



Feeding a growing world: The Scottish ban on GM crops

Student activity sheet

Introduction

In 2015 the Scottish Government decided to ban the growing of genetically modified (GM) crops.

The ban and the responses

On Sunday 9 August 2015, two UK newspapers reported with the headlines:

Scotland to issue formal ban on genetically modified crops (*The Guardian*)

Scotland to ban all GM crops over fears for 'green brand', angers farmers and scientists (*The Independent*)

The Scottish Government's planned ban on the growing of genetically modified crops was announced by Scotland's Rural Affairs Secretary, Richard Lochhead, who said that the Scottish Government would be submitting a request to the EU that Scotland be excluded from any consents for the cultivation of GM crops. He added that banning the growing of GM crops would protect and enhance Scotland's 'clean, green status'.

Furthermore, Mr Lochhead said that there was no evidence of significant demand for GM crops from Scottish consumers and that introducing such crops could risk the £14 billion Scottish food and drink sector. He added that food and drink producers in other countries were reporting a consumer backlash against GM crops. He was therefore advocating a precautionary approach to GM crops, about which the Scottish Government has long-standing concerns, shared by consumers, that should not be dismissed lightly. He believed that GM policy in Scotland should be guided by what is best for the Scottish economy and agricultural sector.

Scottish farmers have expressed their concern that the blanket ban will harm their ability to remain competitive with European rivals. Andrew McCormick, vice-president of the National Farmers Union Scotland, told *The Scotsman* 'There is going to be one side of the border in England where they may adopt biotechnology, but just across the River Tweed farmers are not going to be allowed to.'

Professor Huw Jones, from the agricultural science group at Rothamsted Research, says that GM crops approved by the EU are safe for humans, animals and the environment. He adds that if the opt-out request is granted and Scotland bans the growing of GM crops, it would remove the freedom of Scottish farmers and narrow their choice of crop varieties to grow in the future.

In a letter to *The Guardian*, Professor Anthony Trewavas from Scientific Alliance Scotland stated that anyone who has eaten sweet potatoes has eaten GM food. Sweet potatoes are eaten by a billion people around the world (including the UK) and are high in vitamins A and C, fibre and starch. About 8000 years ago, the bacterium *Agrobacterium tumefaciens* inserted two genes into the original sweet potato DNA, thus producing the first GM sweet potato. These inserted genes, which have been detected in about 300 varieties of sweet potato, cause the root to swell and, as domestication was probably based on root size, the propagation of this GM variety was continued by early farmers. Professor Trewavas argued that the cultivation and human consumption of this vegetable for thousands of years, starting long before modern biotechnology, legitimises the use of GM technology as an aid to increase yield per unit area.



In an article for *The Australian* in February 2015, Patrick Moore, a co-founder and leader of Greenpeace for 15 years and now an independent environmentalist, wrote that recombinant DNA technology is one of the most important advances in the history of agriculture. He explained that humans have been genetically modifying crop plants and domesticated animals since farming began, by artificial selection and later by using radiation and chemicals to induce mutations. The wheat used to make most of our pasta (durum wheat), for example, has DNA that has been modified by exposing the seeds to high levels of gamma radiation, yet no warning labels are required. According to the American Association for the Advancement of Science (AAAS), scientific organisations from the British Royal Society to the World Health Organization (WHO) have come to the same conclusion:

‘Consuming foods containing ingredients derived from GM crops is no riskier than consuming the same foods containing ingredients from crop plants modified by conventional plant improvement techniques.’

Other individuals and institutions, such as the US National Library of Medicine, have pointed out the potential risks of genetic modification. Modified plants and animals may have genetic changes that are unexpected and harmful. GM organisms may interbreed with natural organisms, which may lead to the extinction of the original organism or to other unpredictable environmental effects. Plants may be less resistant to some pests or more susceptible to other forms of environmental damage. Other concerns have been raised about possible allergic reactions to foods where the genes from one food are inserted into another food. For example, if peanut genes are inserted into tomatoes, could someone with a peanut allergy react to tomatoes?

Some anti-GM campaigners refer to GM crops as ‘Frankenfoods’, because removing the genetic material from one organism and inserting it into the permanent genetic instructions of another creates an organism that has not arisen naturally. Examples include potatoes and maize with bacterial genes, pigs with human growth genes, and fish with cattle growth genes. However, Patrick Moore argues that bacteria and viruses have been moving genes between species since life on Earth began, and this random movement of genes has been one of the driving forces of evolution. He argues that GM technology should be permitted so that people can make their own choices; organic and GM-free food will still be available for those who want it.

Stewart Brand, an environmentalist who changed his mind about genetic modification, wrote in his book *The Whole Earth Discipline*:

‘The environmental movement has done more harm with its opposition to genetic engineering than any other thing we have been wrong about. We’ve starved people, hindered science, hurt the natural environment and denied our own practitioners a crucial tool’.

Sources and further reading

www.theguardian.com/environment/2015/aug/09/scotland-to-issue-formal-ban-on-genetically-modified-crops

www.independent.co.uk/news/uk/home-news/scotland-to-ban-all-gm-crops-over-fears-for-green-brand-angers-farmers-and-scientists-10447146.html

Scottish Government press release: news.scotland.gov.uk/News/GM-crop-ban-1bd2.aspx

Response from scientific bodies: www.theguardian.com/environment/2015/aug/18/science-bodies-urge-scottish-government-to-rethink-gm-crops-ban

Response from farmers: www.scotsman.com/news/politics/farmers-alarmed-at-snp-pledge-to-ban-gm-crops-1-3853361

Cited letter from Professor Anthony Trewavas (paywall):

www.theguardian.com/environment/2015/oct/22/eaten-sweet-potato-then-youve-had-a-gm-meal

Article by Patrick Moore: www.theaustralian.com.au/opinion/attack-of-gm-crops-condemns-the-worlds-poor-to-disease-and-death/news-story/c71ba6c75eff55f4da573d76f707e743



Statement from the American Association for the Advancement of Science:
www.aaas.org/sites/default/files/AAAS_GM_statement.pdf

Article in US National Library of Medicine: www.nlm.nih.gov/medlineplus/ency/article/002432.htm

Brand S. *The Whole Earth Discipline*, Viking, 2009

Truth, treachery and GM food: www.theguardian.com/environment/2013/mar/09/mark-lynas-truth-treachery-gm

Facts about GM food: www.livescience.com/40895-gmo-facts.html

Center for Food Safety (USA): www.centerforfoodsafety.org/issues/311/ge-foods/about-ge-foods#

Questions

You could use some of the ideas here to assess your own attitudes and whether they are justifiable in the light of scientific evidence. Are there other factors besides scientific evidence that you should take into account when a decision has to be made?

1. Consider the information about sweet potatoes.
 - (a) Is there any evidence that this naturally genetically modified crop harmed the environment?
 - (b) Does the information that sweet potatoes were genetically modified 8000 years ago without modern biotechnology change the nature of the GM debate?
 - (c) Does this natural product legitimise the use of GM technology?
2. Do you think allowing some farmers in Scotland to grow GM crops would damage its 'green and clean' status? Do normal farming practices damage the environment's 'green and clean' status?
3. Tourism and the oil industry both contribute to Scotland's economy.
 - (a) Do these reduce Scotland's 'green and clean' status?
 - (b) If they do, do you think there are similar objections to them? Give evidence for your answer.
4. Anti-GM campaigners often quote the precautionary principle: 'If any harm is possible, stop the procedure.'
 - (a) Has this principle been applied to other technological, medical and scientific advances?
 - (b) In your opinion, is it a good principle? If not, how would you modify it, or would you ignore it altogether?
5. (a) Discuss Stewart Brand's comments as described above.
 - (b) What have campaigners for and against the use of GM crops contributed to the debate? You should review some of the 'Further reading' section in order to fully answer this question.