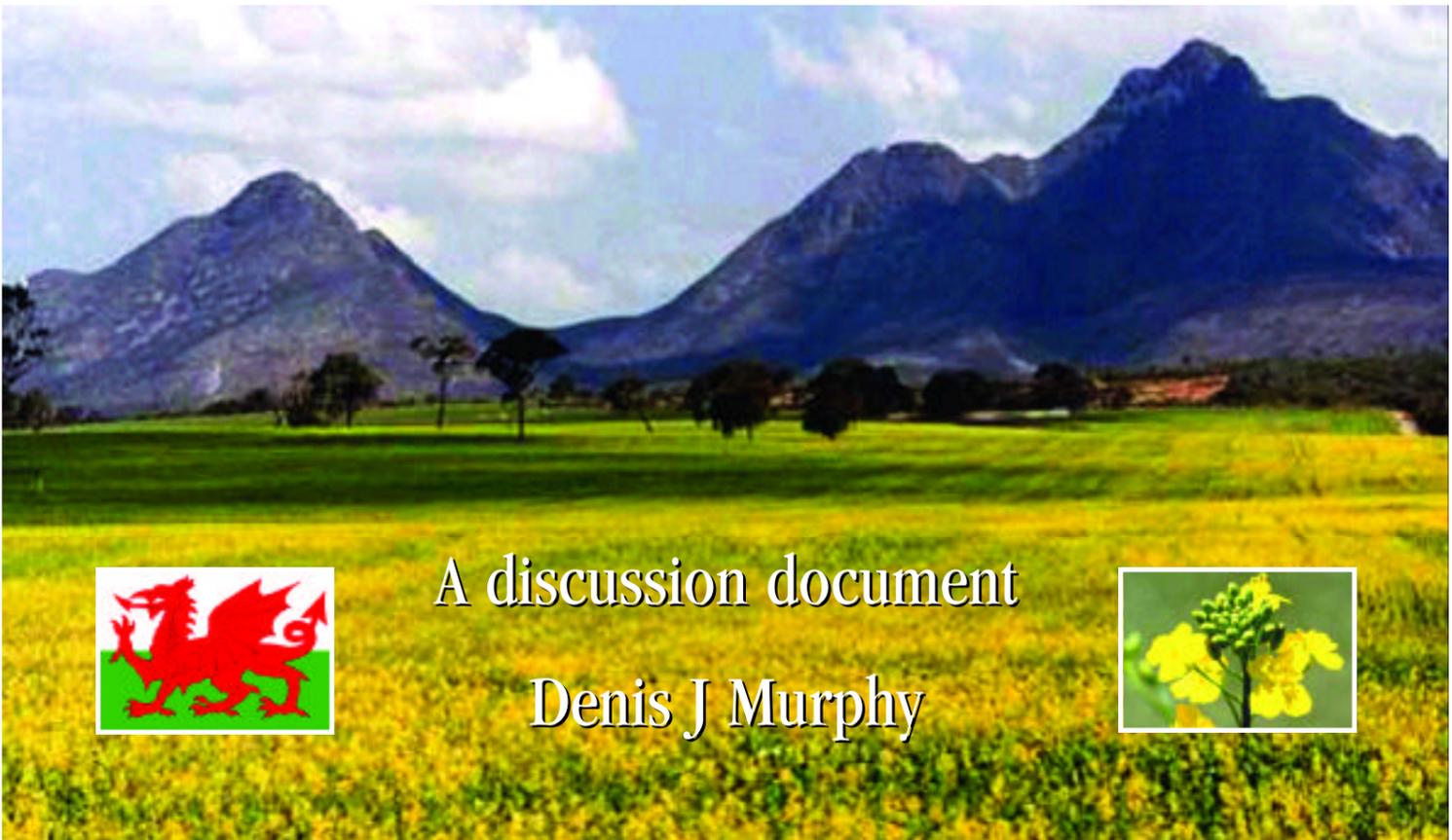




# GM-Free Wales

Admirable aspiration or misguided fantasy?



A discussion document

Denis J Murphy



# GM\* -free Wales - admirable aspiration or misguided fantasy?

*A discussion document*

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## Executive Summary

- **The policy of a “GM-free Wales” is not practically feasible, especially in view of the recent EU approval of GM crops – Wales cannot “go it alone”**
- **The policy is not legally enforceable – as is admitted by some of its original proponents**
- **The policy would not contribute towards enhancing the economic competitiveness of Welsh agriculture**
- **The policy could adversely affect the small number of arable farmers who may wish to grow GM crops by restricting their choice of varieties compared to other farmers in the EU**
- **The policy would not materially assist the organic farming sector**
- **“GM-free Wales” would not significantly benefit the environment – all of the major risks to the Welsh environment lie elsewhere**

## 1. Introduction

"GM-free Wales" is currently an explicit policy objective of the National Assembly of Wales. The purpose of this discussion paper is to examine some of the practical and scientific issues behind the concept of a GM-free Wales. It is hoped that this will contribute to the more general debates now being held on the introduction of GM crops into the UK, the European Union (EU) and elsewhere. This debate is particularly crucial in the context of the recent decision of the EU parliament to permit the import and sale of labelled GM food products (1).

Some key questions are:

- *What is the purpose of a GM-free Wales?*
- *Is a GM-free Wales legally possible?*
- *Is a GM-free Wales feasible if the rest of the UK/EU grows GM crops?*
- *Is a GM-free Wales either realistic or desirable?*
- *Finally, what is the likely impact of a GM-free Wales on:*
  1. *crop production?*
  2. *organic farming?*
  3. *the environment?*
  4. *the overall economy?*
  5. *the 'image' of Wales?*

\* GM stands for “genetically modified” in the sense of a crop variety that contains new genes that have been added using recombinant DNA technology. A GM food is a food that is partially or completely derived from a GM crop.

In July 1999, the GM-free Welsh Environment campaign was launched at the Royal Welsh Show by a range of organisations and pressure groups led by Friends of the Earth Cymru (2). Their mandate was:

- to persuade the National Assembly of Wales to exercise its powers to ensure that it will not permit the release of GM crops into the Welsh environment unless it is satisfied that to do so would be safe for human health and the environment
- to promote Welsh organic and environmentally sensitive farming practices and food produce

This manifesto was signed by several Assembly Members (AMs), including the leaders of the Liberal Democrats, Plaid Cymru and the Welsh Conservatives. The campaign elicited widespread support from many groups and organisations throughout Wales, including the Farmers' Union of Wales the Welsh Food Alliance and the Women's Institute. The policy of restricting commercial GM crop use in Wales was then extended to include obstruction of the government-funded, small-scale experimental field trials designed to test the environmental impact of some types of GM crops. During 2000 and 2001, support for a "GM-free Wales" grew at the National Assembly until it was publicly backed at the highest levels:

*"Our policy, as set out in the partnership agreement 'Putting Wales First', is to restrict any intention to grow GM crops commercially in Wales as far as is lawful according to European Union legislation. We also intend to continue to market Wales as an area of the European Union where the agricultural produce is GM-free."*

- Rhodri Morgan, First Minister, Welsh Assembly (3)

*"I certainly have problems with GM in that I think to have a GM-free Wales would be such a wonderful marketing opportunity for Welsh produce"*

- Christine Gwyther, Welsh Agricultural Secretary on BBC Radio Wales in Feb 2000 (4).

## **2. The concept of GM-free areas**

The concept of a GM-free Wales has been promoted by a number of anti-GM campaigners (2). In many respects, the concept is similar the "nuclear-free" zones that were declared in the 1980s by local anti-nuclear groups in many areas of Europe, Australasia and the USA. However, as Friends of the Earth (FoE) admit, *"Any local authority can declare their area GM-free. In fact you can declare your garden a GM-free area or even your window box"* (5). Of course, there is no legal basis for such declarations, which as Friends of the Earth says, *"should be seen as an aspiration"*.

One way for a local authority to restrict the cultivation of GM varieties (or any other crop varieties that they dislike) is to invoke specific reasons relating to the protection of particular ecosystems/environments in a particular geographic area. Any ban on a particular release of a GM crop would then only apply to that area and would not prejudice any future releases. It is most unlikely that the whole of Wales would fall into the category of a "specific geographic area" for this purpose (6). It is also questionable that sufficiently rigorous scientific grounds relating to particular ecosystems/environments could be found that would result in the exclusion of GM crops, as a class, from an area but would still allow conventional crops to be grown there. For example, a local authority may object to GM varieties of oilseed rape that are herbicide tolerant – the scientific reason being their possible threat to the environment through the production of "superweeds". However, exactly the same scientific arguments would then apply to non-GM crop varieties that are also herbicide tolerant – including oilseed rape, wheat and maize varieties that have been selected by conventional breeding to be resistant to herbicides like atrazine (7).

In this respect, local self-declared GM-free zones may be regarded as a mechanism for registering or publicising a protest against such crops but they would have no legal or scientific basis. Therefore the declaration of a GM-free Wales could be regarded simply as a statement or gesture aimed at publicising

local opposition to GM technology (as with the former “nuclear-free” zones). However, the stance of the National Assembly has gone well beyond this and appears to involve support for serious moves to prevent the cultivation of GM crops in Wales. Is this a realistic proposition?

### **3. The potential extent of GM crops in Wales**

Wales is a comparatively small country with a land area of 2.1 Mha (million hectares) of which about 80% (1.2 Mha) is devoted to some form of agricultural use (8). The vast majority of this land is used as grass and pasture for the 11-12 million sheep and 1.5 million cattle that together make up some three-quarters of national agricultural output. Most of the remaining output is derived from pigs, eggs and poultry. Annual crops only constitute about 1% of the value of agricultural products in Wales.

The total area used for arable crops in Wales is about 60,000 ha, of which about 26,000 ha is used for barley and 15,000 ha for wheat. Barley has not yet been developed as a GM crop and it is most unlikely that commercial GM barley varieties will be available for many years to come. There are some field trials of herbicide tolerant GM wheat varieties currently underway, but these are still several years away from commercial development.

The only Welsh crops that are realistic candidates for the introduction of GM varieties within the next few years are oilseed rape, maize and possibly fodder beet. All three crops are grown in very small quantities in a few restricted areas including the Vale of Glamorgan, Pembrokeshire and the North-East. The total area of oilseed rape cultivation is about 1,000 ha; there is about 4,000 ha of maize and less than 500ha of fodder beet. To put this into perspective, the combined area of oilseed rape and maize in the UK as a whole is over 540,000 ha, i.e. Wales grows well under a thousandth of the total UK crop. However, even the impressive UK production of oilseed rape and maize is dwarfed by that of other EU countries, who together produce over 7 Mha of these two crops.

The conclusion is that Wales is an extremely small producer of arable crops and, when potential GM crops are considered, any Welsh contribution would be tiny. This may be seen at first sight as an argument in favour of a GM-free Wales. After all, if so little of Welsh agriculture is devoted to potential GM crops like maize, oilseed rape and fodder beet, surely their elimination will have hardly any effect on the rest of Welsh agriculture? This is in contrast to a country like England where, for example, oilseed rape is a major crop, especially in the eastern regions. However, the fact that Wales produces so few arable crops also means that the introduction of GM maize, oilseed rape and fodder beet will have little or no effect on other sectors of agriculture. The agricultural sector that is most often cited as being at risk from GM crops is organic farming, but how much organic farming is practised in Wales, what are its products, and how might they be affected by GM crops? These questions will now be addressed.

### **4. Organic Agriculture in Wales**

The organic farming sector in Wales is still comparatively small. While it has grown rapidly over the past five years, this growth has now levelled off. In 2003, about 45,000 ha was estimated to be under organic cultivation as compared with only 9,400 ha in 2000. The Welsh Agri-Food Partnership has set a target was set of 10% of the Welsh agricultural sector to be organic by 2005 (9), but the current proportion is still only about 3% (10). The Agriculture & Rural Development Committee of the National Assembly for Wales has recently conducted a detailed review of organic farming policy in Wales. The report was officially launched in February 2003 (11), with a ministerial response in March 2003 (12).

Most of the 45,000 ha of organically certified land in Wales is not used for arable crops, but rather as grass/forage for animal pasture. The area devoted to organic arable crops is less than 2,000 ha. Nearly all of these arable organic crops are cereals like wheat and barley, which are not candidate crops for

commercial GM varieties in the medium term future. Less than 100 ha of organic land use is classified as “other crops”. This is the maximum area that might be in use for the organic production of non-cereal crops like oilseed rape, maize and fodder beet, i.e. the only crops that could include GM varieties. However, we could find no statistics on whether any of this 100 ha of organic crops really did include any oilseed rape, maize or fodder beet. Therefore, all we can say with confidence is that the maximum potential area of organic oilseed rape, maize or fodder beet is 100 ha. However, it is also possible that there is little or no organic oilseed rape, maize or fodder beet grown in Wales at all.

One of the most vocal groups to object to GM crops for commercial reasons (rather than on solely ethical, environmental or safety grounds) is the organic farming sector. Indeed, it has been claimed that the introduction of GM crops could wipe out organic farming (13). To some extent, the opposition of the organic movement to GM crops in any form is a problem of their own making. This is because organic certification groups, such as the Soil Association and The Organic Food Federation, have adopted a “zero tolerance” approach to any admixture with GM crops or products. In contrast, organic certifiers are willing to tolerate a degree of contamination of organic produce by non-organic conventional produce, e.g. seed, pollen or pesticide spray blown from neighbouring farms. There is also a significant list of non-organic processing aids that may be used in the preparation of organic food products. Furthermore, the presence of as much as 5% of non-organic ingredients is allowed in processed products that are labelled as “organic”. Therefore, it is probably safe to say that there is no such thing as a guaranteed 100% “pure” organic food product.

Many people in the organic movement have admitted that the unrealistic “zero tolerance” approach to GM crops is predicated more on their political opposition to the entire context of GM crops and the agbiotech industry as a whole, rather than on any rational or consistent extension of their pre-existing principles of organic agriculture (which, as we have seen above, is tolerant of small degrees of “contamination” by non-organic produce). Indeed, some of the current generation of GM crops (e.g. Bt maize) could lead to the reduction or elimination of pesticide use, which would at first sight appear to be very much in line with the aspirations of the organic movement. Having decided on a “zero tolerance” approach to GM crops, however, organic producers are faced with the predictable consequence that any cultivation of GM crops within an extensive radius of an organic farm could potentially compromise its organic status, and hence may adversely affect the livelihoods of those involved in the industry. Indeed, in light of the widespread cultivation of GM crops in the Americas, some in the organic movement have wondered whether even the width of the Atlantic Ocean provides a sufficiently wide separation distance to ensure a total lack of GM content. The answer may well be “no”. For example, windborne spores of the soybean fungus, *Phakopsora pachyrhizi*, have recently travelled across both the Pacific and Atlantic Oceans from Asia via Africa to South America (14).

Interestingly, neither the recently published National Assembly report on organic farming policy in Wales, nor the Minister’s response to the report, has any mention of GM crops (11, 12). This is despite the oft-quoted pronouncements of dire consequences for organic farming that will inevitably follow from the introduction of GM crops. Presumably, those who drafted the report did not regard the GM crops issue as being relevant to organic farming in Wales. In contrast, in the Assembly document called “Putting Wales First”, there is the statement that “*We will also seek to exploit the marketing opportunities for identifying Welsh agricultural produce as GM free*” (15). This implies that there are verifiable claims that could be made about the advantages of Welsh produce if it were “GM free”. What are these advantages and what would be the consequences of introducing GM crops into Wales?

## **5. Future Impacts of GM crops in Wales**

### **Organic Farming**

Encouragement of organic farming is regarded by the Welsh Assembly as a public good that may also yield economic benefits for Wales in the longer-term (11). For this reason, new organic farmers are given extra financial subsidies in order to make the transition from conventional farming practices. Is

this expanding sector of the Welsh economy at risk from GM crops? Any risk to organic farmers would only come if the presence of GM crops in Wales were to compromise their organic status. As we have seen above, the overwhelming majority of the Welsh organic sector is not involved in arable crop production and therefore their organic status should not be affected, even if a GM crop like oilseed rape were grown on an adjacent farm. The possible impacts of a GM-free Wales on organic farming are examined in more detail in section 6.

### **Environmental impacts**

Of more general concern than the small organic sector is the potential impact of GM crops on the Welsh environment as a whole. The environment is arguably one of the key national assets in Wales, with its important role in recreation and tourism that also provided the milieu, in which we all live and work.

The GM crops that are currently available have been engineered either to be tolerant to certain herbicides (e.g. weedkillers like glyphosate and glufosinate) or to be resistant to certain insect pests (e.g. by expressing the Bt toxin). Some GM crop varieties grown in the USA contain both of these traits.

Herbicide tolerant and insect resistant crops can have both positive and negative impacts on the environment. On the positive side, herbicide tolerant crop varieties may require fewer applications of herbicide during a growing season. These crops can also enable farmers to implement environmentally friendly practices like zero-tilling or integrated weed management in their fields. Insect resistant crops require far fewer or no applications of chemical pesticides, leading to a reduction of any attendant problems of toxicity and residues.

On the negative side, these GM crops might lead to the emergence of herbicide tolerant weeds if they out-crossed with weedy relatives and use of Bt crop varieties may increase likelihood of the emergence of resistant insects. Of course, these drawbacks also apply to the many varieties of herbicide tolerant and insect resistant crops that have been produced by conventional breeding. However, let us examine the possible environmental consequences of using herbicide tolerant crops in the Wales. There are no wild relatives of maize outside of the Americas, so only oilseed rape need be considered for its potential for out-crossing of herbicide tolerance. Oilseed rape is a member of the Brassica family that includes many popular vegetables like cauliflower, cabbage, broccoli and Brussels sprouts as well as several weeds including charlock and wild turnip. There is a possibility that herbicide tolerant GM varieties of oilseed rape could interbreed by pollen transfer with some of its relatives, including the weedy species.

Even in a GM-free Wales, there would be a strong likelihood of the introduction of herbicide tolerant, GM brassica weeds from across the English border, if the rest of the UK were to adopt GM crops; neither wind-blown pollen and seed in boots and tyres are respecters of boundary lines drawn on a map. Such GM/weed hybrids are extremely unlikely to have a strong selective advantage that would lead them to become more serious weeds. It should also be noted that escaped non-GM oilseed rape is already a common feature of roadside verges and field margins, but the plant is not a serious weed and it is readily controlled in arable areas. Brassica weeds in the general environment are far less serious than introduced exotic ornamental species like the Mediterranean rhododendron, *R. ponticum* (16), Japanese knotweed (17) or Himalayan balsam (18). It is worth noting in this context that the 1,600 or so native British plant species are now competing with 3,000 new ones introduced over the years into the UK with little or no control, many of them via garden centres.

Since only about 1000ha of oilseed rape is grown in Wales, even the conversion of most of this area to GM cultivation would have very little ecological impact. As we have seen above, even the most “weedy” brassicas like charlock are not a serious environmental threat. Therefore, even in a worst-case scenario, the cultivation of GM oilseed rape and the subsequent development of herbicide tolerant weedy hybrids, e.g. with charlock would have little ecological or economic impact.

In contrast to these minor and theoretical risks of GM crops, the **known** environmental impacts of many other agricultural and horticultural practices are truly devastating. Two of the most serious

environmental impacts in Wales are related to intensive sheep farming and introduction of alien ornamental plants that turn into true “superweeds”.

Sheep have been referred to as “woolly maggots” by a noted conservationist (19). The number of sheep in Wales has more than trebled in the past 50 years to some 12 million today. This has had terrible effects on vegetation, wildlife and watercourses. Much of this increase in sheep numbers occurred after the introduction of the EU sheepmeat regime in 1980 and was barely dented by the Foot and Mouth epidemic of 2001. Intensive sheep monocultures in the upland areas of Wales have severely reduced biodiversity, especially of songbirds and native vegetation, and runoff from sheep-dip and fertiliser chemicals have poisoned many streams, especially killing off the aquatic invertebrates that are the main diet of many fish. The result is a barren and impoverished green desert in many a Welsh upland that could and should be a rich and diverse ecosystem attractive to both wildlife and visitors.

There are many serious plant pests in Wales but two of the worst are rhododendron (20) and Japanese knotweed (21). In just one small area around Swansea Japanese knotweed is wreaking immense damage. To quote from the Explore-Swansea website “*an estimated 620,000 tonnes of Japanese knotweed covers the region of Swansea and the Gower Peninsula. This makes the area one of the most affected places in the world to be infested by the plant. To halt the continued spread of this invasive weed would cost Swansea City Council nearly £10,000,000 in weed killer, soil removal and man hours. Under present economic conditions, there seems little hope in managing one of the most gregarious and insidious plants in the world*” (22). In the UK, annual expenditure for the control (often unsuccessful) of Japanese knotweed is estimated at tens of millions of pounds (23). To give just one example, a supermarket recently spent more than £400,000 to resurface a new park through which knotweed was growing.

In comparison with these ongoing, real-life examples, the theoretical environmental risks from the future use of GM crops in Wales appears very minor indeed.

## 6. Consequences of a GM-free Wales

Let us imagine, for the sake of argument, that Wales did become a GM-free nation – what would it mean? We will assume that, in the rest of the UK, farmers are free to use GM crops, whereas such crops are forbidden in Wales. Even less realistically (from a practical and scientific viewpoint) we will also imagine that this policy is rigorously enforced and that no GM crops are grown in Wales over the next decade. What would be the consequences?

The short answer is that there will be **very little, if any, effect on Welsh agriculture**, whether conventional or organic.

A GM-free Wales will of course have an adverse effect on a small number of oilseed rape and maize farmers who will be denied access to crop varieties that they may wish to grow in order to enhance their yield, quality, environmental impact or economic returns.

But surely, would not a GM-free Wales policy benefit the organic sector? This is most unlikely. The absence of a few hundred hectares of GM oilseed rape or maize will have absolutely no effect on organic farmers. One of the main concerns of such farmers is to secure GM-free feed for their animals. At present, virtually all animal feed (mainly soy and maize) is imported into the UK, especially from the Americas. This might provide an opportunity for a few Welsh farmers to grow their own GM-free feed grains, especially maize and oilseed rape. However, with its tiny capacity for arable production, Wales could not supply more than a tiny fraction of even its own needs for animal feed. Therefore, Welsh farmers would still need to import their feed from the rest of the UK or from overseas. But if farmers in the non-Welsh areas of the UK were now growing GM crops on a wide scale, it would soon become impossible to guarantee the complete absence of GM “contamination” in their feed. Remember that the organic movement has a “zero tolerance” policy about the presence of GM ingredients in food or feed so

the presence of even a single “rogue seed” in a batch could result in its rejection. The conclusion is that whether GM crops are grown in Wales or not will be irrelevant as regards the provision of GM-free animal feed to organic farmers because they will still have to import most of their feed from outside Wales.

Will a GM-free Wales be a safer and healthier place to live and work? Not at all. Many people have concerns about the impact of GM food but a GM-free Wales will make no difference to such worries. This is because, for the vast majority of Welsh people, virtually all their food is imported from outside Wales. Luckily, there are no demonstrated or even suspected adverse impacts on human health in any of the current generation of GM crops. Since 1997, well over 300 million Americans and Canadians (and visitors to those countries) have been consuming the products of GM crops. The global area of GM crops is in excess of 58 Mha – that is the equivalent of over 25 times the size of Wales – and no farm workers have yet complained about any health impacts of these crops after six years of growing them.

We are told that a GM-free Wales will be “*a wonderful marketing opportunity for Welsh produce*” (4). But is this statement true? It is certainly a catchy slogan, but unfortunately it does not stand up to detailed analysis. As we have seen above, the removal of a few hundred hectares of potential GM maize or oilseed rape will have no material effect on organic farmers, who will continue to import their animal feed from outside Wales as they do now. There is no prospect of any other commercial GM crops that could be grown in Wales for many years to come. Therefore, it is difficult to see how a GM-free status could be used in any promotional or marketing exercise for Welsh produce that would have any real meaning or scientific validity. It would be like saying that a ban on the use of chemical fertilisers in domestic gardens in Cardiff could be used as a way of promoting Welsh produce – these two issues are at best only tenuously linked and in practice would have no effect whatsoever on each other.

In addition to having little or no impact on organic farming, a GM-free Wales would not, of course make any contribution to alleviating any of the existing serious environmental problems identified in the Welsh Office study (see above and ref 24). Far more devastating than GM crops, both economically and in ecological terms, are the consequences of overstocking of sheep and the rampant, unchecked spread of alien species, especially ornamental plants (25). If one were to draw up a balance sheet of the potential risks and benefits of the major environmental issues that we face in Wales, the possible adverse effects of GM crops, even in a worst-case scenario, would be far less serious than any of the other more immediate and threatening challenges discussed above.

## 7. Conclusions

- The policy of a “GM-free Wales” cannot be defended either as a practical proposition or as a contribution towards enhancing the economic competitiveness of Welsh agriculture.
- “GM-free Wales” therefore serves little purpose beyond that of being a populist slogan in the short term.
- The policy is not legally enforceable, as some of its original proponents themselves admit.
- The policy is not practically feasible if the EU were to approve GM crops – Wales cannot “go it alone”.
- The policy could adversely affect the very small number of arable farmers who may wish to grow GM maize or oilseed rape crops by restricting their choice of varieties compared to other farmers in the EU.
- The policy would not assist the organic farming sector
- “GM-free Wales” would not significantly benefit the environment – the major risks to the Welsh environment are elsewhere

Finally, although a “GM-free Wales” is extremely unlikely in reality, it remains a popular slogan with some sections of the public. “GM-free Wales” is also vigorously promoted by some very active pressure



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