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New report highlights 20 years of economic and environmental benefits from using biotech/GM crops[1]

A new report released today by PG Economics has found that over the last 20 years, crop biotechnology has significantly reduced agriculture's environmental impact and stimulated economic growth in the 26 countries where the technology is used. The innovative agricultural technology has contributed to preserving the earth's natural resources while allowing farmers to grow more, high quality crops. It has also helped alleviate poverty for 16.5 million, mostly smallholder farmers, in developing countries.

"Over the last 20 years, where farmers have been given access to, and the choice of growing biotech/GM crops, they have consistently adopted the technology, contributing to a more sustainable food supply and a better environment where they live," said Graham Brookes, director of PG Economics, co-author of the report.

Highlights in the peer reviewed[2] report include:

Crop biotechnology has reduced agriculture's environmental impact

- Crop biotechnology has significantly reduced agriculture's greenhouse gas emissions by helping farmers adopt more sustainable practices such as reduced tillage, which decreases the burning of fossil fuels and retains more carbon in the soil. Had biotech crops not been grown in 2015, for example, an additional 26.7 billion kilograms of carbon dioxide would have been emitted into the atmosphere, which is the equivalent of adding 11.9 million cars to the roads.

- From 1996 to 2015, crop biotechnology reduced the spraying of crop protection products by 619 million kilograms, a global reduction of 8.1 per cent. This is equal to more than China's total crop protection product use each year[3]. As a result, farmers who grow biotech crops have reduced the environmental impact associated with their crop protection practices by 18.6 per cent[4].

Crop biotechnology has reduced pressure to use new land in agriculture and contributed to global food security

- Biotech crops allow farmers to grow more without needing to use additional land. For example, if crop biotechnology had not been available to farmers in 2015, maintaining global

[1] Report available at www.pgeconomics.co.uk. Also, available as two papers (with open access), separately, covering economic and environmental impacts, in the peer review journal GM Crops and Food. The environmental paper is available at issue 2017, 8,2, p117-147 http://dx.doi.org/10.1080/21645698.2017.1309490. The economic impact paper is forthcoming in 2017, 8, issue 3.

[2] Peer reviewed means accepted for publication in a scientific journal after review by independent experts in the subject(s).

[3] Equal to 1.3 times annual use.

[4] As measured by Cornell University's Environmental Impact Quotient (EIQ) indicator.

production levels that year would have required the planting of an additional 8.4 million hectares (ha) of soybeans, 7.4 million ha of corn, 3 million ha of cotton and 0.7 million ha of canola. This is equivalent to needing an additional 11 per cent of the arable land in the United States, or roughly 31 per cent of the arable land in Brazil or 13 per cent of the cropping area in China.

Crop biotechnology enables farmers to increase crop yields

- Insect resistant (IR) crop technology used in cotton and corn has consistently improved yields by reducing the damage caused by pests. From 1996 to 2015, across all users of this technology, yields have increased by an average of +13.1 per cent for IR corn and +15 per cent for IR cotton relative to conventional production systems. Farmers who grow IR soybeans commercially in South America have seen an average +9.6 per cent increase in yields since 2013.

- In some countries, herbicide tolerant (HT) technology has improved yields through better weed control. For example, in Bolivia, HT soybeans increased yields by +15 per cent. In Argentina, HT technology has helped farmers grow an additional soybean crop after wheat in the same growing season[5].

- Biotech farmers in developing countries, many of whom are resource-poor and farm small plots of land, continue to see the highest yield gains from using the technology.

- Over 20 years, crop biotechnology has been responsible for the additional production of 180.3 million tonnes of soybeans, 357.7 million tonnes of corn, 25.2 million tonnes of cotton lint and 10.6 million tonnes of canola.

Crop biotechnology supports improved livelihoods, especially for poor, smallholder farmers in developing countries

- By better controlling pests and weeds, crop biotechnology helps farmers increase their yields, which leads to higher incomes and better lives for themselves and their families. In 2015, the net farm level economic benefit was $15.5 billion, equal to an average increase in income of $90/hectare. From 1996 to 2015, the net global farm income benefit was $167.7 billion.

Crop biotechnology contributes to global economic success

- Crop biotechnology continues to be a good investment for millions of farmers. In 2015, for each extra dollar invested in biotech crop seeds globally, farmers netted an average $3.45.

- In 2015, farmers in developing countries received $5.15 for each extra dollar invested in biotech crop seeds, whereas farmers in developed countries received $2.76 for each extra dollar invested in biotech crop seeds.

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[5] By facilitating the use of reduced tillage, this effectively shortens the time between planting and harvesting of a crop