



The Global Agrochemical Market in 2012 - Preliminary Review

Our preliminary analysis of country market and company performances in 2012 estimates that the global market for agrochemicals, used in both crop and non crop situations, has improved by 6.6% to reach \$53,635 m. at the distributor level.

Global Agrochemical Market Value (\$m.)

Sales (\$m.)	Crop Protection	Non Crop	Total Agrochemical
2006	30425	5150	35575
2007	33390	5365	38755
2008	40475	5655	46130
2009	37860	5860	43720
2010	38315	5880	44195
2011	44015	6290	50305
2012	47255	6380	53635

The Global Crop Protection Market

Based on this analysis, the global crop protection market is estimated to have increased by 7.4% to reach a total value of \$47.255 m. during 2012. Key elements in this market performance were more stable prices of glyphosate, crop commodity prices sustained at a high level and the strengthening of the US dollar. In Europe, the market benefitted from an early end to the winter, with improved volumes and prices, although a wet summer affected northern Europe, whilst the south was dry. Central and East Europe benefitted from an improved economic position, but suffered from a very cold winter and a dry summer. The US market got off to a good start, but then drought affected the central cornbelt, although other parts of the country were more positive. Maize use for ethanol production was affected by the high cost of the feedstock and the ending of the blending subsidies in 2011. Canada recorded significant growth due to recovery from

the flooding that had depressed 2010 and 2011. Strong crop prices and weaker currencies drove growth in the Latin America market despite a dry start to 2012 in Brazil and Argentina. Asian markets were generally very positive, recovering from adverse weather in 2011, notably in Japan and Thailand, although India suffered another variable monsoon season in 2012 and wet weather affected Southern China and countries in a similar latitude. Australia benefitted from good growing conditions, but low pest and disease pressure and the impact of a strong currency. When currency movements and inflation have been removed from the results, real growth in the market is estimated at 10.0%.

Crop Protection Market Performance 2012

Year	Conventional Agrochemical Market (\$m)	Change from Previous Year (%)	
		Nominal	Real
2006	30,425	-2.5	-6.5
2007	33,390	9.7	2.8
2008	40,475	21.2	10.2
2009	37,860	-6.5	-1.5
2010	38,315	1.2	0.2
2011	44,015	14.9	5.9
2012	47,255	7.4	10.0

Note: Market value is at distribution level and Average Year exchange Rates

Currency affects again had a significant impact in 2012, with the dollar strengthening against most major currencies except the Japanese Yen, the Chinese Yuan and the Australian dollar. Stable to improving glyphosate prices benefitted all regions, but especially the Americas and Asia.

At the regional level, Latin American markets



recorded the strongest growth, gaining from strong crop prices and increasing demand for maize, soybeans and sugarcane. Asian markets were stronger in 2012, assisted by recovery from adverse weather in 2011. Growth was again driven by India and China, despite a variable monsoon season in India and flooding in Southern China. A key factor in China was the banning of the 10% glyphosate formulation forcing a trading up to higher value products. Australia benefitted from normal weather, and strong crop prices offsetting the strength of the Australian dollar, however disease and pest pressure was low. The Japanese market improved steadily, recovering from some of the impact of the Tsunami in 2011. The NAFTA market benefitted from recovery

from flood affected 2010 and 2011 in Canada, better water availability in Mexico and the Southern USA, although the central US cornbelt was badly affected by drought. Crop prices remained high, promoting fungicide usage in areas of adequate rainfall, whilst glyphosate prices improved marginally. Europe benefitted from an early end to the winter, but was held back by a wet summer in the north and dryness in the south. East Europe suffered from a very cold winter and a dry summer. The planting of cereals in Russia recovered for the 2011/12 season, but the harsh winter killed some crops, whilst a hot dry summer limited production. The Ukraine suffered from similar weather conditions.

Regional Market Performance 2012 – Nominal

US Dollar Growth

Region	2011(\$m)	2012(\$m)	Growth 2012/2011(%)
NAFTA	8412	9047	7.5
Latin America	10060	11540	14.7
Europe	12196	12510	2.6
Asia	11607	12275	5.8
Rest	1740	1883	8.2
World	44015	47255	7.4

Whilst all regions enjoyed growth in nominal US dollar terms, as stated above among the key factors in market development in 2012 was the strengthening of the dollar and recovery from adverse 2011 weather. As a result, the provisional analysis of the market shows a more significant market improvement in real terms when currency and inflation are taken into account.

Regional Growth Rates 2012

Region	Nominal Growth 2012 / 2011 (%)	Real Growth 2012 / 2011 (%)
NAFTA	7.5	5.4
Latin America	14.7	20.4
Europe	2.6	8.2
Asia	5.8	9.9

At this time it is difficult to be precise about product performance, however all sectors of the market are expected to record growth in 2012, herbicides due to strong demand and more positive glyphosate prices; insecticides, with sales growth led by new introductions; fungicides due to a good start to the year in Europe, strong crop prices, growth in developing markets and a continuing strong soybean sector.



Company Results First Nine Months 2012

Company	Local Currency	First Nine Months 2011		First Nine Months 2012		%Change 2012/11	
		Local m. \$m	Local m. \$m	Local m. \$m	Local m. \$m	Local	\$m
Amvac	\$	220	220	263	263	19.5	19.5
BASF	•	3343	4702	3802	4874	13.7	3.7
Bayer (Excluding seed)	•	4916	6914	5707	7317	16.1	5.8
Cheminova	DKr	4065	741	4545	782	11.8	5.6
Chemtura	\$	290	290	311	311	7.2	7.2
Dow AgroSciences**	\$	4311	4311	4816	4816	11.7	11.7
DuPont	\$	2229	2229	2409	2409	8.1	8.1
FMC	\$	1055	1055	1271	1271	20.5	20.5
MAI	\$	1998	1998	2115	2115	5.9	5.9
Monsanto*	\$	2567	2567	2810	2810	9.5	9.5
Syngenta	\$	7458	7458	7804	7804	4.6	4.6

* Monsanto Results are for the three quarterly periods ending in August

** Includes seeds

The sales performances of the leading agrochemical companies over the first nine months of this current year are outlined in the above table. Company results were generally very positive, with, for the companies listed, the greatest growth recorded by

Amvac with strong sales of corn soil insecticides, and by FMC assisted by the significant growth of the Brazilian market, a new joint venture in Argentina and product range expansion based on a number of product agreements.

CROP TRENDS

Crop Planted Areas 2012

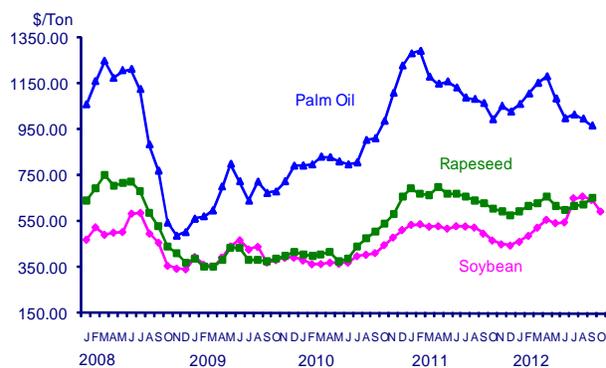
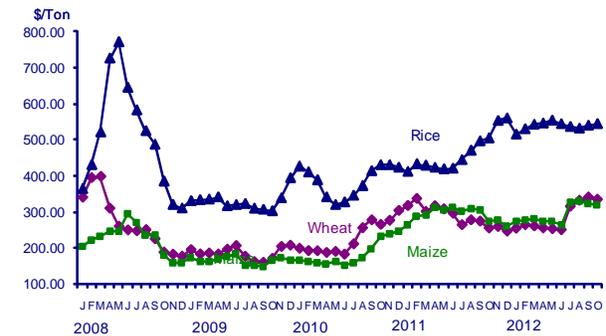
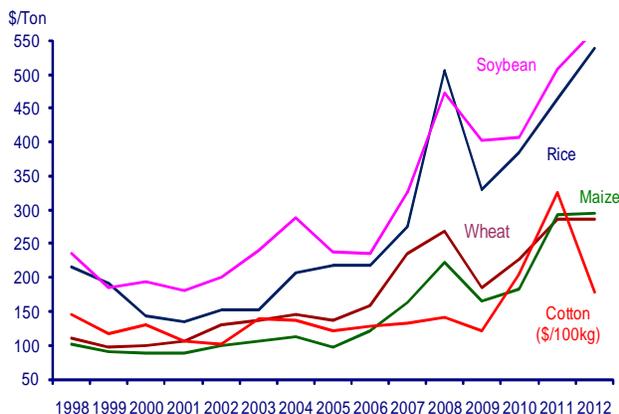
Crop	Global Area 2012 Ha. m.	Change 2012/2011 %	Global Production 2012 Tonnes m.	Change 2012/2011 %
Wheat	217.41	-2.0	653.05	-6.1
Maize	175.23	+3.6	839.02	-4.4
Rice	158.70	-0.1	465.10	0.0
Soybean	108.55	+6.3	264.28	+11.0
Oilseed Rape	34.27	+3.7	59.00	-2.6
Cotton	34.10	-4.9	25.33	-6.3
Sunflower	24.76	-3.7	34.81	-11.0



In 2012, the global planted area of maize, soybean and oilseed rape increased again, whilst the rice area was stable, but wheat, cotton and sunflower all declined. Production was however less positive, with only soybeans recording an increase, rice production stable, but output of all other major commodities declining. For wheat and oilseed rape the key reason for this was adverse weather in Europe; maize production was depressed by drought in the US central cornbelt; sunflower was affected by drought in Argentina and poor weather in Europe, as well as reduced planted area; cotton was predominantly affected by overproduction in 2011 resulting in declining crop prices and falling planted areas, with production also affected by a variable monsoon season in India.

The increase in soybean production was driven by Latin America and despite reduced output in the USA again affected by the drought in the Midwest.

Since 2005, there has been a consistent increase each year in the price of crop commodities. During 2008 prices peaked due to stock reductions, and the impact of financial speculation. During 2009, crop prices fell from this peak but remained at a level above that prevailing in 2006. The impact of adverse weather, poor harvests and rising demand has driven crop prices higher each year since. The only exception is cotton, where overproduction and excess stocks have resulted in falling prices in 2012



Key Factors Affecting the Crop Protection Market in 2012

- More stable glyphosate prices.
- Strength of US dollar against most major currencies.
- Sustained crop commodity prices.
- Latin America benefits from high demand and improved economics of production
- Good corn planting season in US mid west, but subsequent drought.
- The EU benefitted from an early end to the winter, but suffered from a wet summer in the north and dryness in the south.
- East Europe suffered from a harsh winter followed by drought.
- Southern China affected by flooding, but glyphosate price improvement.
- Further increase in GM crop area and adoption of stacked maize varieties.



Overview and Outlook

The outlook for 2013 remains positive, with crop prices strong and futures prices sustained throughout the year, predominantly due to rising consumption and limited 2012 harvests in Europe and North America. Wheat production in 2012 improved in Australia and Canada, but declined in Europe, with falling stocks resulting in a positive price environment for 2013. Maize and soybean demand remains high after a poor 2012 harvest in the USA, despite declining use of corn for ethanol. Dry weather affected sugarcane production in

Brazil, resulting in high sugar prices. Rice stocks remain low by historic standards, sustaining rice prices and the profitability of production. High cotton stocks have depressed prices giving a less favourable outlook for the crop.

The crop protection market in 2012 benefitted from improved volumes and prices. Recovery from adverse weather in 2012 has provided further opportunities for volume growth in 2013, whilst continuing strong crop prices and a healthy farm economy also provide an environment conducive to price improvement.



COMPANY NEWS

Forecast for Growth: Weather for Smaller Farms

It's no secret that weather and agriculture are intricately linked. In addition to the normal cycles and fluctuations, extreme conditions are becoming more frequent occurrences, creating a boon for one crop; a possible catastrophe for another. In India, it can be challenging enough for a small or medium size farm to keep track of the weather and imminent changes, never mind longer-range forecasts that affect an entire growing season or year. For small and medium size farms, gaining access to accurate and localized weather information, determining the subsequent implications, and translating that into action on the farm can be a challenge, especially when manpower, technology and finances are limited.

The extraordinary availability and adoption of mobile phones in India has created an incredible opportunity for rural farmers to have access to certain technical advantages that once were accessible only by the largest and most robust companies in the industry. According to the Telecom Regulatory Authority of India, as of 1 July, 2012, approximately 75% of the total population and 39% of the rural population use a cell phone or mobile device, making the opportunity to access real-time weather data a reality for many smaller farms.

The opportunity to help smaller scale farms leverage weather intelligence is not going unnoticed. India-based Express Weather, for example, has partnered with global weather provider CustomWeather (based in the US) to create a customized weather suite at the farm level. Farmneed, an affordable, weather-linked, customized solution that is delivered via mobile device, is designed specifically for small and medium farms. The service keeps farmers apprised of localized weather as well as providing decision support as to how it affects their activities. The

service accounts for geographic location, type of crop, crop maturity period, and a host of other criteria. Customized disease alerts and advisories can also be implemented. Results include improved efficiency in areas such as sowing, irrigation, pesticide application and disease control, and fertilizer application.

Express Weather CEO Angushujyoti Das states the situation plainly. "Farmers simply cannot afford to be unaware of weather issues. Rains, wind direction, soil moisture, dew humidity, etc. all play a crucial role in a successful crop, from time of sowing to cultivation and harvest. Therefore it is important to develop multiple weather linked practices in agriculture in India."

Glyphosate price increase boosting up Chinese companies' share price

Due to continued glyphosate price increase, share price of listed companies in relation to glyphosate business have recently risen up against stock market. These companies include Jiangshan Agrochemical, Liuguo Chemical, Wynca, Yangnong Chemical, Sanoda, etc.

Glyphosate price started to go up since last August and has increased quickly this year. At present the price of glyphosate original powder stays at around Yuan 27,000/ton, which is Yuan 6,000 up over the price of Yuan 21,000/ton in August 2011, being nearly 30% up. Since 2012, the price went up approximately by Yuan 3,250/ton, which is 15% up.

As of 16th July, glyphosate price ex-works ranged between Yuan 27,000/ton and 28,300/ton, which is Yuan 1,000 – 2,300 up in one month time over the ex-works price of Yuan 26,000/ton in early June. According to statistics, the glyphosate capacity increased by 22% while price went up, there has been a continued short supply.



Glyphosate experienced a price hike in 2008, at that time all glyphosate producers in China expanded their capacity, which then resulted in an oversupply situation with the price slumping from the peak of Yuan 120,000/ton in 2008 to Yuan 19,000/ton in the first quarter of 2009, hence falling into a 3-year long phase of adjustment.

An analysis from securities experts shows that the total glyphosate capacity under normal operation in 2011 was roughly 800,000 tons while the capacity which was shut down for 1 – 2 years and above 2 years amounted respectively to 140,000 tons and 70,000 tons. Once glyphosate price starts to shoot up, the capacity in shutdown at present will be resumed. In case of continued implementation of stringent environmental regulation, glyphosate price will be likely to break through Yuan 30,000/ton (13% rise), or may even go up to a maximum of Yuan 34,000/ton (28% rise); but in case of lack of environmental enforcement to waste water control which results in resumed production by environmentally non-conformable producers, glyphosate price may wander

(Source: CNAGRI.COM)

BAYER CROPSCIENCE

“Agriculture worldwide needs new solutions” Scientists call for urgent turnaround in weed-control research

Growing weed resistance in all major production areas of the world / More than 25-year lull in bringing herbicides with new modes of action to market

Increased research in weed control is urgently required now to address the severe agricultural problems of today and tomorrow. This was a fundamental consensus among all participants of a two-day symposium in Frankfurt and Monheim organized by Bayer CropScience. Sixteen renowned external participants, among them the Nobel Prize-winners in Chemistry Professor Robert Huber and Professor Hartmut Michel, discussed possible solutions and ways forward with some 40 experts from Bayer CropScience.

“For over 25 years no herbicide for broad acre crops with a new mode of action and commercial relevance has been discovered and brought to market by the global crop science industry,” said Dr. Hermann Stübler, Head of Research Frankfurt and Weed Control Research at Bayer CropScience. “There is tremendous selection pressure for herbicide resistance in weeds in all major row crops, and options are shrinking. Weed resistance is a growing problem that is changing agronomic practices and threatening the long-term viability of economical weed control,” added Professor Stephen Powles, Director at the University of Western Australia.

The objective of the symposium was to discuss options for an urgent turnaround in weed-control research. For this purpose, the participants worked in groups on different topics such as how to increase our understanding of plants as whole systems; focusing on new ways to discover new herbicide modes of action and improve chemical lead discovery; and defining collaboration opportunities with leading institutes. The successful moderation of the workshops and the resulting recommendations were thanks to the personal commitment of Professor Herbert Waldmann, Director at the Max-Planck-Institute (MPI) for Molecular Physiology, Professor Detlef Weigel, Director at the MPI for Developmental Biology, and two pioneers in plant molecular biology and founders of several biotech companies, Professor Lothar Willmitzer, Director of the MPI for Molecular Plant Physiology, and Professor Marc Zabeau, Head of the Technology Transfer Office at the University of Ghent.

As Professor Willmitzer stressed in his presentation of the results, “The need for new herbicides with alternative modes of action and/or resistance breaking capabilities is more urgent than ever. This could be achieved by increasing the efforts towards research into plant systems biology and systematically screening for novel *in vivo* phenotyping technologies followed by elucidating the underlying molecular targets and pathways. This scientifically challenging task could be addressed via innovative collaboration models, for example by setting up science hubs at scientific



hot-spots with resources shared with public research organizations, such as the MPI. We have to look at new sources for novel compounds, including natural products, and engage in further dialog with our health care colleagues. Another innovation source would be the development of truly synergistic formulations combining herbicides with novel modes of action.”

(Source: Bayer Crop Science Press Release)

Starpharma and Nufarm Sign Crop Protection Agreement

Nufarm Limited, via its subsidiary Nufarm Australia Limited, and Starpharma Holdings Ltd announced the signing of an agreement under which the parties will apply Starpharma’s Priostar® dendrimer technology to develop innovative crop protection formulations for Nufarm’s product portfolio.

“We are very pleased to be working with Nufarm in this way,” commented Dr Jackie Fairley, CEO Starpharma. “This agreement builds on previous collaboration between the companies and we are excited about the opportunity to work with Nufarm to develop innovative and improved products.”

“This collaboration with Starpharma reflects Nufarm’s renewed emphasis on technological innovation,” said Lachlan McKinnon, Nufarm Australia’s General Manager. “We are seeking innovative ways to differentiate our products so that growers are offered a wider range of control options tailored to their particular needs.”

Starpharma’s Priostar® dendrimer technology has wide applicability in the agrochemical sector. Through its own internal research program Starpharma has previously established that potential benefits of dendrimer to agrochemical formulators and end-user growers include:

More concentrated formulations to reduce transport costs;

Reduction in solvent loading; Improved overall activity; and Increased adhesion, to reduce losses due to rain run-off, and the need for multiple applications.

The terms of the agreement were not disclosed due to commercial confidentiality restrictions.

(Source: Press Release Nufarm, Australia)

WYNCA CHEMICALS

Wynca sales up 33% in Q3 Chinese agrochemical company Zhejiang Wynca Chemical Group (“Wynca”) sales rose by 32.5% in the third quarter of 2012 compared with the same period last year to Yuan 1,566 million. The net profit attributable to stockholders of listed company reached Yuan 35.45 million.

For nine months, due to upward spiral on profit of glyphosate, sales of Wynca rose by 25.5% to Yuan 4,535 million. The net profit attributable to stockholders of listed company reached Yuan 7.7 million, the company succeeded in turning the business around.

The company said, its profitability improved owing to the higher price of its main product, glyphosate, and company turns losses into gains at the end of the third quarter. The company expects that net profit attributable to shareholders of listed company will increase over 50% for the full year.

Wynca is a national leading technical glyphosate producer. The company tops China’s agrochemical sales ratings on several consecutive years. In AgroChemEx 2012, the company won the Responsible Care Award once again.

US

Pesticide News Story: Azinphos-Methyl Uses Cancellation September 30, 2012; Use of Existing Stocks Allowed through September 2013

For Release: August 30, 2012

After considering comments from growers and other stakeholders, EPA has completed a final risk-benefit analysis for the remaining uses of the organophosphate insecticide azinphos-methyl (AZM). AZM can present health risks to workers and can cause negative ecological impacts, while effective alternatives to this insecticide are available to growers. EPA has decided to maintain the September



30, 2012, effective date for cancellation of the remaining uses of AZM, on apples, blueberries, sweet and tart cherries, parsley, and pears.

Due to unusual bad weather conditions in 2012, EPA will modify the cancellation order to allow growers to use only existing stocks of AZM in their possession for another year, through September 30, 2013. All the required mitigation measures now reflected on AZM labeling will remain in effect during this use. Distribution or sale of AZM after September 30, 2012, remains prohibited. This decision will not result in greater use of AZM than originally anticipated, and provides a safer alternative to disposal arrangements.

First registered in 1959, AZM has been used to control insect pests on a wide variety of agricultural crops and on ornamentals, tobacco, and trees. In the late 1990s, EPA began reevaluating AZM with the full involvement of a wide range of stakeholders. In 2001, certain uses were immediately canceled or phased out over a four-year period because of concerns regarding worker health and negative ecological impacts.

In 2006, EPA announced a final decision to phase out the remaining ten AZM uses in three phases, with the last uses ending September 30, 2012. This phase-out helped facilitate the transition to safer alternatives, and includes mitigation measures such as reduced application rates and buffer zones around water bodies and occupied dwellings. In July 2012, EPA released and sought comment on an updated grower impacts assessment for the remaining uses of AZM, which has been useful to the agency in developing this final decision on AZM.

EPA's final AZM risk-benefit analysis will be available on the azinphos-methyl regulatory actions page, and in docket EPA-HQ-OPP-2009-0365 at www.regulations.gov. Further information is available in AZM docket EPA-HQ-OPP-2005-0061 at Regulations.gov.

INDIA

An expert committee today told the Supreme Court (SC) that use of pesticide Endosulfan may be allowed

for next two years only to exhaust the existing stock and the raw material used for its production.

“The Ministry of Agriculture informed that in India, if no further import of raw material is allowed, the existing stock should be depleted within a period of two years after its manufacture.

“Taking into consideration all these facts, the Committee felt that that to exhaust the available stocks of the raw material, manufacture and use of Endosulfan may be permitted for a total period of two years,” the report, filed before a Bench of justices Swatanter Kumar and Madan B Lokur, said.

The recommendations of the expert committee, headed by Indian Council of Medical Research scientist R S Dhaliwal, would now be considered by the court on November 29.

The panel, in its report, said, “The manufacturing and marketing companies should be asked to ensure to completely exhaust the available raw material during this period and ensure that that this pesticide is fully utilised in accordance with label claim and good agricultural practices for pest control.”

The court-appointed committee observed that Endosulfan has “important health hazards/biological effects related to endocrine disruption, carcinogenicity, congenital anomalies and reproductive and neurological abnormalities.”

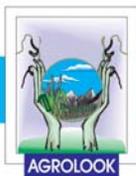
The report also said that other pesticides “by nature, are toxic compound” having certain “unwanted effects”.

The court is hearing a petition filed by Democratic Youth Federation of India that sought a ban on Endosulfan on the ground that it was causing health hazards including genetic disorders.

EUROPE

An assessment of the socio-economic importance of azoles active substances in European agriculture

EXECUTIVE SUMMARY (full report download at base of page)



The objective of this study is to make an assessment of the socio-economic importance in European agriculture of azoles active substances. In order to evaluate the actual relevance of this class of compounds, the economic impact of a withdrawal from use of azoles has been estimated, considering the specific case study of wheat.

The evaluation of the impact has been carried out by taking into account the future trends of the main variables, which are yield, area, production, trade balance, consumption and self-sufficiency. The time frames of the analysis consider a short term impact analysis (2013) and a long term one (2020).

In the short term evaluation, rates of yield reduction have been used to estimate the drop in production linked to the increased diseases occurrence and to related effects that could arise from the withdrawal from use of azole fungicides. In the long term analysis, the development of resistance for the remaining fungicides has been considered along with the yield reduction effect: specifically, in a long term horizon the increasing selection pressure for the remaining fungicides would result in a lack of protection regarding diseases and would cause difficulties in managing them.

The impact analysis carried out by Nomisma has outlined some very clear results.

The projections have shown that, with azoles still in use, wheat yield and cultivated areas would continue to increase in the next few years, resulting in an overall growth of wheat production that has been estimated at +5.0% in 2013 and +13.4% in 2020. According to these trends, the European Union would remain a net exporter of wheat and would continue to produce more wheat than what is being consumed.

The yield of wheat would decrease in the hypothesis that the use of azoles ceased resulting in a loss of production (leaving all other variables constant) of 9.8 millions of tons in 2013 (from 141.1 to 131.3) and 18,6 millions of tons in 2020 (from 152.4 to 133.8). This decreasing production would

not only mean a loss of value of 2.4 billion euros in 2013 and 4.6 billion euros in 2020. It would also mean that the European Union would be unable to satisfy its internal demand and maintain a 100% self-sufficiency rate.

An analysis has also been made of key variables (namely imports, exports, stocks and cultivated area) that would need to adjust to compensate for the reduction of the yield and to guarantee a 100% demand satisfaction rate and a 100% self-sufficiency rate. While there would be substantial changes in all variables, it is particularly significant (and unrealistic) that the cultivated area would need to increase by 7.5% in the short term scenario and by 13.9% in the long term scenario.

The role of azoles is highlighted in maintaining the European Union's position as a net exporter. The sensitivity of the world price to changes in the EU are also highlighted given that it is a primary player in term of production (it accounts for 21% of total wheat production), productivity (European yield is 5.3 t/ha while the global average is 2.9 t/ha) and trade (it contributes to 16.8% of world wheat trade flows).

In conclusion, the study shows that the economic relevance of azoles in the European Union is considerable, as their hypothetical loss would have significant relapses on both the domestic market and international markets. On the internal market, we estimate that without azoles there would be a drop in domestic production, leading to a deterioration of the demand satisfaction rate and to higher prices. This could in turn imply that the European Union could cease to be a net exporter at world level, bringing into question the possibility of the other big wheat supplier (North and South America, Australia, Russia, etc.) to be able to satisfy the global demand. This would increase the current uncertainty concerning global food security, bringing further consequences – which have been prominently emerging over the last years - such as drop in stocks, increase of prices and price volatility upsurge.



WORLD NEWS

VIETNAM

Pesticide use falls within safety margins

The pesticides that farmers are currently allowed to use in Viet Nam do not contain carcinogenic substances and the use of pesticides in agriculture is closely monitored, Nguyen Xuan Hong, director of the Plant Protection Department, said at a monthly meeting to review food safety controls in Ha Noi.

Over the last month, he said, the agency conducted a test on 50 samples of vegetables mainly eaten raw and found that the trace amounts of pesticide residue and heavy metals were within permitted limits.

Over the last year, the agency has analysed 1,545 vegetables samples, and only 12 revealed excessive pesticide residue, accounting for a miniscule 0.8 per cent.

This figure was relatively low compared to the equivalent ratio in neighbouring countries, like Thailand (10 per cent) and Malaysia (12 per cent). In China, the ratio varied from 2 to 17 per cent.

“Over the next five years, we want to lower the ratio to 0.5 per cent,” he said. He noted that while Viet Nam allowed the import of farm products from 59 countries and territories, only 13 of those areas had the right to export farm products of plant origin to use as foodstuffs.

Deputy Minister Nguyen ThiXuan Thu asked relevant agencies to step up inspections on farm products from the countries that had not acquired such rights. By the end of this year, if these countries still did not have the right to export such products, Viet Nam would stop importing their farm products, she said.

She also asked the department to regularly check the quality of pesticides. Once a pesticide

was discovered to be of low quality, its manufacturer should receive a strict punishment such as having its business licence revoked.

(Source: Vietnam News)

Chinese apples to be checked for pesticides

Vietnamese agricultural officials promised to step up checks on China-grown apples imported to the country after media reports alleged that Chinese farmers used pesticide-coated papers to wrap the fruit.

At a meeting in Ha Noi, the Minister of Agriculture and Rural Development directed the Plant Protection Department to promptly have official information regarding the tainted wrapping paper of Chinese apples. Teams may be sent to China for trustworthy information.

Increased checks on Fuji apples imported from China should be an urgent task, Minister Cao DucPhat said.

Chinese media reported last week that papers used to wrap the apples were coated with the pesticides Tuzet and arsenic fungicide, which cause harm to human health.

The pesticides are meant to protect the surface of the apples and keep out diseases that could hurt the crop yield.

The department’s director Nguyen Xuan Hong said wrapping apples from the time they are young until they are ripe was common, but keeping them in pesticide bags was barred.

He also said Chinese officials had collected 2.7 million fruit wrapping bags, and closed down violated bag manufacturers.

in pollen and nectar on treated crops, and of the pyrethroid were based on spraying guidelines.



Bees exposed solely to imidacloprid showed reduced efficiency at foraging while those exposed to cyhalothrin only showed greater death rates – more bees were found dead within the nesting boxes than otherwise. ‘When the bees were exposed to both compounds, as we predicted this had a double whammy effect, with both reduced foraging efficiency and higher death rates,’ says Gill.

Over four weeks, the control colonies lost around 30% of the colony; the colonies exposed to imidacloprid lost 41%, cyhalothrin 51% and both insecticides 69%.

‘It is clear from our work that long-term exposure is important and that multiple exposure has an additive effect on the colonies,’ says Gill. ‘We believe these factors should be taken into account by the regulatory authorities when assessing pesticide use in the environment.’ Currently, pesticides are tested only singly and for periods of up to 96 hours exposure, and in the wild bees will be exposed to many different insecticides.

Commenting on the study, *Norman Carreck*, science director of the *International Bee Research Association*, says, ‘This is an interesting piece of research that adds to our knowledge base of the effects of these insecticides.’ However, Carreck says that the study faces the same problem as all similar research on pesticide exposure investigations. ‘Like all studies of this nature it is extremely difficult to really understand the sorts of concentrations of compounds that bees are exposed to in the wild. So it is difficult to draw conclusions about the significance to the actual effects in the field. The situation in the field is highly variable and it is very difficult to come to a definitive answer.’

ARGENTINA

Argentinean battle over agrichemical use

The conviction of two people in Argentina for illegal pesticide spraying near residential areas could be the first of many, as activists vow to change the way farmers use agrichemicals. However, the new precedent is not expected to affect agricultural production, according to government and industry sources.

Francisco Rafael Parra, a farmer, and Edgardo Jorge Pancello, a pilot, were both given three year suspended sentences. The two were convicted of spraying pesticides over residential areas close to the Ituzaingó neighborhood, in Córdoba province, in one of the most productive agricultural regions in South America. They plan to appeal. A third man was acquitted.

Over the last 10 years Argentina’s GDP has grown between 5% and 12% each year and this is mostly thanks to the export of soya bean and grains. ‘Every herbicide is toxic if you don’t use it in an appropriate way,’ says Jorge Tezón, manager of the science and technology department of *Conicet*, the main funder of science in Argentina. Tezón’s view is backed up by the official government line. ‘This is a case of bad practices; this is not about the chemical composition of the pesticides. Like any domestic insecticide is toxic if you spray it over a person for instance.’ He adds that all the products used in Argentinean fields are certified according to national and international rules and should not cause any health damage when used appropriately.

Industry is taking a similar position. Juan Cruz Jaime is executive director of *Casafe*, the Agrohealth and Fertilisers Chamber, an association of companies that produces agricultural technologies. Jaime says that ‘we focus on good practices and we train thousands of farmers every year to use pesticides according to law. We don’t know how widespread these bad practices are in Argentina but we are not afraid of more trials; if somebody breaks the rules, they have to pay for that.’ Jaime also says that there are similar organisations like *Casafe* in neighbouring countries such as Chile and Brazil following this problem and he doesn’t know of any similar cases of agrichemical abuse brought before the courts in Latin America.

However, for environmental and popular movements this trial was seen as a test case against the intensive use of agrochemicals that might lead to more prosecutions. They are convinced that there is a link between pesticide use and cancer and birth defects. Avila Vázquez, coordinator of the Physicians



Network of Sprayed Towns, is happy with the court's decision and expects further trials in other towns in Córdoba province. 'Now they can't spray over schools and towns,' he says. 'We will make hundreds of criminal complaints.' He argues that is not about 'good and bad practices' but about the system itself, with the use of transgenic grains and huge amounts of herbicides. Vázquez says the intensive spraying of crops has health consequences: 'In the last decade spraying has changed the pattern of diseases: you can see it.'

Casafe says it and other industry organisations are now working with the government on the development of new laws to regulate agrichemicals. However, this is still a work in progress. At the same time environmental organisations are pressing for tighter laws on the use of agrichemicals.

(*Source:* Martín De Ambrosio (RSC))

AUSTRALIA

Diuron product registrations affirmed with significant use changes

The Australian Pesticides and Veterinary Medicines Authority (APVMA) has announced the outcomes of its review of diuron, a herbicide used for the control of agricultural weeds and weeds and algae in and around water bodies.

"The announcement, affirming the registration of most diuron products, but with significant changes to their conditions of use, will bring much-needed certainty to users of these products", said APVMA spokesperson, Ms Susan Whitbread.

"The restrictions we've put in place are very specific for individual crops, and in the case of sugarcane and pineapple, additional seasonal 'no-spray windows' apply.

"While the overall changes are complex, the APVMA has taken a very pragmatic and tailored approach to local use and conditions. We have made a considerable effort to develop workable instructions for the continued use of diuron, while ensuring we can effectively manage risks from the use of this environmentally mobile and persistent chemical.

"Some uses, including industrial applications and use in non-agricultural situations, citrus, apples and pears, ornamental plants and tropical crops such as tea, coffee and pawpaw will no longer be approved.

"Other uses have been restricted significantly, including reduced rates of application, application on relatively flat land, no spraying when heavy or persistent rain is forecast and spray drift buffer zones. There are further restrictions for higher levels of application on sugarcane and pineapples through the use of region and season specific 'no-spray windows'", said Ms Whitbread.

The APVMA's review of diuron commenced in 2002 because of environmental and human health concerns, particularly the potential for diuron to contaminate waterways through agricultural runoff.

On 28 November 2011, the APVMA suspended the registration of selected diuron products—limiting diuron use across Australia including a 'no spray window' on a range of tropical crops such as sugarcane, tea, bananas, pineapples, coffee and pawpaw-while it considered further information and submissions to the review.

"To ensure an orderly phasing in of the new arrangements, the APVMA has issued a permit for 12 months, to cover existing stock in the supply chain. This stock can continue to be used in accordance with the arrangements established under the suspension including a wet season 'no-spray window for some tropical crops'", said Ms Whitbread.

In September 2012, the APVMA published a Diuron Review Findings Report and following industry feedback, has now finalised the review.

CHINA

Pest Menace Threatens China Rice Fields

Weather disturbances and typhoons have caused rice plant hoppers in China's rice fields to reproduce in usually high numbers, making it more difficult for the agriculture department officials to control



the pest. Local sources say that rice plant hoppers have infested over 17.33 million hectares of rice fields, which is about 50% higher than last year.

The Chinese government has taken steps to control the pest attacks and has asked the agriculture officials to obtain the help of professional private companies to control the pest. Last week, the government announced an additional 200 million yuan (about \$31.75 million) to the earlier announced 400 million yuan (about \$63 million) to fight pest attacks.

Earlier this month, the Ministry of Agriculture said less than 5% or about 10 million tons of this year's paddy rice production could be affected by the pest attacks. In July, USDA had increased import estimates for China by about 500,000 tons of rice in both 2012 and 2013 after pest attacks were reported in several rice producing regions in China.

(Source: Oryza News)



BIOTECH NEWS

USDA Crop Acreage Report for 2012, confirms that US farmers continue to demonstrate overwhelming trust and confidence in biotech crops

Global adoption of biotech crops is expected to continue to grow in the future, particularly in developing countries, where there is a promising pipeline of new products

Dr. James said that U.S. farmers continue to demonstrate unprecedented confidence in biotech/GM crops, modified through biotechnology. The June 2012 USDA Crop Acreage Report shows near or complete optimization of the current technology in the three large-acreage biotech crops – maize, soybean and cotton – first commercialized in the U.S. in 1996.

“Unprecedented high adoption rates are testimony to overwhelming trust and confidence in biotech crops by millions of farmers worldwide,” said Dr. Clive James, founder and chairman of the International Service for the Acquisition of Agri-biotech Applications (ISAAA). “Farmers are masters of risk aversion. As soon as biotech crops are commercialized, their adoption is rapid, leading to near or complete optimization – the simple reason for the success of biotech crops in the U.S., and in another 28 countries around the world, is that they generate significant and multiple benefits by reducing yield loss from insect pests, weeds and diseases, and also result in substantial savings of pesticides.”

The June USDA Crop Acreage Report, Dr. James noted, shows a continuing trend to near-or complete optimization of the technology in three major U.S. crops, with 88% of all maize, 93% of all soybean, and 94% of all upland cotton planted to biotech varieties and hybrids featuring the two principal traits of insect resistance and herbicide tolerance.

Since biotech crops were first commercialized in the U.S., and five other countries in 1996, millions of farmers in 29 countries worldwide have made decisions to plant and replant crops featuring the technology on an accumulated area of more than 1.25 billion hectares or three billion acres – an area of crop land 25 percent larger than the total land mass of the United States. ISAAA data indicate that, U.S. farmers continued to plant more biotech crops than any country in the world in 2011 – a total of almost 70 million hectares or 170 million acres, of which half the maize area, and two thirds of cotton had more than one trait, generating multiple benefits. In addition to the three principal biotech crops of maize, soybean and cotton the U.S. also grew half a million hectares of sugar beet (95% adoption achieved in 5 years – the fastest rate of adoption in the US) and modest hectares of biotech canola, alfalfa, squash and papaya. The current devastating drought in the U.S., that is badly affecting at least half of the maize crop, is generating increased interest in biotech drought tolerant maize which is currently being tested in extensive field trials. It is premature to comment on the performance of the biotech drought tolerant maize until the analysis of data from the field trials in the U.S. is completed later this year. Drought tolerance is an infinitely more complex trait than herbicide tolerance and insect resistance and progress is likely to be on a step by step basis. Encouraging results from the 2012 field tests in the U.S. for biotech drought tolerant maize would be a significant step forward to address drought, the most important constraint to increasing crop productivity globally, to which both conventional and biotech applications can contribute.

Dr. James said that “the expected plateauing trend to optimal adoption rates of around 90 percent that we have seen in the U.S., has also been evident in other industrial countries like Australia with



99.5% adoption in biotech cotton. Similarly, as expected, the major biotech crops in principal developing countries exhibit the same trend, again confirming the trust and confidence of farmers in the technology. Herbicide tolerant soybean has virtually reached 100 percent in Argentina and the latest ISAAA data for 2011 shows Bt cotton in India at 88%, and biotech soybean in Brazil at 83%. Given that products in mature markets are already plateauing at close to optimal rates, incremental annual growth in adoption will be more modest and will be boosted as: 1.) additional hectares are planted, as was the case with total maize plantings in the US in 2012 (up 5%); 2.) new traits or new biotech crops are approved; or 3.) new countries adopt biotech crops.”

Rate and scale of adoption in developing countries dwarfs that of industrialized nations

Dr. James observed that of the 29 countries that had adopted biotech crops in 2011, 19 were developing countries and 10 were industrialized nations. China and India lead Asian adoption, Brazil and Argentina lead Latin American adoption, and South Africa leads adoption on the continent of Africa. A growth rate for biotech crops in developing countries at 11 percent, or 8.2 million hectares during 2011, was twice as fast and twice as large as industrial countries at 5 percent or 3.8 million hectares.

Developing countries grew approximately 50 percent of global biotech crops in 2011 and are expected to exceed industrial countries' land area devoted to the crops in 2012, Dr. James said. Additionally, more than 90 percent of farmers planting biotech crops worldwide (equivalent to over 15 million farmers) are small resource-poor farmers in developing countries, up 8 percent or 1.3 million since 2010, he added.

Dr. James said that in the near term, the biggest driver of global biotech crop adoption will be Brazil followed by China once approval to commercialize biotech maize in China is in place, which could be as early as 2013. Brazil, second only to the U.S. in total land area planted to biotech crops, has a science-based, effective and responsible

fast-track approval system for biotech crops and will also benefit from a rich pipeline of new biotech crops coming from trans-nationals, public-private partnerships and its own public-sector research institution EMBRAPA, Dr. James added. Brazil has already approved, for the first time, a “stacked” biotech soybean tolerant to herbicides and resistant to insect pests and initial commercialization could begin as early as the end of 2012 when planting gets underway in the southern hemisphere. China already has 7 million small farmers growing biotech cotton successfully and recently assigned priority for maize so that China can benefit from enhanced biotech maize that will increase meat productivity and make the country more self-sufficient for animal feed. As China is becoming more prosperous, more meat is being consumed which in turn creates more demand for the feed crops, maize and soybean. After more than a decade in development, approval of biotech “Golden Rice,” is expected in the Philippines in 2013/14. This very important product has the capability to generate life-saving humanitarian benefits - 6,000 people a day, mainly women and children, die from complications resulting from vitamin A deficiency.

In conclusion, Dr. James noted that on the continent of Africa, South Africa has successfully planted biotech maize, soybean and cotton for over a decade, and Burkina Faso is cultivating Bt cotton, and Egypt, Bt maize. Several African countries, including Uganda, Kenya, and Nigeria have field trials underway for a range of biotech crops with the widely adopted and accepted biotech cotton likely to be the first product to be commercialized. Biotech crop field trials in Africa include cotton, maize, banana, cowpea, cassava and sweet potato.

(Source: ISAAA)

Scientists torn over Kenya's recent GM food ban

Scientists fear that Kenya's recent banning of the import of genetically modified organisms (GMOs) may be a significant blow to progress on biotechnology research and development in the country.



A cabinet meeting chaired by Kenya's president, Mwai Kibaki, this month (8 November), directed the public health minister to ban GMO imports until the country is able to certify that they have no negative impact on people's health.

In a statement to the press, the cabinet said there was a "lack of sufficient information on the public health impact of such foods".

"The ban will remain in effect until there is sufficient information, data and knowledge demonstrating that GMO foods are not a danger to public health," it added.

The directive comes three years after the government's *establishment of the National Biosafety Authority (NBA)*, tasked with exercising general supervision and control of the transfer, handling and use of GMOs.

The NBA board chair, Miriam Kinyua, tells *SciDev.Net* that for now, the government directive will stand. However, she added that researchers will continue to provide the government with information arising from research into GMO safety, so that a possible review of the directive can be undertaken.

Kinyua says *biotechnology* research in Kenya will continue, as the ban does not infringe upon existing *research and development* activities. She also thinks the directive could help intensify research to provide sufficient data and knowledge on biotechnology.

Richard Okoth, a biotechnology scientist at Kenyatta University, Nairobi, feels that the government's imposition of a ban while continuing to fund research on biotechnology through the National Council for Science and Technology is a contradictory position.

"The essence of GMO research is to provide a product that can complement efforts towards *food security*. This ban will discourage research, as the product for which the research is being conducted has been placed on import ban," Okoth said.

Biotechnology research funding might be compromised, as international donors could be reluctant to provide funds following the ban, he adds.

But the African Biodiversity Network (ABN), a regional research network based in Kenya, supports the step taken by the government and calls for the ban's strict implementation.

"The ban should be strictly implemented and the regulatory institutions should be empowered to enable them do assessment on all imports to safeguard against the bypassing of the law," says Gathuru Mburu, ABN's coordinator.

Kenya only has three biosafety officers, and poor infrastructure and human capacity may make implementing the ban very challenging.

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