ICRISAT works in the drylands which are some of the driest and harshest regions of the world. Working in these regions has given us unique insights, experience and specialized skills in managing soil, water and other natural resources, restoring degraded soils, coping with adverse climate shocks and helping build the resilience of smallholder farmers.

Dryland crops, pearl and finger millets, sorghum, pigeonpea, chickpea and groundnut, which are ICRISAT mandate crops, are Smart Food as they are highly nutritious, grow under adverse conditions with little inputs and have multiple uses beneficial to the farmer. Millets and legumes are traditional dryland crops which provide sustainable livelihoods and productive employment to 2.5 billion people living in the drylands. Millets are high in folic acid, zinc and iron and have 3 times more calcium than milk. Their low glycemic index helps manage blood glucose levels which is useful for diabetics. Both millets and legumes are high in fibre, protein, vitamin and micronutrients such as zinc, phosphorus, potassium, magnesium, etc.

Our work helps farmers cope with climate change by providing them improved crop varieties which can better withstand drought and high temperatures and also help them diversify cropping systems and livelihoods.

We integrate gender across the whole value chain from analyzing problems and opportunities to developing agri-business and linking them to markets.

ICRISAT’s vision of a prosperous and food-secure future for all resonates strongly with almost all of the Sustainable Development Goals (SDGs) since our work is holistic in nature covering multiple aspects of a sustainable future.

Reducing poverty, hunger and malnutrition in the dryland tropics are core to ICRISAT’s mission. Our work across the entire value chain – from improved seeds and technologies to post-harvest agri-business and facilitating market access – helps raise incomes of smallholder farmers while ensuring food and nutrition security.

ICRISAT Impact:

- Improved varieties of pigeonpea developed by ICRISAT have resulted in **80% rise in farmers’ incomes** in Kenya, Malawi, Mozambique, Tanzania and Uganda.
- The Malawi Seed Industry Development project has resulted in **US$3.3 million** worth of consumed legumes and grain in households.
Nutrition is an important aspect of our work. ICRISAT works along the whole value chain to integrate nutritional aspects from improving degraded soils of the drylands to improve crop nutrition, breeding for higher nutrient levels through to working with communities to cook nutritious foods.

ICRISAT Impact:
- To combat anemia in women and children ICRISAT developed the first bio-fortified pearl millet variety – released in India as Dhanashakti – which is 7% higher in iron and zinc.
- ICRISAT specializes in Smart Food like millets, sorghum and legumes that are ‘good for you’ as they are naturally highly nutritious with high levels of calcium, iron, zinc and other minerals. Finger millet has 3 times more calcium than milk. Pearl millet has the highest folic acid content among cereals and is recommended for pregnant women. Millets have a low glycemic index which helps manage blood glucose levels and prevents diabetes.

Providing vocational and technical training to women and youth is crucial to our work of strengthening value chains. Making agriculture profitable enables smallholder farmers to provide quality education for their children.

ICRISAT Impacts:
Around 5,000 youth trained in agri-business, while around 45,000 participants benefited from other trainings and exposure visits.

ICRISAT’s research framework is inclusive as it seeks to incorporate the voices of women, youth and the marginalized to inform its research strategy. Acting as a catalyst we help rural communities develop their own solutions while ensuring women, youth and the marginalized are empowered to participate and lead solutions.

ICRISAT Impact: Having 50% women on watershed committees in India has ensured that their concerns are addressed in decision making. It has also empowered them to have an equal say in community affairs.

More than 27 farmer seed producers associations, totaling 870 members (640 women and 230 men) in the Dosso region of Niger have been working with ICRISAT through the Tropical Legumes II project, since 2007 to: access modern varieties; train in seed production technologies; access inputs; and production market for groundnut seed by linking women seed producers to the market.

Agriculture uses the most water and working in the drylands we work in the most water scarce areas which have the most critical need for solutions to improve water availability. On-farm and off-farm water harvesting and management coupled with treating wastewater for agriculture and integrated watershed management is helping improve water availability for farmers.

ICRISAT Impact:
- ICRISAT’s initial work in Kothapally watershed in India has been scaled up across the state of Karnataka, India. Improved water availability has increased crop yields by 20-66% and resulted in an agricultural growth of more than 5% per annum since 2009.
- The Yewol watershed in Ethiopia has led to a 5-fold increase in the irrigated area and reduced drudgery for women as water is now available on farm.

Dryland crops such as sorghum have the potential to provide a clean and reliable source of energy. Sweet sorghum can be turned into biofuel at a low cost while addressing food security concerns of converting agricultural land to produce bio-fuel.

ICRISAT Impacts:
- Sweet sorghum, grows in a range of environmental conditions, with limited water and nutrients. Biofuel from sweet sorghum costs less, while other parts of the plant are useful as animal feed. Use of sweet sorghum ethanol reduces carbon emission by 80-90% when compared to use of fossil fuels.

Farming and associated non-farm activities are a key driver of livelihoods in rural areas of India and Africa. Additionally engaging women and youth in livelihood opportunities is critical to our work.

Agri-business has the potential to not only benefit farmers through value addition but also attract youth to agriculture.

ICRISAT Impacts:
- ICRISAT’s Agribusiness and Innovation Platform has been working to encourage entrepreneurship among youth by supporting agribusiness start-ups in the domain of food processing, seed business, farming and agri-biotechnology. Impacts so far are: 74 agribusiness start-ups incubated; Over 800,000 farmers benefited by products and value-addition services offered by clients; facilitated US$13.2 million as investment to start-ups; facilitated commercialization of 331 agro-technologies for Indian institutions; and 1,218 ventures provided incubation support.
Digital Agriculture enables farmers’ to access information, finance and markets to minimize farming risks and move up the value chain. Innovative seed financing models are helping farmers in Malawi reap better dividends from agriculture.

ICRISAT Impacts
- In Mali using drones for land mapping has helped strengthen land tenure systems thus benefiting farmers. Coupled with an android-based app this also helps them optimize resource use. Info-entrepreneurs emerged as new professionals to strengthen the existing agricultural extension system.
- The Green SIM innovation pushes relevant information to farmers on their mobiles, while the Green Phablet allows access to a database which can provide customized recommendations to farmers. 40,000 farmers in 171 villages bought the Green SIM in the first six months of the pilot initiative generating additional income for women and youth working as info-entrepreneurs.

Our work in urban wastewater recycling for use in agriculture reduces the burden on civic infrastructure, is environment friendly and promotes safe and healthy agriculture in peri-urban areas which are fast emerging as high growth centers.

ICRISAT Impacts:
- Initial work in treating domestic as well as industrial waste water for use in agriculture is showing encouraging results. Our model comprising decentralized wastewater treatment system and reuse of treated wastewater in agriculture provides a solution for safe reuse of domestic wastewater at community scale.

The core principle underlying ICRISAT’s work is sustainable natural resource management. Reducing the carbon and water footprint and improving soil, water and other natural resources is an integral component of our research.

ICRISAT Impacts:
- Millets, sorghum and legumes are ‘good for the planet’ as they have a low carbon and water footprint. Incorporating pulses in the cropping cycle can reduce the carbon footprint by 24 to 37%. Pulses can eliminate the use of nitrogen fertilizer as they fix nitrogen in the soil. Pulses require less water and effectively increase the water use efficiency of the entire crop cycle.

Read more on: ICRISAT’s SDG work
Watch Dr Bergvinson talk about SDGs
Farmers in Maharashtra, India, are taking to pigeonpea hybrid ICPH 2740 in a big way to combat successive drought years. Despite the drought situation for last two cropping seasons in the state, ICPH 2740 yielded 2 to 3 tons per ha on farmers’ field. The hybrid is also helping farmers break decades-old stagnating yields.

During 2014 and 2015 cropping season more than 30,000 ha was covered with the hybrid pigeonpea ICPH 2740. Farmers are also ready to invest in technologies like micro-irrigation, transplanting, nipping etc., to gain a higher yield.

This has been possible with the support of the Department of Agriculture, Government of Maharashtra, through Rashtriya Krishi Vikas Yojan (RKVY) and Agriculture Technology Mission Agency (ATMA).

More than 300 farmers visited ICRISAT recently to know more about the hybrid pigeonpea and to get seed sample for demonstration in their field. Farmers from both traditional pigeonpea growing areas as well as non-traditional growing areas visited.

During their visit, they interacted with Dr Suhas Wani, Regional Program Director, Asia Program, ICRISAT, and Dr Anupama Hingane, Special Project Scientist, Pigeonpea Breeding, ICRISAT-India, explained the cultivation practices of hybrid pigeonpea and about seed production techniques.

The visiting farmers informed that during the 2015 cropping season pigeonpea fetched a high price of ₹8,000-10,000 for 100 kg which was very profitable for them. With the sudden rise in pigeonpea price in the Indian market, farmers from both rainfed and irrigated regions of Maharashtra are interested to grow pigeonpea as it requires minimum inputs and yields higher benefits compared to other commercial crops like sugarcane and rice. The farmers are now ready to even replace sugarcane, a major cash crop in western Maharashtra, with pigeonpea.

In addition, the Krishi Vigyan Kendras (KVKS), in Latur, Osmanabad and Amravati districts have expressed an interest to undertake hybrid pigeonpea seed production in farmer’s fields and requested for technical guidance from ICRISAT. There is a demand for more than 500 ha under seed production though the KVKS and the farmer producer companies (FPOs) during 2016 cropping season. ICRISAT will supply the parent material, provide technical guidance, train the seed producers and monitor the seed plots as well.

During the 2016 cropping season, Department of Agriculture, Government of Maharashtra, will promote ICPH 2740 across 20,000 ha. This year has marked the biggest demand and the pigeonpea hybrid ICPH 2740 is likely to cover more than 1 lakh ha area by farmers of Maharashtra, Telangana, Karnataka, Andhra Pradesh, Gujarat and Madhya Pradesh. This will be celebrating the International Year of Pulses in the true sense.

Green manure: Pigeonpea adds in its entire crop cycle as leaf drop – 8-16 kg Nitrogen/ha; 2.5-5 kg Phosphorus/ha; 13.5-24kg Potassium/ha.

Celebrating International Year of Pulses

G O O D  F O R  Y O U
G O O D  F O R  T H E  P L A N E T
G O O D  F O R  T H E  S M A L L H O L D E R  F A R M E R

http://grainlegumes.cgiar.org/IYP www.icrisat.org/yp
Hybrid Parents Research Consortia Advisory Committee meet to discuss future direction

The newly-formed advisory committee of the ICRISAT-Hybrid Parents Research Consortia (HPRC) met recently to discuss how to further strengthen the consortium and the possibility of upgrading membership. They also reviewed the activities undertaken over the last year and the status of crop-wise HPRC Annual reports.

Dr Suresh K Gupta, Director-Regulatory Affairs, Hytech Seed India Pvt. Ltd., was elected unanimously as the Chair of the Advisory Committee for 2016-2017.

Efforts to create awareness about the consortia and attract more seed companies to become members was discussed. About 20 seed companies visited ICRISAT during post-rainy season of sorghum and they were shown hybrids that have adapted to rabi season and the companies were offered seeds of the hybrids selected by them for their evaluation. The private company committee members, listed a few potential seed companies to approach and assured the consortia of sharing the consortium activities with these companies. The committee suggested that non-Indian seed companies should be enrolled as members of HPRC only when approvals for their seed exports have been ensured by ICRISAT crop breeders. There were also suggestions to connect HPRC with other important seed related platforms, like the National Seed Association of India (NSAI), Asia and Pacific Seed Association (APSA), and Seedsmen Association of Andhra Pradesh.

To create a consumer demand pull for Smart Food – dryland crops such as millets and legumes – by raising Zimbabweans’ awareness on the nutritive value of traditional food and beverages, an expo featured various traditional foods and beverages, along with methods to prepare them.

At the expo, ICRISAT showcased baked products such as bread, muffins and biscuits made of sorghum and millet and also crop varieties that are suitable for drought prone areas such as Matobo District. Recipes were handed out to visitors to encourage them to try these at home.

Mr Pathisa Nyathi, Founding Director and owner, Amagugu International Heritage Centre (AIHC), welcoming guests to the expo, said, “The expo promotes traditional food that are highly nutritious and recommended for a healthy diet. The event is being held at an ideal time, as it is the end of the cropping season, and this presents an opportunity to explore various types of dishes that could be derived from the available cereals and legumes.”

Mr Nyathi thanked all exhibitors for coming to the expo including the local farmers, appreciating that in a time when the nation was experiencing a drought, the local farmers had come out with some produce to present at the expo. He hoped that this expo, the first of its kind at AIHC, would become a permanent feature.

The expo held on 14 May, was hosted by AIHC, a community oriented cultural centre located in Matobo District of Zimbabwe. It was attended by local farmers, faculty from the Great Zimbabwe University and National University of Science and Technology, AIHC board members, journalists, school children and teachers from King George VI School.

Visitors tasting the baked goods at the ICRISAT stall.

Partners meet

Smart Food promoted at traditional foods and beverages expo
New Project

Sustainable agricultural development through value addition and linking tribal farmers to markets in Adilabad district of Telangana - transitioning tribal farmers from traditional to modern agriculture

Principal investigator: KK Sharma/ A Selvaraj
Period: 2016 – 2017
Investor: Integrated Tribal Development Agency (ITDA), Utnoor, Adilabad district, Telangana state, India
Synopsis: Thiryani, Wankidi and Karameri mandals of Adilabad district are some of the backward regions inhabited by tribals. Establishment of value addition centers for primary processing and providing market linkages would be an effective intervention. The agriculture and farming systems that the smallholder farmers practice are largely traditional that use local indigenous seeds passed on for generations which produce lower yields, thereby resulting in a not-so-profitable agricultural outcome.

Based on our experience in driving the growth of sorghum (jowar) and pigeonpea, value addition and overall improvement of the livelihoods of farmers in the semi-arid tropics, especially in the Telangana region, ICRISAT proposes the following interventions in selected mandals of Adilabad to increase the profitability of smallholder farming and to pave the way towards sustainable agriculture:

▪ Establish pilot plant processing units, dal mills, etc.;
▪ Provide marketing knowhow and market linkages for better price realization;
▪ Provide training on the handling of processing units; and
▪ Provide on-field crop and seed production support and thus develop sustainable agriculture.

ICRISAT Vacancies

Dynamic and motivated aspirants - Join us in improving the lives of smallholder farmers in the semi-arid tropics.

Senior/Principal Scientist – Markets, Institutions, Nutrition and Diversity

The incumbent will lead the theme, Markets, Institutions, Nutrition and Diversity (MIND) and will report to the Director of the Research Program, Innovation Systems for the Drylands (ISD).

Position: Internationally Recruited Staff (IRS).

Location: At one of ICRISAT’s regional sites in Africa (Addis Ababa, Ethiopia; Bamako, Mali; Nairobi, Kenya).

Deadline: 15 July 2016

The position is for an initial period of 3 years and renewable depending on performance.

Applications should have a letter of motivation, latest curriculum vitae, and the names and contact information of three references that are knowledgeable about your professional qualifications and work experience.

All applications will be acknowledged, however only shortlisted candidates will be contacted.

ICRISAT is an equal opportunity employer and is especially interested in increasing the participation of women on its staff. ICRISAT has a flexible approach to international appointments and welcomes dual-career couples.

For further details and online application visit: http://www.icrisat.org/careers/
New Publications

Anticlastogenic potential of pigeonpea (Cajanus cajan (L.) Millsp.) in white mice (Mus musculus L.).

Authors: Sanchez GC, Tanquilut NC, Tanquilut MRC, Soriano Junior HR, Mula MG and Mula RP

Published: 2016. Green Farming, 07 (02): 357-360. ISSN 0974-0775

Abstract: This study investigated the anticlastogenic potential of International Crop Research Institute for Semi-Arid Tropics (ICRISAT) bred pigeonpea utilizing the micronudexs test using white mice models to determine the number of micronucleated polychromatic erythrocytes (MPCEs) in treated and non-treated white mice at the Pampanga State Agricultural University (PSAU), Magalang, Pampanga, Philippines. Furthermore, the study disclose if pigeonpea has detrimental effects on the vital signs and some vital organs such as lungs, heart, liver, kidney and intestine. Based on the study, pigeonpea ICPL 87051 leaves decocton have anticlastogenic effects. This might be attributed to the presence of flavonoids, tannins and stilbenes in pigeonpea leaves that has the ability to lower MPCEs in treated and non-treated white mice. In terms of its effects on the vital signs namely heart rate, respiratory rate and temperature, results showed that pigeonpea did not cause heart palpitation, tachycardia, hyperpnea and hypothermia. Treatments T+ (Positive control, TCN) and T2 (Pigeonpea leaves extract of 0.5 per 20 kg body weight + TCN) have normal heart, liver, kidney, lungs and intestines.

http://oar.icrisat.org/9443/

Impact of developmental project for sustainable pigeonpea livelihood system of rural poor households of Odisha

Authors: Mula RP, Mula MG, Gopalan RS, Das SK, Sameer Kumar CV and Rathore A

Published: 2016. Green Farming, 07(02): 293-299. ISSN 0974-0775

Abstract: Farmers of Odisha’s rainfed areas have poor access to quality pigeonpea materials. In 2011, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) implemented a project ‘Introduction and Expansion of Improved Pigeonpea (Arhar) Production Technology in Rainfed Upland Ecosystems of Odisha’ for four years (2011-2015) covering five districts. Two years after, a survey was conducted to study the adoption and effects of the interventions that revealed insights on yield, income and ways for sustaining and upscaling. The assessment showed that improved cultivars and improved agronomic practices resulted in significant increase in yield and income. ‘One village-One variety’ seed system led to quality seed supply not only in the project sites but also in adjacent villages. Innovative capacity development and commitments of stakeholders enriched knowledge and skills of pigeonpea’s cultivation that helped farmers in making appropriate choices. The result of the investment in two major pigeonpea activities namely improve pigeonpea production technology (IPPT) and seed production (SP) showed a robust investment gain computed at 308% or about four times increased from the ₹ 45 million ($900,000) invested in the project for two years.

http://oar.icrisat.org/9444/

Performance of herbicide on yield and economic returns of pigeonpea [Cajanus cajan (L.) Millsp.] in Bihar.

Authors: Suman S, Panwar G, Mula MG and Kumar S

Published: 2016. Green Farming, 07(01): 123-126. ISSN 0974-0775

Abstract: The research was carried out during kharif season of 2012-13 to find out the cost-effective weed management practices with special focus on fine tuning the dose and time of herbicide application, and its impact on growth and yield of pigeonpea at Bihar Agricultural University, Sabour, Bhagalpur. The result of the study revealed that uncontrolled growth of weeds led to 40.53% reduction in pigeonpea yield in comparison with the other treatments. However, the highest seed yield (2,725 kg/ha) was obtained in weed free treatment but not cost-effective due to high cost in manual weed operation. Among the herbicide treatments, lower weed index (7.25%) was recorded in T2 (imazethapyr @ 40 g a.i. /ha at 15 DAS), which resulted in higher seed yield (2,526 kg/ha), net returns (₹ 71,059/ha) and benefit: cost ratio (2.74).

http://oar.icrisat.org/9447/

Future of seed research is very bright

Authors: Bergvinson D


Abstract: ICRISAT is a non-profit, non-political organization that conducts agricultural research for development in the drylands of Asia and sub-Saharan Africa. ICRISAT and its partners help empower the poor people to overcome poverty, hunger and a degraded environment through better agriculture. Headquartered in Hyderabad, Telangana, India, with two regional hubs (Nairobi, Kenya and Bamako, Mali) and country offices in Niger, Nigeria, Zimbabwe, Malawi, Ethiopia, and Mozambique, ICRISAT conducts research on five highly nutritious drought-tolerant crops: chickpea, pigeonpea, pearl millet, sorghum and groundnut. In a rendezvous with Agriculture Today, Dr David Bergvinson - Director General, ICRISAT discussed about India’s seed priorities and the direction of research.

http://oar.icrisat.org/9515/
Farewell

The following staff members retire on 31 May:

Mr Arockia Dass, Senior Security Supervisor, Security Services, has served the Institute for over 18 years.

Mr Murali O, Security Associate, Security Services, has served the Institute for over 32 years.

On their retirement, Team ICRISAT wishes them all success in their future endeavors.

Reader’s Comments

Thanks for the Newsletter dated 24 April. I read with interest the new Pan-African initiative for the TAAT project. I recall that a few years back an international conference was held at the instance of Mr Kofi Annan, former Secretary-General of the United Nations, at Addis, for ushering in Green Revolution in Africa.

The Biovillage model of agriculture centered rural development, developed and successfully demonstrated by MSSRF, Chennai, India, provides the converging meeting point and forum for all the stakeholders in the top down and bottom up pathways. In effect, it is a TAD mix approach (Technocratic-Academic-Democratic) as coined by late Dr KV Sundaram.

Significant progress in holistic partnerships with host countries and other aid agencies.

I am very heartened to read of these new initiatives in Africa.

Integrated collaboration with host countries, parallel CGIAR programs, pan-African and complementary agencies in weather forecasting etc., has much to offer, placing the next round of Green Revolution strategies to address poverty and climate change as a mega-team with shared aims, and practical realistic mechanisms for achieving the necessary local transformations for vertical integration.

All stakeholders, from farmers, agribusiness and marketing, to aid agencies, bring their respective strengths to bear; have ownership and participation in planning and implementing capacity development. There are worrying signs that the unpredictability of climate change is upon us.

A few pilot project demonstrations to start this model will provide the needed experience and confidence at the local level for a participatory expanded program execution at landscape scale. Know more about the Biovillage model in the below documents.


M Velayutham, Ex-Executive Director, MS Swaminathan Research Foundation, Chennai

Wheat imports to Africa have risen from the time I was an IITA wheat specialist in Nigeria (my reports are in the CIMMYT library).

The drying of Lake Chad is a major concern for future of irrigated wheat production in Nigeria, Cameroon and Tchad, and there are risks to continued flows of northern rivers in the region if conditions become drier, with consequences for irrigation.

The new developments are wonderful and from the CCER meetings in Niger I know that food self-sufficiency is a major strategy for national stability.

Dr Robert John Redden, Plant Breeding and Genetics, RJR Agriculture Consultants, Australia

Hybrid Parents Research... from page 5

Crop-specific Scientists Field Days (SFDs) were proposed for pearl millet, sorghum and pigeonpea to exhibit early maturity materials, and to show medium to late maturing materials.

The ICRISAT-HPRC is in Phase 4 (2014-2018) and the advisory committee held its first meeting at ICRISAT-India on 16 May. The meeting was attended by Mr AK Singh, Bayer Crop Sciences; Dr Suresh K Gupta; Dr Stefania Grando, Director-Science Quality and Strategy; Dr Pooaran Gaur, Theme Leader - Crop Improvement, Asia Program; Dr SK Gupta, Senior Scientist-Pearl Millet Breeding, Crop Improvement, Asia Program, Dr Sameer Kumar, Senior Scientist-Pigeonpea Breeding, Crop Improvement, Asia Program; and Dr Ashok Kumar, Senior Scientist-Sorghum Breeding, Crop ImprovementAsia Program. The HPRC in the current phase involves 37 seed companies (27 pearl millet, 8 sorghum and 2 pigeonpea) in partnership with ICRISAT.