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We are constantly being told that we must accept GMOs, because if we don't the Third World is going to starve. I would like to try and take that idea apart and give some idea of what is actually going on behind this claim.

The companies say that there will be higher yields from GM crops. Well, Peter has done some work on demolishing that. They also claim they will be able to produce more nutritious crops and Golden Rice is one of the first examples. Yet, as we have seen, you would have to eat mountains of it in order to get the right amount of Vitamin A. And, furthermore, it does not yet exist and many GM crops never actually work. Now they are talking about a potato with iron in it and who knows what the case may be with that.

They also say that, with GM, farmers will use less pesticide; and that issue is extremely important for the Third World. Hundreds and thousands of people have been killed or permanently damaged by the use, or misuse, of pesticides over many years - by not being given the right instructions, or protective clothing. It's a very urgent issue. The fact that many of these chemicals were developed by the companies now making claims for GM should not escape us.

Others claim that people will not have to clear forest because they are going to be able to grow GM crops more densely and in different ways, so boosting conservation. Also that farmers will be able to farm degraded and desert areas, because the companies will develop crops with salt and drought tolerance. Monsanto constantly emphasises that, in Africa in particular, where women have to do an enormous amount of weeding, their herbicide tolerant crops are going to cut down on the amount of weeding that these women have to do, back breaking work in the sun.

Naturally enough, if you don't have the arguments to respond, this all sounds very persuasive. So let's have a closer look at some of these claims.

I'll begin with the issue of pesticides. We have only touched on this so far, but it is critical. The main GM crops so far are herbicide tolerant crops, and crops which express a pesticide that is supposed to kill corn borers, among other things. We have already heard a bit about herbicide tolerant crops in the United States. I know something about the situation in Argentina. There, widespread resistance to the herbicide glyphosate is beginning to appear. Resistant weeds mean you cannot use the herbicide to kill them off any more.

Multiple resistance to more than one herbicides happens very quickly. English Nature is really worried about multiple resistance, because if we use both herbicides glufosinate and glyphosate constantly in the environment, quite quickly both weeds and crops develop resistance to both chemicals. And how would we deal with that? English Nature says that we would probably have to use more toxic weedkillers, such as paraquat, which is highly toxic, and 2,4.D. The companies claim that the herbicide glyphosate is so safe you can eat it and you can send children out into the garden straight after you have used it. However, in Argentina, where they spray it from aeroplanes, people are having all kinds of problems. Children are coughing and getting rashes. Argentinian communities say their chickens and small animals are being killed off through this wholesale spraying from the air, which shouldn't be allowed. Glyphosate itself is not harmless, but much wider use of glyphosate and glufosinate, followed by mulitple resistance, is far more harmful. And so, I think, the claim that less pesticide will be used is flawed.

Pesticide expressing crops will also bring problems, because one of the rules of ecology is that everything is based on the relationship between the different elements of the ecosystem. If you have a crop expressing pesticide all the time, you give the insects that eat that crop extra incentives to develop resistance. Unless you have what they call 'refugia' you will have major problems quite soon. Refugia are places where you do not plant the GM crop. The difficulty is that, technically, refugia are hard to implement - to say to a farmer, you can plant the GM crop here; but here you have to plant perhaps the same crop, but a conventional variety; and here you have to have a bit of untreated land where natural enemies of the pest can flourish. If such regimes are difficult to implement in our situation, just imagine what it is like in India where you have hundreds and thousands of farmers, all planting cotton on about half an acre. Imagine trying to get them to have refugias. Imagine trying to manage that system so that you don't generate pest resistance to Bt crops. In fact they are already having a lot of problems with Bt cotton in India, even though resistance has not yet had time to develop. The crop has not performed well. Farmers have been sold bogus GM varieties by unscrupulous salesmen, and they have not been given the proper instructions about how to grow them.

Let's now briefly consider nutrition. We have heard about Golden Rice and the promises being made. But Golden Rice doesn't actually exist yet. It is being worked on but it doesn't actually exist. We don't know if Golden Rice will have Vitamin A in it in a way that can be assimilated by the human body. Everything the companies are saying about better nutrition is promises and the promises will take a long time to be fulfilled.

What we actually have is herbicide tolerant crops and pesticide expressing crops. The herbicide tolerant crops are either developed by the company that produced the herbicide or by two companies working together, Syngenta and Monsanto for example. One produces the herbicide and the other has acquired rights to use the herbicide or to include it in its packages. These things are being sold as packages, the herbicide tolerant seed, and the herbicide. Farmers often have to sign contracts which dictate everything the farmers must do; when they spray, how much they spray, when they harvest, and then who they sell the crop to. If they break these contracts, they can be fined, as has happened in the United States and Canada, where Percy Schmeiser was accused of saving seed that had Monsanto's glyphosate resistance gene it in, and replanting it. In fact, his own crop was contaminated through cross pollination with neighbouring GM crops and he had later to abandon it, to cease saving his own seed.

This is one of the most crucial aspects of the issue as far as the Third World is concerned; that farmers can be prevented from saving seed. Saved seed is absolutely vital still for 1.4 billion people. Saving seed and breeding your own seed has been the basis of food security for thousands of years amongst Third World farmers. There are festivals in India based on exchanging seed, which ensures that the properties of the various farmer varieties are spread around as much as possible. However, farmers who save their seed do not make good customers for large corporations, because they are self reliant - they don't need the company for seed.

Many Third World farmers also plant a multiplicity of different varieties with different characteristics. This spreads risk because if there is a flood, or cold weather, or hot weather, or a particular insect attacks the crops, you have some crop left because there will be some plants which are resistant. Third World farmers realise that they can't predict what is going to happen precisely and so they need to spread risk to deal with it. They have good strategies for dealing with risk, and seed saving, exchange and selection, has always been fundamental to this.

To attack seed saving is really to attack the whole basis of farming in the South. In Asia, farmers have developed hundreds of thousands of varieties of rice. I can't remember how many varieties of rice there were before the green revolution came. Thousands and thousands of varieties, all adapted to particular micro-climates, and all useful to the farmers who bred them. There was a scientist called Richhana in India, who collected hundreds of varieties of rice and wrote lovingly about how this one was resistant to a disease, how this one could grow in a slightly cooler climate, how this one could grow in monsoon flood water as it rose, and finally produce a crop which floated on top . Syngenta tried to buy that collection last year. Obviously it would have been very useful germ plasma for their experimentation, but people in India resisted. They didn't want Syngenta to own the collection. They said, this collection belongs to us. It belongs to the people of India, to the farmers of India. It needs to remain in the public domain so that we can continue to use it when we need to breed new varieties ourselves.

I think this shows us vividly what GM is about. It is a desire, through patenting and genetic engineering to take control of the resources which farmers have developed over the centuries, which are the basis of all our staple crops. I took part in a campaign to fight the patenting of crops in the European Union. The Biotechnology Directive was passed in 1998, enabling mostly large companies to take out patents on living organisms, including crops. As a result there are now 90 patents world-wide on a plant called neem which has many uses in India and all over the world. A group of organisations have overturned one of them on the basis that the company had patented a property of neem which had already been discovered and used by Indian farmers, so the company had no right to claim exclusive rights over it.

If you have a patent on something, you can control all use of it for quite a long time. In fact, although patents only last for 17 - 20 years, you can maintain control for a lot longer than that by the use of contracts and by inserting genetic engineering traits into crops. The patent on glyphosate expired in 2000, but by engineering glyphosate resistance into crops and promoting them world wide, Monsanto manages to keep control of glyphosate. At the moment 91% of all transgenic crops planted world wide contain traits that are the property of Monsanto. Now if that is not global monopoly, I ask myself, what is? And why isn't anyone doing anything about that global monopoly?

We really need to address this situation. Four large transnational companies own nearly 100% of all GM seed. GM is not about helping the Third World. It is about the transnationals helping themselves to Third World resources and to markets in the Third World that will be very important in the future. And Third World farmers are being asked to subscribe to the 'export or die' mentality. Argentina, for example, which is in a terrible state at the moment, has become massively dependent on exporting GM soya. One of the reasons farmers took to it so readily is that, at first, it offered certain advantages. It means that one farmer can manage more hectares

than with conventional crops, because he simply kills off all the weeds with glyphosate. The 'no-till' system Monsanto promotes means that he does not turn the soil over. All he does is apply herbicide to kill of the weeds, so fewer farm workers are needed.

Farmers went into it, understandably enough, because they were told they would make more money as they had to employ fewer people, and they were promised that they would benefit in other ways from the crop, such as higher yields and good markets. Now they are finding that the yield is lower and they can't sell it. People don't want it. But these are not the only problems. They are now getting crop and weed resistance and health problems among local communities which have been sprayed with glyphosate.

Now, in Argentina, because they can't sell the GM soya, the urban populations, who have never before eaten soya beans at all, are being provided with recipes on how to cook GM soya beans. We are often told that, in the US, people have eaten GM for years with no harmful effects. However, in the United States people are not actually eating GM soya beans. They are not actually eating much GM produce direct. Most of it is being fed to animals and then people are eating the meat. So, in Argentina, we really could say that a giant uncontrolled experiment is in process. We should also remember that the Chinese never believed that the soya bean was edible as such, only when treated in some way, for example when fermented. So we shall now see the true results of feeding a population on genetically modified soya beans. Argentina is a country that has got itself into serious difficulties through accepting GM. Farmers have been forced off the land, the economy has suffered, and less food is being produced for the population to eat.

The US government works with the GM companies through US aid and so forth to promote the interests of both those companies and the US government. The terminator technology which was developed primarily to stop saved seed from germinating is a perfect example. It was the outcome of collaboration between the US department of Agriculture and Delta and Pine Land. There are a number of such collaborations between the US government and biotech companies to develop products. Clearly, in this world of ours, this is the way things work. In fact multinational corporations are basically an arm of government. They work with government to promote mutual interests. This can clearly be seen in the development of the food and drugs industries in the States; and when Monsanto lobbied for no-till farming to be included in the definition of carbon sinks in carbon trading. You can see the clear link also in that, very often, the people who work with the transnational corporations often move into government and back again to working with corporations in the phenomenon of 'revolving doors'.

The GM issue is really about who controls our food supply and our seeds. And of course this has a much greater effect on the Third World because there are many more farmers there and much more biodiversity than in Europe or the US. We depend on the Third World for much of our food. We depend on their biodiversity, and that is now being either destroyed in even greater quantity or taken over, unless people resist.

If the real aim of the GM companies was to help the Third World, you would see a completely different pattern emerging. For example, you would see research based on consulting with Third World farmers. An organisation called Masipag in the Phillipines involves collaboration between scientists and farmers. It is led by the farmers, based on their vision of what they want and also what they know, because farmers in these countries are incredibly expert in their field. They really understand what they are doing.

But the problem with GM is that it continues to impose top down solutions, like those developed though the green revolution, without realising that often Third World farmers already have their own solutions. They already had drought and pest resistant crops. They had an understanding of how to deal with pests, intercropping for example. Planting different kinds of crops, or different varieties of the same crop in between each other is something that farmers have used in the Third World for millennia. There are many systems of farming which involve planting certain crops together, eg the Maya of Central America and also in India. Farmers are now experimenting with intercropping ‘sticky rice’ in China. This is a glutinous rice which both people and pests enjoy. An experiment took place in 2001 over a very large area. The yields were greatly increased and there was far less pest attack.

What I find both ironc and tragic is that many of the things we are trying to develop now in the West as being a wonderful way to take farming back from monoculture and the green revolution, are things that people in the Third World have always been doing, or were stopped from doing.

I’d like to give you a final example. It is about the corn borer. The corn borer is also a big problem in the South and in Africa an organization, the International Centre for Insect Physiology and Ecology, has done a lot of work on the corn borer and how to deal with it. This organization also works on genetic engineering solutions, so it is not in principle opposed to them. So, on the one hand we have the GM solution, Bt corn, corn engineered to express bacillus thuringiensis all the time to deal with the corn borer. On the other hand we have some subtle and interesting science, which investigates how to both repel and attract the pest. They have discovered that two plants, called desmodium and napier grass, can be used. One repels the pest from

the crop and t he other attracts the pest. So, by planting in the right pattern, you can attract the corn borer away from the corn and into the borders of the fields.

This system has had a really good side effect. Another big problem with corn is striga, a plant pest. They found that desmodium was crowding out the striga. So, these scientists, working with farmers, have produced a very interesting solution that works with the natural ecology. Rather than trying to change it by force, they are trying to understand and use it to provide solutions which seem to be both more promising and more interesting. They have also introduced a parasitic wasp from the region where the harmful corn borer originated. The parasitic wasp attacks the corn borer and has been released in several areas.

Hans Herren, the Director of this organization, has pointed out that the solutions they are working on cannot be patented, so it is difficult to get funding for the work. No one wants to invest in work that cannot be patented. They are much more interested in investing in work that can lead to exclusive monopoly and profits.

I believe this story quite neatly sums up what is happening – the disregarding of solutions which already exist or can be developed but which cannot be patented, in favour of dubious, temporary measures like engineering resistance to herbicides, because these can be patented for exclusive monopoly profit-making. The Third World does not need such solutions and nor do we.

We need to change direction completely in agriculture and learn from the experience of Third World farmers. Above all we need to halt the destruction of their farming systems, the varieties they have developed and their knowledge and livelihoods.

We can be confident that in rejecting GM food in the UK we are not depriving people in the Third world. GM will not address their real problems. Like us, they neither want nor need GM crops.