

Innovations for a changing world

ICRISAT Annual Report 2008



ICRISAT

INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS
Science with a human face

Innovations for a changing world

Contents

Messages

Message from the Director General	2
Message from the Chairman	3

Innovations for a changing world

Weather-proofing for a warmer world.....	6
Genebank: Investing in the future	8
Whole genome sequences, what do they tell us?	10
Keeping the good, while targeting the bad	12
Rooting around for answers	14
Health checks for soils	16
Delicacies from a degraded land	18

About ICRISAT

ICRISAT Governing Board 2008	20
Financial Summary	22
ICRISAT in the News	24
ICRISAT Rated Superior based on CGIAR Performance Indicators.....	26
ICRISAT Senior Staff and Collaborative Staff.....	27

Partnerships, Publications and Awards

Development Investor Partnerships Initiated in 2007	30
Research Scholars during 2007	41
Workshops, Conferences, Meetings during 2007	46
Training Courses held during 2007	55
Publications (<i>List available on CD version</i>).....	59
Awards 2008.....	60



Message from the Director General

Carl Sagan, one of the most popular American astronomers of our time (1934-1996) once said, "If you want to make an apple pie from scratch, you must first create the universe." On the other hand, an ancient Buddhist expression says, "If we are facing in the right direction, all we have to do is to keep on walking."

While agricultural innovations have come a long way since man first toiled the land to produce food, and the innovations developed by ICRISAT are not at Sagan's apple pie stage, we do have some successes that encourage us to "keep on walking".

The year 2008 was witness to several major global challenges and to several solutions to meet them. Climate change has become a buzz-word, and scientists the world over are working to mitigate the change. Rising to the available data on the impact this will have on agriculture and on the millions of poor farmers who depend on agriculture for their livelihoods, ICRISAT offers ways to employ its methods and mandate crops, which are "climate change adapted".

Biotechnology, at the forefront of innovations for agricultural science, offers more hope. Our scientists are using the power of biotechnology to ferret out genetic secrets that can be employed to tailor crops to existing environmental conditions and the needs of human nutrition. Scientists are also looking at the other side of the coin. What are the implications of these solutions for the innocent bystander, the non-targeted life forms?

Our crop physiologists are focusing on the otherwise hidden from view root systems. This subject has many questions but not as many answers. Also, the data from the survey of micronutrients in soils of India will point scientists in the right direction to both improve soil conditions where necessary, and exploit the richness of soil where possible.

In early 2008 the world moved its collective gaze to Svalbard, made famous by the innovative use of its preserving permafrost. ICRISAT contributed to this global seed bank by committing 111,000 accessions of its mandate crop germplasm to the vault.

ICRISAT went through a major "External Program and Management Review (EPMR)" in 2008. The review provided an opportunity to evaluate the science we perform, and the impact it has on the peoples we serve – chiefly the poor farmers of the semi-arid tropics. The evaluation of the reviewers was encouraging – "The Panel finds that ICRISAT is a strong, well-funded research institute Overall the Panel commends ICRISAT for a well-balanced and substantive research portfolio."

We are humbled and motivated by this evaluation. We are grateful for the support afforded us by our Governing Board, our donors, investors and partners. We are committed to "keep on walking" till we achieve our goal.

William D Dar

Director General

Message from the Chairman



The changing frameworks of local, regional and global agricultural markets in 2008 have created new needs for continued technological innovations to enable poor smallholders to adapt to new market opportunities. ICRISAT has a dual role of understanding the markets on which the farmers of the semi-arid tropics depend and at the same time to create platforms for new and old crops and farming systems to cope with both commercial and environmental changes.

The traditions of social science research in ICRISAT have again proved relevant as adaptations to climate change, the challenges of adopting biotechnology and market demand for bio-energy become increasingly integrated parts of ICRISAT's research agenda. In a more liberalised economy, the cooperation between public and private partners must explore new avenues, and for ICRISAT it has become important to ensure that its obligations to producing international public goods can be maintained in joint ventures with private industry. Innovative models for partnership are emerging as ICRISAT preserves its integrity as part of a changing global scene for international and national agricultural research.

The Board has valued highly the fact that ICRISAT has managed to protect its core values in a year of changing perceptions of food security, and yet has played a creative and positive role in trying to ensure that the international agricultural research system, our CGIAR, develops to serve new realities. Good quality science is a prerequisite for having a strong voice when the reorganizations take place. The Board remains convinced that the strong

financial support that came to ICRISAT from many sources in 2008 reflects a general appreciation of major achievements in 2008 and preceding years. A positive external evaluation of the last five years has conveyed that scientists, support staff, management and the Board of ICRISAT continue to serve the changing semi-arid tropics well.

As we participate in the changes of the CGIAR itself we need to preserve those values, and to enhance the impact that international public goods research can have for poor farmers and poor consumers. There were more food insecure people in the world in 2008 than in 2007, as also in the semi-arid tropics. The challenge grows, fuelled by the changing markets, the changing roles of the players and the changing nature of agricultural research itself in a changing physical environment. The years ahead will tax ICRISAT's ability to adjust to change. I am confident that ICRISAT will succeed.

Stein W Bie

Chairman, Governing Board



Innovations for a changing world





Rain clouds over the Sahel can spell either chaos or crop success.

Weather-proofing for a warmer world

Climate change predictions point to a warmer world within the next 50 years, a trend that is increasingly being supported by 'on-the-ground' measurements. However, the impact of rising temperatures on rainfall distribution patterns in the semi-arid tropics (SAT) of Africa and Asia remains far less certain.

ICRISAT has always been aware of the need to situate our research in the context of seasonally variable rainfall and the impact it has on rural welfare. Within the last 4 years, however, this work has received a new focus following global concern over the impacts of current climate variability and future change. During the last year, ICRISAT has been active in both consolidating its own climate change adaptation research as well as increasingly playing a lead role among the Alliance Centers of the CGIAR.

Facilitating international sharing of information:

In November 2007, ICRISAT celebrated its 35th Anniversary by hosting a 3-day Anniversary Symposium entitled "Climate-Proofing Innovation for Poverty Reduction and Food Security". Dr Martin Parry, co-Chair of IPCC Working Group II gave the inaugural address at the symposium. ICRISAT, together with 12 CGIAR Centers, The World Vegetable Center (AVRDC) and the International Research Institute for Climate and Society, presented key aspects of its ongoing research on climate change adaptation.

In addition, ICRISAT, together with ICRAF, acted as Guest Editor of a special edition of *Agriculture Ecosystems and Environment* (AGEE) entitled "International agricultural research and climate change: A focus on tropical systems." This special edition presented 13 articles from international research institutes, including ICRISAT. It was published in June 2008 (Vol. 126, Issues 1+2).

Board approved Operational Research Plan:

2008-2015: In March 2008, ICRISAT's Board of Trustees approved our Operational Research Plan (ORP) entitled *Adaptations to Climate Change in the Semi-Arid Tropics*. The strategy provides a focused description of the climate change development challenge in the SAT; the rationale for ICRISAT's involvement; what we aim to achieve through our research and the outcomes we will achieve between now and 2015. The ORP is structured around two key strategic considerations:

1. Unless vulnerable farming communities of the SAT are empowered to cope better with *current* season-to-season rainfall variability, adapting to *future* climate change will be a daunting challenge or impossible for most.
2. Given the lead time required to produce 'finished products' of adapted germplasm, we are combining ex ante assessments of the impacts of climate change scenarios

on the performance of our mandate crops with investigations into the required plant characteristics that will both mitigate the negative and exploit the positive impacts of climate change.

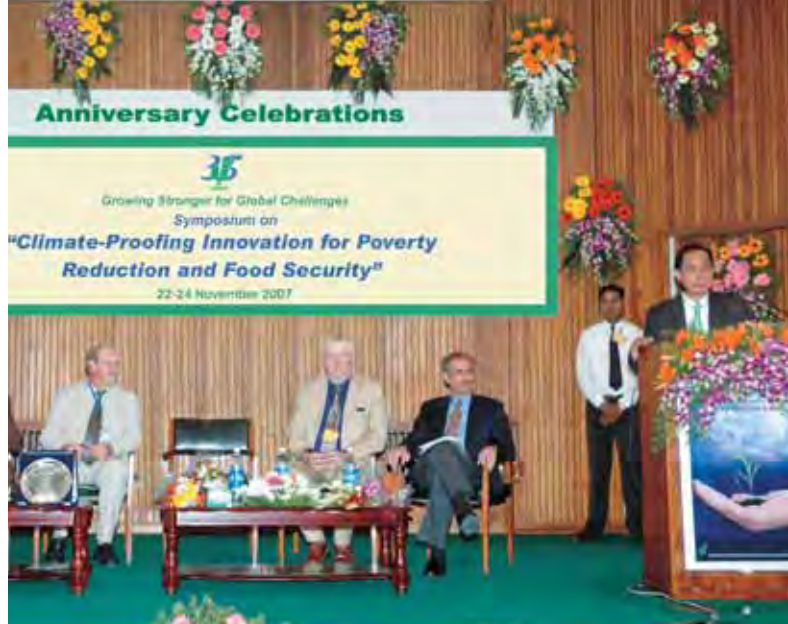
A summary flyer of this ORP has been produced and is available on request in PDF format.

'Hypothesis of Hope' for the SAT: Last May, ICRISAT's crop modelers, GIS experts, crop physiologists and plant breeders met in Hyderabad for a working week. Using a range of weather data driven tools, they initiated research to test the hypothesis that *"in the medium term (2010-2050), ICRISAT is well placed to help farming communities mitigate the challenges and exploit the opportunities that are posed by climate change through (i) re-deployment and re-targeting of the existing germplasm of its mandate crops, and (ii) through the application of existing knowledge on crop, soil and water management innovations.* Whilst the work initiated during this week remains ongoing, early outputs support the hypothesis. Specifically, this ex ante analysis showed that:

- Climate change will modify the length of the growing period across the regions of interest, but that this can in large part be mitigated by the re-targeting and re-deployment of existing germplasm.
- Predicted temperature increases will increase the rate of crop development, with greater negative impacts on crop production than relatively small ($\pm 10\%$) changes in rainfall.
- Yield gap analyses show that the negative impacts of climate change can be largely mitigated through a dual strategy of (a) greater application by farmers of improved crop, soil and water management innovations and (b) better targeted crop improvement approaches, more explicitly focused on climate change adaptation.

Expanding our portfolio in Africa and Asia:

Between 2005 and 2007, ICRISAT partnered with meteorological services, CGIAR Centers and leading climate science researchers worldwide in the development and initiation of eight specially funded



Director General Dr William Dar addresses the gathering while Dr Martin Parry (extreme left) looks on during the symposium.

Proof of Concept projects centered on climate risk management in sub-Saharan Africa. In the last year, three more such projects have been funded. Of particular importance is the project funded by the Asian Development Bank, which has expanded this work to India, Peoples' Republic of China, Sri Lanka, Bangladesh and Pakistan.

Sharing the lessons learned: Although all our projects are ongoing, three key lessons have already emerged:

1. Current season-to-season rainfall variability has a strong influence on farmers' perceptions and practice.
2. New climate driven tools are very useful in characterizing climate induced risk and supporting farmer decision making.
3. Institutional and information support mechanisms to enable the effective use of climate information are essential.

Last June, the organizers of the FAO High Level Conference on *World Food Security: The Challenge of Climate Change and Bio-energy*, invited ICRISAT to present a poster that described these lessons in more detail.

More detailed information on our Climate Change Adaptation research, is available at <http://www.icrisat.org/gt-aes/Adaption.htm>. Farmers may not be able to avoid climate change, but ICRISAT and its partners are working hard to provide them with more stable crop yields in such an unpredictable future.



CGIAR Chair, Kathy Sierra, visits the genebank at Patancheru.

Genebank: Investing in the future

RS Paroda Genebank: In 2006, ICRISAT published a book titled *Genes are Gems* (unrelated to genebanks); but if genes are gems, then what better place to store them than in a bank?! ICRISAT's RS Paroda Genebank located on the campus at Patancheru, India is one of the largest genebanks in the CGIAR system, holding more than 119,000 accessions of its five mandate crops and six small millets from 144 countries. Ninety percent of these accessions are conserved under long term storage (at -20°C). To provide easy access to such a large number of accessions, detailed information about each accession is stored in a database and can be accessed through SINGER, the germplasm/data exchange network of the CGIAR on the Internet.

The genebank team continually enriches the collection and associated database. So far, nearly 700,000 seed samples have been provided to researchers in 144 countries, and 654,000 seed samples to researchers within ICRISAT. Over the years, sixty-six germplasm accessions have been released directly as cultivars in 44 countries, contributing to the enhanced food security in these countries.

A vast number of accessions have been used as building blocks for numerous varieties and hybrids that are cultivated around the world. For instance,

more than 75 national programs have released over 600 varieties of ICRISAT mandate crops, using ICRISAT-supplied materials that trace their origin to lines in the genebank.

To ease and enhance the use in crop improvement of this unwieldy number of accessions, ICRISAT scientists have developed core and mini-core subsets of chickpea, finger millet, foxtail millet, groundnut, pigeonpea, pearl millet, and sorghum. Several new sources of tolerance to biotic and abiotic stresses, and for agronomic traits were identified when these sets were evaluated such as early maturity and large seed size in chickpea and groundnut; vegetable-type (large-podded) pigeonpea; drought and salinity tolerant groundnut, chickpea and pigeonpea; and sorghum accessions with high sugar content. ICRISAT's concept of the mini-core has been recognized worldwide. Additionally, molecularly genotype-based reference sets, which captured over 78% of the allelic diversity in the composite collections, are also available for chickpea, pigeonpea, groundnut, sorghum, finger millet and foxtail millet (<http://www.generationcp.org/>).

Regional genebanks: ICRISAT has established genebanks at its regional centers in Niamey, Nairobi, and Bulawayo. These genebanks conserve germplasm of the mandate crops, the small millets

and other regionally important crops for utilization and distribution. Together, they hold over 58,000 accessions, of which nearly 15,000 have been characterized. Over 15,000 seed samples have been distributed regionally. Between 2003 and 2007, these genebanks regenerated over 7000 accessions, tested seed viability of over 12,000 accessions, and processed seeds of 11,000 samples. Part of the funds provided by the World Bank supported Global Public Goods (GPG) Projects have been used to upgrade facilities and operations. Besides the nearly 15,000 accessions in the Niamey genebank, the genebank has its own backup collection of almost 10,000 groundnut, pearl millet and small millet accessions.

Germplasm adoption: Considering the average operational costs, approximately US\$20 million is needed to maintain 119,000 accessions in perpetuity. To ensure the long-term availability of funds for genebank activities, the Global Crop Diversity Trust and ICRISAT have established an endowment trust, where the Diversity Trust committed US\$8 million and ICRISAT US\$2 million in a rolling multi-year plan, for a total endowment of US\$10 million. The proceeds from the endowment (which are at least US\$450,000 per year) will be used for conservation and management of the collections. Further, ICRISAT has implemented the innovative idea of “adopting” germplasm. ICRISAT staff members and non-traditional donors have contributed funds to adopt several accessions. ICRISAT hopes and believes that more such philanthropists will come forward to adopt these priceless resources for the benefit of humanity.

Svalbard Global Seed Vault: On the Norwegian island of Spitsbergen near the town of Longyearbyen (130 m above sea level) in the remote Arctic Svalbard Archipelago, a Seed Vault has been established to preserve unique duplicate samples of seeds held in genebanks worldwide. The Seed Vault is managed under a tripartite agreement between the Norwegian Government, the Global Crop Diversity Trust, and the Nordic Genetic Resource Center. The Norwegian Government finances upkeep of the structure itself, and the Bill & Melinda Gates



Containers of germplasm ready for shipment to Svalbard.

Foundation and other donors assist selected genebanks in developing countries, as well as the CGIAR institutions, to package and ship seeds to the Seed Vault. Norwegian Prime Minister, Jens Stoltenberg and the Nobel laureate, Wangari Maathai, the founder of the African Green Belt Movement, inaugurated the facility on 26 February 2008 and delivered together the first box of seeds containing rice germplasm from 104 countries. ICRISAT Director General, Dr William D Dar, participated in the opening of this global initiative to store the seeds of agricultural crops from across the world.

The Seed Vault has the capacity to conserve 4.5 million seed samples. With each sample containing on an average of 500 seeds, a maximum of 2.25 billion seeds can be stored at -18°C. ICRISAT has committed to placing 111,000 germplasm accessions of its mandate crops in this vault in a phased manner over the next five years. The first batch of 20,000 accessions was shipped in 2008.

With biodiversity so important for the future of agricultural systems around the world, our ‘banks’ contain our most precious assets. We pledge to the world that we will make every effort to see that the crops under our mandate are safe, secure and freely available for all to use.



Advanced DNA sequencing instruments at ICRISAT-Patancheru.

Whole genome sequences, what do they tell us?

In next few years there will be a flurry of published reports about sequencing of the “complete” genomes of many organisms. What is this all about? How long until we can apply this information to the breeding of new crop varieties that can help poor people in the semi-arid tropics?

First, a little background –

A genomic sequence is simply the order of the four components (bases) in the long chains of deoxyribonucleic acid (DNA) that is found in almost every cell of an organism. In practice, the sequence is written as a string composed of four letters (A, G, C and T) that represent the four bases. A full genome sequence can be several million characters long. Genomic sequences of complex organisms such as plants and animals contain the code for the genes that condition how an organism looks, responds to different stimuli and reproduces. Thus, knowing an organism’s genome sequence should provide great insight into how and why certain functions work, and provide opportunities for improving an organism.

Several plant genomes have already been sequenced. The first was the “lab pet” *Arabidopsis* – chosen as a model system because of its small genome size, small plant size, and short life cycle that made it a convenient and relatively inexpensive

species in which to study plant genes, including how they interact with each other and the environment to produce phenotypic variation that we can see. The next plant to be “sequenced” was rice, also with a small genome size. This was followed by the poplar tree, the tropical fruit papaya, and most recently (January 2009), the tropical cereal sorghum (one of ICRISAT’s mandate crops).

The US Department of Energy’s Joint Genome Institute, which is involved in most genome sequencing efforts, selected sorghum for full genome sequencing because of its:

- small genome size compared to other tropical cereals having the high temperature tolerant, water use efficient C4 system of photosynthesis for converting the energy from sunlight into sugars;
- close evolutionary relationships with other economically important grasses such as maize and sugarcane;
- even closer relationship with one of the worst weeds – Johnson grass; and,
- reputation as a drought-tolerant food, feed, fodder and fuel crop.

Researchers now have a powerful tool to help them develop more efficient ways to improve this crop.

They have first compared the genome sequences of sorghum and rice – two important cereals, whose most recent common ancestor lived more than 50 million years ago. Before their lineages separated, the ancestral grass genome had duplicated, providing greater opportunity for copies of different genes to evolve new variants – some of which have new functions – or lose functions and perhaps get lost. Because of this, a substantial portion of sorghum genes are not found in rice and vice versa. Thus about 7% of sorghum gene-like sequences have no direct counterparts in the genomes of *Arabidopsis*, rice or poplar. These “new” genes are probably responsible for many of the economically important differences between sorghum and rice – but perhaps surprisingly they do not appear to have been that important in the evolution of the more efficient C4 photosynthesis system, which appears to be largely based on evolution of new functions in variants of pre-existing genes.

The total number of gene-like sequences detected in sorghum and rice are similar – roughly 30,000. The biggest difference between the sorghum genome and its much smaller rice counterpart is that the gene-poor repetitive central regions of the 10 sorghum chromosomes are four times larger than those in the 12 rice chromosomes. This means that the gene-rich region of the sorghum genome is relatively small, and one could probably identify most of the genes in other plant species by sequencing only these gene-rich regions.

When the function of a particular gene is determined, scientists have a good idea about what the counterparts of that gene will do in other species. And once they learn which gene controls a particular trait, they can start looking for the most favorable forms of that gene for a particular target environment. With the sequenced genome they can identify trait combinations that are likely to be associated – due to physical proximity of genes on the chromosome. For example, if one could identify the gene sequence that is associated with the *Ma1* gene, which plays a major role in the response of sorghum flowering time to environmental variation in daylength and temperature, they could quickly



Brown midrib sorghum, good for forage and biofuel.

move (by marker-assisted backcrossing) the most appropriate *Ma1* variant into a market-preferred variety or hybrid, creating a new version that can be grown in a new production environment – a more efficient way for plant breeders to adapt crops to perform better in a changing environment.

The sorghum genome sequence was recently used to identify the physical location of a gene involved in the production of lignin – a component contributing to stem strength and digestibility. Search of the sorghum genome sequence for this gene identified its position, and based on this, ICRISAT (and others) could readily identify molecular markers for this gene, greatly simplifying rapid transfer of selected mutant alleles into productive forage and sweet sorghum genotypes. These new “brown midrib” sorghum lines have improved biomass digestibility (important for both forage and biofuel uses of sorghum).

ICRISAT, in collaboration with its many partners around the world, continues to apply modern scientific tools such as whole genome sequencing to better understand the crops we work on and to produce improved varieties more effectively and efficiently for farmers in the semi-arid tropics.



A ladybird beetle predating on *Aphis craccivora* (aphids) on a chickpea plant (Inset, ladybird beetle).

Keeping the good, while targeting the bad

Appetite suppressant: In 2008, insect-resistant transgenic crops expressing genes from the bacterium *Bacillus thuringiensis* (Bt) that control specific insect pests are being grown on some 40 million hectares in 25 countries. These insect-resistant crops have been deployed successfully for the management of bollworms in cotton, and corn earworm and stem borers in maize – insect species that feed on many crops, including the ICRISAT mandate crops like chickpea, pigeonpea and sorghum, and cause considerable damage in farmers' fields.

Realizing the potential benefit to farmers, efforts are underway at ICRISAT to develop transgenic chickpea and pigeonpea with resistance to pod borers. As we screen for the best lines for effective control of the target insect pests, we are also studying the effects of these on those insect species that are actually beneficial to the crops. While considerable information has been generated on the efficacy of Bt-transgenic crops against the effects on natural enemies of the crop pests in USA, Australia, and China, little information is available on the effects of insect-resistant transgenic crops on the non-target natural enemies of crop pests in the semi-arid tropics (SAT) in Asia and Africa. Therefore, scientists at ICRISAT studied the effects of Bt toxins on the natural

enemies of the pod borer (*Helicoverpa armigera*), one of the most important crop pests in the SAT, under laboratory and field conditions.

Bug eats bug: When an important biocontrol agent, the parasitic wasp (*Campoletis chloridae*) of pod borer larvae, are fed on Bt-intoxicated pod borers larvae under laboratory conditions, significant reductions in cocoon formation and adult emergence were observed. In addition, the larval period of the parasitoid was also prolonged by two days, although there were no adverse effects on female fecundity. Scientists believe that the observed adverse effects of Bt toxins on *C. chloridae* were largely because of poor nutritional quality and early mortality of the pod borer larvae when fed on Bt-intoxicated diets. In fact, most of the larvae died in only five days, while the parasitoid larvae needs eight days to complete development. Scientists were not able to detect any direct effects of Bt toxins on the parasitoid and no Bt proteins were detected in the larvae, cocoons, or adults of the parasitoid when fed on Bt-intoxicated pod borer larvae.

The interactions of Bt toxins were also studied on the generalist predator, the ladybird beetle (*Coccinellid beetle*), which is an important predator of aphids, larvae of lepidopteran insects (butterflies/moths),



The parasitoid, Campoletis chlorideae, parasitizing a pod borer (Helicoverpa armigera) larva.

and other soft-bodied insects. When ladybird beetle larvae were fed on diets containing either of two *Bt*-proteins, Cry1Ab and Cry1Ac, reduced larval survival and adult emergence were observed as compared to the controls (larvae fed on non-*Bt* containing diets). However, such a forced dietary situation is highly unlikely to occur under natural conditions. There were no adverse effects of the *Bt* proteins when the ladybird larvae were reared on aphids fed with different concentrations of Cry1Ab or Cry1Ac in the artificial diets. Results suggest that direct exposure to *Bt*-protein in the transgenic plants will have little effect on the survival and development of ladybird beetles.

Testing with cotton: ICRISAT scientists are also assessing the effects of *Bt*-transgenic cotton on natural enemies, arthropod biodiversity, and the flow in the insect fauna of the *Bt* proteins under field conditions. So far, there were no differences in the numbers of the generalist predators such as the Coccinellid beetle (Ladybird beetle), Chrysopids (Lacewing) and spiders (*Clubiona* and *Neoscona* species). Extensive surveys in farmers' fields in the Indian states of Andhra Pradesh, Maharashtra and Karnataka found no significant differences in parasitism of bollworm eggs and larvae on *Bt*-transgenic and non-transgenic cotton. Scientists

also observed that there was no significant differences in the abundance of natural enemies of crop pests such as Coccinellid beetle, Chrysopid, Cotton leafhopper, Thrips, Ash weevils, Dusky cotton bug, Red cotton bug, spiders and grasshoppers on *Bt*-transgenic and non-transgenic cotton.

Results to date predict minimal if any adverse effects of *Bt*-transgenic cotton on the non-target natural enemies of crop pests, nor on other beneficial insect species, under field conditions. This confirms the high degree of specificity that *Bt*-transgenic crops have for the target insect species.

Scientists will continue to monitor the effects of *Bt*-transgenic crops on the non-target insect species for longer periods of time under different agro-climatic conditions to better assess the potential effects in farmers' fields.



The large-scale lysimetric facility seen here with groundnut plants sown in cylinders.

Rooting around for answers

Why a quantum leap in root research?

Much has been reported on the potential of roots to improve crop yield and resilience under drought. However, most studies on roots have used time consuming methods to extricate roots from soil and assess the differences in length and density. This has limited their use in breeding because of a relatively low throughput, and fairly large experimental errors. Furthermore, the information on roots harvested at a single point in time only provides a snapshot of the roots at that particular time, ie, "static" data, which cannot help in defining the exact role of roots. Previously, it was assumed that deeper/more profuse roots would contribute to higher water uptake and then to higher yield. Yet, the relation between rooting and water uptake remains controversial. In what drought scenarios, soils, and crops can roots contribute to water uptake and yield remains an open question.

Water uptake is crucial during key stages of plant growth such as reproduction and grain filling, at which times small differences in water uptake could lead to large yield differences. To tackle such issues, methods are needed for direct, precise, and "dynamic" measurement of water uptake, in field-like situations. ICRISAT is attacking these questions in a recently renovated, large lysimetric facility (over 3500 cylinders) using weighable tubes with soil depth and

volume comparable to field conditions. With such a system, large mapping populations and reference germplasm sets (300 to 400 entries) can be assessed under several water treatments and replications, making it highly valuable for detailed research and breeding purposes.

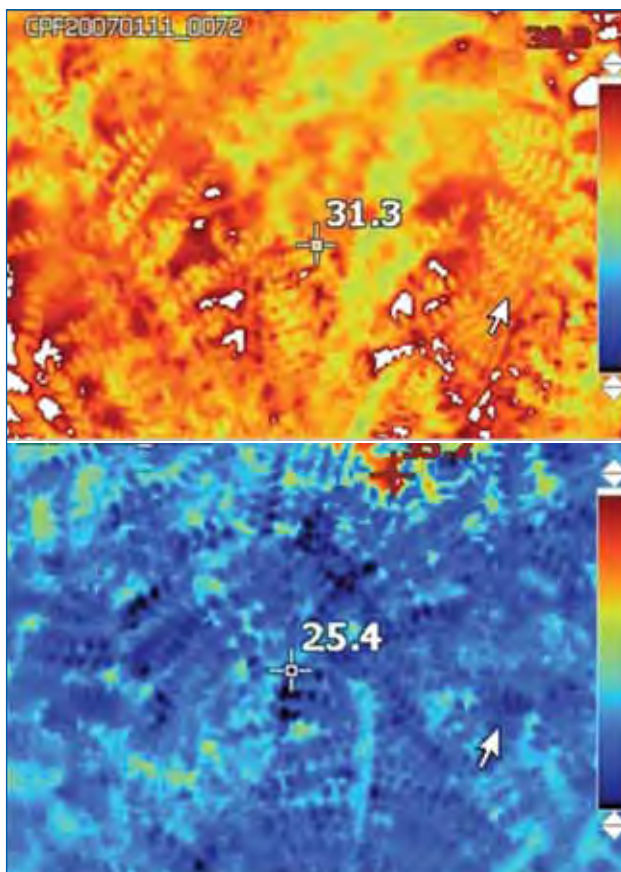
By using this system, scientists are studying the link between genotypic differences and differences in leaf temperatures. Since water extraction leading to transpiration would mechanically contribute to leaf cooling, measurement of leaf temperatures in the field by infrared thermometers could indicate water uptake and provide an easy system for field evaluations.

Finally, simulation modeling to predict the climatic conditions and crops in which roots can bring yield benefit would be a basic anchor of the root research efforts.

The lysimetric system at ICRISAT: Scientists paid detailed attention to developing a lysimetric system that mimics the field conditions as closely as possible. Two types of cylinders are being used. Small tubes are 1.20 m long and 20 cm in diameter, while large tubes are 2.00 m long and 25 cm in diameter. The dimensions of the tubes were determined to provide a volume of soil to each individual plant that corresponds to the volume of soil available

under current sowing density: small tubes for groundnut and chickpea and large tubes for pearl millet, sorghum and pigeonpea. About 3000 small tubes and 1300 large tubes can be planted at a time, where the major purpose is to translate the capacity to precisely measure water uptake differences into a throughput that fits the need of the breeding program.

The cylinders are filled with soil typical for each crop being tested. Dry soil is alternated with watering in a step-wise fashion to ensure that the cylinders are uniformly filled at the same density and at the same moisture level. Normally, two seeds per cylinder are planted in wet soil and thinned to 1 plant per cylinder after germinating. Watering is done at regular intervals. This system is most suited to mimicking a number of drought regimes of a range



Infrared leaf temperatures can indicate water uptake.



Weighing the PVC cylinders to assess plant water use for transpiration.

of crops. To impose water stress, the cylinders are saturated to field capacity and are allowed to drain for one full day and 2 nights. After saturation, a layer of low density polyethylene beads, 2.0 cm thick, is applied uniformly on the soil surface to reduce soil evaporation. Our measurements indicate that 90% of soil evaporation is prevented with the beads. After drainage, cylinders are weighed, and weighed again at regular intervals to assess tube water loss, which almost equates to plant transpiration. The beads also allow pegging in the case of groundnut.

In preliminary experiments, scientists imposed the last irrigation (to saturate the soil profile) at about one week after flowering. Various iterations of the experiment with varying watering regimes produce large differences in water uptake in groundnut genotypes contrasting for drought tolerance (about 1 liter of water differences). Scientists are successfully using this system to assess a large number of accessions (reference collections of groundnut, foxtail and finger millet), as well as transgenic groundnut and chickpea, where they are studying the role of the *DREB1A* gene on triggering more root development under stress conditions.

Even after just one year of operation, the lysimetric facility at ICRISAT promises a bright future for root studies in many crops. Perhaps finally, roots are getting the attention they deserve!



Estimation of macro and micro nutrients with an Atomic Absorption Spectrophotometer.

Health checks for soils

In the semi-arid tropical (SAT) regions of India, rainfed agriculture is greatly influenced by water shortages caused by low, highly variable and erratic rainfall. In addition to water shortage, crop productivity in these regions is also affected by low soil fertility. In the past, little effort was devoted to diagnosing and managing the nutrient-related problems in farmers' fields. The on-going integrated watershed management program by ICRISAT and its partners provided the opportunity to diagnose the soil infertility-related problems by soil testing; and to develop nutrient management protocols and determine on-farm crop responses to fertilization in the SAT zone of India.

Scientists used the soil test results as the entry point for sustainably increasing rainfed agricultural productivity in these regions. Soil testing requires an effective and efficient sampling methodology to be effective, so a stratified random soil sampling method was evaluated and adopted for sampling the Appayapally watershed

in Mahabubnagar district of Andhra Pradesh. Fifteen soil fertility parameters, including major, secondary and micronutrient elements were tested using a computer program. The results showed that this methodology could be used effectively and economically for soil sampling in a watershed of about 500 ha in area.

Once the methodology was standardized, scientists used this in on-farm trials to diagnose nutrient deficiencies. Further, they developed a model that uses soil test results to diagnose nutrient deficiencies and simultaneously formulate balanced nutrient management protocols. Scientists shared the soil test results with farmers before proceeding with the science-based balanced plant nutrient application and recording of the resulting crop

Percentage of farmers' fields deficient in soil nutrients in different states of India.							
State	No. of farmers' fields	OC	AvP	K	S	B	Zn
Andhra Pradesh	1927	84	39	12	87	88	81
Karnataka	1260	58	49	18	85	76	72
Madhya Pradesh	73	9	86	1	96	65	93
Rajasthan	179	22	40	9	64	43	24
Gujarat	82	12	60	10	46	100	82
Tamil Nadu	119	57	51	24	71	89	61
Kerala	28	11	21	7	96	100	18

responses compared with the farmer's input management. The data accumulated through these nutrient management trials were used to develop site-specific nutrient management strategies for enhancing agricultural productivity in these SAT regions.

In the last five years, scientists surveyed a very large number of farmers' fields in several districts of Andhra Pradesh, Karnataka, Tamil Nadu, Rajasthan and Madhya Pradesh, and collected and analyzed over 18,000 soil samples in the Charles Renard Analytical Services Laboratory (CRAL) at ICRISAT headquarters. The results of analysis showed that almost all farmers' fields were low in organic carbon (OC), low-to-moderate in available phosphorus (AvP) and generally adequate in extractable potassium (K). However, the widespread deficiencies of sulfur (S), boron (B) and zinc (Zn) were most revealing; their deficiencies varied with nutrient, soil type, district and state.

Follow-up on-farm trials conducted at different locations in SAT India during various seasons in the last five years showed significant yield responses of a range of field crops to the applications of S, B and Zn (30 to 70%) over farmers' input treatment. The yield responses were larger (up to 150%) over farmers' input treatment when S and the micronutrients were added along with N and P, because farmers have been adding sub-optimal amounts of N and P. Scientists concluded that the deficiencies are widespread and are holding back the potential of rainfed production systems.



Farmers participate in collecting soil samples in Madhya Pradesh, India.

For a sustainable increase in agricultural productivity, soil health needs to be maintained through the diagnosis of nutrient disorders followed by balanced nutrition of crops. Currently, farmers apply small quantities of N, P and K, which are not enough. Also, the application of S and micronutrients to correct deficiencies is a must. Taking this research further for practical use by planners, extension agents and farmers, ICRISAT prepared GIS maps using the interpolation technique to depict the available nutrient status of soils in seven districts under the Sujala Watershed Project in Karnataka. The districts covered by the survey were: Kolar, Chickballapur, Chitradurga, Madhugiri, Tumkur, Dharwad and

Haveri. Further, ICRISAT and partners issued Soil Health cards to the farmers, which bear details of the status of the soils in their farms based on the available nutrients and organic matter status of their fields.

Percentage of farmers' fields deficient in soil nutrients in different districts of Karnataka, India.

District	No. of farmers' fields	OC	AvP	K	S	B	Zn
Dharwad	1129	31	53	1	79	39	44
Haveri	1532	55	42	5	85	46	60
Chitradurga	1489	76	54	15	86	64	80
Madhugiri	987	81	67	30	93	91	51
Tumkur	2054	75	64	35	92	92	50
Kolar	2161	81	31	34	85	87	32
Chickballapur	2257	78	37	34	80	80	52



Harvesting a roselle crop in Niamey, Niger.



Farmers dig "Zai" holes before the rains.

Delicacies from a degraded land

The Sahel, south of the Sahara in northwestern Africa, has a very hostile environment. High temperatures and intense soil-eroding rains are its trademark. The acid sandy soil is nutrient poor with very low organic carbon content. In these harsh conditions, 60 million poor people need to live and grow food.

The Sahelian soil undergoes a continuous process of erosion. Between 70 to 90% of the population live off rain fed agriculture, but drought is a frequent threat, and the lack of nutritional balance in the daily diets is becoming a matter of concern to the international community.

The Bioreclamation of Degraded Lands (BDL) system developed by ICRISAT provides solutions to these constraints. The BDL is an integrated system aimed at increasing food production and income of poor farmers (chiefly women) through the utilization of degraded lands for production of rain fed fruit trees and vegetables.

The BDL method: Degraded lands are scarified to break down the surface crust. Micro-catchments (called demi-lunes) are built to catch and store runoff rainwater. The size of a demi-lune varies, but is usually 2 x 3 m. The harvested water is stored in the soil for long periods and is utilized by a tree planted in the 40 x 80 cm ridge left in the center of the open side of the demi-lune.

Demi-lunes are usually spaced in a 5 x 10 m grid fashion. The area between the demi-lunes is occupied by planting pits known as "zai" holes, which are 20 cm in diameter and 20 cm deep. About 250 g of manure is placed in the bottom of the zai hole and is covered with a 5 cm layer of soil. Traditional vegetables are planted in the zai holes, which also collect runoff water. The deeply placed compost results in extensive root growth allowing the plants to exploit both water and nutrients.

Empowering women: In the Sahel, women are denied the right to own cropland, but a village chief can allot degraded lands to women. The women can then form associations that are legally registered. The association in turn leases each of its members a plot of land in the BDL ranging from 100 to 300 m² in size. In a 200 m² plot, there are two Pomme du Sahel trees and two *Moringa stenopetala* trees intercropped with traditional vegetables.

Crops for the BDL: Trees are a major component of the BDL. They are much more resilient to drought and can cope better with dry spells than annual crops. The most suitable vegetables crops are okra and roselle.

The trees planted in 2006 in ICRISAT's BDL experimental field are still young and are just starting to bear fruit. However, yield data for the traditional vegetables is available. *Senna obtusifolia* can produce



A single tree (here a Pomme du Sahel) is planted in each demi-lune (half-moon structure).

a yield of 1,500 fresh leaves per hectare. The calyx yield of roselle is 450 kg/ha and the fresh yield of okra fruit is 1,000 kg/ha. The estimated annual value of tree and vegetable products can amount to US\$1,200/ha.

Tree species: *Ziziphus mauritiana* is a small tree native to the Sahel but with a wide range of distribution all the way to Thailand. India domesticated this tree. The fruit resembles a small apple, prompting the name Apple of the Sahel, or Pomme du Sahel in French. A mature tree can give a yield of up to 20 kg of Vitamin C rich fruit.

Moringa stenopetala originated in Ethiopia and Kenya. The tree yields large quantities of leaves that are consumed as a vegetable. Its relative, *Moringa oleifera* (moringa or horseradish tree, commonly called drumstick) from India is well known in Sahelian countries. Moringa is one of the most nutritious vegetables known – the green leaves and immature pods and seeds are consumed.

Tamarindus indica (tamarind) is native to dry parts of Africa and South and southeast Asia. The fruit (pod) is usually sour. ICRISAT is testing four varieties of Sweet Tamarind obtained from USDA-Florida.

Sclerocarya birrea sub-species Caffra (marula) is a drought tolerant tree native to Africa's drylands.

The sub-species "Caffra" that grows in southern Africa is a very robust tree. The fruit of *Sclerocarya* are used for juice, wine and liquor production. The kernels are used as tasty nuts. The kernel oil is used in cosmetics.

Other trees being studied for use in the BDL system include: *Acacia senegal*, a Sahelian tree that produces the well-known gum Arabic; *Boswellia papyrifera*, a Frankincense tree from dry Ethiopia; *Acacia tumida*, a fast growing Australian species producing a high biomass on marginal lands; and *Lawsonia inermis* (henna, the leaves are used for cosmetics).

Vegetables: Two traditional leafy vegetables are planted in the BDL system: *Senna obtusifolia* and roselle (*Hibiscus sabdariffa*).

Okra (*Albemoschus esculentus*) is a very important component of the diet of Africans. The World Vegetable Center (AVRDC) in partnership with ICRISAT has identified a short duration cultivar from the Birnie N'koni area that is highly suitable for production in the zai holes of the BDL.

Conclusion: The BDL is an innovative production system of horticulture crops that provides solutions to a range of critical constraints affecting the livelihoods of the rural population of the Sudano Sahel. Because of its simplicity and its many positive attributes the potential for its mass-adoption is very high.



ICRISAT Governing Board 2008



Stein W Bie, Norway
 Chair, ICRISAT Governing Board
 Imsmoen gaard
 Imsroa
 N-2480 Koppang
 Norway
 Phone +47 624 61030
 Mobile +47 9585 5757
 Email Steinbie@online.no



Mangala Rai, India
 Vice-Chairman
 Secretary to the Government of India
 Department of Agricultural Research
 and Education (DARE) and
 Director General, Indian Council of
 Agricultural Research (ICAR)
 Krishi Bhavan
 New Delhi 110 001, India
 Phone +91 11 23382629
 Fax +91 11 23384773
 Email mrai@icar.delhi.nic.in



William D Dar, Philippines
 Director General
 International Crops Research Institute
 for the Semi-Arid Tropics (ICRISAT)
 Patancheru
 Andhra Pradesh 502 324, India
 Phone +91 40 30713222
 Fax +91 40 30713072
 Email w.dar@cgiar.org



Jeff Bennetzen, USA
 Doris and Norman Giles
 Professor of Molecular Biology
 and Functional Genomics,
 Department of Genetics,
 University of Georgia,
 Athens, GA, USA.
 Phone 1-706-542-3698
 Email maize@uga.edu



Philip Ikeazor, Nigeria
 Director, Wholesale Bank | Nigeria North
 United Bank for Africa Plc
 Plot 701 Usuma Street, Abuja, Nigeria
 Phone 08022900572
 Email Philip.ikeazor@ubagroup.com



Nigel Poole, UK
 8, Knowles Avenue
 Crowthorne
 Berks, RG45 6DU, UK
 Phone 44-1-344-771966 or
 44-1-77331-12992
 Email sekona@btopenworld.com



Osamu Ito, Japan
 Director
 Crop Production and Environment Division
 Japan International Research
 Center for Agricultural Sciences (JIRCAS)
 1-1 Ohwashi, Tsukuba
 Ibaraki, 305 8686 Japan
 Phone +81 29 838 6306
 Fax +81 29 838 6651
 Email osamuito@jircas.affrc.go.jp



Molapo Qhobela, SA
 593 Rudolf Street
 Constantia Park
 Pretoria 0010
 Republic of South Africa
 Phone 2712-312-5412
 Fax 2712-323-1413
 Mobile +2782-829-6684
 Email Molapo.qhobela@worldonline.co.za or
 Qhobela.m@doe.gov.za



PK Mishra, IAS, India
 Secretary to the Government of India
 Ministry of Agriculture
 Department of Agriculture
 and Cooperation
 Krishi Bhavan
 New Delhi 110 001 India
 Phone +91 11 2338 2651/8444
 Fax +91 11 2338 6004
 Email secyagri@krishi.delhi.nic.in



P Ramakanth Reddy, IAS, India
 Chief Secretary to the Government
 of Andhra Pradesh
 Secretariat
 Hyderabad 500 022 India
 Phone: +91 40 23452620
 Fax: +91 40 23453700
 Email: csap@ap.nic.in (or)
 cs@ap.gov.in



Margaret D Mwanakatwe, Ghana
 Managing Director
 Barclays Bank of Ghana Limited
 PO Box 2949, Barclays House
 High Street, Accra,
 Ghana



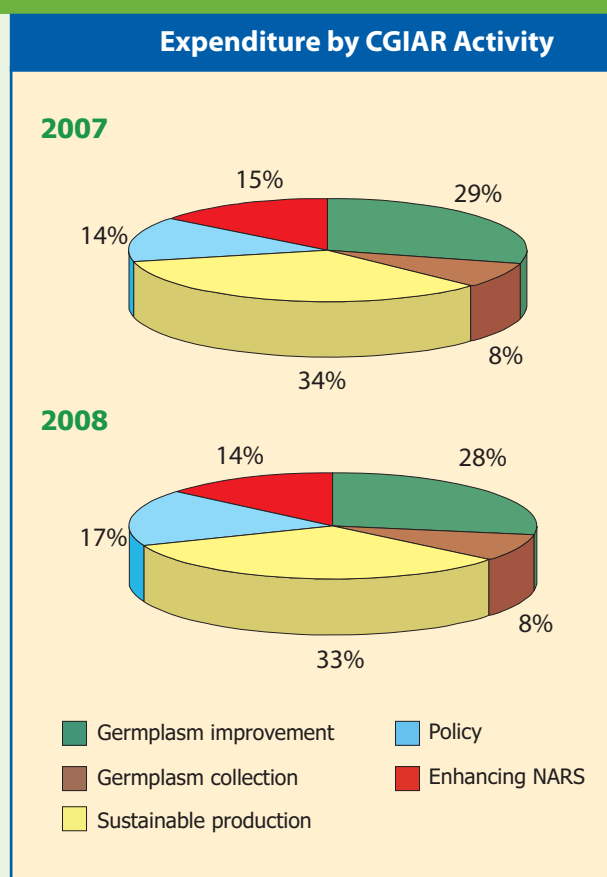
Caroline Pestieau, Canada
 2107-556 Laurier West
 Ottawa
 ON K1R 7X2
 Canada
 Phone +1 613 234 7918
 Fax +1 613 241 5259
 Email Cpestieau@rogers.com



Meryl Williams, Australia
 16 Lorong Batu Uban Satu
 11700 Gelugor
 Pulau Pinang
 Malaysia
 Phone +60 4 655 2831 (home)
 Mobile +61 40 707 0062
 Email m.j.williams@cgiar.org

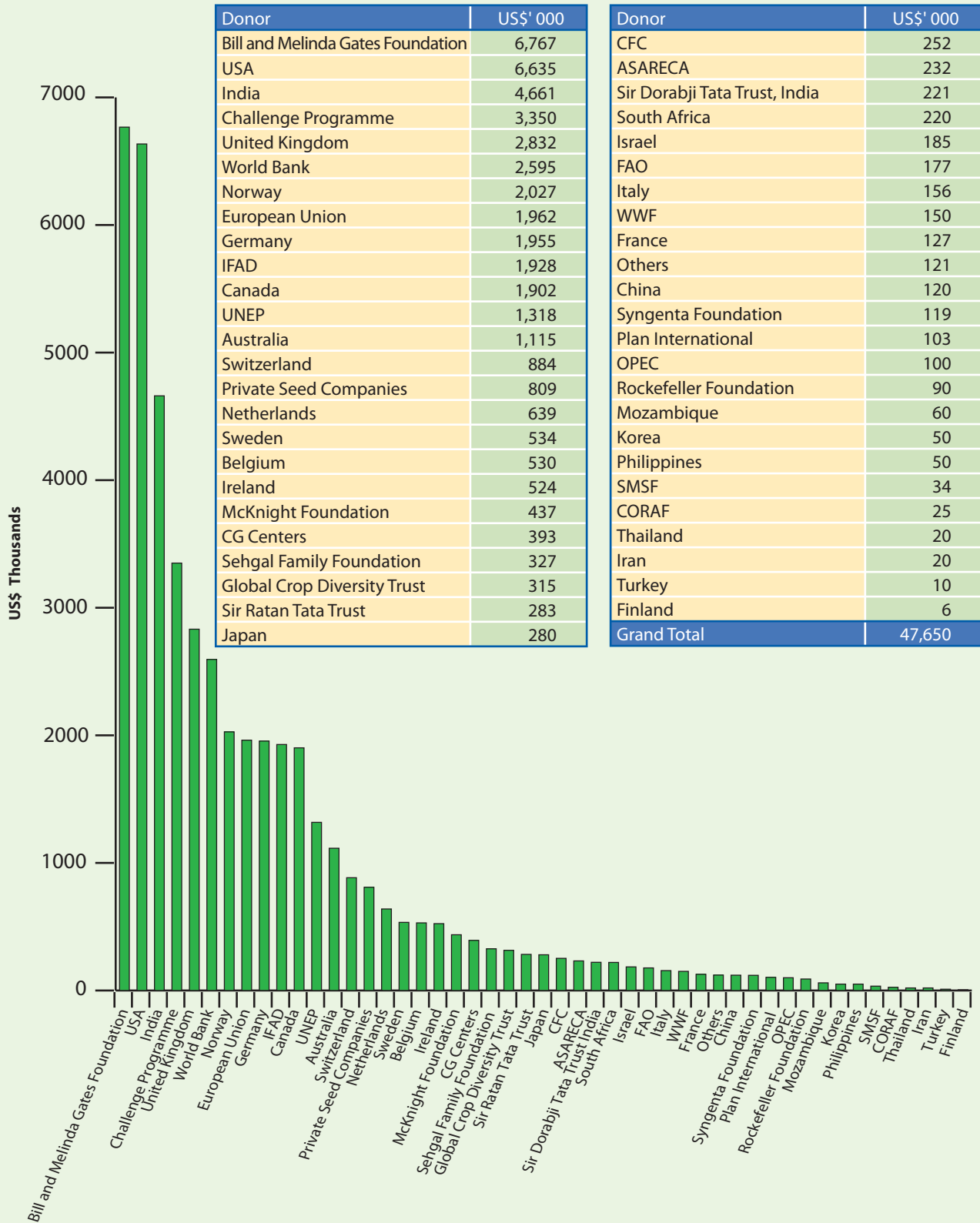
Financial Summary

Balance sheet		
	US\$ thousands	
	2008	2007
Assets		
Cash and cash equivalents	5,378	10,737
Investments	35,208	33,655
Accounts receivable	10,262	11,605
Inventories	881	647
Prepaid expenses	277	319
Property and equipment - net	5,460	5,241
Other assets	1,203	1,239
Total Assets	58,669	63,443
Liabilities		
Accounts payable	9,969	10,096
Accruals and provisions	1,353	634
Payments in advance from donors	12,730	17,562
Long-term liabilities	11,176	12,972
Total Liabilities	35,228	41,264
Net Assets		
Unrestricted		
Unappropriated	12,993	10,255
Appropriated	8,294	9,522
Permanently Restricted	2,154	2,402
Total Net Assets	23,441	22,179
Total Liabilities and Net Assets	58,669	63,443



Operating results and movements in net assets		
	(US\$ '000)	
	2008	2007
Operating results		
Revenue	50,285	42,131
Expenditure	47,547	37,599
Change in net assets, operational	2,738	4,532
Net assets - Unrestricted		
Unappropriated		
Balance, beginning of the year	10,255	5,723
Operating (deficit)/surplus for the year	2,738	4,532
Changes in accounting policies	-	-
Balance, end of the year	12,993	10,255
Appropriated		
Balance, beginning of the year	9,552	9,822
Changes in accounting policies		
Acquisition of Physical facilities	(1,228)	(300)
Total Net Assets - Unrestricted	8,294	9,522
Net Assets - Permanently Restricted	2,154	2,402
Total Net Assets	23,441	22,179

Grant income from donors for 2008



ICRISAT in the News

POOR MAN'S MEAT TO DO FARMERS PROUD

By Peter Musa

SCIENTISTS have developed a new type of pigeon pea that will raise the hope of feeding millions of children in need of vegetable protein.

As the upgraded pigeon is set for double production of protein, farmers too will be laughing all the way to the bank. The new variety, known as shikha, can mature in four months — half the time the traditional one takes and its yield is up by 40 per cent.

Shikha has earned its name from the poor man's meat and it is intercropped with maize, continuously yielding longer after maize is harvested.

Pigeon pea is traditionally a well crop in drier areas which normally the first to be hit by drought.

With medical encouraging more vegetable proteins than meat, the pea is counted among the greens that the poor need.

WEDNESDAY, JUNE 20, 2007



HYDERABAD

...g technique developed by scientists to help small farmers in the semi-arid Sahel region boost their yields is being introduced to poor farmers in East and West Africa. It is hoped that boosting yields through better techniques and more crop varieties will help bring down skyrocketing food and fertilizer prices on the continent, alleviate hunger and poverty. VOA Correspondent [details from our East Africa Bureau in Nairobi]



[caption here]

Researchers at the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) are thriving using a small-scale fertilizer.

Result: The first plan is an international scientific research innovation in sorghum grain to nutritious levels through genetic engineering.

The Ksh1.3 billion (\$21 million) project intends to turn the wide range of genetically modified sorghum grain in Kenya for domestic use.

A consortium of nine global scientific research bodies have come together for the Africa Bio-fortified Sorghum (ABS) project to develop the nutritionally rich sorghum in search of long-term solutions to malnutrition in Africa.

INTERNATIONAL MEDIA.COM
The East Africa
HOME NEWS

Ready for Frankenbeer? Sorghum is one of the few crops that grow well in arid and semi-arid regions, hence, the move to improve it through genetic engineering.

TWO HIGH-PROFILE PARALLEL initiatives are underway in Kenya to improve the nutritional quality of genetically modified sorghum grain in Kenya for domestic use.

Launched separately by different agricultural experts, it is expected to have far-reaching economic implications for thousands of small-scale farmers.

The first plan is an international scientific research innovation in sorghum grain to nutritious levels through genetic engineering. The Ksh1.3 billion (\$21 million) project intends to turn the wide range of genetically modified sorghum grain in Kenya for domestic use.

ICRISAT's 'outstanding' rating

ICRISAT has received an 'outstanding' rating from the World Bank, a press release said on Monday.

The rating is based on the results of the performance measurement system developed by the CGIAR and the World Bank.

They had taken into account how each of the CGIAR centres fared with regard to outputs, impact, quality and relevance research, institutional and financial health and stakeholder perception.

ICRISAT for \$ 2.4 million

India-based International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) director of the Institute in Nairobi says the institute's bound to save many poor families.

ICRISAT has received an 'outstanding' rating from the World Bank, a press release said on Monday.

The rating is based on the results of the performance measurement system developed by the CGIAR and the World Bank.

They had taken into account how each of the CGIAR centres fared with regard to outputs, impact, quality and relevance research, institutional and financial health and stakeholder perception.

ICRISAT for \$ 2.4 million

ಕಿರಣ್ ಪೇಸು ಕೃಷಿಗಾಗಿ ಉಪಯುಕ್ತವಾಗಿದೆ. ಇದು ಹೆಚ್ಚಿನ ಉತ್ಪಾದನೆ ಮತ್ತು ಹೆಚ್ಚಿನ ಪೋಷಕಾಂಶಗಳನ್ನು ಒದಗಿಸುತ್ತದೆ. ಇದು ಹೆಚ್ಚಿನ ಉತ್ಪಾದನೆ ಮತ್ತು ಹೆಚ್ಚಿನ ಪೋಷಕಾಂಶಗಳನ್ನು ಒದಗಿಸುತ್ತದೆ.

ಕಿರಣ್ ಪೇಸು ಕೃಷಿಗಾಗಿ ಉಪಯುಕ್ತವಾಗಿದೆ. ಇದು ಹೆಚ್ಚಿನ ಉತ್ಪಾದನೆ ಮತ್ತು ಹೆಚ್ಚಿನ ಪೋಷಕಾಂಶಗಳನ್ನು ಒದಗಿಸುತ್ತದೆ. ಇದು ಹೆಚ್ಚಿನ ಉತ್ಪಾದನೆ ಮತ್ತು ಹೆಚ್ಚಿನ ಪೋಷಕಾಂಶಗಳನ್ನು ಒದಗಿಸುತ್ತದೆ.

BusinessMirror

BusinessMirror

ICRISAT advocates rescue plan for farmers

ICRISAT advocates rescue plan for farmers

ICRISAT advocates rescue plan for farmers

ICRISAT advocates rescue plan for farmers

ICRISAT advocates rescue plan for farmers

ICRISAT advocates rescue plan for farmers

ICRISAT advocates rescue plan for farmers

ICRISAT advocates rescue plan for farmers

SciDev Net
Science and Development Network

FEATURES

Purging Malawi's peanuts of deadly aflatoxin

Local efforts to put an end to aflatoxin outbreaks are helping groundnut farmers back to prosperity, reports Charles Mkhoka.

For Amos Katosa, a subsistence farmer in Malawi's central region district of Mchinji, the groundnut — popularly known as the peanut — has been his main source of income for the past 40 years.

He describes how the crop helped to pay school fees for his four children and to buy household necessities for his family.

But over the past few decades, peanut sales have been declining at commodity markets.

Little did farmers like Katosa know, but the groundnut, once their best income earner, was facing a major challenge that would jeopardise Malawi's contribution to the international export market.

The challenge was aflatoxin, a highly potent poison contaminating crops and rocking Malawi's groundnut industry, which could no longer meet international standards of quality.

Cost of the problem
Aflatoxins are a waste product from the fungus Aspergillus, which grows on food crops such as groundnuts, sorghum and cassava.

Business Standard
Thursday, Jul 17, 2008

BS Online Markets & Investing Companies & Industry Banking & Finance Economy & Policy Opinion & Analysis Life & Leisure

ICrisat develops hybrid pigeon pea

ICrisat develops hybrid pigeon pea

ICrisat develops hybrid pigeon pea

ICrisat develops hybrid pigeon pea

ICrisat develops hybrid pigeon pea

ICrisat develops hybrid pigeon pea

ICrisat develops hybrid pigeon pea

ICrisat develops hybrid pigeon pea

ICRISAT rated “Outstanding” two years in a row based on CGIAR Performance Indicators

Indicator	ICRISAT's Performance		
	2005	2006	2007
Output targets achieved (%)	98	96	98
Outcomes assessment (scale of 0-15 for 2005 and 1-10 for 2006 & 7)	12	6	7.8
Center commitment to document impacts (scale of 1-10)	5.9	7.3	7.3
Overall impact assessment performance (scale of 1-10)	8.55	8.55	8.55
Peer-reviewed publications per scientist	3.6	3.1	3.1
Publications with developed country partners (%)	43	49	49
Financial health indicators: Short-term solvency (liquidity) (range 90-120 days) Long-term financial stability (range 75-90 days) Efficiency of operations (indirect cost ratio) Cash management on restricted operations	280 122 23 0.58	171 114 23 0.27	206 148 23 0.14
Has the Center completed a Board-commissioned CCER on Center governance and management during last 3 years	No	No	Yes
Does the Board have a clear strategy for communicating with stakeholders (including CGIAR members, other Centers, Partners)?	NA	Yes	Yes
Did the Board discuss and act on any significant deviations: • from previously announced targets and strategic goals as defined in the MTP? • from the budget planned (more than 10 percent)?	Yes, fully No deviations	Yes, fully No deviations	No deviations Yes
Has the Board reviewed the adequacy of Center's risk management and internal control mechanisms?	Yes	Yes	Yes
Does the Board have an approved schedule for CCERs on program matters?	Yes	Yes	Yes
Are procurement policies and their implementation fully consistent with the CGIAR guidelines?	Yes, fully enforced	Yes, fully enforced	Yes, fully enforced
Assessment of Board Statements (scale of 1-8)	5.00	8.00	7.17
Does your Center have Board-approved gender diversity goals?	Yes	Yes	Yes
Overall rating by World Bank	Superior	Outstanding	Outstanding

ICRISAT Senior Staff and Collaborative Staff

(Name, Designation, (Location), Nationality)

Patancheru (Headquarters)

William D Dar, Director General, *Philippines*

C Geetha, Senior Manager, DG's Office, *India*

TN Menon, Head, Internal Audit, *India*

T Kulashekar, Senior Manager, Internal Audit, *India*

Prabhat Kumar, Director, Business and Country Relations, *India* (New Delhi)

Communication Office

Rex L Navarro, Director of Communication and Special Asst to the DG, *Philippines*

Lydia Flynn, Senior Editor-in-Chief, *India*

Project Development and Marketing Office

Bl Shapiro, Director, Project Development and Marketing Office, *USA*

Human Resource and Operations

IR Nagaraj, Director, Human Resources and Operations, *India*

AJ Rama Rao, Senior Manager, Human Resources, *India*

C Narasimha Reddy, Senior Manager, Medical Services, *India*

Housing and Food Services

K Ravi Shankar, Head, Housing and Food Services, *India*

Transport Services

K Jagannadham, Head - Transport Services, *India*

Security Office

TD Peter, Head, Security Services, *India*

Purchase, Supplies and Disposal Services

PN Mallikarjuna, Head, Purchase, Supplies and Disposal, *India*

Financial Services

Rajesh Agrawal, Director-Finance, *India*

S Sethuraman, Head, Financial Services, *India*

Deputy Director General's Office

Dave Hoisington, Deputy Director General (Research), *USA*

B Hanumanth Rao, Manager - Intellectual Property, O/o Deputy Director General, *India*

Global Theme – Agroecosystems (GT-AE)

Benjamin Philipp Kumpf, Communication Specialist (Natural Resources Management), *Germany*

AVR Kesava Rao, Scientist (Agrometeorology) *India*

S Marimuthu, Scientist (Agronomy), *India*

Prabhakar Pathak, Principal Scientist (Soil and Water Management), *India*

Ch Srinivasa Rao, Scientist (Soil Science), *India*

RC Sachan, Special Project Scientist, *India*

Piara Singh, Principal Scientist (Soil Science), *India*

TK Sreedevi, Senior Scientist-Watershed Development, *India*

Suhas P Wani, Principal Scientist-Watersheds, *India*

Global Theme – Biotechnology (GT-Biotech)

Jayashree Balaji, Scientist-Bioinformatics, *India*

Pooja Bhatnagar, Scientist (Cell/Molecular Biology), *India*

Mukesh Dhillon, Special Project Scientist, *India*

CT Hash, Principal Scientist (Breeding), *USA*

Nalini Mallikarjuna, Senior Scientist (Cell Biology), *India*

L Krishna Murthy, Scientist (Plant Physiology), *India*

Abhishek Rathore, Scientist (Biometrics), *India*

S Senthilvel, Scientist (Biotechnology), GT-Biotech, *India*

Kiran K Sharma, Principal Scientist (Cell Biology), *India*

Vincent Vadez, Senior Scientist (Plant Physiology), *France*

Rajeev K Varshney, Principal Scientist-Biotechnology, *India*

Varsha Wesley, Special Project Scientist (Plant Pathology), *Australia*

Global Theme - Crop Improvement (GT-CI)

CLL Gowda, Global Theme Leader-Crop Improvement, *India*

A Ashok Kumar, Scientist-Sorghum Breeding, *India*

Ashok Alur, Project Coordinator-CFC Project, *India*

Pratap Singh Birthal, Principal Scientist (Socioeconomics), *India*

PM Gaur, Principal Scientist (Breeding), *India*

S Gopalakrishnan, Scientist-Bioproducts, *India*

SK Gupta, Scientist (Pearl Millet Breeding), *India*

T Nepolean, Special Project Scientist, *India*

SN Nigam, Principal Scientist (Breeding), *India*

Suresh Pande, Principal Scientist (Pathology), *India*

KN Rai, Principal Scientist (Breeding), *India*

GV Ranga Rao, Special Project Scientist, IPM, *India*

P Srinivasa Rao, Scientist (Sorghum Breeding), *India*





Belum VS Reddy, Principal Scientist (Breeding),
India

Aruna Rupakula, Scientist (Breeding), *India*

KB Saxena, Principal Scientist (Breeding), *India*

HC Sharma, Principal Scientist (Entomology),
India

Mamta Sharma, Scientist (Legumes
Pathology), *India*

Rajan Sharma, Scientist (Cereals Pathology),
India

Rakesh Srivastava, Scientist (Pigeonpea
Breeding), *India*

RP Thakur, Principal Scientist (Pathology) and
Head, Plant Quarantine Unit, *India*

HD Upadhyaya, Principal Scientist (Genetic
Resources), *India*

Global Theme - Institutions, Markets, Policy and Impacts (GT-IMPI)

MCS Bantilan, Global Theme Leader-
Institutions, Markets, Policy and Impacts,
Philippines

VR Kiresur, Senior Scientist (Economics), *India*

Kamanda Josey Ondieki, Associate
Professional Officer (Institutional Innovation
Specialist), *Kenya*

P Parthasarathy Rao, Principal Scientist
(Economics), *India*

K Purnachandra Rao, Principal Scientist
(Village Level Studies), *India*

Agri-Business Incubator (ABI)

MS Karuppan Chetty, Manager, ABI, *India*

S Aravazhi, Deputy Manager, ABI, *India*

R Bhubesh Kumar, Assistant Manager, ABI,
Kenya

Agri-Science Park (ASP)

Abdul Rahman Ilyas, Chief Operating Officer,
ASP, *India*

Saikat Dutta Mazumdar, Technical Director,
NutriPlus Knowledge Center, *India*

Farm Engineering Services (FES)

M Prabhakar Reddy, Head, Farm Services, *India*

C Buchappa, Manager, Engineering,
Engineering Services, *India*

Suresh C Pillay, Manager, Farm Services, *India*

K Hanmanth Rao, Manager, Farm Services,
India

Knowledge Management Sharing (KMS)

V Balaji, Global Leader, Knowledge
Management Sharing, *India*

Pradyut Modi, Senior Manager, Information
Systems Unit, *India*

S Srinivas, Head, Library and Documentation
Services, *India*

Rosana P Mula, Coordinator, Learning Systems
Unit (LSU), *Philippines*

Eastern and Southern Africa (ESA)

Nairobi, Kenya

Said N Silim, Director, ESA, *Uganda*

Richard B Jones, Assistant Regional Director,
ESA, GT-CI, *UK*

Tsedeke Abate, Project Manager - Tropical
Legumes-II Project, GT-CI, *Ethiopia*

Peter Cooper, Principal Scientist, GT-AE, *UK*

Santie M de Villiers, Regional Scientist
(Legume Cell Biology), GT-Biotech, *South
Africa*

Prakash N Dixit, Associate Professional Officer
(Agroclimatologist/Crop Modelling), GT-AE,
India

Dan Kiambi, Senior Scientist Biotech, GT-
Biotech, *Kenya*

Bancy E Mati, Regional Facilitator-IMAWESA,
Kenya

Henry F Ojulong, Post Doctoral Fellow,
GT-CI, *Uganda*

Mary A Mgonja, Principal Scientist (Breeding),
GT-CI, *Tanzania*

Philip Ndungu, Regional Administrator, *Kenya*
NVPR Ganga Rao, Scientist (Breeding), GT-CI,
India

KPC Rao, Principal Scientist, GT-AE, *India*

Kassa Semagn, Molecular Geneticist/Technical
Coordinator, *Ethiopia*

Bekele Shiferaw, Senior Scientist-Resource and
Development Economics, GT-IMPI, *Ethiopia*

Marcel van den Berg, Associate Professional
Officer (Business & Finance), *Netherlands*

Bulawayo, Zimbabwe

SJ Twomlow, Global Theme Leader, GT-AE, *UK*

Isaac J Minde, Principal Scientist (Economics)
and Country Representative, GT-IMPI,
Tanzania

John P Dimes, Senior Scientist (Farming
Systems Modeling), GT-AE, *Australia*

Sabine Homann, Scientist, GT-AE, *Germany*

Hove Lewis, Scientist (Agronomy), GT-AE,
Zimbabwe

Kizito Mazvimavi, Scientist (Agricultural
Economics), GT-AE, *Zimbabwe*

Suraj Pandey, Associate Professional Officer
(GIS), GT-AE, *India*

Swathi Sridharan, Editor-ESA, Communication
Office, *India*

Andre F van Rooyen, Regional Coordinator,
Desert Margins, GT-AE, *South Africa*

Govindan Velu, Associate Professional Officer
(Plant Breeding), GT-CI, *India*

Lilongwe, Malawi

Moses Siambi, Senior Scientist and Country
Representative, GT-CI, *Kenya*



ES Monyo, Principal Scientist (Breeding), GT-CI, *Tanzania*

Moses Osiru, Associate Professional Officer (Groundnut Pathology), GT-CI, *Uganda*
Maputo, Mozambique

Carlos E Dominguez Otero, Country Representative and Seed Systems Specialist, *Colombia*

West and Central Africa (WCA)

Niamey, Niger

Farid Waliyar, Director, WCA, GT-Biotech, *France*

Ramadjita Tabo, Asst Regional Director and Principal Scientist (Agronomy), *Chad*

Saidou Koala, Principal Scientist & Coordinator DMP, Global Coordinator-DMP, *Burkina Faso*

MS Diolombi, Regional Finance Officer and Administrator, WCA Region, *Nigeria*

Debesaye Senbeto Hailu, Regional Scientist, *Ethiopia*

Bettina Haussmann, Senior Scientist (Pearl Millet Breeding), *Germany*

Falalou Hamidou, Regional Scientist (Physiology), GT-Biotech, *Niger*

Jupiter Ndjeunga, Senior Scientist-Economics, GT-IMPI, *Cameroon*

Albert Nikiema, Regional Scientist, *Burkina Faso*

Dov Pasternak, Consultant, GT-AE, *Israel*

Olanrewaju Smith, Principal Scientist, *Canada*
Bamako, Mali

BR Ntare, Principal Scientist (Breeding) and Country Representative, *Uganda*

Norbart Maroya, Regional Scientist (WASA Coordinator), *Benin*

Tom van Mourik, Associate Professional Officer (Agronomy-Striga), *Netherlands*

Eva W Rattunde, Principal Scientist (Sorghum Breeding & Genetic Resources), GT-CI, *Germany*

HFW Rattunde, Principal Scientist (Sorghum Breeding & Genetic Resources), GT-CI, *USA*

Marjolein Smit, Associate Professional Officer (Human Nutrition), GT-CI *Netherlands*

PCS Traore, Remote Sensing Scientist & GIS Head, GT-AE, *France*

Collaborative Staff

AVRDC

Madan L Chadha, Director, AVRDC-RCSA, (Patancheru), *India*

Ekow Akyeampong, Regional Coordinator, (Bamako, Mali), *Ghana*

Sokona Dagnoko, Vegetable Breeder, (Bamako, Mali), *Mali*

Messa Diouf, Vegetable Breeder, *Senegal*

Issoufou A Kollo, Plant Pathologist, (Mali), *Bamako, Niger*

Sanjeet Kumar, Vegetable Breeder (Niamey), *India*

Albert Rouamba, Vegetable Breeder, (Bamako, Mali), *Burkina Faso*

CIP

Sarathchandra G Ilangantileke, Post Harvest Specialist, *Sri Lanka* (New Delhi)

CIMMYT

Pervez H Zaidi, Scientist, Global Maize Program (ARMP)

CIRAD

Benoit Clerget, Principal Scientist-Echo-Physiology, (Bamako), *France*

Kirsten Vom Brocke, Principal Scientist, Breeding, (Bamako, Mali), *Germany*

Fabrice Sagnard, Principal Scientist-Population Genetics, (Bamako), *France* (Deceased Nov 2008)

ILRI

Michael Blümmel, Global Project Leader, (Patancheru), *Germany*

S Anandan, Senior Scientist (Animal Nutrition) (Patancheru), *India*

Rainer Asse, Sociologist (Post Doc), (Bamako, Mali), *USA*

Augustine Ayantunde, Animal Scientist, (Bamako, Mali), *Nigeria*

Peter G Bezkorowajnyj, Project Manager, (Patancheru), *Canada*

Oumar Diall, Veterinary Scientist, (Bamako), *Mali*

Abdou Fall, Animal Scientist, Bamako, Mali, *Senegal*

Bioversity

PN Mathur, Principal Scientist, (New Delhi), *India*

IWMI

Madar Samad, Regional Director, South Asia, (Patancheru), *Sri Lanka*

K Palanisami, Director, IWMI-TATA Policy Research Program, (Patancheru), *India*

JIRCAS

Ryoichi Matsunaga, Team Leader and Soil Scientist, (Niamey), *Japan*

Keiichi Hayashi, Soils Scientist, (Niamey), *Japan*

Akira Kamidohzono, Soil Scientist, (Niamey), *Japan*

Hide Omae, Team Leader and Soil Scientist, *Japan*

Satoshi Nakamura, Soils Scientist, (Niamey), *Niger, Japan*

ODI

Catherine Longley, Special Project Scientist-ODA, (Nairobi), *UK*

ROCARS

Aboubacar Toure, Associate Coordinator, (Bamako, Mali), *Mali*

Suri Sehgal Foundation

MD Gupta, Technical Director, (Patancheru), *India*

WWF

Biksham Gujja, Project Leader, ICRISAT-WWF Collaborative Project, (Patancheru), *India*

Development Investor Partnerships Initiated in 2008

Supplementing the CGIAR's core support to carry out new targeted projects

Donor	Project	Collaborators
Asian Development Bank	Component 2 on Vulnerability to Climate Change: Adaptation Strategies and Layers of Resilience	Central Research Institute for Dryland Agriculture (CRIDA), India; Guizhou Academy of Agricultural Sciences (GAAS), China; Center for Policy Dialogue (CPD), Bangladesh; Council for Agricultural Research Policy (CARP), Sri Lanka; and Pakistan Agricultural Research Council (PARC), Pakistan.
Australia – ACIAR	Improving postrainy sorghum varieties to meet the growing grain and fodder demand in India	National Research Centre for Sorghum (NRCS), India; International Livestock Research Institute (ILRI), India; University of Queensland, Australia; Queensland Department of Primary Industries & Fisheries, Australia.
Australia – ARC Linkage Grant through UWA/ COGGO	Physiological and molecular characterisation of salinity tolerance in chickpea	University of Western Australia (UWA), Australia; Council of Grain Growers Organization (CLIMA), Australia
Bill and Melinda Gates Foundation (BMGF)	3rd Regional Conference on Agricultural Water Management in Eastern and Southern Africa	International Fund for Agricultural Development, Italy; Ankober Traditional Terraces, Ethiopia; Anjenie Soil and Water Conservation Watershed, Ethiopia; Endris Irrigation Users Group, Ethiopia; Jelissa Small-Scale Irrigation Cooperative, Ethiopia; Minjar Shenkora Rainwater Harvesting, Ethiopia; Kanyuambora Tumaini Self Help Group, Kenya; Sagana-Maganjo Farmers Group, Kenya; Mphaki Horticultural Association, Lesotho; Ngolowindo Horticultural Cooperative Society, Malawi; Inkingiyubuhinzi Cooperative, Rwanda; El Dagag Development Organization, Sudan; Lekitatu Irrigation Scheme, Tanzania; Makanya Kitivo Water Harvesting Group, Tanzania; Nyanga-Kentale Kukuuma Butonde (NKKBG) Farmers Group, Uganda; Chinsungwe Farmers Group, Zambia
Canada : CIDA-Niamey	Renforcement du pouvoir économique des femmes à travers la propriété foncière et la génération des revenus (Strengthening of womens' economic capacity through land ownership and incomes generation)	Action des Groupements pour le Developpement Local (AGDL), Niger; Contribution au Developpement Rural (CDR), Niger

Donor	Project	Collaborators
CIDA-Niamey	Promotion de plantations d'arbres fruit Institut d'economie rurale, Mali; dans la commune rurale de Karma, Département de Kollo, pour la sécurité alimentaire et la génération de revenus (Promotion of fruits tree plantations in the rural district of Karma, Department of Kollo, for food security and income generation)	Action des Groupements pour le Developpement Local (AGDL), Niger
CIDA-Niamey	Promotion de plantations d'arbres fruit Institut d'economie rurale, Mali; dans la commune rurale de Safo, Département de Maradi, villages (Soumarana, Adaradou et Ntarna), pour la sécurité alimentaire et la génération de revenus (Promotion of fruits tree plantations in the rural district of Safo, Department of Maradi, for food security and income generation)	Contribution au Developpement Rural (CDR), Niger
Commonwealth of Learning (COL)	To organise and facilitate the Think Tank Meeting at Patancheru from 22-24 September 2008 to find ways to best utilize electronic and human interventions to scale up information and communication technologies for development (ICT4D) initiatives to reach disadvantaged rural masses	Commonwealth of Learning, Canada
IDRC	Legume diversification in small-holder tobacco systems of Malawi: Climate risk management and market opportunities	The National Smallholder Farmers' Association of Malawi (NASFAM), Malawi; Meteorological Department, Malawi, Reading University, UK
Consortia of donors (via CGIAR)		
Bioversity/SGRP/WB	Collective Action for the Rehabilitation of Global Public Goods in the CGIAR Genetic Resources Systems: Phase 2	ICARDA, IRRI, CIMMYT, CIP, WARDA, Bioversity International
	Alliance Bioenergy Platform – Biofuels Symposium	ICRISAT, CIMMYT, IFPRI, CIAT, CIFOR, ICARDA, ICRAF, ILRI, IRRI, IWMI
CGIAR/IFAR	Development and evaluation of transgenic groundnut plants for resistance against foliar fungal diseases	
CIAT/SSA CP	Adapting integrated watershed management for productivity and beneficial conservation of agricultural landscapes in the Lake Kivu Pilot Learning Site	Mekerere University, Uganda; International Water Management Institute, Sri Lanka; Institut des Sciences Agronomiques du Rwanda (Rwanda Agricultural Research Institute), Rwanda; Plate Forme Diobass, DR Congo; Syndicat des agri-éleveurs du Rwanda, Rwanda; Syndicat de Défense des Intérêts Paysans (SYDIP) Nord-Kivu, DR Congo; Kabale Local Government, Uganda

Donor	Project	Collaborators
CP – CPWF – Waternet	Integrated water resource management for improved rural livelihoods -- Quantifying water productivity in rainfed cropping systems in Limpopo province	Waternet, Zimbabwe; Limpopo University, South Africa; Venda University, South Africa; Institute for Soil, Climate and Water, South Africa
ICARDA	Establishment of Global Crop Register for Chickpea	ICARDA
IFPRI	Strengthening cropping system evaluation for agriculture production and resource management policy analysis	
IFPRI	Collaboration on policy briefs on local seed markets in India, Kenya, Mali and Niger (Dr Latha Nagarajan to prepare discussions and policies papers)	IFPRI, Institut d'economie rurale, Mali; MS Swaminathan Foundation, India; Institut National de Recherches Agronomiques du Niger (INRAN), Niger
IFPRI-BMGF	Planning Grant for Consultative Proposal Preparation and Mock-up Prototype Portal Development under Global Open Food and Agriculture University (GO-FAU) Program	International Food Policy Research Institute, USA
CIMMYT/GCP/BMGF	Capacity Building Needs related with objectives 1 & 4 of the TLI project	Chitedze Agricultural Research Station, Malawi; Institut Senegalais de Recherches Agricoles (ISRA), Senegal; Ethiopian Institute of Agricultural Research, Ethiopia; Lake Zone Agricultural Research Development Institute, Tanzania
CIMMYT -- GCP	Product Delivery Coordinator in the Challenge Initiative: Improving drought tolerance in chickpea for Africa and Asia	Ethiopian Institute of Agricultural Research, Addis Ababa, Ethiopia; Kenya Agricultural Research Institute, Nairobi, Kenya; Egerton University, Njoro, Nakuru, Kenya; Indian Institute of Pulses Research, Kanpur, UP, India; Rajasthan Agricultural University, Bikaner, Rajasthan, India; Rajmata Vijayaraje Scindhia Krishi Vishwa Vidyalaya, Gwalior, MP, India; Acharya NG Ranga Agricultural University, Hyderabad, AP, India; University of Agricultural Sciences, Bangalore, Karnataka, India
CIMMYT -- GCP	Provision of genotyping services in support of the GCP	
Generation Challenge Program (GCP) through CIMMYT	Cultivating Plant Diversity for the Resource Poor – Generation Challenge Program Commissioned Research Activities	Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), France; All India Coordinated Pearl Millet Improvement Project (AICPMIP), India; Central Arid Zone Research Institute (CAZRI), India; ILRI, India; Embrapa, Brazil; IRRI, Bioversity International, CIMMYT, CIP, National Institute of Advanced Studies, India; John Innes Center (JIC), UK; Wageningen University, Netherlands; National Institute of Agricultural Botany (NIAB), UK; National Research Center for Sorghum (NRCS), India; Institut Senegalais de Recherches Agricoles (ISRA), Senegal
Generation Challenge Program through CIMMYT	A dataset on allele diversity at orthologous candidate genes in GCP crops (ADOC)	

Donor	Project	Collaborators
Generation Challenge Program through CIMMYT	Phenotyping sorghum reference set for drought tolerance	
Generation Challenge Program through CIMMYT	Improving molecular tools for pearl millet	
Generation Challenge Program through CIMMYT	Assessment of the breeding value of superior haplotypes for AltSB a major AI tolerance gene in sorghum: linking upstream genomics to acid soil breeding in Niger and Mali (ALTFIELD)	
Generation Challenge Program through CIMMYT	Linking genetic with phenotype for drought tolerance traits through molecular and physiological characterization of a diverse reference collection of chickpea	
Generation Challenge Program through CIMMYT	Development of Generation CP Domain Models and Ontologies	
Generation Challenge Program through CIMMYT	High performance computing facilities for the GCP platform	
Generation Challenge Program through CIMMYT	Data Analysis Support for Existing Projects in SP2 with Emphasis on Integrating Results from Microarray and Mapping Experiments	
Generation Challenge Program through CIMMYT	Development of an integrated GCP Platform	
Generation Challenge Program through CIMMYT	GCP Quality Management and Data Quality Improvement	
Generation Challenge Program through CIMMYT	Further Development and Support for Use of IMAS by NARS and other user communities	
Generation Challenge Program through CIMMYT	Phenotyping course for drought related traits across tropical legume - Concepts and practices	
Generation Challenge Program through CIMMYT	Improving drought tolerance in chickpea for Africa and Asia	

Donor	Project	Collaborators
Generation Challenge Program through CIMMYT	MAGIC: Multiparent Advanced Generation Inter-Cross development for gene discovery and allele validation	
Generation Challenge Program through CIMMYT	Developing Genomics Resources for Pigeonpea using Next Generation Sequencing Technologies	
Generation Challenge Program through CIMMYT	Enhancing groundnut (<i>Arachis hypogaea</i> L.) genetic diversity and speeding its utilization in breeding for improving drought tolerance	
Generation Challenge Program through CIMMYT	Developing DArT markers for several crops in the GCP	
China	Establishment of CAAS-ICRISAT-ICARDA Joint Centre of Excellence for Dryland Development	Chinese Academy of Agricultural Sciences, China; ICARDA, Syria.
EC/ACF-Zimbabwe	Technical support for the Promotion of conservation farming by Action contre la Faim (ACF) in Chipinge District, Zimbabwe	Action Contre la Faim (ACF), Zimbabwe; AGRITEX, Zimbabwe
EC-CARE Intl.	Support to Vulnerable Groups to Achieve Food Security Project	Care International, Malawi; Target National Relief and Development (TANARD), Malawi
EU/ORAP	Improved goat production and market participation for food security and sustainable livelihoods in Zimbabwe	Organization of Rural Associations for Progress (ORAP), Zimbabwe; Netherlands Development Organisation (SNV), Zimbabwe; Agritex Agricultural Technical and Extension Services, Zimbabwe; Ministry of Agriculture, Department of Agricultural Research for Development, Zimbabwe
EC/University of Copenhagen (UoC)	Domestication of <i>Jatropha curcas</i> for oil production on smallholders farms in the Sudano-Sahelian region with focus on Mali	Forest and Landscape Denmark (FLD), Denmark; University of Copenhagen (UoC), Denmark; Institut d'Economie Rural (Institut d'economie rurale, Mali); Mali; World Agroforestry Centre, Mali ; Mali FolkCentre (MFC), Mali; Mali Biocarburant S.A. (MBSA), Mali
EC-Wageningen	Novel staple food-based strategies to improve micronutrient status for better health and development in sub-Saharan Africa (INSTAPA)	Wageningen University, Netherlands; Swiss Federal Institute of Technology (ETH) Zuerich, Switzerland; Institut de recherche de developpement (IRD), Montpellier; Institut d'economie rurale, Mali; , France, London School of Hygiene and Tropical Medicine (LSHTM), London, UK, Departement de Technology Alimentaire, Centre National de la Recherche Scientifique et Technologique (DTA), Burkina Faso, University of Abomey Calavi, Benin; University of Nairobi, Kenya, University of KwaZulu Natal, South Africa, International Food Policy Research Institute/ Harvest Plus (IFPRI/HP). International Institute for Tropical Agriculture (IITA) KARI, Kenya; IITA, Nigeria; Harvest Plus, USA
FAO	Assessing the promotion of conservation farming adoption among the smallholder farmers in Zimbabwe	NGOs in Zimbabwe

Donor	Project	Collaborators
CIRAD	Reproducing crops, Reproducing a society	Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), France
CIRAD-BIOS	Agroecological adaptation and varietal adaptation	Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), France; Institut d'economie rurale, Mali; University of Valparaiso, Chile
BMZ/GTZ	Sustainable conservation and utilization of genetic resources of two underutilized crops – finger millet and foxtail millet – to enhance productivity, nutrition and income in Africa and Asia	University of Hohenheim, Germany; National Agricultural Research Organization, Uganda; Kenya Agricultural Research Institute, Kenya; Department of Research and Development, Tanzania; University of Agricultural Sciences, Bangalore, India; Rajendra Agriculture University, Muzaffarpur, India; Acharya N G Ranga Agricultural University, India
BMZ/GTZ	Assess and establish Andhra experience of establishing consortium of capacity building service providers for watershed management	Government of Andhra Pradesh, India
BMZ/GTZ	To establish and support state level consortiums of capacity building service providers under the public programmes for watershed management in the states of Karnataka, Rajasthan and Uttarakhand	National Institute of Agricultural Extension and Management (MANAGE) India; Govt. of India, State Governments of Karnataka, Rajasthan, Uttarakhand, NGOs and Universities
BMZ/GTZ AAACC	Community management of crop diversity to enhance resilience, yield stability and income generation in changing West African climates	United Nations Development Program, Burkina Faso; KWG, Ghana; Union of Farmers of the Circle of Tominian, Mali; Fuma Gaskiya, Niger; AGRHYMET Regional Centre, Niger; Institut d'Economie Rurale, Mali; Institut National de l'Environnement et Recherche Agricole (INERA), Burkina Faso; Institut National de Recherches Agronomiques du Niger (INRAN), Niger; Savannah Agricultural Research Institute (SARI), Ghana; University of Hohenheim (UH), Stuttgart, Germany
Global Crop Diversity Trust	Agro-morphological characterization of West and Central African accessions selected from the GCP pearl millet reference collection	Institut d'Economie Rurale, Mali; Lake Chad Research Institute, Nigeria
Dept. of Biotechnology India (DBT)	Information system for Marker Assisted Breeding	
DBT	Development and evaluation of transgenic groundnut for resistance to the groundnut stem necrosis disease (GSND) caused by the tobacco streak virus (TSV)	Donald Danforth Plant Science Center, USA
DBT	DBT-ICRISAT platform for translational research on transgenic crops (PTTC)	

Donor	Project	Collaborators
DBT/NCPGR	Construction of the transcript map and development of functional markers for chickpea	National Center for Plant Genome Research, India
DBT-UAS	Marker assisted introgression of foliar disease resistance in groundnut	University of Agricultural Sciences, Dharwad, India
Department of Scientific & Industrial Research-DSIR, Ministry of Science & Technology, GOI	For establishment of Technopreneur Promotion Programme (TePP) Outreach Centre (TUC)	
Dept of Bio-Technology (DBT)	Molecular Marker Assisted introgression of <i>Aspergillus flavus</i> resistance and aflatoxin production in to farmer preferred vairties of groundnut	
Dept of Bio-Technology (DBT)/ UAS, GKVK	An effort to link genetic diversity with phenotype for drought tolerance traits through molecular and physiological characterization of a reference collection of groundnut	University of Agricultural Sciences, Bangalore, India
DSIR - GOI	Establishment of Technopreneur Promotion Programme (TePP) Outreach Centre (TUC) at ICRISAT	
GOI - Dept of Land Resources	Capacity building training programme under common guidelines 2008 for watershed development project	
GoI/MoA/DOAC	Taking Pigeonpea Hybrids to the Doorsteps of Farmers under National Food Security Mission (NFSM)	Agricultural Research Station, AICRP Pulses, Gulbarga, India; University of Agricultural Sciences, Dharwad, India; AP State Seeds Development Corporation Ltd., India; Department of Agriculture and Cooperation, Ministry of Agriculture, India; College of Agriculture, Parbhani, India; Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola, India; S.D. Agricultural University, SK Nagar, India; National Seeds Corporation (NSC) Limited, India;
GoI/MoA/DOAC/ ISOPOM	Exploiting Host Plant Resistance for <i>Helicoverpa</i> Management to increase the Production & Productivity of Chickpea & Pigeonpea under Rainfed Conditions in India	Acharya N G Ranga Agricultural University, India; University of Agricultural Sciences, Regional Research Station, Gulbarga, India
Govt of AP	Establishment of Bio-Food Knowledge Center in Agri-Science Park at ICRISAT [renamed as NutriPlus Knowledge Center (NutriPlus)]	Department of Biotechnology, Govt of Andhra Pradesh, India; Plant & Food Research, New Zealand, Nandan BioMatrix Limited, India
Govt of AP	For organizing 2nd Agbiotech Day Conference and Exhibition as a part of BioAsia 2008.	Government of Andhra Pradesh, India

Donor	Project	Collaborators
Govt of AP	Towards sponsorship for meeting the cost of organising a focused networking events and showcasing Genome Valley in the Bio International Convention, BIO 2008 to be held from 17-20 Jun 2008 in San Diego, USA	Govt of Andhra Pradesh, India; Maryland India Business Round Table (MIBRT), USA and Private Sector Partners
Govt of Karnataka	Establishing Participatory Research-cum-Demonstrations for Enhancing Productivity with Sustainable Use of Natural Resources in Sujala Watersheds of Karnataka (cost extension)	Government of Karnataka, University of Agricultural Sciences, Bangalore, Dharwad, NGOs, BAIF Development Research Foundation, India; MYRADA, India
ICAR	Marker aided selection technology for improvement of pearl millet	All India Coordinated Pearl Millet Improvement Project, ICAR, Rajasthan, India
ICAR/NAIP	Value Chain Model for bio-ethanol production from sweet sorghum in Rainfed areas through collective action and partnership	National Research Centre for Sorghum (NRCS), Hyderabad, India; Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, India; Indian Institute of Chemical Technology (IICT), Hyderabad, India; International Livestock Research Institute (ILRI), Hyderabad, India; Sri Venkateswara Veterinary University (SVVU), Hyderabad, India; Rusni Distilleries Pvt Ltd., Hyderabad, India
NFSM, Govt of India	Enhancing Chickpea production in rainfed rice fellow land (RRFL) of Chattisgarh and Madhya Pradesh States of India followed improved pulse production and protection technologies (IPPPT)	Jawaharlal Nehru Krishi Viswavidyalaya, India; Indira Gandhi Krishi Viswavidyalaya, Chattisgarh, India; NGOs, India
IFAD	Linking the Poor to Global Markets: Pro-poor Development of Biofuel Supply Chains	Acharya N G Ranga Agricultural University, India; Mahatma Phule Krishi Vidyapeeth, India; Mariano Marcos State University, Philippines; Institut d'Economie Rural (Institut d'economie rurale, Mali); Mali; CLAYUCA, Colombia; CIAT Regional Center for Asia, Lao PDR; VAAS and NLU, Vietnam; GSCR, China
Irish Aid	Malawi seed industry development	Seed Trade Association of Malawi (STAM) and the National Smallholder Farmers' Association of Malawi (NASFAM)
Mozambique	Support for Interaction Between Farmers, and Agricultural Concession Companies Through Accelerated Technology Exchange	National Agronomic research Institute (IIAM), Mozambique; Mozambique leaf tobacco company (MLTC), Mozambique
Mozambique	Improving adoption rates by linking variety development to seed market	National Agronomic research Institute (IIAM), Mozambique; local seed companies, Mozambique
Norway	Producing more food grain with less water: promoting farm-based methods to improve water productivity	WWF International, India; Agriculture Man Ecology Foundation (AMEF), India; Peoples' Science Institute (PSI), India; Vikas Sahyog Kendra (VSK), Jharkhand, India; Centre for Rural Operations and Programmes Society (CROPS), India; Sher-e-Kashmir University of Agricultural Sciences & Technology (SKUAST), India
Norwegian Research Council	Linkages between Rural Institutions and Redistributive Networks: Agricultural Marketing Coops, Elite Capture, and Patrimonialism in East Africa	Molde University College, Norway

Donor	Project	Collaborators
AVRDC/BMZ-GTZ	Genetic, Physiological, and Molecular Approaches to Improve Heat and Drought Tolerance of Tropical Tomato	Asian Vegetable Research Development Center, Taiwan
Bill and Melinda Gates Foundation	Village Level Studies for Evidence-based Decision Making a Scoping Study for South Asia	National Centre for Agricultural Economics and Policy Research (NCAP), India; International Rice Research Institute (IRRI), Philippines, Center for Policy Dialogue (CPD) and NARS from SAT India, East India and Bangladesh.
BecA	Introduction of striga resistance QTL into Farmer Preferred Sorghum Varieties (FPSVs) in Tanzania and Rwanda through marker assisted backcrossing	Biosciences Eastern and Central Africa, Nairobi; Sokoine University of Agriculture, Tanzania; The Kigali Institute of Science and Technology, Rwanda; National Agricultural Research Institute, Rwanda
Concern Worldwide, Somalia	Livelihood Security Project in Lower Shabelle Region, Southern Somalia	Somali Agricultural Technical Group (SATG) and the Somali Agronomists Association (SAGRA), Somalia
D1 Oils	Jatropha research program	
International Foundation	Intensification of Gum Arabic Production in the Sahel	Community Action Program, Niger; ASI Private Company, Niger
Kellogg Foundation	Strengthening the rural economy in southern Africa through enhanced productivity and marketing opportunities in food legumes	NARS and NGOs in Malawi and Mozambique
McKnight Foundation	Assessing Occurrence and Distribution of Aflatoxins in Malawi	National Association of Smallholder Farmers of Malawi (NASFAM), Malawi
Moi Univ, Kenya	Towards the Development of Sorghum Varieties Resistant to Sorghum Midge through Marker-Assisted Selection to Improve Sorghum Production in East Africa	Moi University, Kenya
Pioneer Overseas Corp.	SSR marker genotyping information of 31 of their proprietary elite inbred millet lines	
Russell IPM Ltd, UK	Evaluation of Helicoverpa pheromone lure	
SM Sehgal Foundation	Development of Stem Borer maize for SF using conventional and biotech tools	
Sir Dorabji Tata Trust	Improving Livelihoods in Dry Land Areas through Community Watersheds in the states of Madhya Pradesh and Rajasthan	Jawaharlal Nehru Krishi Viswavidyalaya (JNKVV), India; Central Research Institute for Dryland Agriculture (CRIDA), India; BAIF Development Research Foundation, India; Central Arid Zone Research Institute (CAZRI) India; DEEP Development Research Foundation Institute, BYPASS, State Govt. of Madhya Pradesh, State Govt. of Rajasthan, Maharana Pratap University of Agriculture and Technology, Rajasthan Agricultural University and NGOs

Donor	Project	Collaborators
Sir Ratan Tata Trust	Increasing agricultural productivity of farming systems in parts of Central India through participatory research-cum-demonstration and knowledge sharing innovations	Central Research Institute for Dryland Agriculture (CRIDA), India; Jawaharlal Nehru Krishi Viswavidyalaya (JNKVV), India; State Govt. of Madhya Pradesh, India; Maharana Pratap University of Agriculture and Technology, Rajasthan, India; Agricultural University, Gramin Vikas Trust, Tata Steel Rural Development Services, PRADHAN, Foundation for Ecological Security (FES) and NGOs, India
Solar Electric Light Fund (SELF)	Benin Micro-irrigation Project – Phase 1	Solar Electric Light Fund, USA; Stanford University, USA; Association pour le Developpement Economique, Social et Culturel de Kalalé (ADESCKA), Benin
USA -- AJWS	Technical Support for a program (TIPA) to disseminate packages of low pressure drip irrigation systems combined with horticulture management for small producers in Senegal and adjacent countries	The Israeli Embassy, Senegal; World Vision-Senegal, Green Senegal- a local NGO, NGO Handysable, NGO Education Sante, Thies Technical school, Senegal Millenium Village the school Saint Marist de Hann, Senegal
McKnight Foundation	Statistical Training for the CCRP West Africa Community of Practice	Trainers: R Stern from University of Reading, UK; Participants (trainees) from: Helen Keller International, Mali and Burkina Faso; Institut d'economie rurale, Mali; Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), France; Institut National de Recherches Agronomiques du Niger (INRAN), Niger; Institut National de l'Environnement et Recherche Agricole (INERA), Burkina Faso and ICRISAT
Pool of Donors	ICRISAT-Private Sector Sweet Sorghum-for Ethanol Research Consotrium on a Long term basis (SSERC)	Praj Industries Ltd., India; Tata Chemicals Ltd, India.
WWF	Dialogue on Water, Food and the Environment	WWF International, Netherlands
DFID-BBSRC/Univ of Sheffield	Unravelling the molecular genetic basis of Striga resistance in cereals: Integrating Quantitative Trait Loci (QTL) and genomic approaches	Univ of Sheffield, UK, National Institute of Agricultural Botany (NIAB), UK; WARDA
DFID-BBSRC-Aberystwyth Univ	Integrating genomics and mapping approaches to improve pearl millet productivity in drought prone regions of Africa and Asia	Institute of Grassland and Environmental Research, Aberystwyth, UK; All India Coordinated Pearl Millet Improvement Project, Mandore, Rajasthan, India; HAU Regional Research Station, Bawal, India; CSIR Savannah Agricultural Research Institute (SARI), Ghana; ILRI, India
DFID-Zimbabwe	Protracted Relief Programme Phase-2 (PRP-2)	NGOs, the Department of Agricultural, Technical and Extension Services (AGRITEX), Zimbabwe; Africare, Zimbabwe, Action Contre la Faim (ACF), Zimbabwe; Concern Worldwide, Zimbabwe; Department of Agricultural Research for Development (ARED), Zimbabwe
USA/New Mexico State Univ	Valencia Peanut Core Collection Germplasm Exchange and Development	New Mexico State University, USA

Donor	Project	Collaborators
USAID	Developing Sustainable Seed Systems to Support Commercialization of Small-scale Agriculture in Sub-Saharan Africa	African Seed Trade Association (AFSTA), the Seed Science Center – Iowa State University (SSC-ISU)
USAID	Developing Sustainable Seed Systems to Support Commercialization of Small-scale Agriculture in East Africa	CNFA Inc., the Seed Science Center – Iowa State University (SSC-ISU)
USAID	Developing Sustainable Seed Systems to Support Commercialization of Small-scale Agriculture in West Africa	Economic Community of West African States (ECOWAS), Seed Science Center at Iowa State UnivInstitut d'economie rurale, Mali; CNFA, Inc., African Seed Trade Association (AFSTA), Alliance for a Green Revolution in Africa (AGRA), Central Advisory Service on Intellectual Property (CAS-IP)
USAID	West Africa Seed Alliance	Economic Community of West African States (ECOWAS), Seed Science Center at Iowa State UnivInstitut d'economie rurale, Mali; CNFA, Inc., African Seed Trade Association (AFSTA), Alliance for a Green Revolution in Africa (AGRA), Central Advisory Service on Intellectual Property (CAS-IP)
World Bank	Technical Support to the “Unité de Gestion et de Suivi” of the Acacia senegal Plantation Project in Niger	Achat Service International (ASI), Niger; Programme d'Appui Communautaire (PAC), Niger
World Bank	Documenting and Disseminating Good Practices and Farmer Innovations in Agricultural Water Management in Africa.	International Fund for Agricultural Development, Italy; Ministry of Water Resources of Ethiopia; Ministry of Water and Irrigation of Kenya; Ministry of Water and Irrigation of Malawi; Ministry of Agriculture of Rwanda; Ministry of Water and Irrigation of Tanzania
World Bank	Assessing Impacts of Land Rehabilitation Programs in Niger on Poverty and Sustainable Land Management: Reporting and Dissemination Activities	International Food Policy Research Institute, USA; Government of Niger, Niger
World Bank	Survey of farming households	

Attributed support for core programs from the Commission of the European Communities, India, Iran, Italy and Japan is not listed but is included in the Financial Summary



Research Scholars during 2007

Names	Country	Degree	Topic
Completed during 2007			
Reshma Rizvi	India	PhD	Physiology genotypic variation and marker assisted selection for efficient soil phosphorus acquisition in pearl millet
V Thirumala Rao	India	PhD	Breeding approaches to exploit heterosis for grain mold resistance in sorghum
S Mathiyazhagan	India	PhD	Etiology and biological control of collar rot disease of chickpea
T Padmaja	India	PhD	Evaluation of Bt toxins and its metabolites against <i>Helicoverpa</i>
Ch Sridhar Kumar	India	PhD	Influence of abiotic factors on infection and response of immune systems of <i>Helicoverpa</i> to bio-pesticides <i>Metarhizium</i> and NPV
Venot Jean Philippe	France	PhD	Agrarian change and access to water in the lower Krishna basin
Andreas Gramzow	Germany	PhD	Policy measures to improve rural livelihoods in India
Christina Nyhus Dhillon	USA	PhD	The effects of major crop commodities on iron intake in rural India (1972-2002)
Martin P Morano	Italy	PhD	Provision of public goods through participatory planning: on experimental exploration of the deliberative process
Bongani Ncube	Zimbabwe (ICRISAT- Bulawayo)	PhD	Understanding cropping systems in semi-arid environments of Zimbabwe: options for soil fertility management. Ph.D. Thesis, Wageningen University, Wageningen, The Netherlands. 155pp
Nicholas Tunhuma	Zimbabwe (ICRISAT- Bulawayo)	MSc	Environmental impacts of small-scale natural resource exploitation, implications on water resources and rural livelihoods. UNESCO-IHE
Willem De Hamer	Dutch (ICRISAT- Bulawayo)	MSc	Potential Water Supply of the Mnyabezi Catchment A case study of a small reservoir and alluvial aquifer system in the arid region of southern Zimbabwe. University of Twente



Names	Country	Degree	Topic
Brenda Chibulu	Zimbabwe (ICRISAT- Bulawayo)	MSc	University of Zimbabwe
Continuing during 2007			
T Jyothi	India	PhD	Shoot fly resistance marker-assisted backcrossing
Vijay Abarao Dalvi	India	PhD	Study genetics cytology and stability of cytoplasmic genetic male sterility system in pigeonpea
G Kalyani	India	PhD	Transgenic groundnut with resistance to foliar diseases
Fatema S Husain	India	PhD	Introgression of fungal disease resistance from wild <i>Arachis</i>
Madhurima Bhatnagar	India	PhD	Development and characterization of transgenic groundnut plants for enhanced production of B-carotene to combat vitamin A malnutrition
Namita Srivastava	India	PhD	Molecular and physiological characterization of genetic variation for salinity tolerance in the core germplasm of pigeonpea and groundnut
A Bharathi	India	PhD	Phenotypic and genotypic diversity in the finger millet germplasm
T Mahender	India	PhD	Genetic and genomic mapping of pearl millet using EST and other markers for abiotic stress tolerance
J Shridhar Rao	India	PhD	work on Abiotic stress tolerance in groundnut transgenic
V Surekha Devi	India	PhD	Interaction of acid exudates in chickpea on the biological activity of cry toxins from <i>Bacillus thuringiensis</i> against <i>Helicoverpa armigera</i>
P Ramu	India	PhD	Development and application of EST-SSR marker in sorghum
V Vengadessan	India	PhD	Genetics of panicle and seed size in pearl millet
Guillome Laberge	Canada (ICRISAT- Niger)	PhD	Legume Rhizodeposition as N source in cropping systems of the West-African savannahs



Names	Country	Degree	Topic
Walter Mupangwa	Zimbabwe (ICRISAT- Bulawayo)	PhD	Water and nitrogen management for risk mitigation in semi-arid cropping systems. University of the Free State
Colin Mabiza	Zimbabwe (ICRISAT- Bulawayo)	PhD	Linkages between the environment, innovations and institutions and their impacts on livelihoods: Cases from the Mzingwane Catchments. UNESCO-IHE
David Love	Zimbabwe (ICRISAT- Bulawayo)	PhD	Land/water/livelihood strategies and water resources availability. UNESCO-IHE
Nester Mashingaidze	Zimbabwe (ICRISAT- Bulawayo)	PhD	Influence of tillage practice and residue retention on weed dynamics. University of Pretoria
Joined during 2007			
Yogendra P Khedikar	India	PhD	Molecular tagging of resistance to late leaf spot and rust in groundnut
Mandeep Sharma	USA	PhD	Tissue culture and transformation of sorghum
S Annemie Maertens	Belgium	PhD	The effects of networks and identity on investments and market participation behavior
N Mashingaidze	Zimbabwe	PhD	Weed dynamics within smallholder conservation systems
Sowmini Sunkara	India	PhD	Development of groundnut transgenics for resistance to <i>Aspergillus flavus</i>
B Ravi Sankar Reddy	India	MSc	Assessing the potential for polymorphism detection across different cereals using EST-SSR primer pair's development from sorghum and pearl millet.
Jagbir Singh	India	MSc	SSR-based genetic diversity analysis in elite chickpea genotypes
Sushil Kumar	India	PhD	Pearl millet drought tolerance mapping
Peter M Vijay	India	MPhil	Biochemical mechanisms of resistance to <i>Helicoverpa armigera</i> in wild relatives of chickpea
S Srinivasan	India	PhD	Physiology, inheritance and molecular mapping of salinity tolerance in chickpea, <i>Cicer arietinum</i> L.
I Parama Siva	India	PhD	Influence of gut micro-flora of <i>Helicoverpa armigera</i> on biological activity of <i>Bacillus thuringiensis</i>



Names	Country	Degree	Topic
B Ratna Kumar	India	PhD	Pesticide residue monitoring and management in different cropping systems
Surasak Boontang	Thailand	PhD	Study program on DNA markers linked to specific leaf weight and relative water content under drought stress in peanut (<i>Arachis hypogaea</i> .L).
Deeptha Chittor Umpathy	India	MA	Impact of women's status on children's nutritional health in VLS villages of Dokur and Aurepalle
G Harini	India	PhD	Biological control of <i>Aspergillus flavus</i> invasion in groundnut (<i>Arachis hypogaea</i> , L.) an approach for the management of aflatoxin contamination
Fatiemeh Zaker Tavllaiece	Iran	PhD	Transformation and characterization of legumes (Chickpea) for abiotic stress tolerance
Pampapathy	Australia	PhD	Role of endophytes in aphid resistance
N Lalitha	India	PhD	Genotypic and phenotypic diversity in chickpea (<i>Cicer arietinum</i> L.) germplasm reference collection
M T Vinayan	India	PhD	Exploiting gene synteny to improve stem borer resistance mapping in sorghum (<i>Sorghum bicolor</i> L.)
Spurthi Nagesh Nayak	India	PhD	Identification of QTLs and genes for drought tolerance using linkage mapping and association mapping approaches in chickpea (<i>Cicer arietinum</i>)
Sunitha Choudhary	India	PhD	Physiological and molecular characterization of pearl millet for salinity tolerance
Ruchika Bhardwaj	India	PhD	Genetic analysis and molecular characterization of resistance to <i>Ascochyta</i> blight in chickpea
Medulline Terrier	France	MSc	Study program on Transpiration efficiency in groundnut
Vinod Dadarao Parde	India	PhD	Inhibition of <i>Helicoverpa armigera</i> gut zymogen activation by plant protease inhibitors
K Gopal Reddy	India	MSc	Genetic of traits related to drought tolerance in groundnut
Raj Kishore Pasam	India (ICRISAT-Niamey)	MSc	Phenotyping photoperiod-sensitive flowering in West African pearl millet inbred lines



Names	Country	Degree	Topic
Randy Nijkamp	Dutch (ICRISAT-Niamey)	MSc	Agro-ecological studies on Striga resistance in pearl millet
Kadidiatou	Nigeria (ICRISAT-Niamey)	MSc	Estimation of quantitative-genetic parameters in dial crosses among West and Central African pearl millet landraces
Frank Erkenbrecher	Germany (ICRISAT-Niamey)	MSc	Diagnostique pour la caractérisation des systèmes semenciers des agriculteurs du petit mil dans trois villages au Niger 2006 et 2007
Zira Mavunganidze	Zimbabwe (ICRISAT- Bulawayo)	PhD	An evaluation of weed management options in cotton based farming system practicing conservation agriculture. University of Pretoria
Chipo Mubaya	Zimbabwe (ICRISAT- Bulawayo)	PhD	Farmers Coping and Adaptive Strategies to Climate Variability and Change in Small-Scale Rural Economies: Experiences from Zambia and Zimbabwe. University of the Free State
Veronica Makuvaro	Zimbabwe (ICRISAT- Bulawayo)	PhD	Impact Of Climate Change On Smallholder Farming In Zimbabwe, Using A Modeling Approach. University of the Free State
Prospard Gondwe	Zimbabwe (ICRISAT- Bulawayo)	PhD	Cropping Decisions under Variable Climate for Mujika Small-scale Farmers in Zambia. University of the Free State
Kudzai Nyengerai	Zimbabwe (ICRISAT- Bulawayo)	MSc	The effect of tillage method on soil moisture conservation and crop response to fertilizer application rate under dry land conditions. Africa University.
Ronald Mandumbu	Zimbabwe (ICRISAT- Bulawayo)	MSc	Weed seed bank dynamics under different tillage practices and mulch retention levels in semi-arid south western Zimbabwe. University of Zimbabwe
Eness Mastvaga	Zimbabwe (ICRISAT- Bulawayo)	MSc	An Economic Assessment of Smallholder Farmers Adaptive Capacity to Climate Change in Zimbabwe. University of the Free State
Mthokozisi Ncube	Zimbabwe (ICRISAT- Bulawayo)	BSc	Soil physical characteristic under conservation agriculture. Midlands State University

Workshops, Conferences, Meetings during 2007

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
Chickpea Scientists' Meet, 4 and 5 Jan	ICRISAT Patancheru	31	ICRISAT and ICAR	ICRISAT and ICAR
Workshop on Livestock and livelihoods: Improving market participation of small-scale livestock producers (Lili Markets), 15-17 Jan	ICRISAT-Bulawayo	14	Mozambique, Namibia, and Zimbabwe	ICRISAT and ILRI
International conference on Linkages between Energy and Water Management for Agriculture in Developing Countries, 29-31 Jan	ICRISAT Patancheru	30	Different parts of the world	ICRISAT, IWMI, FAO, IWREC
The conference on energy-water nexus for agriculture, 29-30 Jan	ICRISAT Patancheru	30	IARI Universities and the private sector	IWMI, ICRISAT, FAO, IWREC
Two day in-house review, 6-7 Feb	ICRISAT Nairobi	32	Across Eastern and Southern Africa (ESA) region	ICRISAT Nairobi
Safety Awareness Program (SAP)	ICRISAT Patancheru	35	New staff of partner organizations and safety wardens	ICRISAT
Two-day Sujala-ICRISAT Project Review and Planning Workshop, 19-20 Feb	ICRISAT Patancheru	50	Farmers, NGOs	ICRISAT
Personal and team effectiveness workshop, 19-21 Feb	Pragathi Resorts, Hyderabad	12	ICRISAT Scientists	ICRISAT Patancheru
Regional workshop on Minimizing aflatoxin risk in peanuts, 21-22 Feb	ICRISAT Patancheru	37	Australia, China, ICRISAT India, Indonesia, Malawi, Papua New Guinea	ACIAR, ICRISAT
The first annual conference of the Indian STEP and Business Incubator Association (ISBA 2007), 25-27 Feb	ICRISAT Patancheru	150	Public and Private sector Managers of Incubators etc.	ABI ICRISAT, ICICI Knowledge Park and the University of Hyderabad
Asian In-House Review, 27 Feb-1 Mar	ICRISAT Patancheru		ICRISAT Scientists	ICRISAT Patancheru
Collective action and property rights conference, 28 Feb-2 Mar	Entebbe, Uganda		Team from ICRISAT and collaborating institutions in India and Kenya	

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
Indo-US project to use innovative e-technologies for distance education and extension on efficient water management, 5-9 Mar	ICRISAT Patancheru			
Mid-term evaluation of CFC project meeting, 6-10 Mar				
India-Africa Agri-food Summit, 7-8 Mar	New Delhi	150	India and Africa	FICCI, the Ministry of Agriculture, the Ministry of Commerce and Industry and the World Bank
Third international conference on linking markets and farmers: Exploring leading practices to foster economic growth in rural India, 11-15 Mar	New Delhi	530	Delegates from across the world	
Expert Consultation Meeting for Developing a Strategy for the Global Conservation of Sorghum Genetic Resources, 12-14 Mar	ICRISAT Patancheru	28	India, China, Ethiopia, France, Nigeria, Sudan, Australia, the GCDT and ICRISAT	ICRISAT, GCDT
Gates Foundation meeting, 19-20 Mar	Seattle, USA	20	International experts	The Bill and Melinda Gates Foundation
LiLi: Markets country level Inception workshop, 20-21 Mar	ICRISAT Bulawayo / Matopos Zimbabwe	28	National research and extension services, farmer organizations, local government authorities, private sector and NGOs	ICRISAT Bulawayo
A review and planning meeting of the Challenge Program on Water and Food (CPWF) Volta Basin project, entitled Enhancing rainwater and nutrient use efficiency for improved crop productivity, farm income and rural livelihoods in the Volta Basin, 21-22 Mar	Ouagadougou, Burkina Faso	22	ICRISAT, TSBF-CIAT, Kenya; CIAT, UNU, Ghana; SARI, Ghana; INERA Burkina Faso, SAFGRAD Burkina Faso and ZEF	
The Seventh Meeting of the CGIAR Science Council (SC), 26-30 Mar	ICRISAT-Patancheru,		CGIAR Science Council	ICRISAT Patancheru
CGIAR and FAO meeting, 3 Apr	FAO headquarters at Rome, Italy			

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
World Bank-ICRISAT-Michigan State University Consultation meeting on the World Development Report 2008 (WDR 2008), Agriculture for Development, 2-3 Apr	Grand Hotel in Bamako, Mali	30		ICRISAT Bamako
CFC-FAO-ICRISAT project Annual Review and Planning meetings, 2-3 Apr	ICRISAT Patancheru		Sorghum Research Institute, China; Field Crops Research Institute, Thailand; The Marathawada Agricultural University, India; Federation of Farmers Association, India. FAO and CFC, ICRISAT	
Brainstorming session: Models of public-private partnership in agricultural biotechnology, 7 Apr	New Delhi	40	ICAR, ICRISAT, Department of Biotechnology of the Government of India, private seed companies, consultants, APCoAB	APCoAB
Social Scientists meeting, 10-13 Apr	Nairobi	18	ICRISAT, ILRI, IWMI and IFPRI	ICRISAT and partner CG Centers
CFC-FAO-ICRISAT project annual review planning and steering committee meeting, 11-12 Apr	Cha-Am Thailand	15 approx	India, China and Thailand	
Workshop on Dignity at the workplace, 16-18 Apr	ICRISAT Patancheru	25	ICRISAT Staff	ICRISAT Patancheru
WCA Training Workshop on Hybrid Sorghum and Pearl Millet Breeding, 17-19 Apr	ICRISAT Bamako	29	Senegal, Mali, Burkina Faso, Ghana, Niger and Nigeria	ICRISAT Bamako
BMZ project Mobilizing Regional Diversity for Creating New Potential for Pearl Millet and Sorghum Farmers in West and Central Africa: Regional meeting of sorghum and millet breeders at Bamako, Mali, 20-23 Apr	ICRISAT Bamako	12	Senegal, Mali, Burkina Faso, Niger, Nigeria, Germany, India, ICRISAT, ISRA, IER, INERA, INRAN, LCRI, IAR	BMZ

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
International Seminar/workshop on Horticulture Value Chain from seed to retail shop, 28-29 Apr	ICRISAT Patancheru	90	Retailers, farmers from AP, Maharashtra APEX agencies, private sector companies, companies from Netherlands and Israel	Agri Science Park, Rac Global India, Horticulture Mission, Bejo Sheetal Jalna
CCER Panel review meeting, 7-11 May	ICRISAT Patancheru	>40	Scientists from ICRISAT	ICRISAT Patancheru
42 nd Annual General meeting of AICPMIP, 14-16 May 07	ICRISAT Patancheru	150 approx	Public and private sector	ICAR and ICRISAT
Integrated Marker-Assisted Selection (IMAS) software workshop, 14-18 May	ICRISAT Patancheru	27	Scientists from Brazil, India, Kenya, Mauritius, Nigeria, The Philippines, South Africa, Thailand and The Netherlands	ICRISAT Patancheru
Workshop on Raising the profile of international agricultural research, 15-17 May	Nairobi, Kenya	22	Media relations specialists from CGIAR Centers	CGIAR Media Unit
International Conference on Zinc Nutrition and Genetics of Crops, 24-26 May	Istanbul, Turkey	175	Representatives from 16 countries and ICRISAT	
CGIAR Consortium in Central Asia and the Caucasus, 29-30 May	Dushanbe, Tajikistan		Nine CGIAR Centers, AVRDC, Michigan State University and eight countries of CAC	
Planning meeting of the Groundnut Genomics project, 21 May	ICRISAT Patancheru	14	NFBSRA, UAS, Dharwad, National Research Center for DNA Fingerprinting CCMB	ICRISAT Patancheru
Support to Agriculture and Forestry Development Project (SAFDP) meeting, 23-26 May	Yei, Uganda	30	Ministries of Agriculture and Forestry, Southern Sudan, ICRISAT	World Bank
CGIAR System-wide Gender & Diversity Associates Jamboree, 4-8 Jun	ICRISAT Patancheru	40	14 CGIAR Centers (CIMMYT could not attend)	CGIAR
A Stakeholders' Consultation Workshop to prepare the National Agricultural Innovation Project (NAIP) proposal on Value chain of biofuel crops in rainfed areas, 5 Jun	ICRISAT Patancheru	30	Partners from eight institutions, including ICRISAT	Theme-2, NAIP

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
CGIAR meeting on fruit and vegetables, 5-8 Jun	ICRAF, Nairobi		ICIPE, ARI and NARS partners, including CIRAD and the University of Florida.	ICRISAT, AVRDC
Meeting on adapting to climate change	ICRISAT Bulawayo		Meteorological offices, universities, extension services, CSIRO, CIAT and ICRISAT	
In-House Review (IHR), 21-22 Jun 07	ICRISAT Sahelian Center (ISC)		ICRISAT Sahelian Center (ISC)	
A half-day consultation meeting, 28 Jun	ICRISAT-Bamako, Mali	27	IER delegation, ICRAF, ILRI and AVRDC, Team ICRISAT at Bamako, Syngenta Foundation	ICRISAT-Bamako
A two-day dissemination-cum-end of the project workshop, 2-3 Jul	Bamako, Mali	46	Mali, Niger, Nigeria, Senegal Burkina Faso, Gambia, Ghana, Guinea USAID Mali, Syngenta Foundation and NGOs	ICRISAT Bamako
TATA-ICAR-ICRISAT project partners' workshop, 9-10 Jul	ICRISAT Patancheru	40	Sir Dorabji Tata Trust, BAIF, DEEP, BYPASS, Govt. of Rajasthan, Govt of Madhya Pradesh, MPUAT, College of Agriculture, CRIDA, CAZRI and ICRISAT	TATA-ICAR-ICRISAT
Workshop on data assimilation for carbon cycle, 8-13 Jul	Boulder, Colorado			The Institute for Mathematics Applied to Geo sciences and the Mathematical Sciences Research Institute at the National Center for Atmospheric Research (NCAR)
Farmers-scientists interactive meeting, 18 Jul	ICRISAT Patancheru	110	Farmers from Anantapur district, AP	ICRISAT, ICAR, AAI
Comprehensive Assessment of Watershed Program consisted of review and planning meetings on 23-24 Jul	ICRISAT Patancheru	35	CRIDA, Govt of AP and ICRISAT	ICRISAT Patancheru
Workshop on impact of watershed management on women and vulnerable groups on 25 Jul	ICRISAT Patancheru	35	CRIDA, Govt of AP and ICRISAT	ICRISAT Patancheru

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
Workshop on best-bet options for integrated watershed management, 25-27 Jul	ICRISAT Patancheru	35	CRIDA, Govt of AP and ICRISAT	ICRISAT Patancheru
First High Level Conference on Biofuels in Africa, 30 Jul-1 Aug	Addis Ababa	250	African govt. the Govt of Brazil, regional and International organizations, NGOs and the private sector	AU, Government of Brazil, UNIDO
The E-India conference on ICT4D, first week of August	New Delhi	1, 300	30 countries	CSMDS UNDP and the Ministry of Information & Communication Technology, Govt of India
Mission 2007 annual meeting, first week of August	New Delhi	600	7 countries	
The World Water Week conference 12-18 Aug	Stockholm	2000	30 countries	150 organizations along with Stockholm International Water Institute
The CFC-FAO-ICRISAT project on Enhanced utilization of sorghum and pearl millet in poultry feed industry to enhance the livelihoods of small-scale farmers in Asia extended its activities to the state of Karnataka, India, 14 Aug	Dharwad	50		NAID
2 nd Bi-annual conference of the African Association of Agricultural Economists (AAAE), 18-22 Aug	Accra, Ghana	200	Over 35 countries in all sub-regions of the continent	Minister of Food and Agriculture of the Government of Ghana
Farmers-Bankers meet, 18 Aug	Palvai	350	Farmers from 13 villages	CFC-FAO-ICRISAT
Montpellier meeting on the Oasis initiative to combat desertification and dryland degradation, 20-22 Aug	CIRAD Montpellier, France	61	24 countries across Asia, Africa and Latin America	CIRAD and IRD
The experts consultation meeting, 27-29 Aug	IRRI	45	12 countries	APAARI, ICRISAT IRRI, IFPRI and CIMMYT

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
The annual review and planning meeting of the chickpea component of the project on Development and popularization of model seed system(s) for quality seed production of major legumes to ensure seed-sufficiency at the village level, 27 Aug	ICRISAT Patancheru	16	IIPR, Kanpur; JNKVV, Jabalpur; ICRISAT	ICRISAT
The Center-Commissioned External Review (CCER) on governance, management and support services, 30 Aug-5 Sep	ICRISAT Patancheru	4	CCER members	ICRISAT
The Indo-Canadian workshop on awareness and implementation of biodiesel fuel in India , 4 Sep	IMMT, Bhubaneswar			IMMT, Indo-Canadian Sastri Institute, Canada
The South Asia Work plan Meeting for Tropical Legumes II (TL II) Project funded by (BMGF), 6 Sep	ICRISAT-Patancheru	78	Myanmar, India and ICRISAT	ICRISAT
System-wide livestock program workshop, 17-18 Sep	ICRISAT Patancheru	15	Mariano Marcos State University, Batac, the Philippines; National Institute of Animal Nutrition and Physiology, Bangalore, College of Veterinary Science, Sri Venkateswara Veterinary University, BAIF Institute for Rural Development, Mahaboobnagar	ICRISAT
The Work plan Meeting for South Asia for the Tropical Legumes II (TL-II) Project, 6-8 Sep	ICRISAT Patancheru	55	Department of Agricultural Research of Myanmar, ANGRAU, TNAU, PDKV, UAS-Dharwad and UAS-Bangalore, NGOs and officials of the Dept. of Agri of AP, TN, Karnataka, Maharashtra, Team ICRISAT members	ICRISAT
International symposium on Innovations as key to the Green Revolution in Africa, 17-21 Sep	Arusha, Tanzania	230	Scientists, agricultural extension staff, NGOs and policymakers from all over Africa and other continents	

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
The Fifth global knowledge millennium summit B2B in biotechnology & nanotechnology, 18-21 Sep	ASSOCHAM, New Delhi			ASSOCHAM
The Legumes II project launch workshop, 24 Sep	New Arusha Hotel, Arusha, Tanzania	100	Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Mali, Niger Nigeria, India and Myanmar	
Farmers-buyers dialogue under the CFC-FAO-ICRISAT project, 9 Oct	Sri Venkateshwara Veterinary University	40	SVVU, FFA , MAU, KVK, University of Agricultural Sciences- Dharwad), feed manufacturers (Vimala Feeds, Janaki Feeds, Srinivasa Hatcheries), food product companies (Srinivasa Foods and Feeds) and poultry farmers	ICRISAT
CLAN Steering Committee Meeting, 10 Oct	ICRISAT Patancheru		CLAN members	ICRISAT
APAARI and CLAN meetings, 8-10 Oct	NAARM, ICRISAT Patancheru	70	APAARI members and	ICAR and ICRISAT
Tenth Plant Virus Epidemiology Symposium (IPVE), titled Controlling Epidemics of Emerging and Established Plant Virus Diseases – The Way Forward, 15-18 Oct	ICRISAT Patancheru	220	CGIAR, CIP, ICARDA, IITA, ICARDA, ICRISAT, Australia USA and UK	ICRISAT
57th time, ICRISAT's Governing Board meeting, 22-24 Oct	Lilongwe, Malawi	24	GB members, MG, RC	ICRISAT
Consultation Meeting on Hybrid Parents Research, 31 Oct	ICRISAT Patancheru	43	Representatives private sector companies, ICRISAT scientists.	ICRISAT
Enhancement of incomes and livelihoods through improved farmers' practices on goat production and marketing, 02-03 Oct	Holiday Inn, Bulawayo, Zimbabwe	80	NRES, NGOs, FAO, policy makers, private sector from Zimbabwe	ICRISAT, Matopos Research Institute, NARES and NGOs
Workshop on soil fertility and water management research 8 Nov	Lilongwe Hotel, Malawi	30	Farmers and farmer-based organizations, international agricultural research organizations, non-governmental organizations and the private sector	

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
Rural India @ 60 conference, 13 Nov	Kolkata			The Confederation of Indian Industry (CII)
The sorghum and millet workshop, 14-15 Nov	ICRISAT Patancheru	30	ICRISAT, ILRI and the Indian national program	ICRISAT
Improving water Productivity of Crop Livestock Systems in sub Saharan Africa. Zimbabwe Inception Workshop	ICRISAT Bulawayo	12	Students from Zimbabwe, Scientists from Zimbabwe and Ethiopia	ICRISAT, ILRI and IWMI
United Nations Convention to Combat Desertification (UNCCD) 26 Nov	United Nations Headquarters, New York, USA			
A regional workshop on identification of regional quarantine pests, 26-30 Nov	Bamako Mali		National quarantine services of Benin, Burkina Faso, Cape Verde, Chad, Cote d'Ivoire, Gambia, Ghana Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo. Representatives of African Union (AU), AVRDC, CILSS, CNFA and ICRISAT	ICRISAT and the Seed Sciences Centre of Iowa State University
Annual General Meeting (AGM), 2-7 Dec	Beijing, China		Alliance of CGIAR Centers	CGIAR
IFAD project for legume improvement launching workshop 13 Dec	ICRISAT Patancheru	38	India, Nepal and Vietnam	IFAD, ICRISAT



Training Courses held during 2007

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
A training course on Methods for studying plant virus-insect vector interactions and virus disease diagnosis, 15-19 Jan	ICRISAT Patancheru	10	ICAR	ICRISAT Patancheru
Joint Learning Workshop on Policy Formulation & Harmonization with respect to Water Management for Smallholder Agriculture: Experiences from 15 Countries in Eastern and Southern Africa	Mauritius	41	Botswana, Burundi, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, South Africa, Swaziland, Tanzania, Uganda and Zambia	IMAWESA/ ICRISAT and Government of Mauritius
12-day International Learning Program on Sorghum Hybrid Parents and Hybrid Research and Development, 6-17 Feb	ICRISAT Patancheru	18	Philippines, Sudan and India	ICRISAT Patancheru
Two-day training-cum-exposure program for sarpanches (elected village leaders) from Kadapa district through the District Water Management Agency (DWMA), 6-7 Mar	ICRISAT-Patancheru.	78	Fifty-six sarpanches and Assistant Project Directors of DWMA	ICRISAT Patancheru
Training workshop on watershed development program, 7 Mar	Kadapa, AP	81	Agriculture officers of Kadapa District	ICRISAT Patancheru
Farmers' training program, 19 Mar	Ghagas, Mawet district, Haryana	125	Farmers from Haryana	The Sehgal Foundation
Planning Workshop for: Studies to Identify Agricultural Water Management with Promising Returns to Investment in Eastern and Southern Africa,	Nairobi, Kenya	16	Ethiopia, Kenya, Madagascar, Malawi, Rwanda, Tanzania	IMAWESA/ ICRISAT
Sujala Watershed Program in field training on high-value crops 2-10 Apr	Karnataka			
West African Training Workshop on Breeding Methods for Sorghum and Millet Hybrid Development, 17-19 Apr	ICRISAT Bamako	36	NARS breeders from Nigeria, Niger, Burkina Faso, Mali, Senegal, Ghana; ARI scientists from Germany and US; a private sector representative from Nigeria; ICRISAT WCA cereal breeders and CT Hash	ROCARS, BMZ, IFAD

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
Training workshop on project development and resource generation, 15-19 May.	Isabela, Philippines	34	10 campuses of ISU	ISU, Isabela, ICRISAT
Training on hybrid pigeonpea seed production, 23 May	ICRISAT Patancheru	38	ICAR, Agricultural universities, National Seeds Corporation Ltd., State Farms Corporation of India Ltd., and private seed companies	ICRISAT Patancheru
A joint warden training session involving ICRISAT and the World Food Program (WFP), 21-22 Jun	Bulawayo, Zimbabwe	15	ICRISAT Bulawayo,	UN Security Advisor
Training programs for rural livelihoods program of various states in India, 26 Jun-1 Jul	ICRISAT Patancheru	20	Team members of West Orissa Livelihoods Program (WORLP)	ICRISAT Patancheru
Training course on different aspects of tissue culture techniques, 30 Jul-8 Aug	Beijing, China			Chinese Academy of Agricultural Sciences, Ministry of Agriculture
Expert Consultative Meeting/ workshop on "Lessons learnt from development projects in agricultural water management: A case study Participatory Irrigation Development Programme (PIDP) of Tanzania"	Morogoro, Tanzania	25	Malawi and Tanzania	IMAWESA/ ICRISAT and PIDP of Tanzania
Expert Consultative meeting/ workshop on "Lessons Learnt from Development Projects in Agricultural Water Management: A case study of Smallholder Flood Plains Development Programme (SFPDP) of Malawi	Lilongwe, Malawi	31	Malawi and Tanzania	IMAWESA/ ICRISAT and SFPDP of Malawi
A training program on the use of a Global Positioning System (GPS), 17 Aug	ICRISAT Niamey	21		Lennart Woltering, Ousmane, Hassane and Ibrahim Maikano
Trainers' training workshop on Productivity enhancement for MPRLP, 20-26 Aug	ICRISAT Patancheru	56	Project Facilitation Team (PFT) Members	ICRISAT
A Learning program, 21-25 Aug	ICRISAT Patancheru	6	Senior management scientists from the Republic of Uzbekistan	Ministry of Agriculture and Water Resources of the Government of Uzbekistan, ADB

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
Training workshop and mid-review of the progress on data collection for the studies to identify agricultural water management interventions with investment Potential in Eastern and Southern Africa	Kigali, Rwanda	14	Ethiopia, Kenya, Madagascar, Malawi, Rwanda, Tanzania	IMAWESA/ ICRISAT
Training workshop for journalists Reporting climate change in Africa, 17-21 Sept	Nairobi	15	Journalists	Reuters
Training course on household survey, project Livestock and Livelihoods: Improving market participation by small-scale livestock producers, 25-28 Sep	ICRISAT, Bulawayo	20	All trainees from Zimbabwe, Matopos Research Institute and NARS	ICRISAT Bulawayo
Training program on safe storage of bulk grains, under the CFC-FAO-ICRISAT project, 4 Oct	Udityal, Balanagar mandal	200	Farmers associations from Udityal and Palvai clusters	SVVU, FFA and ICRISAT
Training on household survey and PRA, project Livestock and Livelihoods: Improving market participation by small-scale livestock producers, 29 Oct-02 Nov	Maputo, Mozambique	15	Scientists and technicians, from IIAM, ILRI and Mozambique extension services	ILRI Mozambique
Capacity Building Program on Business Incubation, 8-12 Oct	ICRISAT Patancheru	5	TNAU	AABI ICRISAT
Training program on safe and scientific storage of bulk grains, 13 Oct	Nandkheda, Parabhani	250	Farmers form Koke cluster	MAU and ICRISAT
Training workshop on Advanced tools and techniques for assessing the impacts of climate variability on agricultural systems, 22-27 Oct	Nazreth, Ethiopia,	19	Ethiopia, Kenya, Sudan Tanzania	ICRISAT-ESA
Training program on Pigeonpea cultivation, 25-28 Oct	ICRISAT Patancheru	30	Farmers, extension officials and village level workers from Uttarakhand	ICRISAT
Follow-up training on Process Documentation for District and National Staff in Malawi. A series of four training workshops	Thyolo, Chiradzulu and Nsanje Districts, and Lilongwe, Malawi;	75	Malawi	IMAWESA/ ICRISAT and RLSP of Malawi
Workshop to promote agricultural water management in Burundi	Bujumbura, Burundi	52	Burundi, Kenya, Madagascar, Rwanda	IMAWESA/ ICRISAT and Government of Burundi
First hybrid pigeonpea training program held in China, 25 Nov	Yuan Mou county, China	35	Technicians and scientists	

Event/Topic/Date	Location	Participants	Participating countries/Institutes	Resources and collaborative support
Sorghum and millets workshop, 28-30 Nov		30	Scientists from ICRISAT, PASS, the African Biofortified Sorghum (ABS) project and national sorghum, pearl millet and finger millet programs	
IMAWESA Stakeholder Planning Workshop	Ezulwini Valley, Swaziland	46	Botswana, Burundi, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Rwanda, Swaziland, Tanzania, Uganda and Zambia	IMAWESA/ ICRISAT and SWADE of Swaziland
Training course on Vegetable production, protection and seed production technologies, 3-7 Dec	ICRISAT Sahelian Centre, Niamey	15	Trainees from five West African countries Chad, Niger, Mali, Burkina Faso, Senegal	ICRISAT Sahelian Centre, Niamey, Islamic Development Bank (IDB)
Training day on PRA, project Livestock and Livelihoods: Improving market participation by small-scale livestock producers, 6 Dec	ICRISAT Bulawayo	20	All trainees from Zimbabwe, Matopos Research Institute and NARS	ICRISAT Bulawayo
Training program on Enhanced utilization of sorghum and pearl millet in poultry feed industry to improve the livelihoods of small-scale farmers in Asia, 6-7 Dec	ICRISAT Patancheru	20	Andhra Pradesh and Maharashtra states (Krishi Vignana Kendra, Ambajogai; Marathawada Agriculture University, Parabhani; Federation of Farmers Association of AP, Sri Venkateshwara Veterinary University, Tirupati) and Foretell Business Solutions Private Limited, Bangalore	ICRISAT, under its CFC-FAO-ICRISAT project

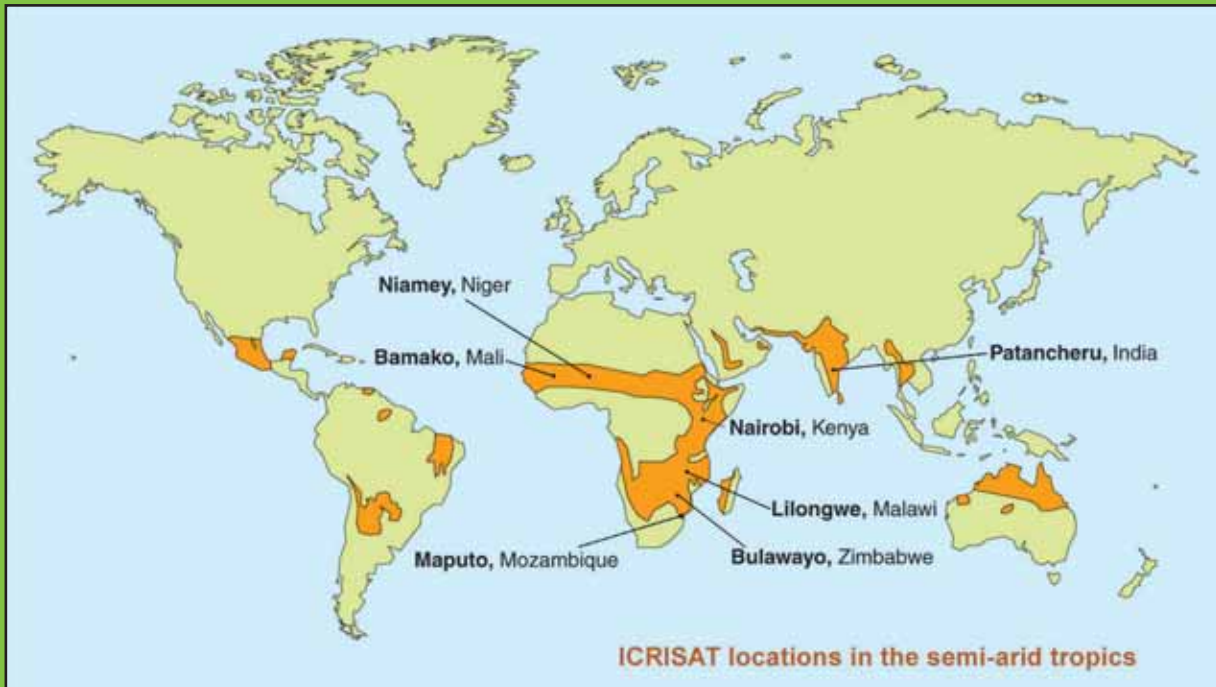
Publications

(List available on CD version.
Distribution on request.)



Awards 2008





About ICRISAT



The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that does innovative agricultural research and capacity building for sustainable development with a wide array of partners across the globe. ICRISAT's mission is to help empower 644 million poor people to overcome hunger, poverty and a degraded environment in the dry tropics through better agriculture. ICRISAT belongs to the Alliance of Centers of the Consultative Group on International Agricultural Research (CGIAR).

Contact Information

**ICRISAT-Patancheru
(Headquarters)**
Patancheru 502 324
Andhra Pradesh, India
Tel +91 40 30713071
Fax +91 40 30713074
icrisat@cgiar.org

ICRISAT-Liaison Office
CG Centers Block
NASC Complex
Dev Prakash Shastri Marg
New Delhi 110 012, India
Tel +91 11 32472306 to 08
Fax +91 11 25841294

**ICRISAT-Nairobi
(Regional hub ESA)**
PO Box 39063, Nairobi, Kenya
Tel +254 20 7224550
Fax +254 20 7224001
icrisat-nairobi@cgiar.org

**ICRISAT-Niamey
(Regional hub WCA)**
BP 12404, Niamey, Niger (Via Paris)
Tel +227 20722529, 20722725
Fax +227 20734329
icrisatsc@cgiar.org

ICRISAT-Bamako
BP 320
Bamako, Mali
Tel +223 20223375
Fax +223 20228683
icrisat-w-mali@cgiar.org

ICRISAT-Bulawayo
Matopos Research Station
PO Box 776,
Bulawayo, Zimbabwe
Tel +263 83 8311 to 15
Fax +263 83 8253/8307
icrisatzw@cgiar.org

ICRISAT-Lilongwe
Chitedze Agricultural Research Station
PO Box 1096
Lilongwe, Malawi
Tel +265 1 707297/071/067/057
Fax +265 1 707298
icrisat-malawi@cgiar.org

ICRISAT-Maputo
c/o IIAM, Av. das FPLM No 2698
Caixa Postal 1906
Maputo, Mozambique
Tel +258 21 461657
Fax +258 21 461581
icrisatmoz@panintra.com

www.icrisat.org