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Biotech firm plans to fund GM rice crops with carbon credits

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Money paid by green consumers to offset their flights and by companies that go carbon-neutral will be used to fund the planting of genetically modified (GM) crops under plans drawn up by a US biotechnology company.

Arcadia Biosciences is working with the Chinese government to reward farmers in China that grow the firm's genetically modified (GM) rice, with carbon credits that they can sell for cash.

The credits would be sold on the global carbon trading market set up under the Kyoto protocol, the international agreement to cut greenhouse gas emissions, which is used by governments, companies and individuals to offset their pollution. Arcadia plans to expand the Chinese scheme to more crops in other countries, including Britain.

Arcadia says its GM rice requires less nitrogen fertiliser, and so farmers that grow it will lower their emissions of nitrous oxide - a greenhouse gas some 300 times more potent than carbon dioxide. Swapping global rice supply to the GM version, the company says, would save the equivalent of 50m tonnes of carbon dioxide each year, and generate £750m in carbon credits for farmers.

Eric Rey, the president and chief executive of the California-based Arcadia, told the Guardian: "A technology that allows farmers to participate in carbon credit markets will give agriculture a clear incentive to reduce its greenhouse gas emissions. It's a way for farmers, and us, to make money, while doing something positive to help the environment."

World agriculture accounts for 17% of industrial greenhouse gas emissions, more than the transport sector. Rey aims to have the Chinese scheme running by 2012, in time to take advantage of new carbon markets expected to be created by a successor treaty to Kyoto. The first steps towards such a treaty were taken at the UN climate meeting in Bali last month.

Arcadia is working to apply the reduced-nitrogen technology to GM wheat, rape seed oil, sugarbeet, maize, sugarcane, cotton and turf for golf courses and landscape gardening, which could also be grown in exchange for carbon credits. None of the crops have yet been commercialised, though Arcadia has sold several licenses to companies to use them, including oil seed rape to Monsanto.

Mr Rey said: "This could be used in all major crops around the world. Considering the growth in global population and the need to increase food production to feed them, this technology could be an important tool to minimise the impact of agriculture on global warming." Officials inside the UK government's Department for Business, Enterprise and Regulatory Reform are advising the company on how to develop the idea.

The widespread use of nitrogen fertiliser is reckoned to account for about one-third of agricultural emissions. Less than half the nitrogen is typically absorbed by crops, with

the rest leaking into the soil and water supplies, or released to the air as nitrous oxide. The Arcadia technology inserts a gene that improves the nitrogen uptake, which means less fertiliser is needed to produce a given yield of crop.

The Chinese project is in Ningxia, a tiny mountainous province in the north of the country, where fertiliser use is among the highest in the country. Working with local officials, the company is conducting experiments to measure the emissions from conventional rice - information required by the United Nations before they would allow the GM scheme into the Clean Development Mechanism, which rewards clean technology projects with carbon credits.

Arcadia's GM rice has not yet been planted there; the company must first get regulatory approval, as well as convince the government to allow farmers to sell the GM rice for food. China has commercialised GM cotton and minor food crops such as tomatoes, chilli and sweet peppers, but has drawn the line so far at staple foods including rice, corn and soybeans.

Rey said the potential of the technology to tackle climate change should make critics reconsider their blanket opposition to GM crops. Although GM crops are widely grown in countries such as Canada and the US, and are expanding rapidly in mainland Europe, they remain controversial, partly because they are perceived only to benefit the biotech companies and farmers.

Clare Oxborrow, GM campaigner for Friends of the Earth, said: "We have never taken an absolutist position on GM crops but it's too early to say if we would accept something like this given all the concerns about safety and environmental impact of GM. We would need to have a proper debate, but at the moment we simply don't know enough about the impact of this technology or whether it would deliver."