ICRISAT
Happenings
Newsletter
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Africa moves to scale up proven technologies to overcome poverty and hunger.

Collaborative effort for an agricultural revolution across Africa

A new pan-Africa mega initiative, 'Technologies for African Agricultural Transformation (TAAT)', was launched recently as an ambitious and bold plan to address poverty, hunger and malnutrition across the African continent.

The objectives of TAAT include: scaling up 'proven' technologies and innovations; contributing to engendering transformation needed to address the issues and prevent them from worsening; create widespread and real impact on the ground and in many realms including – productivity, food security, market access, income, etc; and assist African Development Bank's (AfDB) Regional Member Countries derive greater value from agricultural produce.

The initiative aims to revitalize and transform agriculture within the shortest possible time while restoring degraded land and maintaining or strengthening the ecosystems that underpin agriculture.

At a recent international workshop, eight priority areas for intervention were identified (see table).

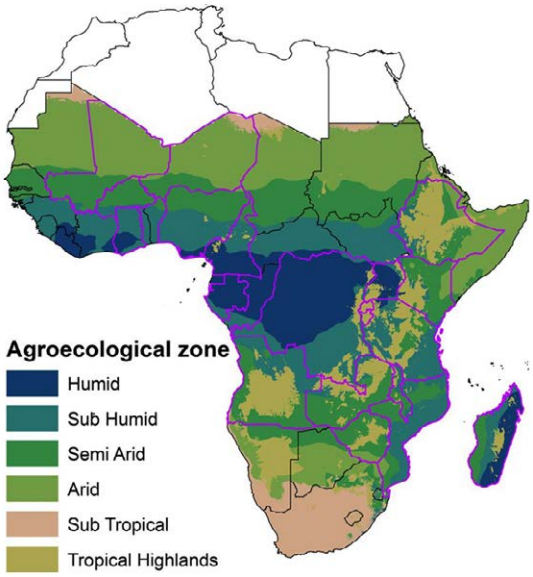
This initiative will be funded by AfDB and other co-sponsors, led by the International Institute of Tropical Agriculture (IITA) and supported by the Forum for Agricultural Research in Africa (FARA), the Alliance for a Green Revolution in Africa (AGRA), CGIAR centers, and national agricultural research system partners, who will provide technical and development support.

Dr Jonas Chianu, Principal Agricultural Economist, AfDB, listing the challenges that the African continent face, mentioned that one-third of all calories consumed in Africa is imported, amounting to US$77 billion per year. Poverty is widespread, with 49% of Africans earning below US$1.25 per day. This is further complicated as 40-60% of the 400-800 million young Africans are unemployed. Stressing on the need to address the low agricultural productivity and the weak value chains, he stated that solutions are needed for all categories and TAAT is a way of addressing this challenge.

to page 2...

Collaborative effort for... from page 1

Priority Areas	Region	Partners
Achieving self-sufficiency in rice production	SH	Africa Rice, IFPRI
Intensifying cassava production and agro-processing	H, SH, SA	IITA, IFPRI
Achieving food security in the Sahel with an emphasis on sorghum, millet, livestock	SA, A	ILRI, ICRISAT, IFPRI
Transforming Africa's savannah into a bread basket with an emphasis on maize, soybean, dairy, poultry, and beef	SA	ILRI, IITA, CIMMYT, IFPRI
Restoring and expanding plantations of three high value export crops, cocoa, coffee and cashew	H, SH	IITA, ICRAF, IFPRI
Expanding horticulture, particularly vegetables, dessert bananas and bio-fortified sweet potatoes	H, SH, TH	CIP, CABI, AVRDC, IFPRI
Reducing Africa's massive importation of wheat	SA, A, TH	ICARDA, CIMMYT, IFPRI
Achieving self-sufficiency of fish production via aquaculture	All	World Fish Center, IFPRI
H – Humid; SH – Sub Humid; SA – Semi Arid; A – Arid; TH – Tropical Highlands		



Priority areas identified for intervention through the TAAT initiative.

ICRISAT has been working across the semi-arid region of Africa since the 1970s and is an active partner in 'Achieving food security in the Sahel, with an emphasis on sorghum, millet, livestock', which is one of the eight priority areas.

Dr Ramadjita Tabo, Director - West & Central Africa, ICRISAT-Mali, presented the various technologies tested and implemented by ICRISAT for cereals and legumes across the semi-arid regions. This included, improved varieties, fertility enhancement practices, mechanization, conservation agriculture and water management, and cropping systems.

Participants discussed how a collaborative approach could help achieve the goals of TAAT and turn Africa into a net food exporter as well as set Africa in step with global commodity and agricultural value chains. Adopting modernized, commercial agriculture is seen as the key to transforming Africa and the livelihoods of its people, particularly the rural poor.

Possibilities for collaboration/funding for TAAT with ongoing activities and funding mechanisms from different donors was discussed. Ways to increase synergies and decrease competition and overlap were also discussed.

The three-day workshop brought together leading agricultural experts from Africa and beyond, development institutions, research agencies, the private sector, financial institutions, academia, and civil society to define and chalk out the TAAT initiative, both in terms of approach and technical content. The workshop was held at IITA, Ibadan, Nigeria, from 12-14 April, and was attended by more than 200 participants. ■

Participants at the launch of TAAT at Nigeria.

Towards a sustained mechanism for integrating research efforts in Niger

Aiming to improve the efficiency of agricultural research, stakeholders came together recently to put in place a sustained mechanism for collaboration and cohesion among partners in Niger.

Participants at the recently held CGIAR site integration National Consultation Workshop, analyzed their past experiences and looked at future opportunities for integration of research programs in Niger.

The objectives of the national consultation were to:

- Map the current and past interventions of CGIAR centers in Niger;
- Understand the national priorities of Niger and how the integrated efforts from CGIAR centers may complement ongoing efforts of other partners;
- Set the basis for development of a site integration plan to enable transparent interaction with local stakeholders;
- Devise plans for monitoring progress and assessing impacts; and
- Define the governance structure, plans for coordination and communication activities.

In his opening remarks, Dr Malick Ba, Country Representative, ICRISAT-Niger and Coordinator of Niger site integration, stressed, "It is most important to capitalize on the main elements needed to make site integration functional and efficient, which include understanding national priorities and what is planned, and mechanisms and partnerships with national structures and other stakeholders."

Gaps and opportunities for integrated implementation of CGIAR Research Programs (CRPs) were discussed along with operational aspects. While recognizing that CGIAR centers and partners already collaborate on projects, participants looked at how site integration can be more effective and have greater impact.

In order to align with national agricultural priorities, both CGIAR centers and CRPs agreed on the importance and need to understand national strategies as elaborated in the 3N Initiative (Nigeriens Nourish Nigeriens), which is the national strategy for agricultural development and overall food and nutrition security strategy in Niger.

At a regional level, Niger is a lead country for livestock research and development for the 15 Economic Community of West African States (ECOWAS) countries. Dr Dan Jimo, Representative, West Africa Agricultural Productivity Program (WAAPP) and of the National Council for Agricultural Research (CNRA), provided a detailed explanation of WAAPP implemented in 13 ECOWAS countries (including Niger) in two phases over a 10-year period.

Participants identified 3N and ECOWAS as opportunities for synergy among CGIAR centers and CRPs, and to align and contribute to key priorities identified by the government of Niger.

The joint positioning of scientists especially on crosscutting themes (gender, nutrition and climate) and integration of crop-trees-livestock was seen as paramount to strengthening site integration. It was agreed that the development of joint proposals will reinforce site integration. Participants also agreed on using the draft ICRISAT country strategy document, for development of the site integration plan.

Participants felt that donors should fully participate in the consultation, monitoring and evaluation of outcomes of the site integration, in addition to their substantial financial contribution. Their involvement and suggestions in communication, advocacy and proposals will be crucial.

Key features of integration identified for a better impact on intervention sites included:

- Ensure clarity in roles and responsibilities of each partner,
- Transparency and good governance,
- Efficient management of time and resources by avoiding duplication, and
- Joint intervention at scale.

Participants at the CGIAR site integration workshop.

Concrete ways to monitor progress and assess impacts would be to establish a synopsis record of each intervention, establish a uniform mechanism for monitoring and evaluation of interventions at all integration sites. Communication efforts will include joint visits, events, community of practice, innovation platforms inclusive and open to all stakeholders and to harness ICTs effectively to disseminate information to farmers.

to page 4...

Indian Ambassador-designate to Zimbabwe visits ICRISAT

Mr Masakui interacts with ICRISAT scientists.

Mr R Masakui, Director, External Publicity & Public Diplomacy, Ministry of External Affairs, Government of India visited ICRISAT-India on 15 April. Mr Masakui is India's Ambassador-designate to Zimbabwe and will assume office in Zimbabwe during mid-May. Besides visiting various ICRISAT facilities, Mr Masakui spent some time at ICRISAT's Agribusiness and Innovation Platform (AIP), where he was appraised of the AIP initiative on setting up a food testing laboratory in Zimbabwe with the support of the Indian Government. Mr Masakui was briefed about the various activities at ICRISAT, particularly in Zimbabwe, during his meeting with Dr Peter Carberry, Deputy Director General-Research; Dr Kiran K Sharma, Director-Platform for Translational Research & Chief Executive Officer-Agribusiness and Innovation Platform; Dr Anthony Whitbread, Research Program Director-Innovation Systems for the Drylands and Dr Rajeev K Varshney, Research Program Director-Genetic Gains and Director, Centre of Excellence in Genomics. The meeting concluded with a conference call with Dr David Bergvinson, Director General, ICRISAT. Mr Masakui assured that he would work closely with ICRISAT in Zimbabwe through the Government of India. ■

Call for case studies for the 'Gender, Breeding and Genomics' workshop

The CGIAR Gender and Agriculture Research Network is looking for case studies within the centers and CGIAR research program networks to illustrate the successful integration of gender responsive strategies in conventional breeding programs and genomics. To submit a case study send an abstract (maximum of 500 words) on or before 15 May 2016. A small number of case study authors will be invited to present their study at the workshop "Gender, Breeding and Genomics" that will take place in Nairobi, Kenya from 18-21 October 2016.

For more information, https://gender.cgiar.org/open-call-for-case-studies/

Towards a sustained mechanism... from page 3

Other opportunities discussed included, facilities on ICRISAT campus, and at the Institut National de la Recherche Agronomique du Niger (INRAN); and funding from donors such as the World Bank, International Fund for Agricultural Development (IFAD) and European Union (EU).

It was proposed that CNRA, INRAN, Faculty of Agronomy and other academic structures at agricultural universities, regional structures such as Agro-meteorology, Hydrology, Meteorology regional center (AGRYMET) and international organizations such as the Research for Development Institute (IRD) be considered as key players in the integration efforts, and that farmers' organizations, NGOs and rural development projects also be fully involved.

The CGIAR site integration workshop was held on 15 March at the ICRISAT-Niamey training center. About 20 participants representing national agricultural research and extension services, advanced research institutes, farmers and farmer groups, international and regional research organizations, policy makers, NGOs, private sector, donors, CGIAR centers [World Agroforestry Centre (ICRAF), International Livestock Research Institute (ILRI), AfricaRice, Bioversity, IITA, International Center for Agricultural Research in the Dry Area (ICARDA) and ICRISAT] and CGIAR research programs [Water, Land and Ecosystems (WLE), Climate Change, Agriculture and Food Security (CCAFS)] attended the national consultation. ■

New publications

Overview of hybrid pigeonpea seed production technology and its on-farm validation

Authors: Sawargaonkar SL, Saxena KB and Saxena RK

Published: 2016. Plant Knowledge Journal (PKJ), 05 (01): 13-17. ISSN 2200-5404

Abstract: Pigeonpea [*Cajanus cajan* (L.) Millsp.] is known for its high protein grains and it occupies an important place in subsistence agriculture of tropics and sub-tropics. The major constraint of the crop has been its low productivity. The recent emergence of hybrid technology in this crop has provided a platform for breaking its decades-old low yield plateau. In the last four years three CMS-based pigeonpea hybrids with 30-50% on-farm yield advantage were released in India. To increase the national pigeonpea production, now efforts are being made to take this technology to the door steps of farmers in a big way. To achieve this, an easy and economically viable seed production technology was successfully developed. This paper, besides describing the salient features of this technology, discusses results of its on-farm seed production program. On average, hybrid yields of over 1000 kg/ha were recorded with a seed-to-seed ratio of 1: 200. In the last two seasons the adoption of hybrid technology has shown very positive response from the cultivators with its planted area standing beyond 150,000 ha mark in 2015.

http://oar.icrisat.org/9410/

Grain iron and zinc densities in released and commercial cultivars of pearl millet (*Pennisetum glaucum*)

Authors: Rai KN, Yadav OP, Govindaraj M, Pfeiffer WH, Yadav HP, Rajpurohit BS, Patil HT, Kanatti A, Rathore A, Rao AS and Shivade H

Published: 2016. The Indian Journal of Agricultural Sciences, 86 (03): 11-16. ISSN 0019-5022

Abstract: Crop biofortification is a cost-effective and sustainable agricultural strategy to reduce micronutrient malnutrition arising from iron (Fe) and zinc (Zn) deficiencies. A large number of hybrids and open-pollinated varieties (OPVs) of pearl millet *[Pennisetum glaucum* (L.) R. Br.] have been released and/or commercialized in India. Eighteen OPVs and 15 high-Fe candidate hybrids were evaluated in multi-location trials for Fe and Zn density to identify those with high density of these micronutrients. The Fe density in OPVs varied from 42 mg/kg to 67 mg/kg, and Zn density from 37 mg/kg to 52 mg/kg with ICTP 8203 having the highest Fe density (67 mg/kg) followed by ICMV 221 (61 mg/kg) and AIMP 92901 (56 mg/kg). While ICTP 8203 had also the highest level of Zn density (52 mg/kg), ICMV 221 and AIMP 92901 had 45-46 mg/kg Zn density. The Fe density in hybrids varied from 46 mg/kg to 56 mg/kg and Zn density from 37 mg/kg to 44 mg/kg. Four hybrids, viz. Ajeet 38, Proagro XL 51, PAC 903 and 86M86 had the highest Fe density of 55-56 mg/kg and 39-41 mg/kg Zn density. The six commercial cultivars (2 OPVs and 4 hybrids) identified in this study with high Fe and Zn densities can be undertaken for expanded cultivation in their recommended ecologies to specifically address the Fe and Zn deficiencies in India. This study also enabled to re-define base line for Fe density at 42 mg/kg for hybrids, the most dominant cultivar type grown in India.

http://oar.icrisat.org/9394/

Genomic Tools in Groundnut Breeding Program: Status and Perspectives

Authors: Janila P, Variath MT, Pandey MK, Desmae H, Motagi BN, Okori P, Manohar SS, Rathnakumar AL, Radhakrishnan T, Liao B and Varshney RK

Published: 2016. Frontiers in Plant Science, 07 (289): 01-15. ISSN 1664-462X

Abstract: Globally, groundnut improvement programs have developed varieties to meet the preferences of farmers, traders, processors, and consumers. Spurt in genetic information of groundnut was facilitated by development of molecular markers, genetic, and physical maps, generation of expressed sequence tags (EST), discovery of genes, and identification of quantitative trait loci (QTL) for some important biotic and abiotic stresses and quality traits. The first groundnut variety developed using marker assisted breeding (MAB) was registered in 2003. Introgression lines that combine foliar fungal disease resistance and early maturity were developed using MAB. Establishment of marker-trait associations (MTA) paved way to integrate genomic tools in groundnut breeding for accelerated genetic gain. Genomic Selection (GS) tools are employed to improve drought tolerance and pod yield, governed by several minor effect QTLs. Draft genome sequence and low cost genotyping tools such as genotyping by sequencing (GBS) are expected to accelerate use of genomic tools to enhance genetic gains for target traits in groundnut.

http://oar.icrisat.org/9402/

Sorghum and Millets in Eastern and Southern Africa: Facts, Trends and Outlook

Authors: A Orr, C Mwema, A Gierend and S Nedumaran

Published: 2016. Working Paper Series No. 62. ICRISAT Research Program, Markets, Institutions and Policies. ICRISAT India: 76 pp.

Abstract: This report analyses current and projected trends for sorghum and millets in Eastern and Southern Africa (ESA). Cereal production in this region is dominated by maize (70%) with sorghum accounting for 7% and millets 2% of total cereal production. Between 1981 and 2012, trends in the area, production and yield of sorghum were negative for southern but positive for eastern Africa, where production doubled to reach 6 million tons. ESA was a net importer of sorghum, with Ethiopia and Sudan the largest importers, and Uganda the largest exporter. Despite its image as a poor man's crop, the price of sorghum was higher than for maize in Ethiopia and Kenya, although not

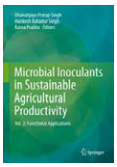
to page 6... ▸

New publications... from page 5

in Zimbabwe. Trends in the area, production and yield of millets over the same period showed weak but positive growth. Strong production growth in Ethiopia was offset by negative growth in Uganda due to civil unrest. Domestic prices were above world prices, with the relative price of millet higher than maize in Ethiopia and Kenya, though not in Zimbabwe. Trade in millets was thinner than for sorghum, with Kenya being the biggest regional importer. The East African Community allows free trade in cereals among member states but this is hindered by high transport costs and periodic export bans in drought years. Since 2004, the region has run a trade deficit in sorghum and millets. Nominal Rates of Protection between 2005 and 2012 were negative for sorghum and maize in Ethiopia, subsidizing domestic consumers, but positive or close to zero in Kenya, protecting domestic producers. Projections using the IMPACT model (International Model for Policy Analysis of Agricultural Commodities and Trade) show production of sorghum in ESA rising from 6.6 million tons in 2015 to 19.5 million tons in 2050, and from 2.3 to 7 million tons for millets. By 2050 ESA is projected to change from being a net importer to being a net exporter of sorghum (2.5 million tons) and millets (1.8 million tons). Scenarios were run to determine the impact of higher income growth, 25% faster yield increases for sorghum, millets and maize, and climate change using climate models GFDL (Geophysical Fluid Dynamics Laboratory) and MIROC (Model for Interdisciplinary Research on Climate). In combination, the effect is positive, increasing production of sorghum by 33% and of millets by 56% over the baseline scenario by 2050. These results suggest that in the future, sorghum and millets will play an increasingly important role in food security and trade.

http://oar.icrisat.org/9441/

Formulations of plant growth-promoting microbes for field applications



Authors: Gopalakrishnan S, Sathya A, Vijayabharathi R and Srinivas V

Published: 2016. Pages 239-251 *in* Microbial Inoculants in Sustainable Agricultural Productivity: Functional Applications. Springer India, India. ISBN 978-81-322-2642-0

Abstract: Development of a plant growth-promoting (PGP) microbe needs several steps starting with isolation of a pure culture, screening of its PGP or antagonistic traits by means of different efficacy bioassays performed in vitro, in vivo or in trials under greenhouse and/or field conditions. In order to maximize the potential of an efficient PGP microbe, it is essential to optimize mass multiplication protocols that promote product quality and quantity and a product formulation that enhances bioactivity, preserves shelf life and aids product delivery. Selection of formulation is very crucial as it can determine the success or failure of a PGP microbe. A good carrier material should be able to deliver the right number of viable cells in good physiological conditions, easy to use and economically affordable by the farmers. Several carrier materials have been used in formulation that include peat, talc, charcoal, cellulose powder, farmyard manure, vermicompost and compost, lignite, bagasse and press mud. Each formulation has its advantages and disadvantages but the peat based carrier material is widely used in different part of the world. This chapter gives a comprehensive analysis of different formulations and the quality of inoculants available in the market, with a case study conducted in five-states of India.

http://oar.icrisat.org/9396/

Soil microbes: The invisible managers of soil fertility

Authors: Sathya A, Vijayabharathi R and Gopalakrishnan S

Published: 2016. Pages 1-16 *in* Microbial inoculants in sustainable agricultural productivity: Functional applications. Springer India, India. ISBN 978-81-322-2642-0

Abstract: Microorganisms are an essential and integral part of living soil influencing various biogeochemical cycles on major nutrients such as carbon, nitrogen, sulfur, phosphorus and other minerals and play a superior role in maintaining soil health than other biological components of soil. They also have the capacity to suppress soil borne pathogens and indirectly help in agricultural productivity. Besides contribution of specific microbes to soil health by participating on nutrient cycles, certain other microbes directly/indirectly promote plant growth through the production of phytohormones, enzymes and by suppressing phytopathogens and insects. The vast functional and genetic diversity of microbial groups including bacteria, fungi and actinomycetes supports in all the above ways for soil health. This book chapter gives an outline of such microbes and their contribution in promoting soil health and its role as soil health indicators.

http://oar.icrisat.org/9395/

Farewell

Dr Thiagarajah Ramilan, Scientist - Bio-economic Modeling, Innovation Systems for the Drylands, ICRISAT-India, concludes his assignment effective 25 April after 3 years of valuable and dedicated service to ICRISAT.

We wish him all success in his future endeavors.