Credits

Images
Front cover: Rice farmers in India
Inside front: Kenyan scientists on IRMA project
Inside back: Countryside of North-East Brazil
Back cover: Woman farmer in Africa

The Review 2008
Syngenta Foundation for Sustainable Agriculture

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Welcome to the Seventh Annual Review of the Syngenta Foundation for Sustainable Agriculture

2008 Review

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Highlights for 2008

January
Andrew Bennett retires and joins the Board of the Syngenta Foundation. Marco Ferroni is appointed Executive Director.

February
Working group on agriculture, trade and food security, convened by the Foundation, meets at IFAD in Rome to prepare for high-level conference in September.

March
External Review and stakeholder survey is initiated; Foundation makes presentation on roles and impact of foundations at conference on Swiss ‘Stiftungswesen’ in Zurich; hosts meeting of Swiss Forum for International Agricultural Research in Basel.

July
Foundation’s Board meets in Toulouse; considers results of External Review and stakeholder survey; approves new operational strategy (“smallholders, productivity, and markets”).

August
The Syngenta Foundation participates in information and dialogue event organised by Solidarity Third World in Winterthur.

September
Foundation team grows by three new members; presentation to Syngenta’s Senior Executive Committee introduces the concept of ‘co-creativity’ between the Company and the Foundation; mission to Brazil reviews Projeto Dom Helder Camara/Elo; Geneva Trade and Development Forum meets in Crans-Montana, with trade and food security challenges in West Africa debated at executive forum sponsored by the Foundation.
April
Foundation holds programme discussions with FARA, the Forum for African Agricultural Research, in Accra; makes presentation at IFAD conference on smallholders and biofuels in Rome; participates in ‘vision’ retreat of CGIAR in Addis Ababa; sets out food security challenges at Annual Meeting of BASAID, an association for development cooperation set up by employees of multinational corporations in Basel.

May
CGIAR’s Executive Council meets in Ottawa; Marco Ferroni participates as a member of the Executive Council.

June
Mission to India and Bangladesh explores options for scaling up the programme in the first country and initiating a new programme in the second; Foundation in charge of panel on assessing partnerships at US National Academies’ Roundtable on Science and Technology for Sustainability in Washington, D.C.

October
Project with STAK (the Seed Trade Association of Kenya) launched in Nairobi; end-of-Phase II Conference of IRMA project (Insect Resistant Maize for Africa) held in Nairobi; World Food Day Lecture by Sir Colin Berry in Basel; presentation on “Harnessing private and public investment for enhanced productivity in smallholder agriculture” by Marco Ferroni at World Bank Annual Meetings Seminar in Washington, D.C.

November
Foundation’s strategy and operational programme discussed at special ‘Syngenta Lecture’ in Basel; Foundation-sponsored panel held at Wilton Park conference on agriculture and food security, UK.

December
Foundation’s Board meets in Basel; approves investment portfolio for 2009; symposium on food security held in Zurich, in collaboration with the North-South Centre of ETH.
Welcome to the seventh Review of the Syngenta Foundation

2008 was a watershed year, one in which the challenges in global agriculture intensified and the way the Foundation operates was fundamentally changed.

Food prices grew dramatically in 2008, peaking around the middle of the year. Agriculture and food became front-page news throughout the world. While the price of food was displaced as a media topic by news of the financial markets and the economic downturn later in the year, the food crisis is still very much alive and is probably now entering its chronic phase.

This is due to both short and long term factors. Demand has grown along with incomes and population growth in many countries, while supply fails to keep pace. In fact, the aggregate growth rate of cereal productivity per unit of land has been declining for some time. Given the scarcity of arable land, yield growth must rise in ways that are sustainable in the long run, and achieving that sustainability will depend on developments in at least three areas: plant science, land use (including water and habitat) and the active involvement of small farmers in the developing world who typically farm less than two hectares. The Foundation is engaged on all three of these fronts.

Our plant science, rural development, and agricultural extension projects proceeded on track in 2008, developing improved technology and helping growers make gains in their cultivation practices and production through the more efficient use of inputs and natural resources, including water. Our strategy and operations continued to be focused on engaging small-scale farmers and the opportunities we can create to support their productivity and sales. Changing dietary patterns and growing consumer demand are creating new markets that should stimulate production, if infrastructure bottlenecks and gaps in services can be addressed and fair contracts negotiated with buyers in the food value chain.
Small farms are critically important to both food security and sustainability in most parts of the world. The 450 million smallholders and their families in developing nations today represent close to one-third of the world’s population. While some migrate to non-farm jobs every year, rural population growth replaces many, so lasting solutions securing agriculture and the production of food continue to depend on the participation of this category of growers. Increased productivity of labor and land, and the efficient use of natural resources will improve rural living standards and food security alike, while expanding the supply of food for consumers in cities and towns.

In 2008, the Foundation conducted an External Review and SWOT analysis (strengths, weaknesses, opportunities and threats) of the strategy and programme of activities. Partners and stakeholders analyzed assets and results and yielded specific suggestions to modify our approach.

Highlighted in this review were recommendations to further develop the Foundation’s strategic direction by making the programme more coherent and leveraging links to Syngenta (the company) and its employees.

In accepting many of these recommendations, the Foundation has developed the theme of co-creativity with Syngenta (the company). This involves cooperation through knowledge partnerships and investments in innovation identified and prioritized by the Foundation, in order to strengthen the impact in the mission to create value for resource-poor producers in developing countries. This Annual Review describes our activities throughout the year.

Marco Ferroni
Executive Director and Member of the Foundation Board
Reviewing the Mission and the Role
The Challenge Revisited:

Agriculture as a Driver for Development and Value Creation

Decades of relatively cheap food and neglect of agriculture have eroded awareness of the sector’s role in economic growth, food security and poverty reduction. The World Bank’s World Development Report 2008 (“Agriculture for Development”) set out the supporting arguments again. Blue-prints do not exist but action to secure sustainable food, feed and fibre production is possible. Needs and conditions vary in agriculture-based, ‘transforming’, and urbanized economies, yet some principles apply: investment in infrastructure and public goods, including R&D, pays off; agricultural spending needs to be in line with the sector’s economic size; subsidies and transfers that placate interest groups create distortions at the expense of poorer farmers, the environment, consumers and the public purse; and institutions and the business climate matter. Vibrant private activity is needed for agricultural and food sector growth.

Resource-poor small farmers are a key group requiring attention. The problems of global poverty and hunger cannot be solved without them and their contribution to the food supply is needed.

New markets, the result of economic growth in the developing world, and new technologies together create opportunities for patterns of development centered on smallholder farmers. In Africa, such patterns are particularly important, given agriculture’s large share of economic growth and the fact that most poor people live in rural areas. In Asia, widening rural-urban income disparities and the food aspirations of the growing urban middle class are descriptive of the challenge and the opportunities alike. In Latin America, agriculture for development must focus on connecting small farms with agricultural and food markets and off-farm activities. In all settings, environmental and natural resource challenges must be addressed, and governance for agriculture must be considered and, in many instances, improved.

The Syngenta Foundation is active in this multilayered space. We focus on small-scale farmers, often in semi-arid areas, by supporting their productivity as growers and linking them to markets. Broadly, our efforts and investments in Africa, South and East Asia, and Latin America attempt to tap agriculture as a source for development and benefit of rural people. We bring crop science, economic analysis and business acumen to the task, envisioning a world without food crises and hunger.
Accumulated Experience:

The Baseline for the Future

The External Review and SWOT analysis carried out in 2008 confirmed the Foundation's fundamental strengths and highlighted its role in improving the productivity and competitiveness of small farms in developing countries. Examples of how product development, country activity and the leveraging of investments benefited these groups are highlighted in the accompanying box.

The Review also highlighted areas for development. Clearer objectives and strategic direction were called for and most respondents concluded that the Foundation's uniqueness resided in its link to Syngenta AG. They encouraged the Foundation and its Board to leverage the company and its science-based agricultural know-how for the benefit of small farmers in developing countries.

Based on these insights and responses, and building on accumulated strengths and achievements, the mission was re-defined to focus on one key goal: helping small farmers become more professional growers. In pursuing partnerships to this end, the Foundation, while maintaining its independence, will leverage Syngenta technology and expertise as appropriate and feasible. The principle that growers are entitled to the best available solutions, irrespective of their origin, applies.

Accumulated Experience:
The Baseline for the Future

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Some Past Achievements

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Accumulated Experience:
The Baseline for the Future

Some Past Achievements

Product development

- Insect-resistant maize varieties released (CIMMYT/KARI Kenya)
- Improved varieties for millet, sorghum and cowpea released in Eritrea and Mali (since spreading to West Africa); participatory methods of plant breeding developed (involving farmers); improved agronomic practices disseminated
- Milk cooperative model PRECAD developed; now applied by others, e.g., Millennium Development Village/Danone (Mali)
- Models (and inventory) of PPPs in international agricultural research clarified, helping CGIAR to come to terms with issue
- Anti-erosion techniques developed and tested in Eritrea; farmers and intermediaries trained; techniques now adopted
- Management model for agricultural research stations developed (IER), so far adopted by 8 stations in Mali
- Post-harvest technologies for staple grains developed and adopted in Segou region, Mali

Leveraging investments

- Study of molecular basis of Striga resistance led to a larger programme funded by others to identify and improve expression of Striga resistance in sorghum and millet
- Support of the GROFIN/ASPIRE programme helped create critical mass in credit for SMEs
- Investment in the BioCarbon Fund and the Voluntary Carbon Standard raised the profile of carbon finance and the necessary action on climate change
- Together with Syngenta AG contributed to the Global Crop Diversity Trust and played a key role on governance and finance in the development of the Trust
- Support of the Golden Rice project provided the capacity to submit an advanced proposal for funding from the Bill & Melinda Gates Foundation
- The BMGF investment of $13m to scale up CGIAR “Women in Science” fellowships was preceded by early support from Syngenta Foundation
- A development cluster involving Winrock, Sasakawa and others was created around the Foundation-supported Cinzana research station in Mali
- The Foundation-supported BecA Technology Platform in Kenya enabled novel partnerships in advanced agricultural R&D
- Global Information Satellite laboratory established at the University of Asmara now proving helpful to multiple partners

Country activity

- Developed supply chains for high value products in Brazil's Northeast, benefitting Asentados
- New crop varieties now adopted by farmers and improving lives in Eritrea, Kenya, Mali
- Methods for agricultural extension in India developed, and now ready to be scaled up
The Foundation’s mission and aim is to foster innovation and introduce technology and links to markets that help small farmers become more successful growers. The purpose, ultimately, is to see farmers’ incomes and livelihood improve. The intervention areas include the deployment of agricultural science to develop sustainable solutions specific to local conditions and to help create, and link farmers to, markets on the input and the output side of the value chain.

On the input side, for example, seed industries offering relevant, high-quality and affordable products are still missing in many countries. They need to be developed as a prerequisite to moving seed from the experiment stations into farmers’ fields. On the output side, the role of processors and supermarkets offers the hope to link farmers more pro-actively to changing consumer demand. The Foundation is active in both of these areas.

The diagram on the next page contextualizes the Foundation’s target group of ‘sub-commercial’ small farmers.

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**Mission**

To create value for resource-poor small farmers in developing countries through innovation in sustainable agriculture and the activation of value chains.

**Role**

To lead in facilitating and scaling up approaches and excel through the knowledge and expertise developed with partners.
How We Work

Three Modes of Engagement

The Foundation pursues its identified goal through courses of action under the themes of Growing Systems, Science and Skills, and Outreach.

Growing Systems refers to an integrated systems approach to work “on the ground” that operates through local partners and provides direct support to farmers through agricultural services, know-how transfer and marketing support. A key challenge here is to develop and apply methods and models of agricultural extension that work and can be scaled up.

Science and Skills comprises initiatives in agricultural R&D and product development. Special attention is paid to the development of public-private partnerships in agricultural research to bring out the complementarities of resources and capabilities that are needed to address the problems of farming in drought-prone, under-endowed parts of the world.

Outreach refers to analytical contributions and communications in agriculture, food, and global food security. This is underpinned by policy analysis sponsored by the Foundation and takes the form of publications, web-based resources, workshops with stakeholders and partners, and conferences tailored to professional audiences and the general public.

Categories within agricultural sector

<table>
<thead>
<tr>
<th>Income from agricultural activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial farms</td>
</tr>
<tr>
<td>Large farm holder</td>
</tr>
<tr>
<td>Medium farm holder</td>
</tr>
<tr>
<td>Commercial smallholder</td>
</tr>
<tr>
<td>Sub-commercial smallholder</td>
</tr>
<tr>
<td>Landless workers</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of landholdings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial farms</td>
</tr>
<tr>
<td>Foundation target group</td>
</tr>
</tbody>
</table>
The Foundation’s Smallholder Focus

Farmers with less than two hectares of land, on average, and facing constraints in...
Projects and Activities
Millions of growers in the developing world are cut off from the scientific advances and public goods that can help increase agricultural productivity and improve livelihoods and income. The Foundation believes that even marginal farmers can participate in agricultural development if up-to-date knowledge, technology and practices are brought within their reach. What follows are three examples (in India, Mali and Brazil) of how the Foundation and its partners worked with growers in 2008.

**2008 Milestones – Growing Systems**

<table>
<thead>
<tr>
<th>India:</th>
<th>Mali:</th>
<th>Brazil:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A new approach to agricultural extension developed</td>
<td>• Village associations transformed into cooperatives</td>
<td>• Processing and high-standard packaging of cash crops expanded</td>
</tr>
<tr>
<td>• Inputs and agronomic practices adopted</td>
<td>• Agro-dealer store and cooperative marketing introduced</td>
<td>• Product certification achieved</td>
</tr>
<tr>
<td>• Strong production response for rice and vegetables</td>
<td>• New farm activities introduced, including a dairy value chain</td>
<td>• Employment and income of participating communities up</td>
</tr>
<tr>
<td>• Improved farmer income</td>
<td>• Income generating activities for 1375 women farmers consolidated</td>
<td></td>
</tr>
</tbody>
</table>
The Challenge
Low and unstable rice yields and lack of employment during the dry season are problems known to many in rural India. Projects supported by the Foundation and implemented jointly with Syngenta India through Syngenta Foundation India (SFI) are doing something about this.

Objectives and Activities
Through cooperation with local NGOs, 4 agricultural and rural development projects were started in 2005 to 2007 in 3 states: The Chandrapur and Jawhar projects in Maharashtra, the Kalahandi project in Orissa and the Bankura project in West Bengal. Activities in 2008 consolidated the achievements of previous years. Training programmes were conducted to inform farmers about advanced agronomic techniques, quality seeds, planting materials, soil fertility and water management. Rice yields were raised to levels higher than the all-India average on many farms, in some locations with recourse to the System of Rice Intensification (SRI), a technique originally developed in Madagascar. Vegetables were introduced as a cash crop and source of employment during rabi, the dry season. Vegetable growing obviates the need for disruptive migration to precarious off-farm jobs as unskilled labor during that period.

A variety of approaches to agricultural extension were followed, balancing top-down and bottom-up methods to bring on board the knowledge of farmers. Field demonstrations that included trials of new varieties and techniques were carried out in selected fields. Visits of local farmers to the farms of progressive growers were organised and group learning events for farmers took place. The principles governing extension activities in the projects supported by the Foundation in India include ‘competence’ and ‘follow-through’, i.e., the commitment to share with farmers the best available knowledge and technical and agronomic solutions that the professional community is capable of and the pledge to have trained personnel available to assist farmers throughout the cropping season at all times when the need arises. The presence and work of local partners and NGOs is pivotal in framing the contributions of the extension specialists and agronomists made available by the Foundation.

Results
The interventions so far have produced encouraging results as shown by an external evaluation commissioned in 2008. Strong gains in vegetable yields were achieved by many farmers, and food security was improved through reliable production of rice. Cash incomes increased, enabling farming families to meet critical expenditure needs more readily than before. A market survey for fresh produce was conducted in 2008 by the Foundation. Its findings are being analyzed for the implications the project’s approach has on the marketing strategies to be recommended to growers.
The Challenge

The Projet de Renforcement de Capacités pour une Agriculture Durable (PRECAD) was conceived as a follow-up to long-standing, Foundation-supported research to improving livelihoods of local farmers through dissemination of technologies and enterprise development at the nearby Cinzana Research Station. The challenge is to raise incomes by intensifying both agricultural and off-farm activities and fostering links to markets.

Objectives and Activities

PRECAD functions with strategic partners in three lines of activities. Firstly, the project supports the development and implementation of business plans for producer associations where capacity building is the overall theme. To improve technical capacities, the project has also created Village Technical Teams and installed grain and input storage facilities at the village level. To foster new services and products, the project has supported credit groups by and for women and helped create farmer cooperatives in key value chains. PRECAD has developed activities in some 25 villages and 6 cooperatives with an emphasis on farmer groups.

Results

Much progress has been made in 2008 with functional Village Technical Teams. Cooperatives, storage facilities and a women’s credit component have also been developed. Twenty-four technical teams have been trained so far in topics that include cereal-bean rotations, production of quality seeds, soil fertility options and other agronomic aspects. Sales of grain through the marketing cooperative Faso Jigi have increased (210 tons in 2007, from 531 producers). Sesame and milk sales are up and women’s credit-financed activities in trading and small crafts have become a significant source of family income. Developments in other crops (including Jatropha and Acacia) are at an initial stage.

An external evaluation conducted in 2008 recommended further improvements to the PRECAD model: moving from a village (or territorial) focus to a value chain approach; in terms of project governance, to simplify structures and allow for more effective participation from producers; and as to the project’s relationship with communities, to shift from thinking of them as ‘beneficiaries’ to viewing them as partners.
The Challenge
The Caatinga – ‘the grey land’ – is a one-million square kilometer area in northeast Brazil that is home to about 25 million people making a living from farming and raising livestock. Growing cashew is traditional in the Caatinga and the nut accounts for some 20 per cent of the value of crops harvested. Some of the tools used in this farming have not changed for generations, and few farmers can access credit.

Objectives and Activities
The Syngenta Foundation set up Projeto Elo (Elo means ‘link’) in partnership with the regional development agency Projeto Dom Helder Camara (PDHC) to help growers add value to their products and access new markets. Specific to different agro-ecological zones, the Elo Project practices agricultural extension for farmers, providing the knowledge and equipment to grow, harvest, process and market cashews, fruits and vegetables, produce honey and rear free-range chickens. The processing equipment provided included small packaging units that were capable of producing products to the standards required for official certification.

This enabled sales to supermarket chains, hotels, restaurants and institutional customers. Training activities ranged from literacy to vocational and entrepreneurial training. Building a culture of self-respect and a ‘can do’ attitude in the communities is one of the project’s major goals.

Results
Improved farmer independence has bred a sense of ownership and a culture of pride in the villages touched by the project. Farmers have raised their revenues by moving further down the value chain, producing end-products such as branded and packaged roasted nuts (Mãos Crioulas), jams (Os Marianos), bananas (Sombras Grandes e Milagres), and honey (Galho de Angico).

Over 500 farmers increased income and production in 2008 by growing and processing cashew nuts. The community of Novo Zabelê recorded particularly strong income growth. Farmers in the communities of Umbuzeiro and Leitão increased their production from 2.5 tons to 18.3 tons of nuts in 2008. Farmers were also able to sell in more diverse markets, including new supermarkets, hotels, bakeries, bars, restaurants, street markets, distributors and vendors.
A lot of technology and knowledge exists that, if adopted by farmers, could enhance sustainability and yields. Still, new investment in agricultural research is needed to address problems not yet solved and keep up with the evolving dynamic of the physical and biological systems that underpin agriculture. Through its Science and Skills initiatives, the Foundation focuses on developing technologies and products that smallholders need to produce and compete. What follows are three examples of the Foundation’s work in this area in 2008.

### 2008 Milestones – Science and Skills

<table>
<thead>
<tr>
<th>IRMA:</th>
<th>BecA Hub:</th>
<th>Tef:</th>
</tr>
</thead>
</table>
| • 12 insect resistant maize varieties released  
• Insect resistance management strategy developed  
• Farm management surveys conducted  
• Enabling environment to shape policy-making and testing of procedures in biosafety, with KARI’s biosafety greenhouse a showcase for other countries | • BecA Hub established in Nairobi as a first class research facility for plant science in Africa  
• A pioneering project in biodiversity genotyping for cassava and sorghum was first project hosted by the Hub  
• Worked with plant breeders from 12 African countries and international partners  
• Identified potentially useful traits in land races of the two crops through molecular marker techniques | • Screening the DNA of over 6000 mutants using TILLING analysis and over 500 tef accessions using EcoTILLING  
• First- and second-generation mutants planted at the University of Bern and the Syngenta biology center in Stein  
• Two genes associated with dwarf characteristics from tef were cloned for mutant analysis |
Insect Resistant Maize for Africa (IRMA)

The Challenge
Maize is crucial to African livelihoods. Improvements in maize yields and the maize value chain are critical to incomes on the farm and food security for households and countries as a whole. Pests account for significant losses in production in the region, with stem borers the most prominent. The IRMA project has worked since the early 2000s to develop, test and release insect resistant maize for the region, using conventional and biotechnological approaches.

Objectives and Activities
The goal continues to be the development of insect resistant maize varieties for farmers in Kenya and other interested countries in the region. The project is a partnership between CIMMYT, the Kenya Agricultural Research Institute (KARI), Syngenta Foundation, and (formerly) the Rockefeller Foundation. Over the past number of years, by means of conventional breeding, the project developed maize that is resistant to stem borers and post-harvest pests. Several varieties have been released. The project also developed capacities to deal with transgenic technologies, addressing technical, regulatory, proprietary, and stewardship aspects that arose.

Results
In terms of biology, 3 open pollinated varieties and 9 hybrids in national performance trials were released in 2008; an insect resistance management strategy was developed; and access to a private sector gene was negotiated. These new varieties in Kenya are likely to stimulate accelerated releases in other countries in the eastern and southern African ‘maize belt’.

In knowledge transfer, know-how in gene technology was transmitted from CIMMYT to local staff and KARI and a pool of young talents was supported in their advanced studies under special assignments with the project.

In socio-economic studies, farm management surveys were conducted in major agro-ecological zones in Kenya, and the results of a consumer survey about GMOs were published.

Finally, in terms of contributions to building an enabling environment, the IRMA project (the first of its kind in Kenya) played a pioneering role in helping to shape policy-making and testing of procedures in biosafety, with KARI’s biosafety greenhouse becoming an example for other countries.
Biosciences Eastern and Central Africa (BecA)

A New African Agriculture Technology Platform

The Challenge
Research and capacity building in Africa needs further support. An effective form is to offer an advanced technology platform for research and training that complements the resources available in national programmes and at local universities. This is what BecA is about. BecA is an initiative endorsed by the New Partnership for Africa’s Development (NEPAD) that is designed to help eastern and central African countries develop their own agricultural bioscience research by sharing first class research facilities in addressing regional problems. The BecA Hub hosts biotechnology research projects implemented by African scientists and also provides research-related services and capacity building. The research projects hosted by the Hub are dedicated to solving problems in African agriculture.

Objectives and Activities
The BecA Hub is a shared technology platform initiated in Nairobi in 2004 to provide cutting-edge bioscience technologies, bioinformatics, research-related services, and training opportunities for African scientists, with substantial financial support from the Government of Canada. The Syngenta Foundation has helped build up core competencies, technologies and equipment. The Foundation has also provided practical support in the form of coaching, know-how transfer, and continuing advice on organisation, management, finance and sustainability.

The BecA Hub’s research platform is now shared by approximately 150 users from different countries. Users include scientists from African agricultural research institutes, universities and regional biotechnology networks, as well as international agricultural research centres and their partners. The BecA Hub is part of a shared research platform hosted and managed by the International Livestock Research Institute (ILRI) on its Nairobi campus. It currently hosts 15 research projects, addressing a range of issues that constrain crop and livestock production across Africa. The Hub also supports some 35 young African scientists undertaking MSc and PhD studies in biosciences.

Results
The first pioneering project hosted by the platform was in biodiversity genotyping for cassava and sorghum for the improvement of local varieties. Working with plant breeders from 12 African countries and international partners, the project successfully completed its mission in just three years, identifying potentially useful traits in land races of the two crops through molecular marker techniques. The lines are now being shared among participating countries and used in breeding programmes to develop new, higher yielding and more stable varieties. Once released, these should have an immediate impact on farm production of the two crops.
Biotechnology for Genetic Improvement of the Ethiopian Cereal Tef

The Challenge
The gluten-free cereal tef is one of the most valuable crops in Ethiopia, where it is grown on some 2.5 million hectares and serves as a staple food to 50 million people. Although tef is a versatile crop, able to grow under a wide range of agro-climatic conditions, it has not been given adequate attention by the scientific community. It is an understudied ‘orphan’ crop that generates low yields compared with other cereals. The main limiting factor is lodging, the plant’s tendency to tip over in the rain and wind or when fertilizers are applied. The lodged plant poses a problem for harvesting.

Objectives and Activities
The objective of the project is to obtain semi-dwarf tef lines that are resistant to lodging. The technique used is the non-transgenic mutation analysis method of TILLING (targeting induced local lesions in genomes). A modified method known as EcoTILLING is also applied on a large number of non-mutagenized natural populations to detect useful genetic variations. The useful accessions obtained via this technique can be crossed with local varieties and then used for field tests.

Results
The project is screening over 6000 mutants using TILLING and over 500 tef accessions using EcoTILLING. First- and second-generation plants were grown in the greenhouses of the University of Bern and at the Syngenta biology center in Stein. Leaf samples were harvested from each mutation and DNA extracted. Based on candidate genes identified from rice and other cereal crops, two genes associated with dwarf characteristics were cloned from tef for use in TILLING mutant analysis.

After backcrossing or crossing with other lines, the new lodging resistant varieties will be tested for overall performance under field conditions in Ethiopia.
The Syngenta Foundation was actively engaged in policy analysis and outreach on issues of food security in 2008, as demonstrated by the following events.
Export bans by Asian and West African surplus-producing countries compromised food security in importing West African countries during the recent period of high food prices. The suggestion that a better balance between domestically focused and trade reliant approaches at the regional level would help was debated at a high-level forum on agriculture, food security and trade at the first meeting of the Geneva Trade & Development Forum in Crans-Montana, in September. The Forum is a platform for poorer developing countries, with significant participation of policy makers from Africa (see www.gtdforum.org). Working with Michigan State University and regional institutions, the Foundation sponsored structured discussions in a closed, executive caucus and a plenary panel on how trade-based strategies for food security could be achieved. What this would entail in terms of the need for countries to cooperate across borders was also debated. An agenda for work going forward was agreed with a focus on devising a more effective regional approach that surplus and deficit countries could endorse.
Evaluating Multi-Stakeholder Partnerships for Sustainability

What factors condition the effectiveness of partnerships in ‘sustainable development’ and how can we measure results?

The U.S. National Academies’ Roundtable on Science and Technology for Sustainability held a symposium (co-sponsored by the Foundation) in Washington D.C. in June 2008 to examine challenges that selected partnerships have had to deal with. The conclusions highlighted the need to ensure that there are clear objectives to which all agree and that all partners should contribute something beyond financial resources. There should be a single project plan with milestones and agreement on who does what, and there ought to be a pre-agreed governance mechanism to resolve differences. Metric-based evaluation was identified as essential. This also needs to take into account the fact that goals and objectives may evolve as information accumulates and partnerships mature.

The discussion showed how partnerships can produce valuable results even if they failed to met all their stated goals. Specifically, the research partnership to bring public and private expertise to bear on the development of a vaccine for East Coast Fever, a livestock disease, was ultimately unsuccessful in its task. However, it was shown to influence the organisation of several programmes in international livestock health research and may eventually be judged as an innovative response to a highly complex challenge in R&D.
In a World Food Day public event organised by the Foundation on October 16 in Basel, Professor Sir Colin Berry of London emphasized the need for the agricultural R&D community to take a proactive stance on the role of crop protection and high-performance seeds in food security and sustainable agriculture.

In his lecture entitled Food, Facts and Phantasy: The Invasion of Unreason, Sir Colin, an expert in regulatory toxicology of materials, pesticides and pharmaceuticals, discussed arguments in decision-making and public communication. “Science does not provide answers in a form that can be used by politicians”; “scientific thought does not come naturally to people” and “scientists can get it wrong!” he said. So, effective communication of findings to different stakeholders and audiences can be as challenging as it is indispensable in the interest of raising food production.

Marco Ferroni of the Syngenta Foundation moderated the event, and Rob Neill and Karsten Neuffer, both from Syngenta AG, intervened as discussants.
Food Security Symposium:
How to Ensure Food Security Today and Tomorrow?

Higher food prices harmed poorer people in 2007-2008 and led to political unrest in some developing countries. Some governments and development agencies increased spending on food aid and safety nets to help those most immediately affected. Many also adopted short-term trade and price policies to shield domestic consumers from higher prices. This relief usually came at high expense, not only in cost to government treasuries but by undermining the farming sector. A number of surplus-producing countries cut their exports, hurting consumers in importing countries.

Responding to this situation, the Foundation teamed up with the North-South Centre of the Swiss Federal Institute of Technology (ETH) to prepare and hold a conference on “Reinventing agriculture in the face of new and urgent global needs.”

The event, on December 12 in Zurich, brought internationally renowned speakers and a highly motivated audience of more than 200 to the ETH’s Auditorium Maximum for a day of searching debate. The conference website www.foodsecurityconference.ch provides details on the programme, speakers, presentations, and key conclusions.

Food supply challenges and the need to increase food availability in ways that keep markets open and are sustainable in the long run emerged as a theme of convergence at the conference. Smallholders were seen as key stakeholders in the quest for higher overall production. Raising their productivity as farmers and integrating them into the market economy, both domestically and internationally, was seen as important for food security, the reduction of poverty, economic growth, and both rural and overall economic development.

The water and soil challenge, and climate change, received considerable attention at the conference, as did the need for better agricultural services, including technology transfer and investment in physical and information infrastructure. A number of speakers and participants called for a doubling of public investment in international agricultural R&D and the creation of incentives for enhanced private investment in agriculture. Agricultural extension was seen as a neglected area where new thinking and new partnerships and approaches are needed.
Going Forward
The results generated by the Foundation in 2008 corroborate the belief that we are on the right track with our strategy and approach. The experience in India, for example, demonstrates how significant increases in productivity and farm income can be brought about through use of quality seeds and the right technologies from knowledge centers such as agricultural universities, research institutions and the crop science industry. Yet, far greater improvements would be possible if better performing seeds and agronomic solutions were developed for difficult agricultural zones, such as dry-land and rain-fed agriculture, and extension mechanisms were activated to reach large numbers of farms.

The focal areas of the Foundation relate to science, seeds, soil fertility, water, crop protection, interactive forms of knowledge transfer to farmers, and markets by which inputs reach growers and products are sold. The challenge is also about focus, organisation, and having a highly motivated team, in addition to joining forces with partners. We think that we have progressed in all of these dimensions in 2008. Going forward, and building on experience accumulated in the past, we intend to scale up for continuously growing impact and reach, benefiting ever increasing numbers of farmers.

Several new projects are expected to come on stream in Growing Systems in 2009, in tandem with a significant expansion of activities in India along proven lines. A seed systems development project with STAK, the Seed Trade Association of Kenya, has recently begun to operate with a view to accelerating the process of moving improved seed from breeders’ labs to farmers’ fields (see below). For the same purpose, the Foundation is supporting a project initiated by Cornell University to provide business development services to small and medium-sized firms in the seed industry in East and Southern Africa.

In Science and Skills, too, investments in 2009 will increase. Projects with selected centers and programmes in the Consultative Group on International Agricultural Research (CGIAR) are expected to increase, often with knowledge contributions from the R&D community of Syngenta. Public-private partnerships in international agricultural research must be expanded to pool the resources and skills needed to respond to the agricultural and food production challenges that lie ahead.

The Foundation is dedicated to making a difference in smallholder agriculture. Outreach activities in 2009 will support this goal, complementing the Foundation’s operational work.
Towards a Better Functioning Seed Market – STAK

The project initiated in October 2008 with STAK, the Seed Trade Association of Kenya, will develop seed catalogues for specific zones; establish a soil testing lab; operate demonstration plots for improved varieties; conduct workshops to enhance seed growers’ standards and skills; develop certification and seed testing services; and work with regulators on phytosanitary control and rules governing cross-border trade. Improvements in these areas are needed to enable seed markets to function and farmers to gain access to seed.

“The collaboration between Syngenta Foundation and STAK seeks to address some of the main challenges facing the seed industry development in Kenya. Our goal is two-fold: to facilitate the access to new and improved seed available to small scale farmers in Kenya and to build capacity for seed company staff, regulators and growers.”

Obongo Nyachae, Executive Officer STAK

Seed Trade Association of Kenya (STAK)

STAK is an organisation of seed companies which are registered by the Kenya Plant Health Inspectorate Services (KEPHIS) to produce, process and/or market seeds in the country. About half of the 67 registered seed enterprises in Kenya are STAK members and account for over 90% of the 30'000 mt of formal seed sold in the country annually.

Launching STAK project in Kenya, October 6, 2008
The Syngenta Foundation has partnered with the following organisations:

- African Seed Trade Association
- Alliance for a Green Revolution in Africa
- Bill and Melinda Gates Foundation
- Biodiversity International
- Comité National de la Recherche Agricole of Mali (CNRA)
- Consultative Group on International Agricultural Research
- Cornell University
- Council on Foundations
- CUTS International
- Emerging Markets Forum
- Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA)
- Ethiopian Institute of Agricultural Research, Melkassa Research Station
- Farmer Organisations of Cinzana Gare and Katiema, Mali
- Faso Jigi Cooperative, Mali
- Food and Agriculture Organisation of the United Nations
- Ford Foundation
- Forum for Agricultural Research in Africa (FARA)
- Global Crop Diversity Trust
- Hewlett Foundation
- Indian Agricultural Research Council (ICAR)
- Indian Institute of Agricultural Research (IARI)
- International Livestock Research Institute (ILRI)
- Institute of Rural Economy, Mali
- Intercooperation
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
- International Development Research Center (IDRC)
- International Food Policy Research Institute (IFPRI)
- International Foundation for Science
- International Fund for Agricultural Development
- International Rice Research Institute (IRRI)
- KARRTABYA, Indian NGO
- Kenya Agricultural Research Institute (KARI)
- Maharashtra Institute of Technology Transfer for Rural Areas
- Maharogii Sewa Samiti, Indian NGO
- Michigan State University
- Ministry of Agriculture, Mali
- National Academies (USA)
- National Confederation of Agricultural Workers, Brazil
- North-South Centre, ETH Zurich
- Novartis Foundation for Sustainable Development
- Partnership with Developing Countries
- Partnership to Cut Hunger and Poverty in Africa
- Pragati Pratisthan, Indian NGO
- Projeto Dom Helder Camara, Brazil
- Promavi-Ranford
- Research Triangle Foundation
- Rockefeller Foundation
- Secretariat for Territorial Development, Ministry of Agrarian Development, Brazil
- Seed Trade Association of Kenya (STAK)
- Shamayita Math, Indian NGO
- Solidarity Third World, Switzerland
- Swiss Commission for Research
- Swisscontact
- Swiss Forum on International Agricultural Research
- The Energy Research Institute (TERI)
- University of Bern
- World Bank
- Zamorano University, Honduras
1. Martin Taylor, Chairman
Martin Taylor is Chairman of the Foundation Board and the non-executive Chairman of the Board of Syngenta AG. Advisor to Goldman Sachs International and Vice Chairman, RTL Group SA. Formerly Chief Executive, Courtaulds Textiles and Barclays.

2. Marco Ferroni, Executive Director
Foundation Board Member and Executive Director of the Foundation; former executive at the Inter-American Development Bank and senior advisor to the World Bank.

3. Andrew Bennett
Foundation Board Member; Former Executive Director of the Syngenta Foundation. He is President of the Tropical Agricultural Association of the UK and Chairman of the Board, Centre of International Forestry Research (CIFOR). Previously he was Director, Rural Livelihoods and Environment, UK Department for International Development.

4. Christian Bonte-Friedheim
Foundation Board Member; former Director-General of the International Service for National Agricultural Research (ISNAR); and former Deputy Director-General of the Food and Agriculture Organisation (FAO).
5. Pierre Landolt
Foundation Board Member. Pierre Landolt is also a member of the Board of Directors of Syngenta AG, the President of the Sandoz Family Foundation, and an agricultural entrepreneur in Brazil.

6. Klaus M. Leisinger
Foundation Board Member; President and CEO of the Novartis Foundation for Sustainable Development; Professor, Development Sociology, University of Basel; former Special Advisor to the United Nations Secretary General.

7. Eugene Terry
Foundation Board Member; Eugene Terry was Chair of the World Agroforestry Centre. He worked with the World Bank from 1997 to 2002 and was Director-General of the West Africa Rice Development Association (WARDA).

Jens Kellerhoff
Attorney, Secretary to the Foundation Board.
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