations. This was followed by further discussions.

Workshop Synthesis and Recommendations

To avoid overlap, the two group reports were merged into a composite document under two headings reflecting the main issues. Discussions covered a wide range of issues that will affect the implementation of the project. Some relevant points raised in the earlier workshop and discussions have also been reflected in this synthesis:

Recommendations (from earlier discussions and endorsed by the participants of the workshop)

1. Formation (activation) of a Wheat Commodity Council (Board) to include all stakeholders along the value chain to strengthen the value chain. It is suggested that the Board is directly supported by the Minister of the MoAF in partnership with the TAAT Wheat Compact of Sudan.
2. Create stable and sustained policies for wheat commodities and develop a clear plan of action by the state for wheat grain and seed production and marketing, strictly adhering to these policies and action plans.
3. Establish a clear short- to long-term plan for the total target area to be covered by wheat along with a collateral plan for seed production. The plan would result in 25% of the wheat area being planted with certified seed annually. This plan should be well aligned with the production of breeder and basic seed and the maintenance of commercial varieties.
4. Adoption of an integrated plan with enabling policies (tax exemptions, subsidies, etc.) to encourage the private sector to be enrolled in seed production for the strategic crops. This will result in the rapid evolution of the seed industry in Sudan.
5. Declare innovative and supportive financial and insurance policies for agricultural production to support producers and encourage them to continue and sustain wheat seed and grain production.
6. Undertake further analysis of the wheat seed sector and value chain by a specialized taskforce, with clear terms of reference and timeframe, involving all partners. This taskforce should be under the auspices of the Minister of MoAF and work in partnership with the TAAT Wheat Compact.
7. Develop a clear vision for wheat production from research to end use products with a focus on strengthening the value chain by supporting all stakeholders, their interrelations, and capacities.
8. This vision should take care of the genetic, physical, and physiological quality of the seed as well as the quality of the grain and end use products. This is achieved by developing a clear varietal map across the production areas and the adoption of marketing policies based on the quality of the seed and grain.
9. Current areas under wheat production may not assure self-sufficiency in grain production. This requires exploring the areas proposed for horizontal expansion and the provision of the necessary infrastructure and production technologies.

Wheat Grain Value Chain

To realize higher levels of self-sufficiency, several factors need to be addressed to make the wheat value chain functional. These factors include:

- Introducing quality-based grain production, pricing and marketing
- Developing an appropriate infrastructure for grain transportation and storage
- Creating market linkages from production to processing
- Providing a consistent enabling policy environment for sustainable production
- Creating a commodity exchange facility (BURSA) to oversee wheat production in the country (see recommendation 1).

Wheat Seed Value Chain

Recommendations

- Expand wheat to new potential areas to increase domestic production and improve wheat crop productivity by using the recommended agronomic packages to meet self-sufficiency (see recommendation 9)
- Establish a national coordination body for planning seed production at the national level bringing together the key stakeholders
- Strengthen the technical capacity of the seed producers through adequate training and provision of enabling policy and regulatory frameworks.

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TAAT Wheat Project Launch in Nigeria

In Nigeria, as elsewhere in sub-Saharan Africa, wheat is becoming a strategic staple food crop – a result of increased demand arising from an increased population and urbanization and changing food habits. Nigeria has both irrigated and rainfed wheat production conditions. Commercial production usually takes place under

irrigation between latitudes 10°N and 14°N during the dry Harmattan season (November–March). The availability of heat-tolerant varieties had enabled wheat production to reach 90% in the 1990s. The wheat production level in Nigeria has been very low. In 1985, domestic wheat production was about 50,000 tonnes. In 1988, the Federal Government of Nigeria initiated the Accelerated Wheat Production Program across all the states in the 'wheat zones' to boost wheat production in the country. This led to area expansion and increased productivity and production and the level of self-sufficiency, but inconsistent government policy resulted in a decline in wheat production and self-sufficiency. The SARD-SC intervention, supported by AfDB and the Federal Government-funded wheat value chain (ATA) projects, revolutionized wheat production in Nigeria. The area increased from 50,000 ha in 2012 to 250,000 ha in 2017. Wheat production increased from 70,000 tonnes in 2012 to 625,000 tonnes in 2017 and wheat productivity increased from 1.5 t/ha in 2012 to 2.5 t/ha in 2017. To date, wheat self-sufficiency remains a challenge as domestic consumption reached 4.2 million tonnes in 2017. Wheat production needs to be increased to meet the growing demand, and it is possible to achieve the targets given the potential available irrigable wheat area – close to 1.2 million ha – in the country.

Wheat Seed Sector Consultation Workshop

The *National Wheat Seed Sector Consultation Workshop* was held 28–29 November 2018 in Kano, Nigeria following an earlier project launch meeting on 16 October 2018 in Abuja, Nigeria. About 44 staff from partner organizations, including NARS, public, and private seed companies, and senior policy and decision makers of the federal and state Ministries of Agriculture attended the workshop. The opening ceremony was honored with the presence of the Honorable Member of Parliament, Mr Munir Baba Dan Agundi, who was joined by Barr. Attahiru Maccido, Commissioner of Agriculture, from Kebbi State, and Dr Kaleson Wesley Gwadi, Executive Director of the Lake Chad Research Institute (LCRI).

On the first day, presentations were made by national partners on the status and trends in wheat production and consumption and the interface between SARD-SC and the TAAT Wheat Project in Nigeria. This set the scene for the workshop.

ICARDA gave a presentation on the '*Trends in seed sector development: international experiences with a focus on wheat'*. This was followed by presentations on the state of the national seed sector by the National Agricultural Seeds Council (NASC) of the Federal Government of Nigeria. Additional presentations were made on the state of planning, production, and marketing of early generation seed by LCRI, and certified seed production by private seed companies, such as Premier Seed, Rahama Seed, Value Seeds, Maina Seeds, etc. The presentations were followed by a discussion of the national seed sector in general and the wheat seed sector in particular.

Participants in the TAAT National Wheat Seed Sector Consultation Workshop

On the second day, two working groups discussed key issues relating to the wheat seed sector and implementation of the project. To guide these discussions, each group was given separate focus areas and a list of suggested topics to consider within each area. Working Group 1 addressed the Wheat seed value *chain* while Working Group 2 explored the *Wheat grain value chain*. In the afternoon of the second day, the groups presented their findings and recommendations. This was followed by further discussions.

Workshop Synthesis and Recommendations

To avoid overlap, the two group reports were merged into a composite document under two headings reflecting the main issues. Discussions covered a wide range of issues that will affect the implementation of the project. Some relevant points raised in the earlier meetings and discussions have also been reflected in this synthesis.

1. The Working Groups found that the key policy and/or institutional constraints that hinder the wheat seed value chain development include:
    - Inconsistent government policy and unregulated imports in the wheat sector
    - Inadequate funding of research and extension services and weak farmers' associations
    - Inadequate infrastructure for wheat production and quality grain
    - High interest rates for investments, poor marketing and pricing, and the lack of a formal guaranteed price.

2. For a functional commodity value chain, the Innovation Platform found success by bringing together key stakeholders at the operational and strategic levels and defining their roles and responsibilities. The Working Groups identified the following key stakeholders and their roles in the wheat value chain.

Key value chain actors	Roles and responsibilities
Government agencies (federal and states, NASC)	• Formulate policies and create an enabling environment • Provide necessary incentives that will make wheat production competitive • Establish a quality grain grading system based on premium prices
Agricultural research institutes (LCRI and the Institute for Agricultural Research) and universities	• Develop varieties with high yield and grain quality • Develop agronomic practices that will ensure high yields in farmers' field
Extension services	• Disseminate along the value chain a knowledge of production and information on the market • Build the capacity of farmers
Seed and input suppliers (seed companies and agro-dealers)	• Produce and supply sufficient quantities of quality seed and inputs at the right places and times at affordable prices
NGOs	• Mobilize cooperatives and formal groups, train them in group dynamics and agri-business.
Farmers and wheat farmers' associations	• Clustering for ease of provision of services • Contract and out-grower farming • Produce quality grains • Aggregate and bulk quality grain
Financial institutions	• Provide easily accessible credit facilities to stakeholders along the value chain
Insurance institutions	• Provide insurance cover to mitigate risks and uncertainties for value chain actors
Grain marketers	• Buy grain from the farmers • Clean and aggregate the grain and provide warehousing • Market grain to the millers
Flour millers and flour millers' association	• Provide information on the requirements for milling • Support farmers to produce quality wheat

3. In order to meet wheat self-sufficiency, Nigeria needs horizontal expansion – to bring more land under wheat cultivation – and vertical expansion – to boost crop productivity per unit area of land by using new technologies, such as heat-tolerant wheat varieties and integrated crop management technologies. The major geographical zones with potential for wheat production include:
   - All North West States: Kano, Jigawa, Sokoto, Zamfara Kaduna, Katsina, and Kebbi
   - The North East states: Borno, Gombe, Bauchi, Yobe, Adamawa, and Taraba
   - The North Central States: Plateau State
   - The South-South States: Obudu for rainfed areas.

4. The NASC is an arm of the federal Ministry of Agriculture and Rural Development. It executes the policy, regulatory, institutional, and technical matters of the national seed sector. It is expected to ensure that seed production is systematically planned from early generation seed (EGS) to certified seeds, commensurate with proper projections of seed demand and seed supply. However, wheat seed production is very low and is not commensurate with demand where the informal sector dominates. NASC hold a national forum for seed production planning bringing together the key actors of the seed sector.

5. In order to link wheat production with markets, the following actions need to be taken by the key stakeholders:
   - Understand international politics in the wheat sector, particularly to protect the interest of Nigerian farmers
   - Mobilize and sensitize stakeholders to using locally produced wheat by millers and ensure it meet the standards
   - Government should impose a tariff on the import of wheat
   - Government should buy wheat grain from farmers and sell to millers
   - Procure compact milling machines given the readily available market for wheat flour
   - Negotiate between farmers and millers to set win–win prices
   - Train wheat farmers in agri-business or enterprise management
   - Increase productivity to compete with global market by using high-yielding varieties and best agronomic practices
   - Understand millers' demands and grain quality requirements.

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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 Success: Ethiopia on a New Path to Explore Global Malt Markets

Known as the "king of crops", barley has been grown by farmers in Ethiopia for centuries for food, local beer, and medical purposes. The many varieties of the crop with its multiple nutritious and healing characteristics has positioned Ethiopia as a historical center of diversity. Farmers across the country's different topographies and agro-ecologies have grown barley for centuries and have developed a unique diversity of ecotypes and landraces. The oldest types of barley are believed to have been around for thousands of years. Today, barley is in the spotlight because of its potential to boost the economy by attracting interest from international malt markets.

Ethiopian farmers have not only maintained the diversity of barley in the field, but also perfected its multiple uses for food, beverages, and as feed sources. Barley is revered in Ethiopian culture as a weaning food for children and if the mother is not able to breastfeed her child. The crop is known also to promote the healing of broken bones, for heart health, and diabetes protection to mention a few uses.

While barley is still cultivated largely as a subsistence crop in Ethiopia, the introduction of malt barley has changed the landscape, particularly in recent years. Ethiopia is becoming the hub of maltsters and breweries of global significance following the privatization and acquisition of public investments. Global brands, such as Heineken, BGI, and Diageo, which are among the global leaders in beer production, and Boortmalt and Soufflet among the maltsters, have established themselves now in Ethiopia.

Currently, the Ethiopian beer market is growing at an annual rate of 15–20%. There is capacity to produce 12.35 million hectoliters of beer annually from 12 breweries operating under five companies. This requires 197,600 tonnes of malt from the maltsters or 262,808 tonnes of raw malt barley grain from farmers. Currently the amount of Ethiopian produced malt is estimated to be 52,000 tonnes, which is about 25% of what could be needed.

With the right investments and approach, the industry is looking at a golden opportunity. Such an opportunity could benefit millions of smallholder farmers and the country at large, and potentially position Ethiopia as a key player on the world scene of malt barley.

It would allow Ethiopia to capitalize on its unique agro-ecology and to translate thousands of years of experience in producing barley into an impact on socio-economic development at a national scale. The production, aggregation, processing, transportation, and delivery of industry-desired raw malt barley of a quality standard would require new efforts to standardize and scale up a production scheme to match the needs and deliver outputs on time.

Public–private partnerships could be one of the ways forward to equip and prepare Ethiopia and its barley farmers for the world market. Earlier this month, on 2 August 2018, ICARDA, in collaboration with the Ethiopian Gonder Malt Factory and the Amhara Regional Agricultural Research Institute, gathered together stakeholders in the production of malt barley from Amhara Regional State. Among them were representatives of global beer brands, presenting the views and challenges to be overcome to unlock the potential of Ethiopia's barley production.

Among the next steps, a decision is needed on the architecture of collaboration and whether the public–private partnerships could be the way forward.

"This is the right time to join forces and explore new ways of working together, and in doing so we might find the key to enable the production of barley – the king of crops – to play the role in Ethiopia which it deserves," says ICARDA's Zewdie Bishaw from Addis Abeba, Ethiopia, from where he oversees the coordination of sub-Saharan activities.

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Argentina One Step Away from GM Wheat Commercialization

"We mustn't do what other countries have already done; we must do what no other country did," said Bioceres CEO, Federico Trucco, while presenting HB4 wheat, a transgenic wheat variety with drought tolerance traits.

The development started in the mid-1990s when Raquel Chan and her team identified the *HB4* gene that endows sunflower seed with drought tolerance. In 2003, Bioceres reached an agreement with Conicet to develop it commercially. In 2007, HB4 was transferred to other crops such as soybean, maize, and wheat. To date, the technology is one step away from being available to Argentinean farmers. The developers are just waiting for the findings on the impact of HB4 wheat on markets (domestic and foreign) to be released by the Ag-Industry Secretariat.

"Initially we have seed to plant 20,000 ha next year. I hope government authorities realize that HB4 is a milestone for the scientific sector in the country and for the food and agricultural chain," Trucco added. Read more from the Genetic Literacy Project.

Source: Crop Biotech Update (November 28, 2018)

Report: Pakistan Achieves Biotech All-Time High in 2017

In 2017, the eighth year of planting Bt cotton in Pakistan, the country achieved a 96% adoption rate of Bt cotton, or 3 million ha of the national total area – 3.11million ha – planted to cotton.

A publication by the International Society for Southeast Asian Agricultural Sciences states that 725,000 smallholder cotton farmers in Pakistan planted and benefited from Bt cotton in 2017. The increase in the Bt cotton area in Pakistan in 2017 was possible through the introduction of a substantial support package for farmers. It included fertilizer subsidies, reduced loan interest rates, and other measures introduced by the Government of Pakistan.

The recent Global Status of Commercialized Biotech/GM Crops by the International Service for the Acquisition of Agri-biotech Applications reports that Pakistan is one of 24 countries that planted biotech crops in 2017. For more, read the article in Pakistan Today.

Source: Crop Biotech Update (November28, 2018)

The 2019 International Rules Include a New Spanish Version

The International Rules for Seed Testing are ISTA's primary instrument to promote uniformity in seed testing. The ISTA Rules have 19 sections that provide definitions and standardized methods to be used in, for example, sampling, testing seed lot quality, and reporting results for international trade. The ISTA Rules are also a useful reference guide to germination conditions and methods for over 1000 species.

Every year the ISTA membership meets to discuss and vote on Proposed Changes to the ISTA International Rules for Seed Testing and the associated method validation reports under the guidance of the ISTA Technical Committees. At the 2018 ISTA Annual Meeting in Sapporo, Japan, the ISTA Designated members voted on the 2019 Edition with a new Rules Chair, Ernest Allen, and Vice-chair, Sue Alvarez.

The new edition plans to incorporate the changes voted on in Sapporo and the corporate branding colors and layout formatting. Most importantly, it will include also a new Spanish language version.

ISTA have realized the significance of having the International Rules for Seed Testing in Spanish and what it means for Spanish-speaking countries to acquire and read them in their own language. More than 400 million people speak Spanish as a native language, making it the second most spoken language in the world. Currently, ISTA has nine accredited laboratories in Latin America and two more in Spain, but it would like to gain more brand awareness in the Spanish-speaking area.

Next year in January, ISTA will implement a new marketing strategy focused on Spanish-speaking countries. Currently it is developing this strategy, the goal of which is to gain brand recognition and a wider reach in the market.

As most people know, ISTA Rules are in an electronic format and this new year we will follow the same trend when incorporating the new language. ISTA hopes that the membership finds having the ISTA 2019 Rules useful and a step forward in membership services. For more information contact: Fabiola Rivera, ISTA; tel: +41 44 838 60 03; e-mail: fabiola.rivera@ista.ch.

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A New ISTA Validation Method Procedure Now Available Online

The method validation document (Procedure: Validating methods and organizing and analyzing results of inter-laboratory comparative tests) is designed for new methods, modifications of existing methods, and comparison of a new method with an existing one. ISTA Seed Health Committee drafted these guidelines in collaboration with ISTA Stat Committee for test organizers who want to validate seed health methods by studying performance criteria and organizing inter-laboratory comparative tests.

For further information visit the following links:

- Seed Health Committee
- Seed Health Documents

News from International Union for the Protection of New Varieties of Plants (UPOV)

Examination of Afghanistan's Law

The UPOV Council at its 52nd ordinary session on 2 November 2018, recommended that Afghanistan incorporate certain amendments in the "Plant Variety Protection Act" and recommended that, once the amendments have been incorporated into the Act, the amended Act be submitted to the Council for examination.

Adoption of documents

The UPOV Council adopted revised versions of the following documents:

- UPOV/INF/16: Exchangeable Software
- UPOV/INF/22: Software and Equipment Used by Members of the Union
- TGP/5 Section 1: Experience and Cooperation in DUS Testing: Model Administrative Agreement for International Cooperation in the Testing of Varieties
- TGP/7: Development of Test Guidelines.

All adopted documents will be published in the UPOV Collection (see http://www.upov.int/upov_collection/en/).

FAQ on the benefits of new varieties of plants for society

The UPOV Council adopted the following FAQs on the benefits of new varieties of plants for society:

- *Feeding the world*: New varieties of plants are an essential and sustainable means of achieving food security in the context of population growth and climate change. The availability of an increasing choice of healthy, tasty, and nutritious food at affordable prices relies on new varieties, which are adapted to the environment in which they are grown, and which provide a viable income for farmers.
- *Improving lives in rural and urban areas*: In rural areas, innovation in agriculture and horticulture is important for economic development, with production of high value varieties of fruit, vegetables, and ornamentals providing increased incomes for farmers and employment for millions of people around the world. At a time of increasing urbanization, new varieties support the development of urban agriculture and the growing of ornamental plants, shrubs, and trees that contribute to improving the urban environment.
- *Respecting the natural environment*: Improved yield, more efficient use of nutrients, resistance to plant pests and diseases, salt and drought tolerance, and better adaptation to climatic stress are some of the features that enable new varieties to increase productivity and product quality in agriculture, horticulture, and forestry, while minimizing the pressure on the natural environment.

UPOV PRISMA PBR Application Tool

The UPOV Council agreed to extend the introductory phase for UPOV PRISMA (Plant Breeders' Rights Electronic Application) tool until December 2019, during which time UPOV PRISMA will be free of charge (see *SeedInfo* No. 55).

UPOV PRISMA is an online, multi-lingual tool for making plant breeders' rights' applications in participating UPOV members. UPOV PRISMA currently has 30 participating UPOV members, covering 69 countries (see http://www.upov.int/upovprisma/en/index.html)

Cooperation in the Examination of New Plant Varieties

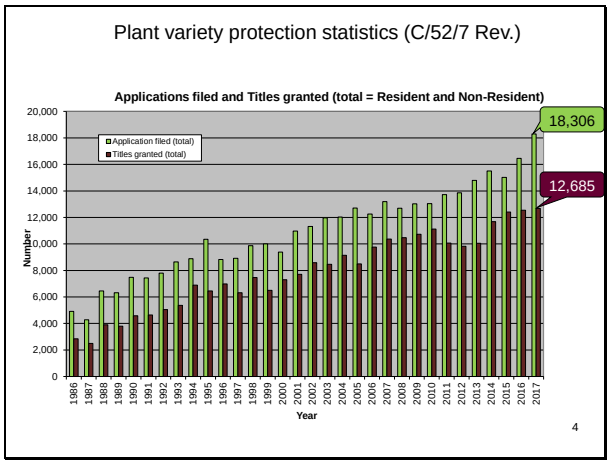
In 2017, the number of plant genera and species for which there were agreements between members of the Union for cooperation in the examination of distinctness, uniformity and stability reached 2018 (a 4% increase).

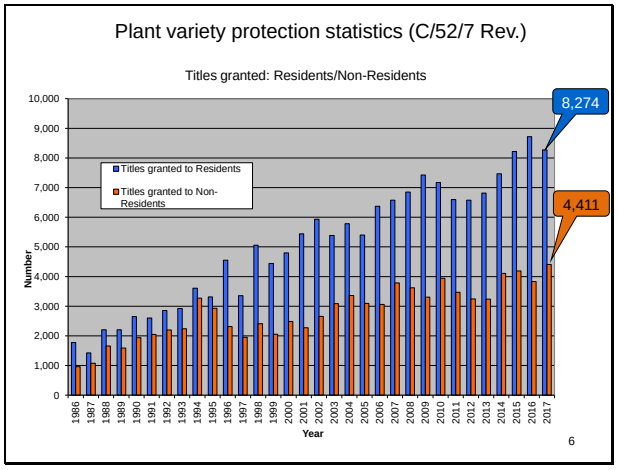
Plant Variety Protection Statistics

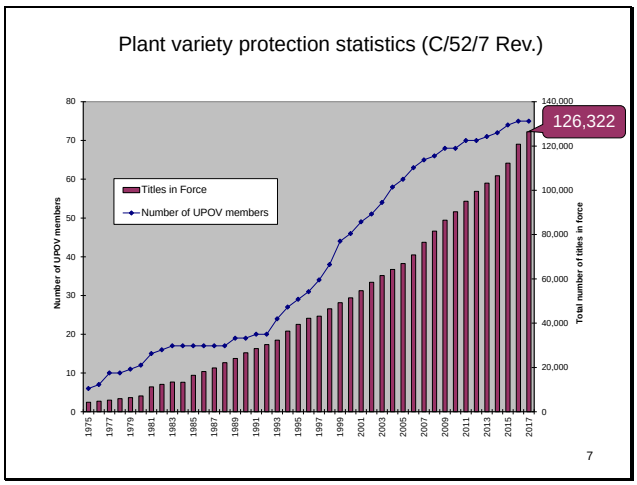
The number of applications for plant variety protection increased from 16,455 in 2016 to 18,306 in 2017 (an 11.2% increase from 2016).

The number of titles granted increased from 12,550 in 2016 to 12,685 in 2017 (a 1.5% increase). The 126,322 titles in force in 2017 represented a 4.6% increase on the figure for 2016 (120,734).

The following charts indicate the trends in applications filed and titles granted since 1986. Information is also provided on the 10 members of the Union receiving the largest number of applications in 2007, 2016, and 2017, and an analysis of applications by the residence of breeders for the same years:







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

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.

Ethiopian Seed Association (ESA) Holds its Annual Meeting

The ESA held its Ninth Annual Meeting 8 December 2018 in Addis Abeba, Ethiopia. ESA is an association of private and public seed companies and currently has 30 members dealing with various crops in the country. The meeting was officially opened by Mr Sani Redi, State Minister of the Ministry of Agriculture.

Mr Melaku Admasu, Board Chairperson, reviewed the current state of ESA. He reiterated that although significant progress has been made in the diversification of the Ethiopian seed sector, the participation of the private sector remains limited in terms of its capacity and performance; the public sector and the informal sector continue to dominate the landscape. He emphasized the policy dialogue going on with the government and called upon its members and the stakeholders to have a frank and open discussion on the outcome of the study on *Assessment and identification of policy and regulatory constraints of private seed sector development in Ethiopia* commissioned by the Alliance for a Green Revolution in Africa Micro Reforms for African Agribusiness (AGRA-MIRA).

Participants of the ESA annual meeting

The review addressed the key policy, regulatory, institutional, and technical constraints of the seed sector and its governance. He identified possible government interventions to develop a robust seed system in the country. Currently the private sector has released 11.9% (143 varieties) of the 1198 agricultural and horticultural crop varieties submitted. These provided 26% of the total certified seed supply (128,281 tonnes) in the 2016/17 crop season. The performance of the private sector however is better for the varietal release of vegetable crops (32% of 233 varieties) and the certified seed supply of crops, such as maize hybrids, where they can collectively supply about 56% of the total certified seed supply in the country.

The highlights of the assessment are given below (in no particular order):

Challenges and suggested solutions to encourage private sector participation in the seed sector*

Challenges	Suggested solutions
1. Policy matters	
1.1 Interference, non-transparency, and inefficiency of seed marketing and the distribution system	• Make direct seed marketing (DSM) transparent and more efficient • Provide regulation for the operation of DSM and follow-up its performance thorough monitoring and evaluation • Ensure availability of hard currency for imported seed on a priority basis
1.2 Seed production and processing	• Develop an efficient and a well-coordinated system for the production and delivery of quality EGS with equitable access to public and private companies • Support local government in enforcing the contractual agreements between seed growers and seed suppliers • Allocate fertile land with irrigation primarily for horticultural crops and cotton, including seed production business, on priority rights
1.3 Seed quality assurance	• Improve quality control laboratory service delivery by strengthening the facilities and its human resource capacity • Support the capacity for the private sector to undertake seed certification, developing the guidelines and accrediting those qualified • Support private seed companies to build capacity for internal quality control systems
1.4 Variety development and protection	• Ensure the participation of stakeholders in variety registration and release and enhance capacity by developing a proper structure with capable leadership for efficient service delivery • Facilitate the participation of the country in regional harmonization of institutions involved in variety development and release, as well as seed import and export • Re-assess the quarantine service of the country and assign a responsible body • Formulate regulation for public research centers to transfer exclusive use rights by licensing varieties to private seed companies • Place seed imports on the list of those agricultural priority inputs for receiving hard currency • Develop and promote public–private partnerships to popularize varieties, enhance extension work, and ensure sustainable use by farmers
2. Government support for private seed sector	
2.1 Under-developed capacity of the private seed sector	• Facilitate and support domestic private seed companies to engage in joint ventures with foreign seed companies to build capacities in business operations, access to capital, knowledge, and technological inputs

2.2 Absence of loan schemes to support the private seed sector by public and private banks	• Put in place, regulations that govern the provision of a bank loan scheme earmarked for supporting the development of the seed sector with an in-built motivation mechanism to attract loan takers and encourage investment in the seed sector
2.3 Shortage of key farm machinery and poorly developed infrastructure	• Make provisions to import crucial farm machinery, processing machines, laboratory equipment, and transport vehicles free of tax • Facilitate the provision of and access to farm machinery leases for private seed companies
3. Governance and institutions	
3.1 Absence of a national body to guide seed sector development	• Make relentless efforts to change the mindset/bias of the government towards the private seed sector • Develop a seed regulatory system that is capable and renders impartial service to all stakeholders in the seed business • Foster a strong and complementary relationship between federal and regional institutions concerned with guiding seed businesses and managing responsibility • Develop and implement laws and regulations that protect seed farms from unlawful expropriation of lands by local governments and looting by hooligans

Note: *The text is edited for space and clarity

Implementation of the recommendations is expected to:

- Modernize the seed sector and make it competitive. This will enable it to deliver efficient services to farmers by supplying adequate amounts of quality seed in a timely manner to those who are reasonably close
- Enable the seed sector to have a profound effect in transforming the agricultural sector
- Sustain the business of varietal development, seed production, and marketing for both domestic and multinational seed companies operating in the country and strengthen their contributions to the overall effort of national agricultural development
- Enable creation of a vibrant seed sector that generates a sustained source of foreign currency for the country.

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Fostering Rehabilitation of Agricultural Research and Seed Systems to Restore Food Production Capacity in Syria

Background

Agriculture plays an important role in the Syrian economy. Prior to the 2011 conflict, agriculture contributed about 25% to GDP, employed 30% of the labor force and accounted for more than 16% of exports. Strong policy support and the allocation of resources enabled the development and adoption of new crop varieties and their associated technologies, the expansion of infrastructure, like irrigation facilities, and provision of adequate agricultural inputs and services. This led to increased agricultural productivity and production aimed at achieving food self-sufficiency in strategic crops. The GCSAR and the GOSM, both public sector research and development organizations, were at the forefront of these achievements.

ICARDA and Syria have a long history of partnership since the establishment of the Center 40 years ago in 1977. From its headquarters, at Tel-Hadya near Aleppo, ICARDA undertook its global mission of addressing the grand challenges of agriculture research for development in temperate dry areas with the major focus on CWANA. Syria hosted and provided multi-faceted support to ICARDA. It also benefited significantly from ICARDA's research for development endeavor. This long-term partnership resulted in the release of several high-yielding cereal and legume varieties and their associated integrated crop management technologies, integrated land and water management technologies, and the strengthening of human resources through degree and non-degree training programs. ICARDA built institutional capacity with significant contribution to the development of the agricultural sector in the country.

From July 2012, with the escalation of the Syrian conflict, ICARDA relocated its staff and research

operations to different countries within its mandated region. The prolonged crisis led ICARDA into long-term decentralization of its research activities by establishing research platforms and thematic research hubs across the region. Nonetheless, ICARDA, as a non-political and non-profit organization, continued the cooperation throughout the period of the crisis, but at levels far below that desired by both parties.

Rehabilitation of the Agricultural Sector

The Syrian conflict has had a devastating effect on the country's economy and its population. It has led to a massive displacement of farming populations from the food producing rural areas to refugee camps, where they now depend on food aid and humanitarian assistance. At the national level, the agricultural sector suffered most and has shown significant decline in terms of production and productivity because of the disruption to the availability of and access to agricultural inputs (e.g. seeds and fertilizers) and services (e.g. extension, etc.). Moreover, the operation of national institutions, like GCSAR and GOSM, have been severely curtailed because of the security situation. They have suffered reduced capacity because of damage to the infrastructure and facilities.

In April 2018, during its 62nd meeting, the Board of Trustees asked ICARDA to send a multidisciplinary delegation to Syria to explore the possibilities and modalities for participating in the post-conflict rehabilitation of the agricultural sector. The ICARDA team visited Syria in July 2018 and met with the national and international agriculture research for development partners operating in the country. These included the Ministry of Agriculture and Planning and its various departments as well as international development partners like the Food and Agriculture Organization of the United Nations (FAO) and the International Fund for Agricultural Development. From these consultation meetings it was concluded that rebuilding the agriculture sector to re-establish food and nutritional security is a challenging and immediate priority for the country. Given its long-term partnership and knowledge of the agricultural sector in the country the MoA requested ICARDA to play a leading role in the reconstruction of the agricultural sector by:

- Quickly re-establishing linkages with the national agriculture research for development organizations in the country
- Strengthening its presence to facilitate direct professional interaction with the national staff to speed-up capacity building in all relevant agriculture disciplines
- Building and coordinating an effective consortium of research for development with the national and international development partners and donor agencies to undertake the task.

To respond to the above priorities, number of activities are now being implemented.

Strengthening NARS Capacity

The GCSAR, with its network of eight agricultural research centers across the country, is the sole public entity responsible for the generation of technologies for agricultural crops in the country.

Provision of breeding materials

The Syrian crisis led to displacement of not only its farming population, but also its best trained scientific staff. Capacity development of young scientists to replace the experienced staff who left the country during the crisis is a top priority for the Ministry of Agriculture. The GCSAR allocated a 60-ha farm to be used for theoretical and on-the-job practical training in plant breeding and EGS production for its young professional staff. The plan is to involve the young scientists in the whole operation of conducting agricultural research and management – from field layout to planting to crop management as well as from germplasm evaluation to data collection, analysis and reporting. The ICARDA farm in Lebanon supplied 49 nurseries of 9 crops to be planted at Jedrin Research Station, Hama, Syria (Table1). This will be the basis for the release of the next generation of improved crop varieties in Syria.

Table1. List of nurseries sent to GCSAR for planting in Jedrin Research Station, Hama

Crop	Number of nurseries supplied
Bread wheat	5
Durum wheat	2
Sub-total	**7**
Spring barley	4
Winter barley	2
Sub-total	**6**
Faba bean	10
Chickpea	11
Lentil	11
Grass pea	4
Sub-total	**36**
Total	**49**

Provision of source seed

Apart from technology generation, GCSAR is also involved in variety maintenance and EGS production (breeder seed) of improved crop

varieties sharing the responsibilities with GOSM (pre-basic and basic seed). In addition to the elite lines supplied for variety development, about 40 kg of breeder, 50 kg of pre-basic, and 80 kg of basic seeds of 20 varieties released in Syria, but which have been maintained and produced by ICARDA, were supplied to GCSAR and GOSM. The primary aim is to strengthen EGS production and use it for further multiplication as a first step towards rehabilitating a national seed system (Table 2).

Partial view of nurseries planted in Jindren Research Station in Hama

Table 2. EGS seed supplied to GCSAR and GOSM in 2018/19 cropping season

Seed class	Crop	Number of varieties	Quantity of seed supplied (kg)	
			GCSAR	GOSM
Breeder	Barley	2	4	4
	Bread wheat	3	12	12
	Durum wheat	5	25	25
	Sub-total	**10**	**41**	**41**
Pre-basic	Barley	2	10	10
	Bread wheat	2	15	15
	Durum wheat	5	25	25
	Sub-total	**9**	**50**	**50**
Basic	Bread wheat	1	10	10
	Chickpea	3	30	30
	Faba bean	2	15	15
	Lentil	5	25	25
	Sub-total	**11**	**80**	**80**
Grand total		**20**	**171**	**171**

Rehabilitation of the National Seed Sector

The GOSM, with its network of 11 offices, is the sole public sector entity at the forefront of national seed supply in the country. Much of its large-scale seed operation has been disrupted by the crisis. ICARDA is implementing a pilot program seed business in Syria on a small scale, in cooperation with FAO, using financial support from the Department for International Development. A total of 14.5 tonnes of basic seed, from 20 ICARDA-originated varieties released in Syria, were shipped for this purpose. The is the first-year activity of a two-year program (Table3).

Table3. Basic seed supplied for community-based seed production and marketing in 2018/19 cropping season

Crop	Variety	Quantity of seed supplied (kg)
Bread wheat	Cham 4	200
	Cham 6	200
	Cham 10	200
Durum wheat	Cham 3	200
	Cham 7	200
Barley	Arta	25
	Furat 3	50
Chickpea	Ghab 3	75
	Ghab 4	75
	Ghab 5	75
Lentil	Idleb 3	75
	Idleb 4	75
	Total	**1,450**

ICARDA has expertise and experience in the rehabilitation of the agricultural sector through its involvement in Afghanistan, where it led the Future Harvest Consortium in Rehabilitation of Agriculture in Afghanistan. It built the agricultural research and national seed systems from scratch following a devastating civil war. Syria is no exception. ICARDA can provide the leadership once peace is restored in the country.

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Varietal Releases Across the Region

ICARDA continues to develop and share elite germplasm of cereals (bread and durum wheats, food and malt barley) and legumes (faba bean, chickpea, lentil, and grass pea) with its National Agricultural Research Systems (NARS) partners globally for further evaluation and release in the respective countries. In 2017/18, for example, 1521 sets of international nurseries were distributed to 135 collaborators in close to 50 countries. It was another successful year, where about 37 cereal and legume varieties have been released in 11 countries so far in the 2018 crop season. These figures may change slightly when reports trickle down from the NARS partners in the coming months.

Number of cereal and legumes varieties released by NARS from ICARDA germplasm in 2018

Crop	No. of varieties	No. of countries	Key traits
Bread wheat	9	2	High yield; grain quality; resistance to rusts
Durum wheat	2	2	High yield; high grain quality
Winter wheat	8	4	High yield; high grain quality; rust resistance
Barley	9	5	High yield; good malt quality; rust resistance; dual purpose
Chickpea	2	1	High yield; machine harvestable; resistance to Ascochyta blight and Fusarium wilt; large seed size; adapted to cold regions
Lentil	7	4	High yield; grain quality; seed size
Total	**37**	**11**	

Research Notes

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

Farmer's Selection of and Preferences for Malt Barely (*Hordeum vulgare* L.) Varieties Adapted to Northern Ethiopia

Yetsedaw Aynewa[1], Seid Ahmed[2], and Zewdie Bishaw[11]*

Abstract

Participatory variety selection (PVS) of malt barley (*Hordeum vulgare* L.) was conducted at Hizba and Embahatsi *kebeles* (lowest administrative unit) in the Africa Rising site of Endamehoni district in northern Ethiopia during the 2017/18 main cropping season. Six released malt barley varieties were evaluated on four farmer's fields in mother trials. The female farmers' matrix ranking showed that the highest score value was recorded for varieties IBON174/03 and HB1964, while the lowest was recorded for Bekoji 1. For male farmers, the highest score value was recorded for variety HB1964, and the lowest for Bekoji 1. According to the female farmers' selection criteria, varieties. IBON174/03 and HB1964 ranked first and HB1963 and Holker stood second. For male farmers, variety HB1964 ranked first, IBON174/03 second, and HB1963 third. The highest grain yield was recorded for HB1963 and the lowest for Bahati. Most of the male and female farmers' selection criteria were positively correlated with grain yield. The positive correlation helps to select cultivars indirectly and initiate local seed production.

Key words: *Correlation, indirect selection, malt barley, matrix ranking*

Introduction

Barley (*Hordeum vulgare* L.) is one of the most important cereal crops in the world, ranking fourth in area grown – more than 49 million ha globally – next to wheat, rice, and maize (FAO, 2013). In Ethiopia, barley is ranked fifth next to teff, wheat, maize, and sorghum (CSA, 2018). It is mainly used for food, malting, and feed. With economic development, more barley will be needed for breweries and animal feed. Hence, an increase in grain yield has been a major objective for barley breeding programs.

Malt is the second most important use of barley, particularly in beer production – industrial or homemade. It is also used for hard liquors, malted milk, and flavoring in a variety of foods. Barley malt is added to biscuits, bread, cakes, and desserts. Grains and sprouts from malting barley also have a desirable protein content for animal feed (Emebiria et al., 2003).

The main objectives of this study were to (i) identify well-adapted, high-yielding, disease-resistant and farmer- and industry-preferred malt barley varieties and (ii) recommend malt barley varieties based on their performances for further seed production and supply.

The study was geared towards the relevance of plant breeding with emphasis on PVS and seed

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supply. It hopes to shed light on a mechanism for extending PVS and the seed supply system in Ethiopia, particularly in the study areas.

Materials and Methods

Malt barley PVS was conducted at Hizba and Embahatsi *kebeles* at the Africa Rising site of Endamehoni district in the 2017/18 cropping season. The experiment was carried out with six malt barley varieties released by NARS – Bahati, Bekoji 1, Holker, IBON174/03, HB1963, and HB1964. The varieties were evaluated through PVS. Mother trial type experiments were conducted under rainfed condition in four farmers' fields representing similar barley agro-ecologies.

Each variety was planted by hand at a seed rate of 100 kg/ha in a 25 m^2 plot. Fertilizer was applied at the rate of 100 kg/ha NPS and 50 kg/ha urea. All the NPS and half of the urea were applied at planting. The second half of the urea was applied at the tillering stage. At each *kebele*, two groups of farmers – one male, one female – were randomly selected. These were organized separately to participate in the PVS. Both farmer groups used parameters such as disease tolerance, number of tillers, crop stand, spike length, and number of kernels to evaluate the varieties. Matrix ranking was used to evaluate the varieties based on the farmers' selection criteria. Ranking was made with score value of 1 (very poor) to 5 (excellent).

Results and Discussion

The malt barley varieties were evaluated by male and female farmers separately at the physiological maturity of the crop. The evaluation revealed that there is a significant difference between varieties based on the performance parameters. For female farmers, the total score value ranged from 222 to 282 (Table 1). The highest score value and the first rank were recorded for varieties IBON174/03 and. HB1964 (282); the lowest was recorded for variety Bekoji 1 (222). The second rank was recorded for varieties HB1963 and Holker – score value, 258. In PVS, farmers are given finished or nearly finished products effectively addressing the needs of farmers (Morris and Bellon, 2004). Participatory plant breeding has been proposed as a solution to the problem of fitting the crop to a multitude of both target environments and users' preferences (Ciccarelli et al., 1996).

Table 1. Female farmers' evaluations of malt barley varieties in northern Ethiopia

Variety	DT	SPL	CS	NK	MA	Total	Rank
Bahati	60	42	42	42	42	228	3
Bekoji 1	60	42	36	42	42	222	4
HB1963	60	48	54	54	42	258	2
HB1964	60	60	48	60	54	282	1
Holker	60	48	54	54	42	258	2
IBON174	60	60	48	54	60	282	1

Note: DT – disease tolerance, SPL – spike length, CS – crop stand, NK – number of kernels, MA – maturity

The male farmers' evaluations had total score values ranging from 120 to 270 (Table 2). The highest score value was recorded for variety HB1964 (270), the lowest for Bekoji 1 (120). According to the male farmers' evaluation criteria, HB1964 ranked first, IBON 174/03 second, and HB1963 third. Similar results were observed in grandmother-mother trials of malt barley PVS in northwest Ethiopia (Aynewa et al., 2013) and mother trials on durum wheat (Aynewa et al., 2016), lentil (Aynewa et al., 2017), food barley and faba bean (Aynewa et al., 2018).

Table 2. Male farmers' evaluations of malt barley varieties in northern Ethiopia

Variety	DT	SPL	CS	NK	MA	Total	Rank
Bahati	60	18	42	18	24	162	5
Bekoji 1	60	12	12	12	24	120	6
HB1963	60	24	42	36	12	174	3
HB1964	60	60	42	60	48	270	1
Holker	60	24	42	18	24	168	4
IBON174	60	48	12	48	60	228	2

Note: DT – disease tolerance, SPL – spike length, CS – crop stand, NK – number of kernels, MA – maturity.

Figure 1. Malt barley PVS trial at Embahatsi kebele, Endamehoni

The grain yield analysis showed that there is a significant difference between the malt barley varieties. The yield data ranged from 1.16 t/ha for variety Bahati at Hizba *kebele* to 5.92 t/ha for variety HB1963 at Embahatsi (Table 3).

Table 3. Performance of malt barley PVS trials at the Africa Rising site in Endamehoni district

Variety	Yield (t/ha)				
	Hizba 1	Hizba 2	Embahatsi 1	Embahatsi 2	Mean
HB1963	1.92	0.68	3.52	5.92	3.01
HB1964	1.88	1.88	4.64	4.72	3.28

Holker	1.6	2	4.68	5.88	3.54
Bahati	1.44	1.16	3.08	5.32	2.75
IBON174	1.76	1.2	5.24	5.2	3.35
Bekoji 1	2.16	1.6	4.12	4.24	3.03

The Spearman correlation coefficients of the female farmers' evaluations based on the selection criteria were for spike length (r = 0.59), crop stand (r = 0.41), number of kernels (r = 0.52), and maturity (r = 044). They were positively associated with grain yield (Table 4). Disease tolerance did not show correlation with grain yield because some the varieties are disease tolerant.

Table 4. Spearman correlation coefficients with yield in female farmers' evaluations

	DT	SPL	CS	NK	MA	GY
DT						
SPL		1	0.492	0.903	0.848	0.597
CS			1	0.635	0	0.412
NK				1	0.584	0.524
MA					1	0.439
GY						1

**Correlation is significant at the 0.01 level.
Note: DT – disease tolerance, SPL – spike length, CS – crop stand, NK – number of kernels, MA – maturity, GY – grain yield

The Spearman correlation coefficients revealed that male farmers' evaluations based on the selection criteria were number of kernels (r = 0.23), spike length (r = 0.49), and maturity (r = 0.52). These were positively associated with grain yield while crop stand (r = -0.21) was negatively associated with grain yield (Table 5).

Table 5. Spearman correlation coefficients with grain yield of male farmers' evaluations

	SPL	CS	NK	MA	GY
SPL	1	0.210	0.955	0.585	0.492
CS		1	0.210	-0.439	-0.207
NK			1	0.5235	0.231
MA				1	0.516
GY					1

** Correlation is significant at the 0.01 level.
Note: SPL – spike length, CS – crop stand, NK – number of kernels, MA – maturity, GY – grain yield

Conclusion

Identifying and introducing high-yielding and disease-resistant malt barely varieties will help to diversify, increase production, and minimize risks from abiotic and biotic stresses. However, seed availability and accessibility remain major constraints unless alternative options are available. Farmers' evaluations are crucial in selecting preferred malt barley varieties for consumption and the malting and brewing industries. The association between farmers' evaluations and grain yield are important in recommending suitable varieties adapted to the target environments through indirect selection and are better linked with further seed production and supply.

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Meetings and Courses

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

Conferences

International Conference on Legume Genetics and Genomics

The Ninth International Conference on Legume Genetics and Genomics (ICLGG) will be hosted 13–17 May 2019 in Dijon, France. This ninth edition of the biennial ICLGG conference will continue to promote the international dissemination and discussion of legume sciences. The aim is to help the scientific community, breeders, and industry stakeholders to contribute relevant answers to challenges of environmental sustainability and security for the agri-food sector.

Student registration is also now possible!

You may register at: http://iclgg2019.com/register-now/

Africa Seed Trade Association (AFSTA) Congress 2019

The AFSTA Congress will be held in Mombasa, Kenya, 5–7 March 2019. For more information, please contact the AFSTA Secretariat at afsta@afsta.org

ISF World Seed Congress 2019

The International Seed Federation's (ISF's) World Seed Congress 2019 will be held in Nice, France, 3–5 June 2019, with the theme of '*Where Knowledge Flows*'. Conference registration will open on 8 January 2019 at 11:00 GMT. See the ISF World Seed Congress 2019 website for more info.

International Seed Testing Association (ISTA) Seed Symposium 2019 and 32nd ISTA Congress 2019

The Seed Symposium of the 32nd ISTA Congress under the theme '*Seed technology and quality in a changing world'* will be held in Hyderabad, India, 26–28 June 2019.

The 32nd International Seed Testing Association Congress' Annual Meeting 2019 will take place in Hyderabad, India, 29 June–3 July 2019.

Registration is now open. 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; website: 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

UPOV Distance Learning Courses

Two sessions of each of the following UPOV distance learning courses will be organized in 2019:

i. DL-205 *Introduction to the UPOV System of Plant Variety Protection under the UPOV Convention*
ii. DL-305 *Examination of applications for plant breeders' rights*
iii. DL-305A *Administration of Plant Breeders' Rights* (Part A of DL-305)
iv. DL-305B *DUS Examination* (Part B of DL-305)

The timetable of all courses for 2019 will be:

Session I – 2019

- Registration: 14 January to 15 February
- Study period: 4 March to 7 April
- Final exam: 1–7 April

Session II – 2019

- Dates to be confirmed

The categories of 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/inter-governmental organizations endorsed by the relevant representative to the UPOV Council (*one non-fee-paying student per state/inter-governmental organization; additional students, CHF1000 per student).*

Category 3: Others (*fee, CHF1000).*

More detailed information about the courses and online registration is available on the UPOV website.

CABI Launches PestSmart ELearning Courses: PestSmart Diagnostics

CABI has launched the first in its range of PestSmart eLearning courses: PestSmart Diagnostics. This course covers identification of crop diseases from major pathogens and pest groups and enables learners to go out directly into the field and apply their learning.

PestSmart Diagnostics focuses specifically on the skills and methodologies required for field-based diagnosis. It helps plant health practitioners and students to develop and improve their ability to recognize symptoms, relate them to causes, and to identify what is causing the problem. Containing high-resolution images, case studies, and knowledge checks, it helps learners improve their knowledge through practical, independent learning. The training includes the main pathogen groups as well as insect pests and nutrient deficiencies. The material that forms this package is derived from CABI's flagship programme, Plantwise, which takes a holistic international approach to pest diagnostics and management advice with national extension services. By digitizing Plantwise material and providing a range of learning and practice tools in the PestSmart Diagnostics package, we aim to fast-track the field experience of plant health professionals and students by giving them CABI's wealth of field experience in a single course.

To find out how PestSmart can benefit your Plant Sciences, Pest Management, Horticulture and Agriculture students or to request your free demo please contact our sales team.

Borlaug Global Rust Initiative (BGRI) Training Website Launched

The BGRI training website brings together videos and other assets produced by the BGRI multimedia team. Featuring over 40 training videos, this resource is designed to aid early-career wheat and rust researchers in their studies and to establish best practices for sample preparation, race analysis, and more. The site is divided into three primary categories: Pathology, Breeding, and Surveillance.

The site also currently hosts two complete courses:

- The Art and Science of Rust Pathology and Applied Plant Breeding
- Wheat Breeding Technology Workshop

This resource is for the BGRI community and beyond. Please contact the BGRI if you have training materials you would like to share or ideas for topics that have not yet been covered. For more information Visit the BGRI Training 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

OECD.2018. Concentration in Seed Markets: Potential Effects and Policy Responses

Published by OECD (www.oecd.org); ISBN: 9789264308367 (PDF); Price: USD 198; 236 pp

Recent mergers in the seed industry have led to concerns about market concentration and its potential effects on prices, product choice, and innovation. This study (*https://doi.org/10.1787/9789264308367-en*) provides new and detailed empirical evidence on the degree of market concentration in seed and GM technology across a broad range of crops and countries and analyzes the causes and potential effects of concentration. It also explains how competition authorities have responded to mergers. It suggests policy options to help safeguard and stimulate competition and innovation in plant breeding by avoiding unnecessary regulatory barriers, by facilitating access to genetic resources and intellectual property, as well as by stimulating public and private R&D. As this study shows, policy makers have several levers besides competition policy to ensure an innovative and competitive seed industry.

Stiglitz, J., J. Fitoussi, and M. Durand. 2018. For Good Measure: Advancing Research on Well-being Metrics Beyond GDP

Published by OECD (www.oecd.org); ISBN: 9789264307278 (PDF*); Price: USD 102; 334 pp*

The 2009 Commission on the Measurement of Economic Performance and Social Progress ("Stiglitz-Sen-Fitoussi" Commission) concluded that we should move away from over-reliance on GDP when assessing a country's health. We need

to consider a broader dashboard of indicators that would reflect concerns, such as the distribution of well-being and sustainability in all its dimensions. This book (https://doi.org/10.1787/9789264307278-en) includes contributions from members of the OECD-hosted High-Level Expert Group on the Measurement of Economic Performance and Social Progress, the successor of the Stiglitz-Sen-Fitoussi Commission, and their co-authors on the latest research in this field. These contributions look at key issues raised by the 2009 Commission that deserved more attention. They embrace ideas such as how to better include the environment and sustainability in our measurement system, and how to improve the measurement of different types of inequalities – of economic insecurity, of subjective well-being, and of trust. A companion volume *Beyond GDP: Measuring What Counts for Economic and Social Performance* presents an overview by the co-chairs of the High-Level Expert Group, Joseph E. Stiglitz, Jean-Paul Fitoussi, and Martine Durand of the progress accomplished since the 2009 report, of the work conducted by the Group over the past five years, and of what still needs to be done.

Stiglitz, J., J. Fitoussi and M. Durand. 2018: Beyond the GDP: Measuring What Counts for Economic and Social Performance

Published by OECD (www.oecd.org); ISBN: 9789264307292 (PDF); 144 pp

Metrics matter for policy and policy matters for well-being. In this report, the co-chairs of the OECD-hosted High-Level Expert Group on the Measurement of Economic Performance and Social Progress, Joseph E. Stiglitz, Jean-Paul Fitoussi, and Martine Durand, show how over-reliance on GDP as the yardstick of economic performance misled policy makers who did not see the 2008 crisis coming. When the crisis did hit, concentrating on the wrong indicators meant that governments made inadequate policy choices, with severe and long-lasting consequences for many people. While GDP is the most well-known, and most powerful economic indicator, it cannot tell us everything we need to know about the health of countries and societies. In fact, it cannot even tell us everything we need to know about economic performance. We need to develop dashboards of indicators that reveal who is benefitting from growth, whether that growth is environmentally sustainable, how people feel about their lives, and what factors contribute to an individual's or a country's success. This book (https://doi.org/10.1787/9789264307292-en) looks at progress made over the past 10 years in collecting well-being data and in using them to inform policies. An accompanying volume, *For Good Measure: Advancing Research on Well-being Metrics Beyond GDP*, presents the latest findings from leading economists and statisticians on selected issues within the broader agenda on defining and measuring well-being.

James, H.S. 2018. Ethical Tensions from New Technology: The Case of Agricultural Biotechnology

Published by CABI (www.cabi.org); ISBN: 9781786394644; Price: USD 126; 194 pp

The introduction of new technologies can be controversial, especially when they create ethical tensions as well as winners and losers among stakeholders and interest groups. While ethical tensions resulting from the genetic modification of crops and plants and their supportive gene technologies have been apparent for decades, persistent challenges remain. This book explores the contemporary nature, type, extent, and implications of ethical tensions resulting from agricultural biotechnology specifically and technology generally. There are four main arenas of ethical tension: public opinion, policy and regulation, technology as solutions to problems, and older versus new technologies. Contributions focus on one or more of these arenas by identifying the ethical tensions technology creates and articulating emerging fault lines and, where possible, viable solutions. Key features include:

- Focusing on contemporary challenges created by new and emerging technologies, especially agricultural biotechnology.
- Identifying a unique perspective by considering the problem of ethical tensions created or enhanced by new technologies.
- Providing an interdisciplinary perspective by including perspectives from sociologists, economists, philosophers, and other social scientists.

This book will be of interest to academics in agricultural economics, sociology, and philosophy and policymakers concerned with introducing new technology into agriculture.

Paroda, R.S. 2018. Reorienting Indian Agriculture: Challenges and Opportunities

*Published by CABI (*www.cabi.org*); ISBN: 9781786395177; Price: USD 148.50; 336 pp*

Despite multiple revolutions, daunting challenges face agriculture. How can it address poverty and hunger, including malnutrition? How much is it responsible for the degradation of natural resources (soil, water, and agrobiodiversity) and climate

change? How can agricultural diversification, and secondary and specialty agriculture help to improve productivity, sustainability, and farmers' incomes? Can integrated natural resources management (including conservation agriculture, innovative extension, agricultural education, and an enabling policy environment) help achieve resilience and faster agricultural growth?

This book sketches a journey from green to an evergreen revolution through a reorientation of Indian agriculture to address emerging challenges. It covers global agriculture, genetic resource management, crop breeding (including biotechnology), seed production technology, agronomy, innovative extension, motivation of youth (including women), climate change, and policy reforms for improving farmers' incomes. It provides insight into:

- India's agricultural scenario, and the strength of agricultural research for development.
- Better ways of managing natural resources for sustainable farming systems.
- Climate-smart, diversified, and resilient agriculture for improved productivity and income.
- The need to reorient research, development, and related policies concerned with agricultural research and innovation for development (ARI4D) to harness new opportunities.

This book is for researchers, students, and policy makers interested in agricultural policy, increased food production, rural development, and natural resources management. It addresses general agriculture, genetic resources, crop breeding, seed development, agricultural biotechnology, agronomy, international agriculture, climate change, and sustainable agriculture.

Websites

BGRI

The Borlaug Global Rust Initiative (BGRI) is an international consortium of over 1000 scientists from hundreds of institutions working together to:

- Reduce the world's vulnerability to stem, yellow, and leaf rusts of wheat.
- Facilitate sustainable international partnerships to contain the threat of wheat rusts.
- Enhance world productivity to withstand global threats to wheat security.

Key components of the BGRI include a global wheat community with systems for: cereal rust monitoring and surveillance; gene discovery; improved testing, multiplication, and adoption of replacement varieties; training and capacity building; understanding non-host resistance to stem rust; and increasing levels of investments and coordination in wheat rust research and development.

The BGRI was initiated by ICAR, ICARDA, CIMMYT, UN-FAO, and Cornell University in 2008. It is fostered by the Durable Rust Resistance in Wheat project, which serves as the secretariat.

Communication among the founding organizations led to adoption of a Charter for the BGRI. The Charter calls for an Executive Committee and a general membership comprised of all organizations wishing to participate.

Newsletters

BGRI Newsletter

BGRI newsletter is the online newsletter of BGRI published by Cornell University to inform on the progress made in the fight against wheat rusts through a global partnership of international and NARS. You may access the newsletter on Twitter and Facebook accounts.

Agrilinks Newsletter

Agrilinks is the online hub where agriculture, food security, and development practitioners connect, share, and learn. Established in 2011, Agrilinks has become the go-to source for informative discussions on development topics and the latest information that is furthering resilience, food security, and poverty reduction. Agrilinks is part of the US Government's Feed the Future initiative that addresses the root causes of hunger, poverty, and undernutrition, and establishes a lasting foundation for change. The USAID Bureau for Food Security leads the Feed the Future initiative and supports Agrilinks through the Feed the Future Knowledge-Driven Agricultural Development program It is implemented by Insight Systems Corporation and its sub-contractors, The QED Group, and Training Resources Group.

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.

ICARDA
Science for resilient livelihoods in dry areas

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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