

## Forum on the Future of Agriculture 2009

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Expanding our capacity to produce efficiently: the role of science & technology in farming

Science, and the technological advances it delivers, has been the cornerstone of the development of human beings, society, and our overall quality of life.

Clothes, transport, housing, food, medicine, entertainment have improved almost beyond recognition since Thomas Hobbes famously wrote in 1651 that life was nasty, brutish and short.

It has also played a key role in transforming our food supply. From its production and processing, to distribution and storage, science and technology enables most of us to eat what we want, when we want it, at a price we can afford.

I believe today's food production is an example of excellent technology every bit as impressive and impactful as the development of computers and the internet.

Of course, many of us take this for granted. Few really consider what it takes to produce.

This lack of appreciation might just be a curiosity if it wasn't for the fact that when some people do think about it they have a negative view. They want less technology in food production. In its most extreme form, this results in the preference for organic food which of course uses little or no technology but results in much lower yields at a higher cost than modern intensive agriculture. This wouldn't be an issue either if these views weren't passionately held and, particularly in Europe, are influencing government policy and regulation. And this at a time when the challenge of producing more food with the least possible impact on the environment means we will need to embrace technology in farming like never before.

It was in this context that I was struck by two contrasting reports earlier this month.

In Europe, Member States upheld the rights of Austria and Hungary to ban GM crops by a big majority in spite of the overwhelming scientific evidence attesting to their safety. Moreover, these crops had passed the EU's own approval laws for GMOs widely considered as the toughest in the world. This seems to be another move away from science based decision making in Europe.

Around the same time, China, announced plans to spend an additional 20 billion dollars, equivalent to 40% of the annual CAP budget, to boost crop yields and raise rural incomes.<sup>1</sup> The China National Development and Reform Commission stated that it is difficult to keep grain production growing steadily to meet increasing demand particularly as competition for land use, rising temperatures, and the over use of water, weighs heavily on local production.

Most of this funding is aimed at intensive agriculture and technology including GM crops. This move recognizes the essential role that technology plays in meeting the challenges facing agriculture and reflects the view of most governments, particularly in developing countries.

So, how could these contrasting positions come about?

After all, the world's need for more food is broadly agreed. Global population has grown from about 3 billion in 1959 to over 6.7 billion today and by 2030 there will be 2 billion more mouths to feed.<sup>2</sup> And the growth of the middle classes suggests that these people are not going to be happy with just rice, nor should they be. This translates into the need for 50% more food in 20 years time<sup>3</sup>.

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<sup>1</sup> Annual Budget Speech, Prime Minister Win Jiabao, March 2009

<sup>2</sup> UN Population Division; World Population Prospects: the 2006 Revision

<sup>3</sup> UN Secretary-General, Ban Ki-moon, June 2008

Can we cultivate more land? The FAO estimated in 2002 that as much as an additional 20% of the 1.5 billion hectares<sup>4</sup> currently under cultivation could be added. But this gets nowhere near meeting the 50% increase in demand for food. And what about the risk this could create for natural habitats?

The FAO is right then to recognize that yield improvements – making the most of existing land under cultivation – will be the best way of meeting the increased demand for food.<sup>5</sup> And this means greater use of technology.

Of course, Europe's apparent aversion to technology in agriculture can be traced back to its relatively privileged position with a plentiful supply of high quality, affordable food.

However, there are reasons to believe we can change direction. The food crisis that we discussed in this room one year ago helped to propel food security back into Europe's political lexicon.

And whilst the economic crisis may have replaced concerns about food security the underlying challenges of demand increase and supply uncertainty remain.

For Europe, there are perhaps two critical points.

Currently there is no food shortage but there is an increasing demand for cheaper food as consumers' budgets come under pressure in the economic crisis. Secondly, Europe's

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<sup>4</sup> Food & Agriculture Organisation (FAO) FAOSTAT/ World Agriculture Towards 2015/30, FAO, 2002

<sup>5</sup> *“Land expansion is expected to account for 20 percent of production growth, yield improvements for about 70 percent and increased cropping intensity for the remainder. In sub-Saharan Africa and Latin America, land expansion will still be important, but it is likely to be increasingly outweighed by yield increases”.* - World Agriculture Towards 2015/30, FAO, 2002

favourable weather – adequate water and good soils – provide real potential to further improve productivity and competitiveness of farming. And global warming may even have a favourable impact on agriculture in central and northern regions.

But this will only happen with the help of modern technology.

By using the full range of tools available – including GM crops – we can increase production of safe, healthy, food and make it available at lower prices than ever before. We would also enable our farmers to compete effectively in export markets around the world and increase the potential for non-food uses of crops, including renewable sources of energy.

My message today, therefore, is that we must address the concerns that some have over the use of technology in agriculture and promote a science based approach to its regulation in Europe.

Some of the most compelling rationale for technology comes from a look backwards. 50 years ago, food was around twice as expensive as a proportion of disposable income as it is today.<sup>6</sup> Although I acknowledge that recently the decline in food prices has slowed in recent years. Back in 1960, variety was limited and quality was inconsistent.

On the production side, technology comprised basic fertilizers, low yielding seed varieties and little in the way of chemical crop protection. This just about sustained a global population at roughly one third of today's level.

Contrast that with the six and a half billion people on the planet in 2009, the majority of whom have adequate quantities of high quality, affordable food<sup>7</sup>. A remarkable success story.

A look at how different developing regions of the world have performed is equally revealing. In South Asia the improvements in yields from the adoption of technology led to self sufficiency and increasing economic strength.

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<sup>6</sup> USDA/ Economic Research Service

<sup>7</sup> UN Population Division; World Population Prospects: the 2006 Revision

Compare this with most of Africa, where agricultural productivity is not increasing, little technology is used, many are under-nourished, and economic development is poor.

Increasing crop yields correlate beautifully with greater food availability and decreasing prices. Since 1959, global wheat yields have almost tripled and corn more than doubled.<sup>8</sup> Technology made this possible. Better seed hybrids, GMOs, chemicals that control weeds, diseases and insects. Without this, yields would be 40% lower.<sup>9</sup> Improved fertilizers and advanced mechanization has also made a significant contribution.

The good news is that this can continue. Getting 50% more food by 2030 is possible.

For example, wheat yields in Russia can be doubled, and on the best soils tripled, with modern fertilizers, good seed varieties and effective use of seed treatments, herbicides and fungicides.

Increased use of technology was a major driver of the bumper harvests of 2008.

Furthermore, a recent comprehensive analysis of the benefits of GM crops clearly shows that this technology contributes to increasing yields and improving productivity. And the industry pipeline now includes traits to help plants resist drought stress as well as disease and pest pressure<sup>10</sup>.

Earlier this year, it was also reported that the International Rice Research Institute were confident of breeding rice varieties adapted to most forms of climatic stress with the aid of GM technology<sup>11</sup>.

The quality of chemical crop protection products has also increased markedly in recent years. Today, we have seed treatments that protect young plants against pests and diseases and

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<sup>8</sup> USDA PSD Database

<sup>9</sup> Oerke, 2006, 'Crop Losses to Pests'; *Journal of Agricultural Science* (2006), 144, 31–43. f 2005 Cambridge University Press

<sup>10</sup> Biotech crops; evidence, outcomes and impacts 1996-2006: PG Economics, 2008

<sup>11</sup> IRRI, January 2009

increase plant vigor fungicides that increase green leaf size and growth regulators that increase root size allowing the plant to make greater use of water and fertilizers.

Unfortunately, the word 'pesticide' conjures up a negative image for many people in the developed world and we need to address this. That image is totally unrepresentative of the contribution they make to food production and consequently our quality of life.

Probably the most critical point in the technology debate in Europe, however, is the environment.

But any worthwhile discussion on the environment must surely be in the context of needing to produce more food. This is not always the case.

In contrast, the climate change debate is always in the context of society's need for energy. Why do we make this distinction?

Non-intensive or organic production systems could be considered but only if population was declining and people were satisfied with less protein rich food. Yields in such systems are 30-40% less than from intensive agriculture. But the trends are for an increase in demand...not a decline<sup>12</sup>.

We have to produce adequate quantities of affordable food in the most sustainable way possible. Can intensive agriculture achieve this? I believe so.

First, technology enables maximum productivity on existing land, thereby minimizing the need to bring new land under cultivation. This protects natural habitats and biodiversity.

Second, the technologies that increase productivity do so partly because they help plants make better use of water and fertilizers. They therefore help to address two critical considerations for the environment. Also, conservation tillage has been a really helpful development in recent

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<sup>12</sup> 24 Mäder P et al; "Soil Fertility and Biodiversity in Organic Farming"; Science 296 (2002): 1694–1697

years. By using a simple herbicide application to remove weeds and crop residues you don't need to plough the land.

This has the benefit of conserving soil moisture, reducing greenhouse gas emissions and saving energy.

Our industry runs programs with specific environmental objectives such as Syngenta's work to boost pollinator populations. The goal is to cultivate field margins to provide them with vital habitats – important work in the context of declining bee populations.

However, I do not want to give the impression that technology alone is the answer. The leading providers of technologies train millions of farmers every year on safe and effective use of products, particularly in developing countries.

The contribution from the private sector in these areas is vital because many governments have cut back on extension support for farming. Our industry association, Crop Life, in partnership with other interested parties has launched *Farming First* an initiative to promote sustainable development.

It is focused on helping subsistence farmers become small-scale entrepreneurs.

In conclusion, we need 50% more food by 2030 in the context of water shortages and a changing climate. And there isn't enough additional land to cultivate without threatening natural habitats. Technology can enable us to achieve it and to do so sustainably. And in the environment, we can learn from some of the areas that could be improved from the first intensity phase of 40 years ago.

But this is not being reflected in decisions made by many at the EU level and in member states.

There is hope.

Pro-technology voices are being raised. Its importance is being acknowledged. A retailer with a strong organic food focus, the Coop in Switzerland, stated that Bio cannot feed the world. The CEO of Tesco recently said "stand by the science".

This is right. The evidence is clear.

All of us engaged in agriculture and the food industry have a responsibility to promote the importance of technology to produce more from existing resources.

1,754 words/ 12 minutes