

Contribution of Research and technology to Overcome Challenges of Agriculture in the 21st Century

It is our common desire to provide healthy food to the world's growing population and do this in a sustainable manner. The world is, however, in a situation of rapid change and we need to provide innovative solutions to new patterns of demand.

Drivers for Change

In developing countries we have a rapidly increasing population which needs not only more food but desires more variety and more nutritious food. According to the FAO the world population will be 8 billion by 2025, with arable land per capita declining at the same time. This will put massive pressure on resources such as land and, increasingly, water supplies. In 1995, according to the World Bank, irrigated agriculture accounted for 80% of global water consumption. In places such as sub-Saharan Africa, one of the keys to breaking out of the cycle of poverty may be the ability to export agricultural products.

In the developed world we have sufficient food, but consumers are very concerned about health and nutrition – often due to problems of obesity. Consumers also desire environmentally sound production but are city-dwellers far-removed from practical agriculture. This trend toward urbanization is expected to increase world wide. In the developed world, and particularly in Europe, there is a high demand for fresh food the whole year round irrespective of source and cost, but at the same time the average consumer is more removed from HOW that food is produced than at any time in history.

As global demand for petroleum-based products explodes, we are approaching an energy crisis that cannot be solved by classical means. The price of oil has skyrocketed this summer and is not expected to go down any time soon. Oil, according to the New York Times in a August 21 article, is growing increasingly difficult to extract at the same time that global demand is growing exponentially.

Growers in Europe and NAFTA face uncertainty because of WTO and CAP discussions threatening subsidies and trade routes. Certain crops such as sugarbeet in many European countries may become untenable.

Regulators are increasingly exposed to conflicting stakeholder needs and political pressures. Barriers to biotech approvals in Europe have made development of such products commercially unattractive. In terms of the regulatory system, companies are simply seeking an environment that is fair and reasonable. The U.S. is both, but the EU is neither. For example, because the US field trial permit process is so much more streamlined than in the UK, we've calculated that a regulatory affairs specialist can process 100 field trial applications per year in the US. The same person in the UK could process 3. Europe is thus falling behind China and the US and India as a center for the agricultural sciences as companies relocate their biotech research.

Technology options

Biotechnology provides new opportunities to meet the needs of growers and consumers. This may be through the use of applied genomics as a tool to achieve better genetic understanding and thus better traditional plant breeding, or by delivering a novel product from genetic modification.

Insect control genes can be fitted into existing IPM strategies or provide the possibility to manage pests where it could not be done before.

Research into agronomic traits holds the promise of improving the efficiency of water and fertiliser use. Understanding the components of yield will continue to drive the crop productivity curve higher, therefore increasing the yield per hectare that will be needed to feed a growing population.

Improved nutrition, such as high carotenoid (golden) rice helps us to address vitamin A deficiency with a new approach.

Also in the developing world, the diffusion of expertise in ag biotechnology – driven largely by private industry investment in the science – as enabled local scientists to do groundbreaking research in how they can improve locally important crops such as sweet potato and cassava.

In the developed world, biotechnology has saved the papaya industry in Hawaii by developing a plant resistant to a rampantly spreading fungus that was crop destroying yields.

In the future, using plants to produce pharmaceutical proteins isolated from traditional agriculture may have such advantages of cost and scalability that we can make life-saving medicines more accessible.

Biofuels and enhanced use of plant biomass present a supply-side option to reduce our overall reliance on petroleum as an energy source.

The way forwards

We should look at new technologies in the context of how they can fit in with existing farming systems and the socio-economic framework, not as replacements. Stakeholder groups have widely varying desires and needs which should be accommodated through dialogue and agreement. There will need to be coexistence of these new technologies with classical systems of organic agriculture. Coexistence is not impossible as it has been sometimes portrayed by opponents. Indeed a reality in many parts of the world – with some US growers even producing certified organic and GM crops on the same farm.

It is not the intention of those in the agricultural biotechnology industry that GM crops should supplant all other options. We recognize that, in Europe, because of prosperity and a unique view of agriculture there are many who question the value of GM crops. But at the same time we see the potential of this science to help agricultural production keep pace with demand without reliance on government subsidies. We believe the responsible progress of this technology, undertaken in dialogue with governments and the public, must be encouraged. Syngenta recognises and respects the principle of individual choice. We want to play our part in delivering this choice with technology, information and stewardship, contributing to farming and food production that is sustainable and meets the needs of all stakeholders.

A Brief Curriculum Vitae

David Nevill has global responsibility for the technical development of biotech products in Syngenta. His task is to ensure the responsible progression of GM projects from research through to commercialisation. He therefore works closely with technical, regulatory, planning and business functions. David has a broad experience in agribusiness, having worked in several technical leadership positions in Seeds, Crop Protection and Traits businesses. He also has a diverse geographical experience having worked in England, Nigeria, India, USA, Indonesia and Switzerland. He has lived now for many years with his family in Riehen (BS) and they are all recently granted Swiss as well as their previous British nationality.