

crop protection monthly

international news, comments, features and conference reports

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LEAD ARTICLE

ACTION IN AFRICA

There is now the promise of some real action to feed the rapidly growing population of Africa. At the recent symposium on *Global Agriculture and Food Security*, run alongside the 2012 G8 Summit in Washington, US, three major agribusinesses made significant commitments to invest in African agriculture. The event, hosted by the Chicago Council on Global Affairs and the World Economic Forum, brought together G8 and African leaders, businesses, international organisations and civil society groups. They met with US president Barack Obama and secretary of state Hillary Clinton to discuss new activities to advance food and nutrition security and agricultural development in Africa.

Syngenta to build a \$1 billion business in Africa

Mike Mack, CEO of Syngenta, announced a commitment to build a \$1 billion business in Africa over the next ten years. He said that the investment reflected the company's belief that Africa has the resources not only to feed its growing population, but also to become a major world food exporter. "Africa has become one of our strategic growth regions and our aspiration is to contribute to the transformation of African agriculture. We will deploy our portfolio as part of a system-wide approach linking people, land and technology, with the aim of increasing productivity sustainably and thereby reducing poverty." Syngenta said that the initiative had been driven by the steps taken by a number of African governments to stimulate investment.

Syngenta says it will make cumulative investments of over \$500 million. This includes the recruitment and training of over 700 new employees with a high level of agronomic specialisation. In addition there are plans for the development of effective distribution channels, logistics and local production facilities in collaboration with local partners. In this way the company says it will be able to make technology available to both smallholders and large scale farms. The target over the ten year period is to reach over five million farmers and achieve productivity gains of 50% or more, while preserving the long term potential of the land. Mr Mack continued: "We can bring the knowledge, tools, technology and services farmers need whatever the size of their field or the type of cropping system. Africa needs a fully integrated approach to crops because there is no single technology solution." He added: "We intend to play a leading role in public-private collaborations which will be essential to making a planned transformation actually happen on the ground."

Monsanto to support African agricultural development and growth

Speaking at the same conference, Monsanto's chairman, president and CEO Hugh Grant said his company was supporting the New Vision for Agriculture Initiative – the Grow Africa Partnership (www.weforum.org/issues/agriculture-and-food-security) and the G8's New Alliance for Food Security and Nutrition through a \$50 million commitment over the next 10 years to support sustained African agricultural development and growth. Mr Grant said: "I am delighted to be here taking part in this conversation as I believe public and private sector commitment is necessary and able to support a transformation in African agriculture. As a company committed to improving lives through agriculture, we stand ready to work together with African leaders to turn their ideas into action with the sense of urgency and scale needed to deliver local solutions to meet our global challenges."

As part of its commitment to support food and nutrition security and agricultural development in Africa, Monsanto will, like Syngenta, seek increased collaboration among farmers, private industry, governments and civil society groups that can fuel the development of innovations to increase productivity while also strengthening the complete African agricultural value chain. "Through the partnership and cooperation of many, we can deliver improvements that can drive food security, environmental sustainability and economic opportunity in Africa and beyond."

Part of Monsanto's commitment will go to its continued support of Tanzania's Kilimo Kwanza (Agriculture First) initiative focused on developing a vibrant agricultural sector that will benefit farmers in the Southern Agricultural Growth Corridor of Tanzania. In partnership with the Tanzanian government, Monsanto will take a holistic approach, making commitments to key investments and partnerships that are aligned with Tanzania's agricultural priorities and that span the maize and vegetable agricultural value chains.

Plans include improved access to financial services through a partnership with Opportunity International, continued work with Tanzanian scientists through the Water Efficient Maize for Africa project (www.aatf-africa.org/wema) to introduce new maize hybrids suitable for Tanzania and

available royalty free to seed companies. There will also be support for a new depot in the agricultural corridor and strengthening of agro-dealer networks to provide more choice to farmers, support of a new initiative led by the Earth Institute of Columbia University focused on soil health to encourage best management practices, and the creation of opportunities that provide farmers with improved access to markets.

Monsanto will also partner with additional organisations on the ground in Tanzania, including Farm Input Promotion Services on farmer education programmes and Muunganisho Ujasiriamali Vijijini (MUVI) on the formation of farmer cooperatives that enable farmers to collectively negotiate and market their harvest.

DuPont to help smallholder farmers

DuPont chair and CEO Ellen Kullman also announced her company's intention to support two collaborative, world hunger initiatives. Firstly, DuPont will invest more than \$3 million over the next three years to help smallholder farmers in Ethiopia to achieve food security. It will also be sponsoring an innovative Global Food Security Index being developed by the Economist Intelligence Unit (EIU) to measure the drivers of food security across 105 countries. The index will be published in July 2012 and will be a unique resource for those working to improve food security across the private and public sectors. This interactive benchmark tool will be publicly available so governments, universities, NGOs and others can access the relevant data to help tailor local solutions regarding food security. The index will be released in July 2012 and will take into account underlying factors such as the affordability, accessibility, availability, nutritional value and safety of food to measure food security and assess vulnerabilities country by country. The index is distinct because it uses 25 indicators and adjusts for food price fluctuations to actively reassess the risks countries face over time.

DuPont intends to forge a strategic alliance with the government of Ethiopia and the Agriculture Transformation Agency to directly benefit the productivity of smallholder farmers, thereby improving their ability to produce nutritious food for their families and communities.

Ms Kullman said: "Based on our work with smallholder farmers and African families, we understand that local solutions, local acceptance and community collaborations are critical to improving food security in Africa and around the world. DuPont will commit additional local resources, including recruiting local talent to run our research and operations in Sub-Saharan countries like Ethiopia, Kenya and South Africa, and ensure the solutions we develop are economically, socially and environmentally sustainable."

DuPont now has operations in 35 countries in Sub-Saharan Africa and employs more than 500 people. Ms Kullman said the commitment to grow DuPont's presence on the continent will result in investment to grow these businesses in Africa to more than \$1 billion in revenue in the next decade.

Ms Kullman also highlighted a specific emphasis in Ethiopia in DuPont's collaboration and expansion efforts by announcing a pilot project between DuPont and the Earth Institute of Columbia University to create a rapid soil information system to aid Ethiopian farmers with an effective way to diagnose soil constraints in the field and receive recommendations to improve crop yields. DuPont will invest \$1 million over three years on the pilot project. DuPont's Crop Protection business will work to develop a sulfonylurea weed control offering for wheat to improve productivity, bring novel insect control solutions for cotton and vegetables, and train farmers on the responsible use of crop protection products.

Looking ahead, Ms Kullman said DuPont is exploring a collaboration opportunity with USAID to upgrade agronomic practices and inputs of smallholder Ethiopian maize farmers and increase the profitability of their farms. DuPont will also invest \$2 million to expand seed production and storage facilities in Ethiopia.

EUROPEAN NEWS AND MARKETS

UK PESTICIDE EXPOSURE TESTS CAUSE ALARM

The UK Department of the Environment, Food and Rural Affairs (Defra), has asked scientists to carry out tests in Norfolk to measure how much pesticide people living near fields may have been exposed to. According to local press reports this has sparked a strong reaction from householders who knew nothing about the tests until those living near particular fields received a notice through the letter box. Volunteers living close to the fields are being asked to give urine samples during the spraying season, but according to press reports many are refusing. Some families living in Hevingham are reported to have said they felt like "human guinea pigs" after letters came through their door, offering them £5 vouchers to take part in the trials. Defra has asked the Institute of Occupational Medicine (IOM), to carry out the tests. The IOM scientists intend to collect data from villagers in Hevingham and four other sites in Norfolk, around King's Lynn and Norwich. In Hevingham the tests will be carried out on the cereal growth regulator, chlormequat. Dr Karen Galea, who is leading the research, explained that they already had data estimating what humans' levels of exposure might be to pesticides, but wanted to back this up with data to make sure regulations on pesticides, now in place, were sufficient. Samples were gathered in East Lothian in 2010 and in Kent last year. The results from all of the studies will be available in 2013.

FRANCE PLANS TO BAN SYNGENTA INSECTICIDE

Reuters reports that France plans to ban a Syngenta insecticide widely used on oilseed rape after scientists suggested it could pose a danger to bees. Agriculture Minister Stephane Le Foll said that France intends to withdraw the permit for *Cruiser* (thiamethoxam), when used as a coating for rape seed, pending a two week period during which Syngenta can submit its own evidence. It is believed that the decision was based on a report from the French health and safety agency ANSES, which went along with recent scientific findings suggesting that a sub-lethal dose of thiamethoxam made bees more likely to lose their way and die. Syngenta has rejected the move as based on a single study and not backed up by field observations. Laurent Peron, head of corporate communication for Syngenta France, said: "In France you have 650,000 hectares out of a total area of 1.5 million hectares of oilseed rape treated and there are no cases of bee mortality being identified as being linked to *Cruiser*. The ban will take effect before the start of the next oilseed rape sowing campaign in late summer. A farm ministry official stressed that it would not affect thiamethoxam used on other crops such as corn.

EFSA RULES AGAINST BAN ON MON810 CORN

Following scientific evidence presented by France, the European Food Safety Authority (EFSA) has ruled that "there is no specific scientific evidence, in terms of risk to human and animal health or the environment" to support a ban on MON810 corn. The French government called on the European Commission in February to suspend the authorisation to grow Monsanto's genetically modified corn in the EU. France banned the growing of MON810 corn in 2008, the only GM crop approved for planting in the EU, citing environmental risks. France's high court ruled against the ban in November 2011, following a similar decision by the European Court of Justice last September, leading the government to say it would look at all ways to maintain the freeze on GM planting.

UK PESTICIDE FORUM ON PESTICIDE IMPACTS

The UK Pesticides Forum has published its latest annual report *Pesticides in the UK – the 2011 report on the impacts and sustainable use of pesticides*. The work of the Pesticides Forum in 2011 confirms that the use of pesticides is not adversely impacting on the health of UK citizens or the environment. This it says is testimony to the effectiveness of both statutory and voluntary controls. However, the report says there is scope to reduce risks further without compromising the very real need to control pests, weeds and diseases.

The report shows that overall usage of pesticides (measured by weight of active substance) has continued to decline from a peak in 1998. In recent years this drop has largely been as a result of the loss of two key herbicides, isoproturon and trifluralin, and the reduction in maximum application rates of use of others. These herbicides are all used primarily for the control of black-grass and it remains to be seen how much impact these losses will have on the ability of farmers to control this weed, while minimising the development of resistance to the remaining herbicides used.

One particular important issue the Forum discussed this year was how recent developments in pesticide application technology have helped users apply products more precisely. The use of GPS on

modern sprayers and developments in spray nozzle technology has helped reduce the risk of drift and overspraying. The Forum continues to highlight the importance and value of all relevant stakeholders working collaboratively to co-ordinate and provide advice on pesticide use. This will help ensure that society can derive the benefits from responsible pesticide use without being exposed to unacceptable effects.

EUROPEAN GM CROP AREA DIMINISHES

Fewer and fewer field trials with genetically modified (GM) plants are being conducted in Europe. The widespread rejection of GM plants has created a difficult environment for research and approval and as a result scientists and companies are taking different actions. Up until May 2012 there had been only 41 new applications submitted for release of GM crops. In 2009 there were over 100 new applications, but since then the number has steadily decreased. Some 30 of the new applications for 2012 are from Spain, the remaining 11 are spread across Sweden, Ireland, Denmark, Germany, Belgium, Czech Republic, Hungary and Slovakia. Among the 41 new applications, 27 cultivation experiments are being carried out by the multinational companies such as BASF and Bayer with already developed GM plants and almost all take place in Spain. The other applications come from universities and public research institutions. For some it's about basics and safety research. Only ten new releases are applied to projects in which plants are being developed with new or improved properties.

BAYER'S EXPANDING PORTFOLIO FOR POTATOES

Bayer CropScience's Dr Rüdiger Scheitza spoke about his company's expanding portfolio of potato products at the World Potato Congress, organised by the UK's Potato Council in Edinburgh, Scotland. He said that global production of the third largest food crop after rice and wheat was in 2010 over 320 million tons. Around 30% of this total is being produced in India and China, a trend that is on the increase. Bayer says its extensive offering will be supported with advice on cultivating and marketing high quality potatoes. Dr Scheitza said that two projects, which involve collaboration with PepsiCo in Chile and India, demonstrate sustainable potato production and the role of Bayer CropScience as a reliable partner for the national and international potato trade.

Amongst Bayer's new products is the fungicide *Luna* (fluopyram). The company says that this product offers farmers an innovative solution for the control of white mould and early blight. The key advantages for producers, dealers and consumers are improved storage and a longer shelf-life for harvested produce. The novel fungicide will be launched for use in foliar application and seed treatment in more than 79 horticultural and industrial crops. US registration for *Luna* has been received and the product will be available for the 2012 planting season. Further registrations are expected in key countries for the 2013 growing season.

The new seed treatment product *Emesto* (penflufen) controls tuber and soil borne diseases such as *Rhizoctonia* and *Helminthosporium*, resulting in significant higher quality and increased marketable yield. Dr Scheitza said the product represents a new seed treatment generation which improves plant health and increases the yield potential of potatoes based on sustainability principles - low inputs with optimised output, reduced post-harvest losses and a favourable regulatory profile. In 2012 *Emesto* has received registrations in Canada, US, UK and Ukraine. Further registrations are expected in key countries for the 2013 growing season.

AMERICAN NEWS AND MARKETS

NUFARM INVESTS IN A NEW MANUFACTURING FACILITY IN THE US

Nufarm is to establish a new manufacturing facility in Chicago, US. Opening in 2013, it will also accommodate Nufarm's North American headquarters and the global head office for the group's seed technologies business, Nuseed. The project involves a capital investment of approximately \$9 million. When fully commissioned, the new plant will manufacture most of Nufarm's expanding range of fungicides, insecticides, growth regulators and seed treatments and will support the growth of these segments within the North American market. The company says that the provision of 'in-house' capacity will provide additional flexibility to meet changing market needs and demand, will reduce inventory costs, and will capture an increased, integrated margin.

Nufarm's managing director, Doug Rathbone, said: "These facilities will enable us to more closely collaborate with customers to create innovative products and meet their customised supply requirements." The location of the new plant, in the same general area as Nufarm's Chicago Heights herbicide manufacturing facility, will allow the company to leverage combined purchasing power for packaging materials and other supplies and strategically places the company's production within a one day drive of a large majority of key US customers. Manufacturing operations in the new plant are expected to commence in early 2013, with the relocation of Nufarm's North American office scheduled for later in the year.

MANA INTRODUCES NEW LOW VOLATILE FORMULATION OF ABAMECTIN

Makhteshim Agan North America (MANA) Crop Protection has introduced a new miticide/insecticide *ABBA Ultra* (abamectin) which is an advanced low volatile organic compound (VOC) formulation. The product provides consistent insect and mite control at half the standard use volume of other current insecticides along with improved efficacy and reduced impact on air quality. Labeled for use on cotton, tree nuts, grapes, citrus, pome fruits, strawberries and select vegetable crops, *ABBA Ultra's* modern formulation delivers long lasting control against a wide spectrum of mite species and insects including the Two-spotted spider mite, Pacific mite, European red mite, Willamette spider mite, Red mite, Western grapeleaf skeletoniser, Variegated leafhopper, leafminers, leafhoppers and thrips.

"Although EC-based formulations are effective in delivering mite control, continued use in US states like California may decline due to pending changes in regulations," says Dave Downing, product manager with MANA Crop Protection. "It is anticipated that the industry will replace EC formulations with clean air compliant alternatives like *ABBA Ultra*." According to Mr Downing, MANA's new proprietary formulations are performing equal to, or in some cases better than the previous higher VOC formulations while meeting stringent regulatory guidelines. "*ABBA Ultra* is available for the 2012 season and has characteristics that will secure the continued use of abamectin chemistry," he added. The company plans to launch several new formulations of proven products currently in its portfolio by 2013.

SYNGENTA CANADA RECEIVES APPROVAL FOR INSECTICIDE PRE-MIX

Syngenta Canada has received registration for *Endigo*, a pre-mix insecticide containing two modes of action for long-lasting control of aphids and bean leaf beetles in soybeans and dried shelled beans. The insecticide combines lambda-cyhalothrin and thiamethoxam which give fast knockdown of the insects as well as residual control, and make *Endigo* an effective rotational partner to help manage insect resistance. The product is formulated using *Zeon* technology, which is a proprietary formulation from Syngenta. The *Zeon* micro-encapsulation technology delivers a slow release of the active ingredient to enhance residual insect control. Both soybean aphids and bean leaf beetles can be devastating to bean growers. The former may even impact yield before plant symptoms become readily apparent. Bean leaf beetle damage can be severe early in the season causing defoliation. If the beetles are not controlled, pod feeding can lead to reduced yields and quality.

NEW MARKETING ARRANGEMENTS FOR ISAGRO'S TRICHODERMA

Isagro USA has announced two separate distribution arrangements for its proprietary Trichoderma biorational fungicide, effectively splitting marketing responsibilities between agricultural and turf/ornamental markets. The biorational fungicide contains a 50/50 mix of two distinct natural strains of antagonistic fungi – *Trichoderma asperellum* and *Trichoderma gamsii* – both of which are effective in a broad range of temperatures and humidity. The product controls root and collar rot diseases caused by *Phytophthora* spp, *Rhizoctonia solani*, *Pythium* spp and *sclerotinia* spp. AgraQuest will distribute the Isagro Trichoderma product to conventional agricultural crop markets under the *Bio-Tam*

trademark in the US. AgraQuest also has development rights in Mexico and certain development options in Canada as part of its agreement with Isagro. SipcamAdvan originally introduced the product in 2010 under the *Tenet* trademark, and will continue to market Trichoderma under that brand to turf and ornamental markets. Denny Krass, chairman of Isagro USA, said: "This distribution arrangement will allow each company to focus on its respective markets, which will help Isagro maximise value for the Trichoderma product in both segments." Both agreements took effect from 1 May 2012.

EPA APPROVAL FOR MARRONE'S NEW FORMULATION OF GRANDEVO

Marrone Bio Innovations (MBI), a global provider of natural pest management products for the agricultural and water treatment markets, has received US Environmental Protection Agency (EPA) approval for a new, dry formulation of *Grandevo*, the company's biological broad-spectrum insecticide/miticide. The product is approved for use on ornamental plants and edible crops in field and greenhouse applications, and can be applied by aerial and ground applications. *Grandevo*, and its predecessor formulation *MBI-203* (approved by the EPA in 2011), are derived from a newly discovered species of *Chromobacterium subtsugae*. This novel biopesticide features a complex mode of action and was first used in the Florida citrus market in 2011 to control Asian citrus psyllid - the vector for the lethal citrus greening disease.

Grandevo is effective at controlling a wide variety of pests, including Asian citrus psyllids, armyworms and other pest caterpillars, whiteflies, leaf miners, pepper weevils, peach twig borers, thrips, mites, stinkbugs, mealybugs and white grubs. Pest control has been tested on a range of crops, including citrus, tomatoes, peppers, potatoes, strawberries and almonds. MBI's CEO Pam Marrone said: "With *Grandevo*, growers now have a broad-spectrum product that delivers high performance without chemical residues. It offers longer control intervals than typical natural products and is of low risk to beneficial insects, making it a unique addition to integrated pest management programmes. In addition, its complex mode of action aids in resistance management programmes with synthetic chemicals."

The product is tolerance exempt on food crops, a key benefit for exported crops that are subject to maximum residue levels. Other advantages include a minimum four-hour re-entry interval (REI) and zero-day pre-harvest interval (PHI), which provide growers with additional operational flexibility because they can enter fields to work or harvest crops soon after application. *Grandevo* is compliant with the National Organic Program (NOP) and listed by the Organic Materials Review Institute (OMRI).

SELECTIVE BIOHERBICIDE RECEIVES EPA APPROVAL

Marrone Bio Innovations (MBI) has received US EPA approval for *MBI-005*, a unique broad-spectrum selective bioherbicide for use on a variety of crops, turf and ornamentals. "We are currently optimising *MBI-005* for a broad range of commercial opportunities in crops, turf and consumer lawn markets," said MBI vice president of Biological Research Dr Phyllis Himmel. *MBI-005* is a natural product produced by a *Streptomyces* species that kills weeds by halting cellular biosynthesis and division. Field tests have shown that when mixed with chemical herbicides, *MBI-005* increases their effectiveness, which would allow growers and turf managers to use fewer chemicals and deliver better weed control. Additionally, the product has shown broad-spectrum pre-emergence activity as well as selective post-emergence activity on broadleaf weeds and sedges in turf and crops such as wheat, corn and rice. *MBI-005* is non-toxic to non-target organisms such as birds, fish and bees.

KOPPERT EXPANDS IN BRAZIL

Netherlands-based Koppert Biological Systems (www.koppert.com) has reached an agreement to acquire Itaforte BioProdutos Ltda, pioneers in fungi-based biopesticides in Brazil. The company concentrates primarily on fungal products based on *Beauveria bassiana*, *Metarhizium anisopliae* and *Trichoderma harzianum* which are registered for use within the Brazilian market. Paul Koppert, managing director of Koppert said: "The takeover is of great strategic importance for the further growth of our microbiological product portfolio. This gives us access to a number of biopesticides that complement our existing products. Our policy is focused on further reinforcing this range." Itaforte is based in Itapetinga, São Paulo and was established in 1996 by Valentin Suchek. The company is active in outdoor crops such as soybean, maize and fruit as well as covered crops. Itaforte's products are also approved for use on organic crops.

BIOPEST TO DISTRIBUTE DIRECT IN MOROCCO

The creation of Biobest Maroc Trading (BMT) allows the Belgian company Biobest, specialists for 25 years in bumblebee pollination and sustainable crop management, to distribute its product range in Morocco on its own. The new arrangement will allow the company to focus more on the needs of the local market, explained Jean-Marc Vandoorne, CEO of the Biobest Group. "In recent years, we have built a very fruitful business relationship with our local distributors. To ensure future success in the region, the company must assume the entire responsibility for the whole distribution chain, from growing to the use of biological products. BMT will distribute pollinators, beneficial organisms and biopesticides directly to the growers." Nadine Dumiot, commercial director of BMT, said: "This will guarantee a continuous supply of beneficial organisms adapted to the needs of our customers. We can make direct deliveries from our local production facilities, ensuring a very high survival rate of the beneficial organisms. The expertise we build up will be used by our R&D and production units to develop more effective strategies against parasites specific to the North African countries.

USDA FUNDING TO MITIGATE AGAINST INVASIVE PESTS AND DISEASES

US Agriculture Secretary Tom Vilsack has announced that the US Department of Agriculture will support 321 projects in all 50 states, plus American Samoa and Guam that help to prevent the introduction or spread of plant pests and diseases threatening US agriculture and the environment. The funding, totaling \$50 million, is provided by Section 10201 of the 2008 Farm Bill. "We are committed to partnering with our stakeholders to achieve our mutual goals of identifying and mitigating threats to American agriculture, enhancing our emergency response capabilities, and increasing public awareness of the danger of invasive pests and diseases," said Mr Vilsack. "American agriculture supports 1 in 12 jobs in the US and provides safe, affordable food to consumers. I am confident that the selected projects will help our farmers, ranchers and foresters continue to flourish and build upon these successes." Over the last three years, over 600 Section 10201 projects have helped to protect American agriculture and educate the public about the threat of invasive species.

SYNGENTA SETTLES ATRAZINE LITIGATION

Syngenta and attorneys for several community water systems have agreed to settle litigation related to the herbicide atrazine in order to end the business uncertainty and expense of protracted legal proceedings. The proposed settlement agreement, which requires court approval, was filed with the US District Court for the Southern District of Illinois on 24 May 2012. Under the terms of the agreement, Syngenta expressly denied liability and the plaintiffs acknowledged that they are not aware of any new scientific studies relating to atrazine. The total cost of the settlement for Syngenta is \$105 million, which will be charged to the income statement in 2012. Syngenta will continue to market atrazine as part of its comprehensive corn herbicide portfolio.

US CONSUMERS WILLING TO ACCEPT GM WHEAT

Results of a new survey of US consumer perceptions of agricultural technology has been reported on by the International Food Information Council, IFIC, Washington DC. The survey based on a sample of 750 consumers is the 15th such survey carried out since 1997. Questions were asked about attitudes towards the purchase of foods made with wheat produced using biotechnology. About 70% of consumers surveyed indicated they would be willing to buy such products provided there were additional nutritional benefits or the crop was grown using less land, water or pesticides. Most consumers surveyed indicated favourable or neutral impressions of plant biotechnology, with not one respondent avoiding food with GM ingredients. Less than 1% of the respondents said they wanted to see information about GM derived ingredients on product labels. This compared with nearly 9% of respondents wishing to see more about a food's nutrition and about 6% of respondents wishing to see more about food safety. The vast majority, 76%, had no suggestions about additional information that they would like to see added to food labels. The results of the 2012 survey showed little change to the last IFIC technology survey carried out in 2010. At present there is no commercial production of GM wheat anywhere in the world.

OKANAGAN SPECIALTY FRUITS SEEKS APPROVAL FOR GM APPLES

The possibility of the commercial introduction of GM Golden Delicious and Granny Smith, "Arctic" apples, which are slower to brown while processing, is nearer according to Okanagan Specialty Fruits, of Summerland, British Columbia (www.okspecialtyfruits.com), the company that has developed the trait. The business is requesting approval in Canada for the apple events GD743 and GS784. The Canadian Food Inspection Agency, CFIA, will be seeking comments on the request for unconfined environmental release for commercial planting purposes in Canada.

In 2010, Okanagan Specialty Fruits submitted a risk assessment petition for non-browning apples to the US Department of Agriculture's Animal and Plant Health Inspection Service, APHIS. This was the first petition that the USDA had ever received for a GM apple, and the request is still pending. Neal Carter, president of Okanagan Specialty Fruits, said the USDA has told the company that the agency had completed the scientific review of the petition for the Arctic apple varieties. He said the agency is expected to publish the petition for release in the Federal Register soon, which will then begin a 60-day public comment period. USDA will also work on a plant risk assessment and an environmental assessment that may take several months to complete. Mr Carter said the key driver for the variety is for fresh-cut application. "It is all about getting rid of the antioxidant dips and making apples have their own natural flavour and getting a better tasting, chemical free, fresh cut apple that is competitively priced."

There has, however, been a mixed reaction from the industry following the company's submission for approval in the US. Both, US Apple Association and the Northwest Horticultural Council have urged the USDA to keep the GM variety out of the US. Their concerns relate to the potential marketing harm to the conventional and organic apple industry. Chris Schlect, president of the Northwest Horticultural Council, recently re-confirmed its concerns: "We would hope that the Arctic variety does not enter commercial trade in the US."

SYNGENTA FORMS WHEAT BREEDING PARTNERSHIP IN ARGENTINA

To help boost wheat production in Argentina, Syngenta and long-established local Argentinian wheat breeder Buck Semillas have formed a partnership to develop new, high-performance wheat varieties. The agreement to work towards this goal comes at an important time for Argentina's wheat growers. While competitiveness of other local crops remains strong, current export restrictions pose an additional challenge to wheat farmers who are used to exporting more than 50% of their production. By driving differentiation through new wheat varieties as well as enabling complete and tailored production solutions, Syngenta says this agreement addresses the major local crop needs and helps to ensure that Argentinian wheat maintains its important contribution to world food security.

Buck Semillas has released more than 80 wheat varieties, as well as innovations in other key crops. Recent wheat introductions include the *Buck SY* line, which is already based on successful previous integration of Syngenta genetics. Through this new partnership, Syngenta has the opportunity to apply its leading breeding technologies and to combine its global wheat gene pool with locally-adapted genetics. The goal is to develop wheat varieties which set new quality and yield standards and which set the basis for an improved wheat production system in the future. "Due to increasing global demand, every wheat-growing country in the world is searching for ways to improve yields," says Karsten Neuffer, Syngenta's global head of cereals. "Buck has high-quality material and together we will be developing outstanding high-yielding varieties to achieve the production increases necessary to meet Argentina's future needs."

OTHER NEWS AND MARKETS

ARYSTA OPENS NEW RICE FUNGICIDE FORMULATION PLANT IN VIETNAM

Arysta LifeScience Vietnam has opened a new suspension concentrate (SC) formulation plant in Song Than, Binh Duong province, Vietnam. Later this year the company plans to produce and launch *KASAI-S 92SC*, for the control of rice blast. The fungicide is based on a mixture of kasugamycin and tricyclazole and will be the first SC fungicide for rice blast control available to growers in Vietnam. Tran Quoc Dan, Arysta LifeScience factory manager, said: "With an excellent safety profile, *KASAI-S* offers rice farmers a total solution by controlling rice blast and bacteria leaf disease, which has become more common in rice in recent years." He emphasised the benefit of the SC formulation saying "Suspended concentration formulations are non-powdery, with uniform particle size and are produced with reduced or no use of hazardous solvents that makes them one of the most stable and safest formulations for farmers and the environment." The new plant is the first SC formulation plant in Southeast Asia and was established with technical assistance from Hokko Chemical.

KRISHIDHAN SEEDS AND HOKKO CHEMICALS TO DEVELOP CROP TRAITS

India-based Krishidhan Seeds, an agbiotech and plant breeding company, and the Japanese agrochemical company Hokko Chemical Company have signed an agreement to develop insect resistant and herbicide tolerant traits in major key crops. Under the terms of the agreement, Krishidhan receives exclusive rights from the Hokko group to develop and sell multiple crop products that contain the novel patented glufosinate resistant gene. Krishidhan will stack its own indigenous insect resistant and other herbicide tolerant genes to develop biotic stress tolerant crops like corn, soybean, rice, wheat, eggplant, hot pepper, onion and tomato that will be resistant to both insects and herbicides and intends to commercialise the leads by 2015-16. In 2011, India planted 10.48 million hectares of biotech crops. Products that contain the novel glufosinate-resistance gene stacked with other genes would be among first indigenous traits developed for the developing world, especially India.

ARYSTA INVESTS IN R&D CENTRE IN BRAZIL

Arysta LifeScience is investing in new projects at its Agricultural Research and Development Centre (CPDA) in São Paulo, Brazil. The company will be hiring additional researchers to meet the demand for new products and the development of formulations. The forecasted investment in the areas of R&D and regulatory will be more than \$8 million in 2012. Arysta says that the CPDA acts as a global hub for technology development and technical training for all of the Arysta LifeScience business units. It occupies an area exceeding 70 hectares in a region that allows trials and tests to be carried out throughout the year. This enables the assessment of new crop protection solutions not only for Latin America, but also for other regions in which Arysta LifeScience operates throughout the world.

"The CPDA is expected to become an international centre of excellence for Arysta LifeScience worldwide," said Flavio Prezzi, president & CEO of Arysta LifeScience Latin America. "The selection of Brazil as the main unit for investment reflects the importance of the Latin American region for Arysta LifeScience. Brazil represents one third of the operations of Arysta LifeScience in the world. Among the six business units worldwide, the Latin America Business Unit represents nearly 40%, and Brazil alone accounts for 65% of that business," added Mr Prezzi. The new investments in R&D are part of a series of initiatives that includes plans for Arysta LifeScience to double its size over the next few years.

SYNGENTA LAUNCHES RICE BOWL INDEX

Syngenta has launched the Rice Bowl Index, a diagnostic tool that provides insight and information on the robustness of the food security system across Asia-Pacific. The Rice Bowl Index is designed to facilitate dialogue, collaboration and action between governments, NGOs and the private sector, moving from simply identifying problems to finding solutions.

"Asia is home to over 60% of the world's population and some of the world's fastest growing economies, and yet only has 34% of the world's arable land and 36% of the world's water resources," said Robert Berendes at the Rice Bowl Index launch in Bangkok, Thailand. "At the same time, the agriculture and food production landscape in Asia is changing rapidly and the question of how food security can be increased in an environmentally sustainable way must guide development strategies."

The Rice Bowl Index is the result of a collaborative effort between Syngenta, the Frontier Strategy Group and Professor Paul Teng, Senior Fellow (Food Security) at the Centre for Non-Traditional Security Studies, Rajaratnam School of International Studies, Nanyang Technological University, Singapore. Designed to translate the complexity of food security into an opportunity for action, it is a tool which assesses how robust a country's capacity is to address the challenges of food security. Its unique feature is that it captures the complexity of food security through a multi-dimensional approach and reduces this complexity into user-friendly charts and tables. The tool serves as a common language for different stakeholders to engage in purposeful dialogue leading to solutions-oriented action.

SYNGENTA AND DEVGEN ANNOUNCE RESEARCH AGREEMENT

Syngenta and Devgen have announced a six-year global license and research agreement. The partnership will enable Syngenta to add RNA interference (RNAi) technology to its crop protection pipeline. RNAi is a naturally occurring process in all organisms. In agriculture, RNAi is developed to target and control a specific pest, thereby protecting high-value crops with no harm to beneficial insects. As of April 2013, the two companies will jointly develop new biological insect control solutions based on RNAi technology.

Under the agreement, Syngenta will develop and commercialise sprayable RNAi-based crop protection products originating from Devgen. Devgen will bolster its research activities through funding and royalties from Syngenta, consisting of an upfront technology access payment of €22m and €4.8m per year to fund research over the course of the agreement. Devgen is also eligible to receive royalties from Syngenta on sales of developed products. "We are pleased to enter this research partnership with Devgen given its leading position in RNAi research and proven expertise in RNAi-based insect control," said Sandro Aruffo, global head of Research and Development for Syngenta. "This novel technology further expands our growing range of biological insect control solutions."

DOW AND AGDIA TO AUTOMATE USE OF IMMUNOASSAY STRIPS

Dow AgroSciences and Agdia are to develop and commercialise a novel device that will fully automate the analysis of plants and seeds using immunoassay strips. They say that every year millions of immunoassay strips are used in agriculture and horticulture to detect the presence of a disease or a biotechnologically engineered trait present in a plant or seed. Agdia, a supplier of the immunoassay strips, was the first company to assemble individual strips into a multi-strip comb. The comb format has allowed customers to increase their through-put yet the reading, analysis and capture of data from the combs has been completed manually.

To address this, Dow AgroSciences designed and patented a prototype device and software that automate the process. In seconds, the new reader device captures an image of the comb, analyses the image and stores the data automatically. This is a break-through for the industry that will save time, reduce costs, and may increase the accuracy of the process by eliminating human error. In the agreement, Dow AgroSciences has provided Agdia with an exclusive license to develop and sell a commercial reader device to the agricultural market. Agdia will also design and sell immunoassay combs that will be customised for use with the reader. Daniel R Kittle, global leader, Research & Development, Dow AgroSciences, said: "While it is exciting for Dow AgroSciences to invent this technology, manufacturing and selling a commercial reader is not aligned with our business strategy. Agdia was an obvious choice as a commercial partner because it is a global leader in plant diagnostics for agriculture."

AUSTRALIANS ACCESS NEMATODE RESISTANT WHEAT BREEDING LINES

Australian wheat-breeding companies now have access to several new nematode resistant and tolerant wheat lines, which could enhance the approach to managing these pests in cereal crops. Agri-Science Queensland has released five new wheat breeding lines that are both tolerant and resistant to the root-lesion nematode, *Pratylenchus thornei*. These were developed by staff at the Queensland Government's Leslie Research Centre with funding provided by the Grains Research and Development Corporation. The breeding lines are available to Australian wheat breeding companies so they can develop commercial varieties with the root-lesion nematode resistance and tolerance characteristics.

The nematode affects two thirds of Australia's northern grain crops and can reduce yield by up to 65%, costing growers \$50 million every year. Agri-Science Queensland plant pathologist Jason Sheedy said these new wheat lines should reduce nematode populations in the field while maximising

yields. "The nematode-tolerant characteristics will mean that the wheats can maximise yields under nematode infested conditions, and the nematode-resistant characteristics will mean that soil populations should not build up and affect following wheat crops," he added.

CHEMINOVA FIRST QUARTER SALES UP 16%

Cheminova reports that it has had a satisfactory start to 2012. Revenue was up 16% in Q1 2012 to DKK 1,610 million (\$270 million) and earnings before depreciation and amortisation (EBITDA) increased to DKK 187 million corresponding to an EBITDA margin of 11.6% (8.9% in 2011). Improved product mix and positive price developments compensated for higher raw material and energy costs. The company says the good start to the season is attributable to climatic conditions and a positive outlook in the agricultural sector. Farmers are expected to increase usage of agrochemicals on important crops such as corn, soybeans and wheat as crop prices remain high. The industry, therefore, still expects to achieve growth of up to 5% for the year as a whole based on volume growth and price increases. During the year new fungicides containing azoxystrobin will be introduced in a number of markets, while market penetration will continue for products introduced in recent years. The company maintains the previously announced outlook for 2012 of revenue of approximately DKK 6,000 million with an EBITDA margin of around 10%.

CONFERENCES AND FEATURES

MAKHTESHIM EXPANDS ON ITS VISION FOR THE FUTURE

In 2011 state-owned ChemChina, one of the top 500 companies in the world and the largest chemical producer in China, acquired a 60% share in Makhteshim Agan Industries (MAI). So what does the future hold for the Israeli-based agrochemical company that already ranks seventh in the world, fourth in Europe and has a global share of the market of over 5%. MAI's management team recently took time to meet with business analysts and international journalists in Israel and gave an expanded view of the company's vision of the future. Martin Redbond reports for Crop Protection Monthly.

President and chief executive Erez Vigodman, who joined the company in January 2010, outlined the rapidly changing business environment in which Makhteshim Agan now operates. He pointed to the rising global population, increasing food consumption and an increasing demand for biofuels. In order to meet the projected demands yields will have to improve at a much faster rate. In developed countries this means increasing yield through innovation and in developing countries by boosting productivity through technology and best practice. Adding new agricultural land means making marginal land fit for use. This usually involved novel technologies such as micro-irrigation and recycling waste water which are both highly developed in Israel.

Mr Vigodman said that the agrochemical industry still had substantial growth potential. Crop prices are close to all time highs, there is a gradual technology adoption in Russia and Asia, accelerating use of fungicides in North America and continuing growth in Latin America. He said that while GM substitution for crop protection chemicals is largely over there is still more room for growth of genetically modified crops in Asia and Africa, and later on in Europe.

A formidable partnership

In order to meet these new demands Mr Vigodman stressed the need to change the company's business model to one based on product and service quality, and product distinctiveness. The transformation process started back in 2010 and is still continuing today. Makhteshim Agan is also working with its partners in the ChemChina Agrochemical Corporation (CNAC) to build infrastructure in China and to create one global company that will deliver the company's vision to Create Simplicity in Agriculture. Part of the deal with ChemChina was to float the transformed Makhteshim Agan business within three years.

"The ChemChina project is still work in progress," said deputy chief executive Dr Chen Lichtenstein, formerly executive director of Investment Banking at Goldman Sachs. He joined the Makhteshim Agan Group in 2006 and established MAI's Global Resources Division, combining all of the group's operational activities including manufacturing, supply chain, procurement and R&D. Most significant is the centralised purchasing which has increased the company's bargaining power, tightened its supply chain and reduced costs with greater efficacy.

Today Dr Lichtenstein is responsible for the integration with ChemChina. He told *Crop Protection Monthly* that the integration team he heads up is now focusing on how to build the best platform in China. Food security is a major concern for the Chinese and is being addressed in the country's 12th Five Year Plan. China has 20% of the world's population, 7% of the global arable land and uses 6.6% of the global fresh water resources. Food consumption there is increasing and diets are changing.

The Five Year Plan intends to improve arable land, create more efficient large scale farming and stimulate production. Government policy is also driving consolidation of the agchem industry by eliminating inferior players as businesses relocate to industrial parks and there is a tightening of environmental protection controls. The authorities are also encouraging innovation through national and provincial R&D funding and there is the expectation that Chinese trademark products will contribute 30% to the country's agrochemical sales revenue by 2015 (50% by 2020). Frequently visiting China Dr Lichtenstein and his team are reviewing the ChemChina business and looking to backward integrate specific assets into Makhteshim Agan's global agrochemical business, giving the company a much stronger presence in Asia.

With 120 active substances, MAI now has the broadest product portfolio in the industry. In 2011 six development hubs and two global R&D centres, located in Israel and India, together received 220 new registrations and launched 35 new products. With over 4000 registrations in 120 countries spanning Europe, North America, Latin America, and most major markets beyond, Makhteshim Agan appears to

have all the necessary products on hand to address the majority of crop needs. This means that it is now becoming a one-stop shop for farmers looking for a comprehensive solution.

Yoav Zeif, director - Global Products and Marketing, formerly an associate principal of McKinsey & Company, says that MAI is moving its portfolio from one that was 100% generic to one that is best described as a hybrid portfolio made up of innovative products, branded generic products, generic products, and unique mixtures and formulated products. This portfolio will create both the volume and value that comes from product leadership, distinctiveness, innovative R&D and advance marketing capabilities.

Makhteshim Agan has five synthesis plants and 14 formulation facilities. In Israel there are two sites for synthesis, one in Ashod making herbicides and the second in Ramat Hovav for fungicides and insecticides. There is also a formulation and packaging plant in Beer Sheva equipped with 40 different lines enabling the company to quickly respond to its customers' requirements. MAI is rightly proud of its production and formulation capabilities and has invested \$176 million in environmental protection and safety over the last five years.

In October 2011, MAI announced that it was setting up a new Agricultural Technologies division to focus on identifying, developing and commercialising technologies that can help simplify farming. Mr Vigodman said that the company will improve its ability to meet current and future challenges of agriculture by complementing its high quality, reliable crop protection solutions with effective, novel technologies for agricultural uses.

MAI's new initiative is headed by Professor Uri Shani. He has a diverse professional background in the agricultural arena having served in key positions in the academia, business and public arenas. Most recently, he served as chairman and general manager of Israel's Governmental Water and Sewage Authority. He is chairman of Israel's Steering Committee for the Red Sea-Dead Sea Channel project, as well as professor of Soil and Water Sciences at The Hebrew University in Jerusalem. Previously he served as general manager of Arava agricultural growers and general manager of Yotvata dairies.

It is clear that Makhteshim Agan is being run by an impressive team of highly qualified and committed professionals with decades of proven experience who appear to be on course to a very successful future.

Good progress

The company has recently posted first quarter 2012 sales of \$828.0 million, compared with \$780.5 million in the corresponding period of 2011, an increase of 6.1%. The increase stemmed primarily from an improved mix of products and an increase in volumes sold. In addition, a rise in the price of oil and raw materials since 2011 triggered a slight increase in selling prices in the crop protection sector which allowed MAI to also raise its prices. EBITDA during Q1 2012 was \$163.2 million, equal to 19.7% of sales compared to EBITDA of \$143.2 million (18.3% of sales) for the comparable period in 2011, representing a 13.8% growth rate.

On a geographic basis, the strongest sales growth was delivered by the company's Asia Pacific & Africa region, which contributed \$141.2 million in the first quarter year of 2012, an 11.4% increase from \$126.7 million for the first quarter of 2011. This improvement resulted from an increase in volumes sold in Asia and from the positive impact of changes in exchange rates which were partially offset by the company's hedging transactions. European sales for the first quarter of 2012 were \$423.5 million compared with \$388.9 million in the corresponding period of the previous year, an increase of 8.9%. The growth stemmed mainly from increased volumes and the ability to compensate for some of the increase in raw material costs through moderate price increase. North American sales for Q1 2012 amounted to \$131.9 million compared to \$126.9 million for the comparable period in 2011, an increase of 3.9%. Sales were characterised by an increase in volumes. Sales in Latin America for first quarter of 2012 were \$107.4 million compared to \$113.5 million for the same quarter last year, a reduction of 5.4%. The slight decrease in sales stemmed from lower quantities sold as a result of drought conditions in Argentina.

Commenting on the first quarter results, Mr Yang Xingqiang, Makhteshim Agan's chairman of the Board (Mr Yang also serves as vice president of China National Chemical Corporation), said: "Our strong business performance during the first quarter, including our record sales, gross profit and EBITDA, stems from our focused pursuit of our strategic direction. We are working intensively to

realise the joint potential of MAI and ChemChina following the completion of our merger, including investigating business opportunities that will enable us to strengthen our presence in China and the Pacific Asian region and foster continued growth and improved profitability over the long term.”

Mr Erez Vigodman, added: “These results reflect the transformation our business and operations have been undergoing since 2010. The positive environment in the global agriculture industry in general, and in the agrochemical industry in particular, have also been influential. We are committed to advancing our short and long term agenda as we evolve our business to provide simple, effective, reliable solutions to farmers. We are doing this by implementing significant improvement measures that affect our operations and global infrastructure. At the same time, we are investing significant resources in our future growth, primarily in the integration of Makhteshim Agan and the agrochemical activities of ChemChina, as well as in other major strategic initiatives.”

MONSANTO'S R&D PIPELINE

Speaking to investors at the recent Goldman Sachs Basic Materials Conference 2012 (22-24 May) in New York, US, Monsanto's chief technology officer Dr Robb Fraley said: "Our R&D pipeline offers opportunities beyond breeding and biotechnology and will add incremental growth to the business."

"Monsanto's pipeline has evolved significantly from where it was just a few years ago and today it is more exciting and robust than ever. Not since we developed the first *Roundup Ready* trait have we seen such promising categories of value emerging. We are exploring new areas of technology and new areas of the world, and all roads lead to opportunity for both Monsanto and our farmer customers as we work together to improve yields," said Dr Fraley. He went on to discuss new technologies which include the expansion of the company's Integrated Farming Systems portfolio and a new agricultural biologicals platform featuring BioDirect technology. The latter represents Monsanto's first step into biological products and brings the company's expertise in plant genomics to chemistry for the first time. This could provide new options for sustainable pest or virus control. The BioDirect technology utilises the application of molecules that are in nature, like RNA, to diminish the production of specific proteins in the target organism. "BioDirect technology has the potential to be one of the most exciting advancements for agriculture that I have seen in my career," Dr Fraley said. "By working with a plant's own naturally-occurring processes, we have the potential to create products that are very precise and specific in how they work and may require smaller and fewer applications than current agricultural products. BioDirect technologies could eventually be used to identify new opportunities for current herbicides, create better insect control options, and offer new virus-control tools."

Dr Fraley also referred to the company's progress as it builds its Integrated Farming Systems portfolio, including its plan to acquire precision agricultural engineering and planting technology leader Precision Planting. Monsanto's planned Integrated Farming Systems offering would provide science-based agronomic seed prescriptions with next generation precision equipment, helping farmers increase yield potential and reduce risk.

He also touched on emerging global opportunities, highlighting the company's capital investment in Central and Eastern Europe as well as the continued ascension of agriculture in Brazil and Argentina, all of which are expected to drive Monsanto's growth over the next several years.

In Brazil, Monsanto is getting ready for the commercial launch of its *INTACTA RR2 PRO* soybeans, the first product the company has developed specifically for an international market. *INTACTA RR2 PRO* brings insect protection to the *Roundup Ready 2 Yield* product that has delivered yield increases to US farmers along with glyphosate tolerance. The product has been well-received in on-farm trials and has already been tested by 500 farmers in Brazil with successful results. It is expected to be commercialised pending the deregulation process for Brazil's main soybean importers.

Argentina is also expected to have more agricultural technology choices in the future. Good progress has been made on a new payment system between the company and Argentina farmers and this encourages Monsanto to continue investing in that market. With continuing progress, Dr Fraley said he would expect the company to introduce its on farm programme of trials for *INTACTA RR2 PRO* in Argentina for fiscal year 2014. The company has also invested capital in corn production for Argentina.

Dr Fraley finally discussed the company's planned capital investment in an expansion of its corn seed production facilities in Central and Eastern Europe. "We have a real yield opportunity in Eastern Europe, which has rich, black soil and large tracts of uncultivated, arable land. Corn yields are about half of what they are in comparable areas of Western Europe. The area is well-positioned geographically as an exporter to the rest of Europe, North Africa and the Middle East and has great potential to really boost productivity with better genetics in corn and canola." If yields in Eastern Europe can be improved to the level of Western Europe, farmers in the East could produce enough food for 500 million people. The two key components of increased yield are better seed and agronomic practices.

FOOD SECURITY 2012

The UK Government's Foresight project Global Food and Farming explores the increasing pressures on the global food system between now and 2050 (CPM January 2011). The report highlights the decisions that policy makers need to take today, and in the years ahead, to ensure that a global population rising to nine billion or more can be fed sustainably and equitably. The report makes a compelling case for urgent action to redesign the global food system to meet the challenge of feeding the world over the next 40 years. Taking forward the Foresight project Global Food and Farming Futures, was the theme of a conference organised by the Westminster Forum on global food security held at the Royal Society, London on 23 May. Nearly 200 delegates attended, representing Government and policy makers, universities, research organisations and industry. Bruce Knight reports.

The keynote presentation was by Sir John Beddington, chief scientific adviser to the UK Government, who had overseen the production of the Foresight report published in January 2011. Re-visiting the conclusions, Sir John Beddington emphasised the urgency of not only responding to a projected global population of over nine billion by 2050, but also an expected increase of one billion by 2025, only 13 years away. Africa, he said, represented the biggest challenge where an increase in population of 50% by 2050 is being predicted.

The first steps are to develop an agriculture that manages its resource needs efficiently. Agriculture globally accounts for 70% of the world's water consumption. Agriculture needs also to be 'climate smart'. Specific requirements from policy makers are to raise the profile of world hunger, focus on the importance of agriculture and food, make the most of existing and new technologies including GM, and to address the consumption patterns. Answering a question on the role of GM technology, Sir John Beddington said that while the technology is not the single answer it is one of the answers. In his words it is an idea that "we would be unwise to exclude."

Panelists during the first session of the conference described the implications of Foresight on future practice and policies. Dr Gail Smith from Unilever's Sustainable Agriculture group outlined how the company was working to reduce the impact right along the food chain - on water, greenhouse gas and waste. Its ultimate aim is to halve the combined footprint. In 2010 Unilever set up a ten year plan with the aim of achieving 100% sustainable sourcing of agricultural produce by 2020. By 2011 they had already achieved 24%. Palm oil, one of its most important commodities, had reached 64%, cocoa was 21% but soya was still only 8% and sugar 1%.

Tom Hind, director of corporate affairs, National Farmers Union (NFU), described the challenge of implementing Foresight recommendations in the UK. He said that science has to be applied more effectively. His proposal was to establish a clear road map between the science councils and the farm. The NFU will list the 10 most important challenges to which R & D effort could be aimed. He also recognised that the current knowledge transfer mechanism was not systematic enough. Apart from the application of science the farming industry has to take account of the market place which can cause distortions in demand. He said there was also a need for much more investment in technology.

The second session of the day was chaired by George Freeman MP, chair of the UK all-party parliamentary group on science and technology in agriculture. He recognised that the new generation of parliamentarians has to respond to the challenge set by the Foresight report. The session addressed how the 'sustainable intensification of agriculture' could impact on food security and the price of food. Caroline Hurford, a senior public information officer for the UN World Food Programme, described how world hunger had now shot up the list on the international agenda. There was much encouragement from the fact that President Obama had proposed a new alliance between food security and climate change at the recent G8 assembly. Ms Hurford pointed to the Horn of Africa region where urgent action is currently called for. The problem is not just filling empty bellies; there are other vulnerable groups such as pregnant women to consider. Examples of food programmes included the distribution of a high protein super cereal based on corn and soya meal and high energy biscuits, HEBs. The core need is to establish an Africa based supply chain and to deliver the right food at the right time.

Among the panelists was Sue Davies, from the consumer organisation Which. Her perspective was that there needs to be a more joined up approach to public food issues. For example the problem of obesity seems to be treated in isolation from other dietary issues. On the question of advanced food production methods, such as GM, she reported continued consumer distrust and argued that the technology should be developed in response to need rather forced through. Ms Davies said that

education on issues such as GM and cloning should be improved. She also called for more open debate and a robust regulatory system for food safety.

The role of GM technology was explained by Dr Julian Little, chair of the Agricultural Biotechnology Council. He stressed that GM is not the only answer to improved agricultural productivity but if, as has been the case in Europe, GM and new breeding techniques are never tried they will never be accepted. He cited the CSIRO in Australia as a public sector research organisation which is addressing problems with the best technologies available. Helen Browning, CEO, Soil Association, suggested that there was some coming together of approaches between those promoting technology led agricultural systems and the organic lobby. Her observation on GM was that the public interest should be of greater priority than those of shareholders and suggested that GM should be adopted if the productivity challenges cannot be met by any other means. Helen Browning did emphasis that with so much land having been degraded by intensive farming methods serious attention needs to be given to improved soil management systems.

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