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PG Economics welcomes new ISAAA brief:

Global status of commercialised biotech crops 2007

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The International Service for the Acquisition of Agri-biotech Applications (ISAAA) will soon release its annual status report on global adoption of agricultural biotechnology traits. It is to be expected that the report will confirm trends from other national sources that show yet another significant annual increase in the rate of global plantings of biotech trait crops, providing clear evidence that this green technology is popular with millions of farmers because it continues to deliver important economic, environmental and health benefits.

At the same time, Friends of the Earth (FOE) will release a report *Who Benefits from GM Crops? The Rise in Pesticide Use*, that makes a series of inaccurate and incorrect claims about the global impact of GM technology.

As authors of a number of peer reviewed published reports and papers on the impact of agricultural biotechnology, PG Economics provides below a summary of key real impacts of the technology and comments on the main claims made by the FOE report.

The real impact of GM crop technology

1. Peer reviewed research in scientific journals consistently shows that agricultural biotechnology has delivered substantial economic and environmental advantages. In the first ten years of commercial use, incomes of the 10.25 million farmers using the technology increased by over \$27 billion and pesticide use is 6.9% lower (a saving of 224 million kg of active ingredient) than it would otherwise have been if this technology had not been used. The reductions in the use of insecticides and herbicides, coupled with a switch to more environmentally benign herbicides, have delivered significant net environmental gains. Important savings in carbon dioxide emissions were also made, equivalent to removing over 4 million cars from the roads in 2005.
2. In 2005, the majority of both the farm income gains (55%) and benefits from reduced pesticide use (54%) went to farmers in developing countries. 90% of the farmers benefiting from using the technology are small, resource-poor farmers in developing countries like China and India.
3. The total cost paid by farmers to access GM technology (seed premium) was equal to an average of only 26% of the total farm income benefit – this has been a major reason why GM technology has been so popular at the farm level. For

farmers in developing countries the total cost was equal to only 13% of the total farm income gains they derived, compared to 38% in developed countries.

4. Biotech crops have also delivered a number of other more intangible benefits to farmers. These include:
 - Herbicide tolerant crops have facilitated a switch from a plough-based to a no/reduced tillage production system which has helped reduce soil erosion (and cut carbon dioxide emissions)
 - Insect resistant crops have resulted in improved quality of food (eg, less cancer-causing mycotoxins in corn) and reduced exposure to insecticides for many farm workers in developing countries where use of protective equipment has traditionally been limited
 - Shortening the growing season allowing some farmers to plant a second crop in the same season (eg, maize following cotton in India, soybeans following wheat in South America).

Inaccurate and incorrect claims by FOE

1. The FOE report makes numerous inaccurate and incorrect claims. Information sources cited are not based on peer reviewed scientific journals/research, are not representative of actual impacts, are often based on inappropriate assumptions and use of official (eg, USDA pesticide usage) statistical data and show poor understanding of agronomic and socio-economic issues. Much of the material drawn on is also out of date.
2. Pesticide use has not increased as a result of the adoption of biotech crops – it has fallen significantly relative to levels of use that would have occurred without using biotechnology. More importantly there have been significant environmental gains associated with this reduction in pesticide usage and switches to use of more environmentally benign herbicides – see for example Brookes & Barfoot (2007) GM crops: the first ten years – global socio-economic and environmental impacts in Agbioforum 9 (3) on www.agbioforum.org.
3. GM crops have made important contributions to alleviating hunger and poverty in developing countries. The majority of the farm income gains from using the technology have gone to small farmers in developing countries directly improving their standards of living and family level disposable income
4. GM herbicide tolerant (GM HT) technology has mainly delivered farm income benefits from lower costs of production. Yield impacts have generally been neutral and yield improvement has not been a specific target of the technology – nevertheless, in some countries positive yield effects have occurred, eg, GM HT soybeans in Romania and Mexico.
5. GM insect resistant (GM IR) technology has delivered important farm income benefits mainly from higher yields, especially in developing countries. In developed countries gains from this technology have tended to more associated with lowering costs of production (reduced use of insecticides) and less prominent (but still positive) yield gains
6. Farmers are not being subjected to limited seed choice and high prices. The rapid adoption of GM technology reflects the significant benefits derived from

using the technology relative to the additional costs paid for the technology (see Brookes & Barfoot referred to above). If the technology failed to deliver benefits, farmers would not use the technology. There remains plenty of choice in seed markets and the dominance of seeds containing biotech traits in some countries reflects market demand at the farm level. If competition is perceived to be limited in any seed market this is an issue for competition policy not technology approval legislation.

7. There is a growing and substantial body of objective and representative evidence assessing the impact of biotech crops published in peer reviewed journals. The findings consistently show that on average there have been important economic and environmental benefits associated with use of the technology. None of these have been used or cited by FOE – for those wishing to read further, look for example, at the references in Brookes & Barfoot (2007) referred above.
8. There has not been a steep rise in the development of weed resistance to glyphosate as a result of the adoption and use of herbicide tolerant crops. All weeds have the ability to develop resistance to all herbicides and there are hundreds of resistant weed species confirmed in the International Survey of Herbicide Resistant Weeds (www.weedscience.org). Reports of herbicide resistant weeds pre-date the use of GM herbicide tolerant crops by decades. Currently, there are 13 weed species that are resistant to glyphosate, compared to over 90 resistant to ALS herbicides, or over 60 weed species resistant to triazine herbicides such as atrazine. Several of the confirmed glyphosate resistant weed species have been found in areas where no GM herbicide tolerant crops have been grown. Control of glyphosate resistant weeds is achieved the same way as other herbicide resistant weeds, via the use of other herbicides in mixtures or sequences.

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Key reference material: GM crops: the first ten years – global socio-economic and environmental impacts (2007) in Agbioforum 9 (3) on www.agbioforum.org or www.pgeconomics.co.uk