

The challenge: increase food security in an environmentally sustainable way

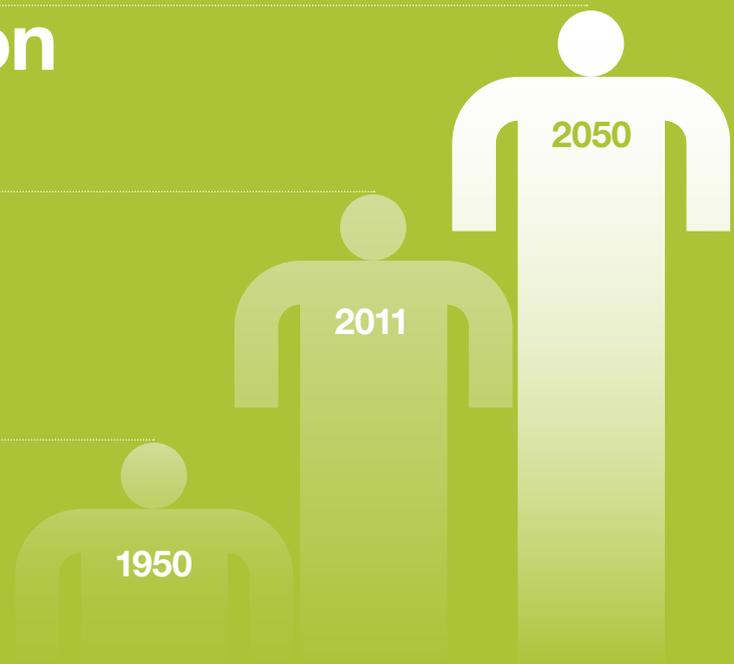
In 1950, the world's population was just 2.5 billion. In October 2011, it hit 7 billion. We can expect another 2 billion people on our planet by 2050. Meanwhile, urbanization and soil erosion are reducing available farmland. So while one hectare could feed two people in 1950, by 2030 it will have to feed five. Already, food demand is outstripping supply in some regions. Farmers must grow more from less: our business is to help make that possible.

World population growth

> 9 billion

> 7 billion

> 2.5 billion



Our contribution

Our ambition is to help growers deliver greater food security to an increasingly crowded world in an environmentally sustainable way. That calls for a step change in productivity and resource efficiency – on both the world's 5 million large farms and its 450 million¹ smallholdings. Every farmer has a part to play.

We believe it can be done, but it will need a system-wide approach that links people, land and technology. These are the foundations for a sustainable production system. Technology enables better solutions that allow farmers to increase productivity and resource efficiency in sustainable rural economies.

Action on food security cannot wait. Just to keep pace with population growth, global average yield per hectare will have to rise. To achieve this, we need to overcome many challenges and dilemmas that are best addressed by working in partnership with farmers and other organizations.

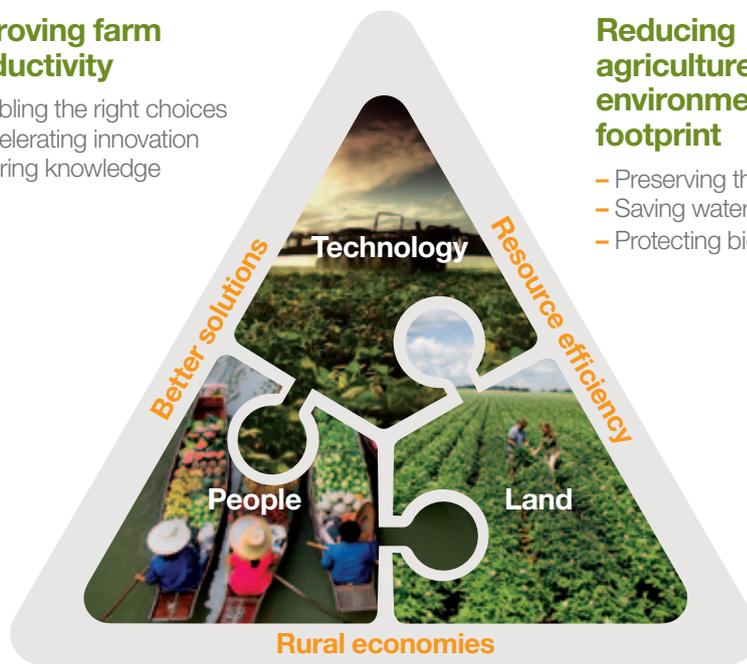
¹ IFAD
www.ifad.org

Improving farm productivity

- Enabling the right choices
- Accelerating innovation
- Sharing knowledge

Reducing agriculture's environmental footprint

- Preserving the land
- Saving water
- Protecting biodiversity



Building rural prosperity

- Building markets
- Valuing farm work
- Community development

Improving farm productivity

Consumers worldwide want more food with better quality and greater variety. To meet this demand, farmers need a variety of tools and techniques: high-quality seeds, water-efficient technologies, nutrients, insect and weed management, and soil conservation. Our contribution has to go beyond providing individual products: we must integrate them into optimized solutions and protocols, and enable farmers to use them productively and profitably.

Large-scale farmers have traditionally been receptive to new technologies and have had the resources to invest in them. As a result, they generate 75 percent¹ of the world's agricultural output today. Looking ahead, another step change in farm productivity will only be achieved if the small growers who farm nearly 40 percent² of the world's arable land also gain access to new technologies. We are committed to continue helping farmers – large and small – to enhance productivity.

New business models that provide tailored solutions and access to markets and finance provide one part of the solution. Education and training provides another. However, to give smaller farmers more support we need to be a partner, not just a supplier.

¹ IAASTD 2008
Agriculture at a Crossroads
² FAO ResourceSTAT,
faostat.fao.org

Growing more on preserved land

“I've moved from producing 400 bags per hectare to 600. I'm saving money and producing more thanks to Syngenta, their products and advice.

Miguel Gil
Potato grower
Boyacá, Colombia

 More online
www.syngenta.com/ar2011



Enabling the right choices

The regulatory environment is tightening. This poses dilemmas for regulators and for innovators like Syngenta: if regulation is driven by political pressures rather than objective science, there is a risk of denying growers crucial tools in the drive for food security.

We need enabling and transparent regulations that make safe new technologies available to all farmers. All chemical products must be handled with care to ensure environmental and human safety. Throughout the development of a chemical product, we work to minimize its risk profile. Once it has been accepted for registration and sale, we work with vendors and growers to help handle, store and use it safely.

Accelerating innovation

The challenge for us is to innovate rapidly and efficiently – not only to develop new products, but also to adapt them effectively to the varying needs of farmers around the world, large and small. New techniques such as computer-based crop modeling are helping us to accelerate the pace.

Efficient and fair intellectual property protection helps to stimulate and incentivize R&D investment. In return, we recognize a responsibility to share knowledge and innovation. In 2011, Syngenta launched the first system to disseminate our patents on native traits in vegetables for the goal of improved plant breeding.

Sharing knowledge

Our technologies deliver many benefits. But the rate of uptake depends on sharing knowledge so that farmers understand the benefits and use the technology correctly.

In many countries, tomorrow's farmers need better, more relevant education. One of the challenges of supplying global markets is to enable growers to develop the knowledge needed to run a profitable, productive and quality-oriented farm. Agricultural extension services are crucial to sharing such knowledge, but are lacking in many countries today. Syngenta plays a part in closing this knowledge gap as well as training farmers to use its products safely and efficiently.

Reducing agriculture's environmental footprint

Farming makes extensive use of natural resources. It uses 40 percent¹ of the world's land and 70 percent² of its fresh water withdrawal. With both in increasingly high demand, it must become more resource efficient. Agriculture relies on biodiversity for crop pollination, healthy soils and water, and air purification. So farmers' needs are closely linked to the protection of biodiversity and the avoidance of further expansion.

To support more efficient use of basic natural resources, we are developing sustainable technologies that protect the long-term economic and environmental viability of farming. Extension services and training through retailers enable farmers to see the benefits of these technologies. They also need to be able to afford them, through access to credit and risk-management mechanisms such as insurance for weather-related crop losses.

From the earliest phases of our research processes we include measures for efficacy, economic benefit, and human and environmental safety. For every crop protection product that reaches the farmer's field, almost 100,000³ are tested but discarded because they do not meet efficacy or safety standards.

We are developing new metrics that assess the full impact of products and technologies, so that we can ensure they deliver benefit without harm. This means viewing farming practices holistically, rather than focusing narrowly on the properties of a single product, to assess their overall resource efficiency.

As crops are traded around the world, so are the inherent natural resources that produced them: energy, soil and water. With increasing natural resource constraints, trade is the first and most efficient mechanism for sharing natural resources as well as simply meeting food demand.

- 1 FAOSTAT
faostat.fao.org
- 2 FAO AQUASTAT, 2005, World Resource and Earthscan "Water for food, water for life" Institute
- 3 CropLife International
www.croplife.org



Sustainable agriculture in Tanzania

“With the new rice protocol, I can control weeds much better. And I can increase my yield and still look after the environment.”

Ramadhani Rajabu Upole
Rice grower
Dihombo, Tanzania

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Preserving the land

Poor farming practices leave soil vulnerable to erosion by wind and rain. In aggregate, an area large enough to feed Europe has already become too degraded to produce food. We need to help farmers increase soil fertility and improve the productivity on their land in sustainable ways. That means crop rotations, restoring degraded land, planting vegetation around fields to prevent erosion and techniques to avoid unnecessary tilling.¹

Fertile soils are important for carbon storage. By reducing soil erosion, greenhouse gas emissions from soil are also reduced. Through cropland management, prevention of land conversion, and modern soil conservation technologies, the agricultural sector could stop contributing excess greenhouse gases by 2030.²

Saving water

40 percent³ of water used for agriculture is wasted. Investment is needed to develop innovative water-efficient technologies, drought-tolerant seeds, crop protection products, and optimized irrigation systems. In 2011, we launched ARTESIAN™, the first corn hybrid that uses moisture more efficiently to give higher yields on drought-stressed land. Herbicides that reduce the need for plowing improve soil's ability to absorb water, protecting it against erosion and water run-off. This has the added benefit of preventing agricultural chemicals and soil in fields from run-off into rivers and streams.

Protecting biodiversity

Biodiversity and agriculture depend on each other; the diversity of nature must be secured to enable global food supply and quality of life. We believe agricultural policies should help and incentivize growers to nurture biodiversity as well as to produce more from their existing acreage.

If we do not sustainably increase agricultural productivity on current farmland, we will not be able to protect biodiversity for future generations. To accomplish the task at hand, farmers and policy makers can coordinate efforts to protect and enhance biodiversity. For instance, growers can turn unproductive field margins into natural habitats for a wide range of species including pollinators.

Building rural prosperity

Strong rural economies are the key to sustainable and productive agricultural systems. There is a prosperity gap between rural and urban populations that causes urban migration. But to meet the growing demand for food we need prosperous rural communities, and farming needs to be an attractive business proposition. We want farmers to earn better incomes and to increase both their quality of life and their capability as stewards of land, water and biodiversity.

¹ United Nations Environment Programme www.unep.org

² United Nations Environment Programme Rapid Response Assessment; *The Natural Fix? The Role of Ecosystems in Climate Change Mitigation*, June 2009

³ 2030 Water Resources Group; *Charting our Water Future, Economic framework to inform decision-making*; December 2009

The Vietnam Coffee Task Force

“The program helps increase the yield and quality of my coffee beans, and I can get a better price for them.”

Van Thiem Phan

Coffee grower
Tân Thành, Lâm Hà, Vietnam

More online
www.syngenta.com/ar2011



Building markets

Farmers must contend with the risks of increasingly volatile markets. The value of a good harvest can be undone by price volatility.

The availability of market information, for example on crop prices, can be increased through knowledge sharing systems. In India we provide information on pest and disease management by mobile phone to 2 million subscribers, in partnership with Nokia Life Tools. In Brazil, our NUCOFFEE® initiative (see page 29) connects growers and buyers to give farmers a fairer deal. These are just examples of what can be done; there is no single solution, and both companies and governments have a role to play.

Valuing farm work

Around the world, young people are leaving farming in search of higher income, better healthcare and education, and the urban way of life. This often causes labor shortages and rising wage costs for growers. Syngenta technologies increase farm profitability and improve labor conditions on the farm. They can also encourage the development of a more highly-qualified labor force, which increases the value proposition of rural employment. For example, plantations adopting the PLENE® technology (see page 26) were able to replace the previous labor-intensive method of planting sugar cane. Syngenta worked together with the Brazilian Sugarcane Industry Association UNICA and the Brazilian government to retrain the workers affected for higher-value jobs.

The long-term solution to labor shortages is to make farming more profitable and attractive to young people, and to build strong rural economies where agriculture is seen as an attractive career path. Governments, non-governmental organizations (NGOs) and industry must work together through policies, regulatory frameworks and investments to bolster the agricultural sector.

Farm work must also be safe and healthy. We set strict health and safety standards to protect employees on our suppliers' farms, and work with growers and workers to protect their health, safety and the environment when they use our products.

Community development

Rural communities need socio-economic development to underpin a healthy agricultural sector. For example, restricted access and storage constraints exacerbate post-harvest losses, which can reach 50 percent in some areas. In Africa, where less than half the rural population lives close to an all-season road, transportation can account for 50–60 percent¹ of total marketing and distribution costs. Worldwide, many rural communities lack other basic infrastructure. We can play a part in addressing these problems, but only concerted action by all interested parties will build successful rural economies.

¹ The World Bank, world development report 2008; *Agriculture for Development*, p. 119



Syngenta Foundation for Sustainable Agriculture: Improving the crop that feeds Ethiopia

An Ethiopian researcher at the University of Bern, Switzerland, supported by the Syngenta Foundation, is leading efforts to raise the yields of tef. This cereal is the staple diet of some 50 million Ethiopians. Tef traditionally has long, weak stalks and is easily damaged by wind and rain. The Bern research team has successfully developed shorter lines. Colleagues in Ethiopia are now evaluating these in the field, crossed with local high-yielding varieties. "The initial results look promising," says SFSA's Ian Barker. "This crop offers huge potential for further sustainable intensification."

Left:
Dr. Zerihun Tadele
Institute for Plant Sciences
University of Bern

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www.syngentafoundation.org