Mike Mack
CEO Syngenta
USDA Agricultural Outlook Forum
February 26, 2009
Remarks
Web Version – 2/23/09

Our subject today is "expectations and realities," so let me start with the expectations for Biotechnology. A short list of expectations might include:

- Feed a dramatically expanding world population;
- Provide alternative fuels that can help break our nation's dependence on foreign oil;
- And husband our increasingly scarce water resources.
- And we need to do all that while protecting our environment and responding to the challenge of global warming;

It's a tall order, but I think biotech can do it -- IF we make the right political and regulatory choices, IF we base regulation and science rather than politics and superstition, IF we are serious about finding the answer to these persistent and growing problems.

This is the issue I want to talk about for the next few minutes. The basic point is this – it is technology that can provide the solution to the persistent and growing problems in food security and environmental sustainability that the world faces today. To be clear – for us at Syngenta, technology means an entire portfolio of products, techniques and expertise that bring out the best in biotechnology, crop protection products and seed care.

First, let's start with feeding the world.

Global population has grown from about 3 billion in 1959[1] to over 6.7 billion today,[2] and it's not stopping any time soon. By 2030 there will be 2 billion more hungry people to feed.

They're not going to be satisfied – nor should they be – with a couple of bowls of rice per day.

A recent Goldman Sachs study predicted that by 2020 the world's middle class – people earning between $6,000 and $30,000 a year – will expand by a billion people, and two billion by 2030.[3] In China alone, the McKinsey Global Institute has predicted that the middle class will grow to be 76% of the population by 2025.[4]

Clearly, the rise in wealth has been slowed by the current recession, but short of a 1930s style global depression, we can count on those trend lines to pick up again when we get our economic house in order.

That means we'll not only have more mouths to feed, they'll be demanding more varied and nutritious diets, with a higher protein content.

Given these global factors, demand for agricultural products has been growing strongly and we expect it to continue at an annual rate of 2.5% for the next 10 years.[5] In twenty years, we will clearly have to double our current production of food and animal feed to meet the growing demand.[6]

This is coming at a time when agriculture is coming under pressure from many other sides as well.

---

[1] http://www.census.gov/ipc/www/idb/worldpopgraph.html
[2] http://www.census.gov/ipc/www/idb/worldpopinfo.html
[3] "A Baffling Global Economy," by Robert J. Samuelson, Washington Post, July 16, 2008.
[4] "The New Global Middle Class," Knowledge@Wharton, July 9, 2008
[5] Speech by Mike Mack, Syngenta Annual UK Parliamentary Dinner, January 12, 2009
[6] Mike Mack, talking points, Davos. CHECK: 2.5% compounded annually for 20 years is only about 63% growth.

While there is enough water globally, many localities already face severe water scarcity, which is limiting yields. Some $30 billion worth of crops were lost to drought in 2007, and it's estimated that two out of every three people worldwide will live in drought or water-stressed conditions by 2025.[7]

We're even feeling the pinch of scarce water resources here in the U.S., including California and increasing concerns about depletion of the Ogallala aquifer that runs from Texas and Oklahoma through the breadbasket of Kansas and Nebraska all the way up to South Dakota.

At the same time we're increasingly looking to biofuels to meet our energy needs – as the President so eloquently said in his inaugural speech, harnessing "the sun and the winds and the soil to fuel our cars and run our factories."

Added to all of this is the urgent imperative we face to find a way to limit the release of carbon dioxide into our atmosphere.

Secretary Vilsak has made these last two items – the creation of next generation biofuels and responding to major environmental challenges such as climate change –top priorities for USDA.

The question is, how do we do all this at once? It seems like a double bind. Maybe even a quadruple bind. An insoluble dilemma. And it would be, in a zero-sum world in which the ratio of inputs and outputs always remained the same.

But there is one thing that can change that zero-sum equation, and that is technology.

[7] The Council for Biotechnology Information, http://www.whybiotech.com/resources/factsheets_food.asp

The economist Paul Roemer has postulated that all real growth in an economy – beyond per capita expansion – comes from the application of new technologies to create ever-greater efficiency and productivity.[8]

What's true on the factory floor is also true down on the farm.

Technology can allow us to unlock the potential of plants, creating new miracles of productivity in agriculture similar to those we've seen in computers, iPods and telecommunications.

It can enable us to do more with less -- to feed more people, and produce more fuel and fiber, while using less water and decreasing our carbon footprint.

Let me stress here that along with the plentiful promise of biotech, strictly defined, the answer needs to be found in the concerted application and innovation of other agricultural technologies, including crop protection and seed care technologies that often act in concert with bioengineered plants to produce extraordinary production step-change.

The fact is, much of today's farmland is underutilized – or badly utilized. We could realize significant yield potential within the next 3 to 10 years by simply deploying existing technologies across land that is currently under cultivation[9]. For example, in Russia and Ukraine – once considered the "breadbasket of Europe" – only 10% of the land surface is farmed efficiently.[10]

Asia, too, could experience a rapid boost in productivity – some 20% in 10 years – simply by adopting current technology.[11]

---

[8] http://www.reason.com/news/show/28243.html
[9] Mack Talking Points, Friday January 30th, Dinner Session.
[10] Mack Talking Points, An Integrated Approach to Energy, Food and Water Security.
[11] Mack Talking Points, An Integrated Approach to Energy, Food and Water Security.

And that's just *existing* technology. There are many new plant technologies that have already been applied in our R&D labs and greenhouses that will be coming to market in the next decade. Some are just around the corner.

One, which can power our cars as opposed to our bodies, is a Syngenta product called Corn Amylase, which we hope will be approved soon by the USDA. It could bring enormous bottom-line benefits to ethanol producers – about 8 to 15 cents a gallon,[12] which is a major impact on an industry that is struggling .

By reducing the amount of water and energy needed to produce the same amount of ethanol Corn Amylase could improve the carbon footprint of ethanol plants by 10% or more.[13]

Secretary Vilsack said recently that he'll push the EPA to boost ethanol in gasoline. He's absolutely right that lifting the current 10 percent cap on how much corn-based ethanol can go into gasoline will be key to supporting the ethanol industry, which as we know is in difficult circumstances. Now is the time to stand firmly behind corn and corn ethanol. As a crop, corn has been one of agriculture's most impressive success stories. We simply must keep supporting this crop – the iSolution or iKernal *(hold up kernel again)* – as corn provides many answers to global agricultural problems. Investing in future corn yields creates healthy markets, successful farmers and food security. A first step would be moving forward with all deliberate speed to get Corn Amylase to market so that the cost savings and efficiencies can be felt now when we need them most.

[12] Corn Amylase Talking Points, USDA Public Comment Period, part 2, 5 February 2009.
[13] Forbes Interview of Syngenta CEO Mike Mack: Smart Seeds, Smart Crops, January 7. 2009.

We've also introduced a new variety of sugar beet that produces yields similar to sugarcane but needs less water, can tolerate the tropical climates of India and could be used for food or biofuel.[14]

Plants can be an efficient and truly renewable way of translating the sun's energy into our gas tanks, and with technology we don't have to be forced into a no-win choice between growing more food or producing more fuel.

Take sugar: Today, Brazil has become one of the world leaders in the production of ethanol from sugar, and no one bats an eye. The world is so awash in sugar[15] – which is available from a variety of sources, including corn and beets -- that people no longer think of it exclusively as a food crop, and sugar growers have had to actively seek and create new markets for their product.

The entire driver is productivity. One hundred years ago, sugar was a coveted commodity. Twenty years from now, people will scoff at the idea that plants should be used exclusively for food.

Plus, the positive environmental benefit of translating sun energy to biofuels is huge. Sugarcane ethanol grown on established soils releases 80 percent less greenhouse gas than gasoline,[16] and the Brazilian ethanol refineries today get much of their power from burning cane residue, in effect recycling carbon from the atmosphere.

That's an engineering efficiency. But there are also genetic engineering efficiencies. There's the Corn Amylase and the sugar beets that I mentioned. We're working today on new enzymes for corn that can convert the green material of the plant

[14] http://www.syngenta.com/en/corporate_responsibility/products_biofuels.html
[15] Forbes Interview of Syngenta CEO Mike Mack: Smart Seeds, Smart Crops, January 7. 2009
[16] Mike Mack, talking points, Davos

and not just the grain so that the corn crop itself will be of greater value in the production of ethanol.[17]

As I mentioned before, a great part of the solution isn't confined to biotech per se, but must include the full range of agricultural technologies, very much including crop protection technologies.

This is especially pertinent when discussing climate change, as the application of effective herbicides will be an essential component in a growing trend of conservation tillage agriculture. According to the U.S. Department of Energy, new research suggests that extensive adoption of no-till agriculture and other crop management strategies could lead to the recovery of two thirds of the carbon otherwise lost.

That amounts to 40 to 50 billion tons of carbon, a number that dwarfs the 6 billion tons released by the burning of fossil fuels[18].

Growing water scarcity is another apparent dilemma for which biotech and agricultural technologies in general can help provide the answer.

Within the next five years my company is aiming to bring to market drought tolerant crops that can be grown on land where they could not before, because of heat and drought stress.[19] We are working on a chemical spray called Invinsa which, by blocking the ethylene signal that causes crops to wilt, will enable them to combat heat and drought stress. This mechanism is already being used on cut flowers.[20] It should be pointed out

---

[17] Forbes Interview of Syngenta CEO Mike Mack: Smart Seeds, Smart Crops, January 7. 2009. Paraphrased by Steve Eury on 2/18/09.

[18] U.S. Department of Energy, Research News: http://www.eurekalert.org/features/doe/2005-09/dnnl-lim091605.php

[19] Forbes Interview of Syngenta CEO Mike Mack: Smart Seeds, Smart Crops, January 7, 2009. Rechecked with Jennifer Gough, 2/19/09.

[20] Forbes Interview of Syngenta CEO Mike Mack: Smart Seeds, Smart Crops, January 7, 2009. Rechecked with Jennifer Gough, 2/19/09.

that this will not only help increase food and fuel production worldwide, it will also give an economic boost to developing nations and farmers who until now have been impoverished by the marginal quality of their land.

Really - there is only one major problem on the horizon.

That's the hostility of regulators in some parts of the world to both biotech and crop protection products, with real pressure to ban the tools responsible for the majority of productivity gains agriculture has achieved so far. This is particularly true in Europe, where governments are beholden to non-governmental organizations[21] and where the discussion of genetically-modified plants is more often based on superstition rather than science.

So far, the United States regulatory system has been the gold standard on encouraging innovation through technology, and I have no doubt that if this nation can hold to its insistence on science-based regulation, we'll find that other countries, such as Brazil, Argentina and others in Asia, will follow the U.S. lead.

But we shouldn't discount the opposition to this technology phenomenon, even in this country. Norman Borlaug, who led the first Green Revolution that saved the world from mass starvation in the 60s and 70s, has said that if his new varieties had been subject to the same kind of regulatory obstruction that many new seeds face today, they would never have become available.[22]

The greatest tragedy is in Africa, where governments don't have the resources to investigate the safety of these plants themselves and so are heavily influenced by the

[21] Forbes Interview of Syngenta CEO Mike Mack: Smart Seeds, Smart Crops, January 7, 2009.
[22] Foreword by Norman E. Borlaug, *The Frankenfood Myth*, Praeger 2004

Europeans. They are also, quite naturally, disinclined to plant crops that are barred from their prime export market.

Part of the problem is complacency. The developed world has become so fantastically efficient at food production that our biggest problem now is too many calories, not too few.

For Europeans today, starvation is only a dim, generational memory.

It's probably no accident that Ingo Potrykus, the man who created Golden Rice – a vitamin A rich, genetically modified variety that could save million of children from the effects of malnutrition – had vivid memories of the desperate hunger he experienced as a young child in war-ravaged Germany.[23]

Unfortunately, hunger and malnutrition aren't just a memory for millions of people in the world today, they're an ever present reality.

Despite numerous high-sounding commitments by governments, the UN Food and Agriculture Organization still estimates that more than 850 million people go hungry every day, and almost six million children die from hunger-related illness every year before their fifth birthday.[24]

Meanwhile, a few months after the leaders of the G8 nations – including France, Germany and the EU -- pledged to support "accelerated research and development and increase access to new agricultural technologies,"[25] the European Parliament voted to further tighten an already highly restrictive approval process for pesticides.[26]

---

[23] Grains of Hope, Time Magazine, July 31, 2000
[24] http://www.globalpolicy.org/socecon/hunger/general/2007/0614zieglerhunger.htm
[25] http://www.whybiotech.com/newsandevents/reportersnotebook.asp
[26] http://www.foodnavigator.com/Legislation/In-praise-of-pesticides

Without current crop protection products, there could be 40% less food available to the world. Imagine if we had to face the pressures we do today with 40% lower yields. Imagine bringing millions of acres more land under cultivation just to maintain current, insufficient yields. Imagine the pressures on the Rain Forests, the devastating soil erosion, water pollution and other environmental impacts as marginal land around the world was brought under cultivation.

That's the path we take if we reject science, and put regulatory barriers in the way of technology.

This brings us to the U.S. role. These problems are global, not national. And if we hope to develop truly global solutions we will need increasingly strong leadership from the U.S. in the international arena. That means negotiating with trading partners transparent, science-based policies for bio-tech exports; and it includes working with EU and others to make sure they adhere to their WTO obligations.

If we embrace science, however, we can have a future of bounty – we can feed a growing population and fuel an energy-hungry world economy while protecting the environment.

That's the choice. There really is no third option.

We've only begun realizing the promise of agricultural technology. As amazing as the products we've already produced are, we're just at the early stages of the learning curve. More or less where digital technologies were back in the 1980s, when CDs were just coming out and an iPod would have seemed like science fiction.

So when I look at the expectations and realities ahead, I'm very optimistic. Because the need is there, and so is the solution. The science is safe, and it's so

profoundly necessary that I believe that ultimately politics and superstition will have to step aside and let us get on with the business of feeding and fueling the world.

All the best to this new Obama Administration – we as industry are partners to you and the farmer, dedicated to working together toward solving global agricultural challenges. Thank you all very much.

###