

Good morning every body thank you for coming. There are still a few more people to come, some of them from some distance and may be a bit late and if they do not turn up the big advantage is that you will all get more lunch. So don't worry

All I am going to do is give you a brief idea of the trust and introduce the panel.

This is thirty years of work on Penrhos and I am deeply conscious of the fact that Tesco's could have done it six months. It is not the work; it is paying for it, earning the money. The whole idea of the Trust is that there are something like 40,000 derelict farm buildings in this country and we cannot find a use for them. I think, no I don't think, I know that what we have done here is not just resurrected the place but we have brought it back to life with new uses. Terry and I go back a long way and one of the uses was a little brewery. It was the first, (TJ and it was great beer too) and we inaugurated it by all taking our clothes off and swimming in the river Wye. It was incredible. (TJ. We started the micro brewery business, it was the first one) Then we had to give it up. I won't go into the reasons why. I'll tell you over lunch. And so back to the Trust. We have learnt many things and one of those is just seeing bad times through knowing that you are going to come out the other end. Some of the farmers are in deep trouble. One of the highest suicide rates in Europe is just over the border there, amongst middle aged Welsh farmers and there is no need for it. So that all of the things that we have learnt (here with this Penrhos Project) could be put to good use and so we have set up a little Trust to do that. The Trust needs members and volunteers.

And now to introduce the team: put a face to a name.

Terry Jones. Many of you will know more about Terry than I do. He introduced Daphne who is the leading light at Penrhos. She is..well I won't say a Dodo, she is not extinct, but she is a very rare bird. She is hidden away there in her kitchen getting your lunch ready. Alison has very kindly stepped in to chair the meeting. Mark Measures.....Well, when I am King of England I am going to give all the farm land to Mark, then Terry will get upset because it will be a monopoly. Bob Kennard is going to tell us how to distribute it and sell organic food. Li Ching has a much wider experience and she can probably help summarize a bit because she has both GM technical and field experience. Dr Michael Antoniou is going to tell us about his experience on the advisory panel to the Government. Now I can hand over the Alison.

Alison

Thank you very much for inviting me and it is a very great privilege to be among these six very eminent speakers. I would just like to explain that we are going to have questions towards the end to if you have any questions that you think of as people are talking please keep them to the end and we will have time for discussion then. I will not talk for long but briefly say that Pesticide Action Network is an international organization with six centres around the world and in the UK we have existed for about 15 years and we have been a critic of what is the old technology of crop production by using chemicals on food and the proposed new GM technology is portrayed as being the new clean technology and one of their claims is that it will use less pesticides on our food. What I would like to describe here is how the agro-chemical manufacturers have escaped the accountability for the human health impacts of their products and to suggest that they have done this by secrecy and the

complacency and the collusion of the regulators and we can anticipate that the GM manufactures will use very similar strategies, so we have to be vigilant.

In the UK there are over 31,000 tons of Agri chemicals used on farmland alone. We do not know how much is used in domestic and amenity use there have been some gains in some areas for disclosure of figures but in other areas the culture of secrecy is still very much prevalent. For example, in the areas where we have gained, consumers can now find out about the residues in their food. The Government does surveys on a very small number of samples and we now can find the results on the Internet and some of the regulatory bodies have opened up quite a lot and this is through consumer pressure and public interest. But at the point to use where pesticides are actually applied finding that information is almost impossible but in the next couple of weeks the Government is to announce a decision about some every remarkable new 'public rights to know' about pesticides.

If any of us went for a walk tomorrow across a farmer's field and got accidentally sprayed with pesticide and it was so bad that we had to go to hospital we would have no legal right to know what that chemical was. The farmer would be obliged to tell the authorities but they cannot tell us what chemical it was without his permission ~ incredible.

So what the government is considering under the new proposals is three things: that we, the public, should have access to farm spray records, that we should have that if we live next to sprayed fields, advance notification and we want signs on site, sign's of what has been sprayed and when and the right to buffer spray zones in residential areas, because at the moment it is perfectly legal to spray right up to someone's window. What we also want is mandatory food labelling, if not the full list of what pesticides have been used in the food production, but a website so people can find out what has been used. The risk in all this is; are we just creating anxiety that will make people ill. We think that the advantages outweigh the disadvantages and that under the scrutiny of a public gaze, the flaws in the regulatory systems will become public knowledge. Pesticides are tested only one at a time we are only just now beginning to think about the cocktail effect. There is no data from chronic exposures of occupationally exposed people, that isn't included on the risk assessment process. There is no consideration at all on pharmaceutical pesticide interactions, so if you are on medication you could be very much more susceptible and data from air dust and pollen should be included in the calculations. The gender bender type of chemicals and the consideration is that they could be having insidious disease effects across the population as a whole. Take testicular cancer for example this has gone up 70% over the last year. We now have 1800 cases in this country and breast cancer is also slow but surely on the rise. The question is that, the regulators prefer to let sleeping dogs lie. To give you very briefing idea of what is allowed to pass, since 1998 the chemical companies have has a legal obligation to report, when they perceived cases of adverse human health and when people complain that they have been made ill by their products and the government received the odd report here and there, but under pressure by us they did a questionnaire survey of the companies. Low and behold all this new information had to be sent in and yet some companies refused to send in anything and the government has actually revoked all the approvals, for all of their products. If those questions had not been asked then those products would still be on the market. Trace down this new menace to April the 19th this year was the 40th anniversary of the death of Rachel Carson who was one of the founders of the environmental movement. She was a remarkable person who put together pieces of

evidence and expressed them so beautifully that public opinion was ignited and what a wonderful speaker at Hay she would have been.

Terry Jones

I would like to start by reading from a children's book of verse that I wrote some years ago 'The curse of the Vampire Socks' This poem is called 'The experts'

Give three cheers for experts
They know a thing or two
If we didn't have them what ever would we do
They built a ship that couldn't sink
It sailed across the sea
Its name was the Titanic and it's gone down in history
For years and years the experts knew the Sun went round the earth
Then Copernicus said 'wrong' they couldn't hide their mirth
They told Columbus not to sail because he might fall off
They had King Louis bled to death because he'd got a cough
Lord Kelvin was a scientist, a really clever guy
Who proved by mathematics, that man would never fly?
And now we've all got nuclear power, so give three mighty cheers
The experts say it can't go wrong
Once in ten thousand years

Once in ten thousand years is a reference to the eighties – the nuclear industry was having to admit that things could go wrong, but they joked 'the likelihood is once in ten thousand years' and of course they got Three Mile Island & Chernobyl. When I was thinking about this GM debate, I kept feeling that I had heard it all before and I know all this stuff and it occurred to me in the last fifty years, we have had the same story- a story of a brand new technology of it being promoted very hard and then people suddenly realising there was something wrong with it. It occurred to me the story of nuclear power, forms a pyridine with what is happening now with GM and I thought it might be interesting just to provide a context with what we are talking about today, to just remind ourselves about the story of nuclear power and how close it parallels the GM thing. With like any new technology, the nuclear power story starts off, with what I call the Clap Trap stage, I think that is where we are at with GM at the moment-when everybody thinks that everything is going to be so wonderful and are so full of optimism with what is going to happen and it's going to solve all the world's problems. The first reactor was commercially working was built in Britain, but America soon jumped on the band wagon and in 1954, the head of the Atomic Energy Commission, Lewis Strauss, famously said "it is not too much to expect, that our children, will enjoy in their home, electrical energy too cheap to meter"- Not in your wildest dreams! Then in the 1960's, the heyday of atmospheric explosions and experiments, they even thought that nuclear weapons, nuclear bombs could be used for engineering projects. So there is this wonderful quote from an encyclopaedia published by Tyne Incorporated in New York, in 1963, not that long go. The writer, under the heading of energy writes, by 1980 cratering explosions (nuclear explosions) will probably be mammoth enough to take on excavation projects, such as the construction of a new shipping canal through the isthmus of Panama and that job would be done by 651 H hydrogen bombs and a total power of 42 mega tonnes. To

built it by conventional explosives would cost 6 billion dollars, using nuclear blasts just over 2 billion dollars, excavating, which took nearly 20 years for the old canal might only take 5 for the new one!

We are still at the optimist stage with GM at the moment and the problem with nuclear power was that the development was being driven by commercial interests, just as it is with GM now, rather than science. The companies were so keen to jump on the bandwagon of nuclear power and so keen to make money out of it, they took the first reactor they could. This reactor happened to be powering the Nautilus submarine, so what they did was that they took this reactor, scaled it up and made it much bigger. It proved to be a disastrous mistake. It was cooled by water, just ordinary water cooling the central core and the problem with this was that the water they turned out was radioactive, putting it then straight into the Irish sea. The other thing it was liable to do was a core meltdown, but they were in such a rush to get things done, they were going to make so much money out of it that they didn't look into other possibly safer types of reactor, like pressurised gas and water reactors. So they then had to install all kinds of cooling systems, which cost billions of dollars because the things weren't safe. They didn't look into the decommissioning or the waste and rushed headlong into it – you then had Three Mile Island & Chernobyl and by the 1980's the nuclear power industry was in total disarray. There were no new plants ordered in the States in 1978 and all those ordered since 1973 were cancelled. Forbes magazine reported in 1985 that a sample of 35 plants then under construction were expected to cost 6-8 times their original price and to take twice as long to build. The magazine called the nuclear power industry “the greatest managerial disaster in business history”. Yet, there are still people promoting it and just the same with GM, resorting to special pleading. I don't know if anyone saw the article by Dick Tavern in The Guardian last week, just trotting out ridiculous arguments, but a week earlier on The Independent front page, the news headline was trying to revive nuclear power! The headline was “only nuclear power can now halt global warming & leading environmentalist urges radical re-think on climate change”. This guy called James Lovelock, who wrote the Gaia theories of books; the article says his cause will cause huge disquiet for the environmental movement and reading this article it all came alight, it was all wrong about this nuclear power but all he had to do was look up James Lovelock on the internet and find out that since 1997, he has been a leading member of ‘Environmentalists for Nuclear Energy’ and he also wrote a book called the same! In this he raises three objections/arguments to nuclear power. Firstly nuclear plants are not bombs, secondly the sun is radioactive and the earth was formed in a huge nuclear explosion millions of years ago, so why are we so worried about radioactivity for then? I'm sure James Lovelock is a very eminent scientist but we all know that the sun is essential to life on earth, but it's not wise to try sitting on it particularly! His final argument was well, all right, you get the disaster like Chernobyl (he calls it the failed Chernobyl plant), well the ground around Chernobyl is now terribly radioactive so people can't live there, but there is much more wildlife now, more so now than more populated areas. He actually seriously suggests that having nuclear waste around is a good way of keeping wildlife! The man is absolutely off his rocker. It doesn't mention the fact that after Chernobyl, there was nuclear fall out on the Welsh Hills and we couldn't eat the sheep off our hillsides for years afterwards. But he doesn't touch on the main arguments/objections of nuclear power, which are, what do you do with the waste and how you de-commission the plant. In the States they still haven't got a storage plan for what to do with the waste. They have dug these tunnels under the Yucca mountains in Nevada, which has cost

them about 5 million dollars and they still can't decide what they should do with it. To de-commission a plant it is estimated 130-330 million dollars per plant and not one plant has been de-commissioned.

The other thing is that can you really believe what people are telling you when there is commercial pressure behind it and it's the same thing that people were eating margarine because it was better for them than butter, and then they discovered that partially hydrogenated oil in the margarine was actually worse than butter was. I remember a farmer friend of mine thirty years ago, showing me around his farm, saying we have got this wonderful protein meal for cattle now, which is great, but what he didn't know at the time was that it was made up of ground up cows and he was turning his cows into cannibals, which we know ended into BSE. You cannot believe what people are telling you. Just last week Glaxo had been had up for fraud, because they had got these drugs, which were meant to cure depression in adolescents and children and in 2002, they were making 55 million dollars in the States out of these drugs. Yet they had tests that these drugs at best were better than the placebo and at worst they were harmful and actually caused violence in children. People providing false material is not new and goes back through history. In the 14th century, Henry IV took the throne from Richard II, he had help from ex Archbishop Thomas Arundel and they needed to get an army together quickly to attack Richard. Arundel did what any politician would do and produced a dodgy dossier! In his case a paper bull that he claimed the Pope was declaring a crusade against Richard II, he produced this paper, which was absolute lies and made up, but they got the army together, defeated Richard and then history somehow forgets about it and they all disappeared, it's no different now between Blair and Bush and the war against terrorism.

With debate on GM, the companies and the press are trying to narrow the argument down to whether GM is safe, for me the real argument is who controlling this technology, who is benefiting from it? The other thing is, what does it do to us, what is the effect on us and finally can we really believe what they are telling us about GM?

Who gains? An Indian writer called Vandana Sheeva wrote "the technology of genetic engineering is not about overcoming food scarcity, but creating monopolies over food and seed, which is the first link in the chain and over life itself".

George Mombiou writing in The Guardian a few weeks ago put it really clearly, "GM technology permits companies to ensure that everything we eat is owned by them, they can patent the seeds and the processes which give rise to them, they can ensure crops can't be grown without their patented chemicals, they can prevent seeds from reproducing themselves and by buying up competing seed companies and closing them down you can capture the food market, the biggest and most diverse market of all".

I mean come off it, George Bush gets on his hind legs and accuses Europe of hindering the great cause of ending hunger in Africa, who is he kidding? We know that what he is really interested in is softening up the market for American Agri-biz. Then what happens to us and how does it affect us? Well I think with GM for me, it goes back to the patenting of genes and once they started patenting genes, we were on the losing wicket there. Now that they own the patents, they can now criminalise you for planting seed, for exchanging seed. The wonderful case of Pirsty Shmizer who was a Canadian farmer and he planted this canola and Monsanto had some of their GM crop nearby and it polluted his crop. Now you would think that Monsanto would actually pay him compensation for polluting his crop, but no, that not quite what happens in the real world! They sued him for 200,000 dollars for intellectual theft of

their genes and they won the case in the court! I think they are still fighting it now, they were claiming not only did he owe them 200,000 dollars, but all his product had to go to them, just a looking glass world.

Most supporters of GM they go back to 2 key projects, there is a sweet potato being engineered in Kenya to resist viruses and a vitamin A enhanced rice and they keep quoting the great successes of GM. But according to George Mombia, the sweet potato, despite millions of funding has just collapsed, it turns out it produced no improvement in virus resistance and a decrease in yield and as for the Vitamin A enhanced rice, Mombia says it doesn't even work in theory because malnourished people appear not to be able to absorb the vitamin A in this form. So you get Lord Taverne, George Bush all still saying, these are great successes of GM and in the same way of Monsanto they fabricated data about cotton in India, claiming the yield increased by 80% when it actually fell by 80%.

I'm afraid you cannot believe what people say to you – not even what I say to you! In that little poem I told you- they told Columbus not to sail because he might fall off. I wrote this a few years ago and am guilty of the general misconception or myth that before Columbus, people thought the world was flat. But they didn't think that – if you read any informed writer in the Middle Ages, they knew the world was round. The idea that people in the Middle Ages thought the world was flat was a lie concocted by an American journalist called Washington Irving and in 1847 he wrote a biography of Christopher Columbus and in it he thought it would be a really good idea if he would Columbus confronting the church fathers at Salamanca. The church fathers accused him of heresy for saying the world was round, when the church thought the world was flat. Irving made this up completely, the church never thought the world was flat and it was then picked up by the Darwinists, who then started accusing people who didn't accept evolution. So don't believe what anyone tells you, not even what I say!!!

Alison

Before Mark Measures speaks can I just ask our audience if we have any farmers here? You have a smallholding? Can I ask who among the audience is concerned enough about GM food to have actually changed your shopping habits and who is concerned about pesticides in food? Yes, we have a sympathetic audience.

Well, I would like to introduce Mark Measures. He runs his own farm, near to here and is involved in Project Carrot, which is a Hereford Sustainability project and is formerly from Elm Farm Research Centre.

Mark Measures

Thank you, Alison, good morning everybody nice to be here and delighted there are some representative farmers, I don't know if there are any scientists here but, if there are, I am sure we will have some good discussions later on. I've just got a few facts and figures to raise then I'm going to talk a bit about farming, which is really all I know about, farming and food production, particularly organic farming and small farms just trying to highlight where they fit in all this discussion about how we manage our environment. Some of the stuff we were doing with Project Carrot in the Bulmer Foundation recently is developing a thing called the ecological footprint which some of you may have come across it's about trying to assess how much land is available for each of us to use and how much we actually use and you might be interested to know in the United Kingdom we use, on average, 4.7 hectares per person

in America, not surprisingly, they use 9.6 but, actually, we only have 1.9 available to us so there is a bit of work to do there. Wildlife has always worried me, just in the last 30 years we've seen a 45% decline in common bird species, which is continuing to decline. With farming, average farm income for 2002 was something like £8000 per farm and for beef and sheep farmers, there are more beef and sheep farmers, it was nearer £3000 per farm. Not surprisingly, we are seeing a decline in the farming population of around 17,000 a year despite the fact the European Union spends 30 billion pounds altogether on agriculture a year but in the UK agriculture has so many downsides, pesticide, pollution, food quality issues, various social issues, damage to environment and so on, that it has been calculated that we do actually 2.4 billion pounds worth of damage every year and that is a cost which, as a society, we bear and never appears in our food crisis, of course.

One final statistic is related to how our whole food system is dominated by corporate organisations. Two companies have 80% of our world grain trading; four companies in the UK have 70% of our food sales. Of course, those multiples, not only is that an unnerving statistic but what I see at the farming end of the business is those multiples having a devastating effect on farms because of their wholly unethical trading practices. I work with a lot of farmers, not just with my own farm, but I can't tell you the disasters that those multiples cause because of the buying practices of their buyers are which are focused on only one thing and that is to drive down the price of food that they purchase and to increase their power over their suppliers. This is all a gloomy situation and, actually, I was supposed to talk about the upside of farming and where are we going next and is there a future for us all and, whereas we do have all those really serious problems, I do see some very positive avenues for us to explore and I think that's why I'm standing here after 20 years and talking about organic farming. I am able to stand here because we have found some solutions for some farmers and that's why I'm talking about organic farming and small farmers. I think organic farming has been particularly successful in addressing a number of issues. We are very conscious of the environmental issues and quite clearly organic farming is doing a great deal to help wildlife, it uses less energy for example in our production methods but there are downsides in that a lot of organic food is transported a ridiculous amount of miles and we have to think about that as well, it's not an 'either, or' it's an 'as well'. Organic food and farming has certainly contributed to the quality of our food in terms of pesticide residues – did you know 65% of all carrots have measurable levels of pesticide? Also organic farming has done a great deal for animal welfare and I think that's an important issue and certainly one that brought me to organic farming as we need to take better care of our animals. There are ways in which we can see ways in which we can improve the questions for farmers is will they make any money doing it? It's been a real challenge, I think, we've succeeded in doing it for some farmers by having premium markets and charging an organic price for our food and that's been a way for some farmers and particularly for farmers where it has been easier to convert where there have been mixed farms with a nice balance of cropping stocking and perhaps they've got a greater sympathy in working with natural systems and working with the environment and for those farms they have been able to convert fairly easily and many of them have ended up being more profitable than they would have been as conventional farmers. There are, of course, all of those hidden costs which I mentioned, that 2.4 billion costs to farming, which society picks up and is never fitted into the price mechanism, the price market mechanism and, somehow or other, if we want to see a bigger expansion of organic farming then we have to try and find a way in which the people who actually cause

the costs have to pick up the bill and there are various ways of doing that, some of it is by legislation and some of it by giving grants, some of it by things like pesticide tax so there are all of those things which can be done from a government perspective and there are other ways which we can look at costing our production methods and some of the work I'm doing with Project Carrot, is this triple bottom line accounting method which tries to put a cost on the social environmental as well as the economic balance sheet of a farm business or any other business.

So that's a little bit about organic farming. As far as small farms are concerned, it is very hard to define what a small farm is, to be perfectly honest, and the more I thought about it the more I realised I couldn't offer you any definition of a small farm because it depends so much on circumstances – a small farm in Argentina is about 1500 hectares, a small farm in some parts of Morocco is ½ hectare – so small is not just about the number of hectares it's actually about the structure, particularly the social structure and being a family unit and if you go to the States now you see that family farming has largely been destroyed and so you'll find that the strong campaigns for family farming because most of the food production methods there are done on purely industrialised corporate lines and then you've got all the destruction that goes with that so it's both about being family farms and, to some extent, size. Many of the farms I've worked with over the years may have 200 or 300 acres but they are certainly family farms and I would still call them small farms.

Just to give you a bit of an example of how I see these farms operating I'm just going to run through 3 or 4 I've worked with over the last few years. One which I am sure some of you will have come across is a small grower called Ian To Hurst who has an intensive vegetable unit outside Reading at Hardwick Estate and he basically has 10 acres which is rented from a big estate and he has a walled garden and in that unit he has an operation which employs 2 full time people, he has various students and apprentices most of the time, he grows a whole range of vegetables and he supplies a box scheme and essentially that is the basis of his business growing vegetables for two or three hundred people and supplying them with a weekly box scheme and that is perhaps the epitome, in many peoples eyes, of a really viable small farm which is meeting the sort of objectives we are looking for – very high employment, an acceptably profitable business but not probably in comparison with his neighbours who are all dashing off to the city and have really well paid jobs. A farmer I worked with for years in Dorset and again some of you might have come across their products is Pam & Will Best who sell Manor Farm milk and they have a 300 acre down land farm with 70 cows, 100 sheep, growing on a rotation of 2 or 3 years of grass then wheat which is for milling and thatching, then oats and then back to a clover lay. They've succeeded in making a business out of that small farm by having this milk packing operation so they are now selling non-homogenised milk throughout the south of England with significant sales in London but also local sales and they've also done other things with that farm. It is exceptional from a wildlife point of view, they have also brought on a vegetable grower, who has subsequently set up a farm shop and now have their own independent business on the farm so they are contributing lots of things.

My partner Jo Greenall and I farm in the Golden Valley and one of our neighbours who we work with as a partner, Trevor Wheeler, he has a 300 acre hill farm and there he has about 50 suckler cows, 300 sheep and he's growing potatoes for seed, which is what we do in partnership with him. With the seed potatoes and also some nature reserve that he manages for the Shropshire Wildlife Trust, he has managed to diversify in a slightly different way and find different sources of income on what is a

relatively small farm and he's built on that by finding direct markets locally and Farmers Markets which have been such an enormous success in the last three or four years. In three years Farmers Markets have grown by 144% and, although it's not a panacea for everybody, it actually gives an opportunity for some farmers to really thrive and make a future for them. So these farmers, I suppose, have demonstrated various things and it's certainly a fact that organic farming is a long-term viable solution. They've produced a unique product that has a recognisable quality and they've been able to market that at a premium. They've been involved in various marketing box scheme approaches, they've got involved in processing and other forms of diversification so they have all been able to build on the basis of an organic system and come up with a financially viable solution for themselves.

I think there are additional opportunities which are open to other small family farms, the whole procurement debate is a very interesting and exciting one and hopefully we can make some improvements like we are trying to do with our school in Clun Valley, in terms of supplying schools with good local organic produce. It's not going to be an easy route, but at the end of the day the accountants might get the better of us and I think it's an optimistic avenue to pursue, particularly as the definition of value for money is beginning to be changed. Well, what is the outcome of this? – Is small really beautiful and I think that while there are some large scale farms which are good, I would never dismiss that, because I am working with Abbey Holme Farm at Cirencester for example, which is a 1,500 acre farm, with a farm shop and they've got intensive vegetables and they're doing lots of wonderful things – it is the exception and it is difficult to do a really good job on a large scale farm than it is on a small scale farm. Particularly, as the larger farms tend to focus in a more single-minded fashion than on profit.

I think there are real threats with the industrialised type of agriculture, which is being promulgated by the US with such enthusiasm through WTO and Global Free Trade and our own current UK focus on cheap food. So small farms generally provide more, particularly more in diversity, fields tend to be smaller, copying tends to be mixed, so you get better habitats. They're also more productive, the level of intensity that one person can produce food out of a small area is amazing and certainly is a lesson that we need to learn from some developing countries. They certainly seem to employ more people per hectare and their general engagement with the community, which is a crucial issue and is quite clearly very different and so provides a real social function, they have cultural involvement and they reflect our history much better.

And finally on the marketing side, local marketing reduces food miles, it brings the consumer closer to the way that food is produced and a greater awareness of how food is produced actually influences the landscape and the surrounding countryside and it generally encourages the local economy.

So that's a very quick run through small farms and organic farming and there is clearly a great future for some farms and there is a great for all farms if we actually change some of our marketing structures and our agricultural policies.

Alison - Thank you very much Mark for that very interesting run through about the advantages of small farming.

May I introduce Bob Kennard who runs Graig Farm Organics and the farming co-operative that supplies it.

Bob Kennard

Good morning. I thought perhaps I would start by just explaining why we are, where we are when it comes to food and I know maybe Mark and those other people here were students of agriculture during the 1970's and the one overriding thing, apart from watching Monty Python every week! Was that we were told that food must be cheaper and you must produce more per acre and that has been the policy of British Government since the war, cheap food. We are spending less than half of our income now on food, compared to 25 years ago. It is down to somewhere between 10-15% of our income, whereas 20-30 years ago it was 30%. Although the real value, if you exclude inflation, the real value of beef, is now 25% less than it was 20 years ago. So, how have we achieved this? Well we've achieved it by using intensive farming methods and the simple economics is that if somebody comes along to you with this wonderful chemical that will do something to you as a farmer to your crop, it will kill weeds or it will save you an operation, as long as the cost of that input is less than the extra yield that you achieve from it – you as a farmer will buy it and we as consumers will buy the food because it is cheaper. It's all a logical progression, that we as a community, as a society, we want cheap food. I heard a horrible statistic recently that in the USA, 12% of the whole of the national sales of Coca-Cola are sold as or with breakfast. We have devalued food; it no longer means anything to any of us other than fuel. I had to speak at a poultry conference last week and I was sandwiched between the one corporate manager of Tesco's, who preceded me and I was followed by the UK's general manager of Kentucky Fried Chicken and he had a list of 10 reasons that KFC or YUM as it is now called, is so wonderful and number 9 out of 10 had actually something to do with the so called food that they were selling. So that is our attitude now, it's not a thing that makes us healthy; it's a fuel that keeps us going through the day.

The UK market in organic food is over 80% sold through the supermarket; although 82% is the latest figure I have heard. It might just be interesting for you to know how we get our food when it comes through the supermarkets. We through our group of 200 organic farmers throughout Wales and the borders, we sell the main proportion of the beef and lambs go to Mr Tesco and Sainsbury's and so on. Now all these supermarkets are reducing the number of people who supply them, it's been a constant process over the years and as regards to organic meat through Tesco and Sainsbury's, they are basically down to one supplier across the UK. Now in the case of Tesco's, all organic lamb goes through one plant in Merthyr Tydfil, that plant is the largest such plant in Europe, it is 14 acres under one roof, it would process the whole of the Welsh beef industry in 10 weeks and is an unbelievably massive plant but they have huge economies of scale. The problem is you may have animals born in Scotland and have to get to that plant in order to be processed and BBC Wales did a wonderful piece a couple of years ago, where they followed a pair of lamb chops, from the lamb on a farm near Swansea and followed it on its route back to a supermarket very near Swansea. They then went to do a vox pop around Swansea town centre and asked people how far you think these lamb chops have travelled and the farm was about 20miles from the Tesco supermarket. People said 50-100 miles, it was actually 750 miles. The lamb had gone from the farm near Swansea, slaughtered near Anglesey, travelled to Cornwall as a carcass to be cut up, then up to the hub of the supermarket, where it was told where to go and it ended up in the supermarket in Swansea.

Because we buy over 80% of our food in supermarkets, it is obviously a very important source of food and in all this my own belief is that the answer lies in our hands. If we persist with this thing of ever-cheaper food, then that is what we will get.

If you look on the Internet and you look for organic beef producers, you will come up with a very nice website from Australia, where there are 4 or 6 organic beef farmers there. The average holding of those ranches is a million hectares – the average. There is absolutely no way in terms of what Mark was saying earlier on about keeping the countryside and so on, that we in the UK could possibly compete with that, absolutely no way and the problem is, we as consumers if questioned outside a supermarket will say, yes of course we want to keep the countryside, yes of course we want biodiversity and all the rest of it, yes of course we want small farmers to thrive, yes of course we want the social benefits of keeping a rural economy going and the final question is, are you prepared to pay for it, oh yes of course we are and then we say goodbye to the PR man, we go into the supermarket and we see two lots of things, one cheap, one expensive and what do we do, we grab the cheap one. So everything is in our hands.

There is 18% of organic food that is not sold through the supermarket and I suppose the good news is that proportion slightly increased last year and that is sold through farm shops, direct sales, Internet, mail order and all these different ways of selling.

But we still have to face all these realities that the vast majority comes from the supermarket. One of the problems we have is that if we asked all of you to write down on a piece of paper, what the phrase organic means, we would probably have quite a few different views. It is a very complicated message to get over to the consumer and in a recent survey, 30% of people when asked, equated the word natural, to the word organic. They thought if they saw the word natural on a pack, actually meant organic so they thought they would buy it. Equally disturbing there was a figure approx 10-20% of people who bought organic products by accident!

There is a basic dilemma within the supermarkets because they cannot emphasise the benefits of organic, because by doing that, they knock the 90% of products that are not organic, that they are trying to sell us! Lets be honest they are using organics in many cases as a lost leader to get the punters through the door and flog them the other stuff because the range that they offer is very limited. One interesting thing recently I've discovered is why organic meat is relatively so expensive to supermarkets? The key to selling meat is to get rid of the whole animal and its no good selling lots of leg of lambs if you end up with tonnes of shoulders, because nobody wants them, so, you have to sell the whole lot and what you have do if you are buying as a processor is to try and sell the whole lot and if the supermarket isn't taking a portion of the animal, you have to find another home for it, so you then sell that bit, whether it be shoulder etc, to the next best available market, which would be a non-organic market at a lower price. So you are taking out part of the carcass that you are selling cheap, which means the bits you have got left, you have actually got to sell more expensively. Why have you got to do that – well next time when you go into a supermarket, have a look at the amount of shelf space that is devoted to organic meat and it is tiny. So the supermarkets are unintentionally I'm sure, restricting the range amount of organic meat that is sold and the knock on effect is that it makes it more expensive. Then their customers tell them it is "too expensive and that's why I don't buy it", so it's a circular argument that we are up against.

The key therefore in this question of marketing and buying organic is to explain to the consumer, what it is they are buying into. It's a whole range of things, it's no GM,

it's animal welfare, it's the social fabric, it's the landscape- all the things Mark was talking about, it's maintaining a social fabric in all the rural areas and the problem is getting that message over and we are not being helped by the fact that supermarkets cannot do it, but I think that the future is bright because there are many other ways of getting into the market, like I explained, farm shops, Internet and so on. But the one thing I would finish on and say to you is that if you are in a supermarket and you see two things one is expensive, one is cheap- don't immediately say bloody hell that is expensive, I'm not buying that, ask why the cheap one is cheap and whether it is an intensively reared chicken compared to an organic one or it's a piece of meat that's come from Argentina, where the average size is a million hectares –or what it is, there is normally a reason for it. Thank you.

Alison – Thanks very much Bob. Could we now ask Dr Michael Antonio to talk about his government experiences with GM.

Dr Michael Antoniou

Thanks very much and first of all I would like to say what a great pleasure it is as well a privilege to be back here again to speak at one of Martin's Heart-to-Heart discussions.

Normally when Martin has me come along to one of these events, he expects me to deal with some of the technical issues around GM and that was obviously very useful in the past when we were all trying to find out what GM was all about and why from a technical point of view it was a major concern. But I thought I would try something different this time as everyone now knows about GM. So I thought I would try and give you an idea of what it was like to serve on the Government's GM Science Review Panel (SRP) as that was certainly an eye opener for me and confirmed a lot of suspicions about how these things are structured and how the message gets out to the public that perhaps GM isn't really bad you know and is something that we should all accept. So that's what I'm going to try and do, relate to you some of the insights and feelings that I got from serving on the SRP and there are some really interesting lessons to be learnt as well.

So, what was the GM Science Review? If you remember, last year we had the "GM Nation?" public consultation and debate, which was composed of three strands. The economic review, the public debate, in which I hope that many of you filled in the questionnaires or took part in the debate, and the Science Review, which was supposed to look at all the scientific literature that was published on GM plant science and technology and come up with an assessment of it as to whether there were concerns or not and if there were, what were they and what can we do about them. As a result of that they published a report in July and this green book here is what came out of that session. Now, at the time that it was published, the GM SRP also invited comments on this first report and they then realised that they had to respond to the comments, which they probably regretted as I'm sure they would have liked to have put this out and then forgotten about it! But luckily for us they said they welcomed comments. So, what I was nominated to participate in was to join the second round of meetings, which ran through the autumn and finished in December last year and then the second report got published in January this year.

The way I got on the GM SRP was rather interesting. The membership of this committee was composed of two people nominated by the group of NGO's (Soil Association, Greenpeace, Friends of the Earth, GeneWatch UK). The biotechnology industry also nominated two people and then the rest of the members were chosen presumably by the chairman, who was Sir Professor David King, the government's chief scientific advisor and civil servants working at the Office of Science and Technology. The two people nominated by the joint NGO's in the first round were Andrew Sterling of the Science Policy Research Unit at the University of Sussex and Carlo Leifert who runs the Organic Farming department at the University of Newcastle. During that first round, Carlo Leifert resigned before the first report was published because he felt it was too biased in terms of that it was too heavily loaded with people that were advocates of GM food. I think he had a point actually, if you look at the membership of the SRP. We were all meant to be on the committee as independent scientists just to objectively appraise as individuals, not representing anybody other than ourselves. However, there were two people, one from Syngenta and one from Monsanto and if you look at the list of other the scientists that were invited, all high standing professors, most have publicly announced how much in favour they are of GM food. So with all the best of intentions there was clearly a bias in the composition of this committee in that respect, even if you were supposed to look at the scientific literature in an unbiased way. There were no academic scientists like myself with a molecular biology and genetics background with a cautionary perspective that would try to balance out the very strong advocacy position that clearly the committee had. So when Carlo Leifert resigned and when it came to the second round of meetings, the NGO's were asked to nominate a replacement. So I got a call from Sue Mayer at GeneWatch UK to ask if I could represent them and go onto the committee instead of Carlo. Obviously I had been working with and advising the NGO's for many years, wonderful people because for me the NGO's represent the heart of the nation and so I said yes, OK. I knew it would take a lot of time but I accepted. So my nomination went in to replace Carlo. But in the meantime the NGO's were informed that Dr Bruce Pearce, who works at the Elm Farm Organic Research Station, was actually going to take Carlo's place on the committee and they all kind of scratched their heads at that point. Bruce is very welcome and they accepted him, but they said, thank you very much but we would still like Dr Michael Antoniou to join the committee as well as they realised that they needed somebody with a molecular genetics and molecular biology background to try and balance out this very strong pro-GM position that was in evidence on the panel. So in the end they accepted the nomination for myself as well and I went in and yes, it was quite an experience, it certainly didn't surprise me, but it was a great privilege and an honour to represent the NGO's and our points of view on the committee.

There are certain key things that struck me during the course of events and since as well and I'm glad to finally have the opportunity to talk about the SRP proceedings in a public forum and perhaps I will feel better at the end of it all! Anyway, I don't suppose many of you read this first 300-page report, but if I was to summarise it in a few sentences, what it does do is give a cautionary approval of GM. It basically considers GM primarily as just another form of plant breeding albeit with its own inherent unpredictable components. On one level this is quite encouraging because this is the very first time, in an official government document, we have the admission essentially from pro-GM scientific groups, that they are acknowledging GM has an unpredictable component to it, something that they had completely denied on previous

occasions. But actually even though they accepted that there were unpredictable components to GM, they generally felt it was not much to be concerned about. They argue that actually non-GM plant breeding is also unpredictable and that their conclusion was that on balance GM plant breeding is less unpredictable than non-GM plant breeding and therefore it's OK! So that's it basically, if you summarise on the technical side, what their position is and as a result of this they feel that the introduction of GM crops in the UK, poses no technical problems as long as you assess each crop on a "case-by-case" basis.

Assessing things on a case-by-case basis is very convenient for people who advocate GM crops. If you just assess GM crops on a case-by-case basis, it means that you are saying there is nothing fundamentally wrong with the technology and as long as you can convince yourself that a given crop is safe for health and environment, then yes it should be approved and it should go out there. A very convenient position to come to. However, it did backfire later on when it came to the approval of the Chardon LL maize, which was one of the GM crops assessed in the farm scale evaluations. Chardon LL was eventually approved by Margaret Beckett (the cabinet Minister at the Department of the Environment), but because of the recommendation that GM crops should only be approved on a case-by-case basis, it meant they could only approve that particular crop, that particular variety of GM maize, grown under the conditions as was done under the auspices of the farm scale evaluations. This is a very restrictive approval and you would have to go through the same trials with every other crop as a result. So not totally OK, but not too bad for us you could say. I think that in the end this is really why Bayer pulled this crop from commercialisation. Remember the Chardon LL maize was withdrawn by Bayer after it was approved and although they made all kinds of excuses, it was obvious that the reason why they withdrew it was because the restrictions of under which it had to be grown, they knew from experience of growing this crop in North America that it just wouldn't work - it would be commercially not viable to be grown under the conditions of the farm scale evaluations.

In the very first meeting of the SRP, we had a review of the results from GM crop farm scale evaluations, from the people who published the work. It struck me in that very first meeting, that the results of the farm scale evaluations as well as the results from the public debate on GM that had happened during last summer, had really hit the advocates of GM crop technology very hard. I remember when we had this presentation of the results from the farm scale evaluations, there was one particular member of our panel who kept trying to come up with quite complicated, quite convoluted farming practice husbandry scenarios, where perhaps you could still grow the GM oilseed rape or the GM sugar beet and not have the negative environmental impact on biodiversity, which the farm scale evaluations showed would be the case if you grew them. I found this on one level annoying and on another amusing as the GM advocates clearly felt they had to come up with a way of rescuing a very damning set of data on the introduction of these 2 GM crop varieties, namely the oilseed rape and the sugar beet. But to the credit of the SRP and especially to Mark Avery of RSPB and Brian Johnston of English Nature, they stood their ground and said "no", we're not going to come up with any saving grace situation for these things, we just have to comment on what was published and that will be the end of it and I think that came out quite well. Which is why in the end only the maize got approved albeit under these very restrictive conditions.

There were three things that I felt particularly aggrieved about through this second round of SRP proceedings, which I thought you should know about. There were a number of principles set out at the beginning before I was a member that were supposed to be represented in the reports. The first was that the report should highlight any “divergence of opinion” on any technical issues surrounding GM and also highlight any gaps in our knowledge as a result that were in need of being filled in by conducting further research so as to come to a conclusion about any divergence of opinion that there may be. Now what do I mean about divergence of opinion? In a scientific context there could be sets of data of a contradictory kind. Under these situations you basically present both sides of the story because there is a divergence in people’s opinions. Under these circumstances your suggestion would be to do more work in order to get more information to find out which side is correct. That’s what divergence of opinion is. Unfortunately, I feel the committee really failed to meet this objective and the reason I think it failed is because of the composition of the SRP. At the end of the day, all the efforts by the likes of Andrew Sterling and myself to try and highlight inadequacies on GM technical issues and to express the clear divergence of opinion that exists in this area as presented in the joint NGO response to the first report, were completely rebutted or dismissed by the strong GM advocacy composition of the committee. So, rather than have this side-by-side divergence of opinion represented in these SRP reports, what you have really is a *weight of opinion* expressed. Now there is a huge difference between divergence of opinion and weight of opinion but basically what you are going to see if you read the SRP reports is the weight of opinion of the committee. Since there was only one of me and twelve of them it was very difficult to win ground on even the smallest of technical issues. So the concerns that I raised about how fundamentally different GM was and that it was wrong to consider it purely as another form of plant breeding technology were not on the whole accepted. At the end of the day they had the weight of opinion and so that is what got represented. What was flagged-up as a divergence of opinion was only acknowledged as the odd sentence or two, here and there.

I was actually amazed as to how little these “expert” plant biologists on the SRP knew about contemporary molecular biology. What do I mean by molecular biology? Well molecular biology is very different to genetics. I’m a molecular biologist and what we do is study the order of genes in DNA and how they are regulated, how they are switched on and how they are switched off in different parts of the body to give rise to all the different structures and biochemical functions. I was amazed how little they knew about molecular biology and yes we had some geneticist’s there, people who breed plants and study the affects of this cross and that cross, but I was actually shocked by how little they knew about molecular biology and jokingly thought to myself that they could benefit by sitting in on my undergraduate lectures on this subject at King’s College as my students seem to know more than they do on this stuff! But that was the weight of opinion that happened to be there.

The other thing that I thought was convenient again for those that advocate GM crops that was a principle of this review, was that only peer reviewed published work was considered, stuff that had appeared in the scientific literature. Now that sounds perfectly plausible, here’s a GM Science Review Panel, so you would expect them to focus on what has gone through a strict scientific process of controlled experimentation, analysis, peer reviewed by other experts in the field and published.

Despite that being very plausible and laudable, it actually means the SRP would ignore completely the performance of GM crops in a real farming context. We know that there have been problems with GM crops right from their introduction in 1996, when the first problems appeared with GM cotton. There have since been recurring problems in performance, consistently lower yields, especially with soya, but because little or none of this gets into the peer reviewed, published scientific literature it meant that it could be ignored. No biotechnology company is going to attract further attention to a major problem with a GM crop by taking it through a controlled scientific experiment to try and find out the cause and then publish it! Quite conveniently therefore all the problems experienced in the real farming world were ignored. Even though I tried to write these issues into some of the earlier drafts of the second report, they were immediately taken out, simply because they were not within the sphere of peer reviewed published work. To highlight this further, in our very last meeting, just before Christmas last year, we had some papers tabled by Dr Maewan Ho of the Institute of Science in Society about transgenic unstable lines and how they are illegal. What this report shows and it says in the first paragraph “in a recent study on 5 commercially approved transgenic lines (GM crops), carried out by 2 French laboratories, all 5 transgenic inserts (that is, the GM genes that had been inserted into these crops), had all moved around, not just from the initial construction of the crop but also from the original structure reported by the company, there was clear evidence that all lines were genetically unstable”. You would think that is an incredibly important piece of information. So, just as we were finishing, I turned to Sir David King and said, “Sir David, there is this thing here from ISIS, which we haven’t considered yet as part of the tabled papers” and immediately one of the other members of the committee said “it was unpublished research, this is actually meeting reports, information from meetings”. It was unpublished work so that was the end of the story. It was really insulting, but that is as far as it would go.

The last thing was the consideration of alternatives. The committee were supposed to look at alternatives to GM for achieving the same kinds of objectives. The NGO’s and other people’s response to the first report had highlighted the fact that basically there was nothing in this considering alternatives to GM. Whenever this issue came up during our meetings, there was no consideration, for example, of organic approaches for meeting food needs. I also included a statement about non-GM uses of biotechnology, which we call marker-assisted breeding, where you use genetics to follow more accurately the outcomes from natural breeding programmes, so that you end up with your final result more quickly. In the final outcome, only one sentence about this appears in the second report!

These for me were major discrepancies in the SRP proceedings and I feel it failed in this way because it was weighted in its membership. This weight of opinion basically dictated what should and should not be reviewed and how things should come out of at the end. As a result there was weight of opinion expressed rather than a divergence of views as clearly exists in the wider world. The position held was that if there were any problems with GM crops, we have got this amazing regulatory process that will weed out any problems before the crop is introduced into a real farming context and this was a view expressed despite the fact that there have been (and still ongoing) very many GM crop problems after they had gone through the regulatory process and grown for a number of years.

So where do we go in the future? I would like to finish with a bit of horizon scanning. However, firstly I would personally like to thank all those who have campaigned on the GM food issue over the years and those who participated in the “GM Nation?” public debate last year. This was an immensely valuable thing and many thanks to all of you that have done that, because it was a very powerful positive outcome for us. Certainly since the first Heart-to-Heart that we had here at Penhros all those years ago, we couldn't have dreamt that we would be here today and still not have a single commercially grown GM crop in the UK! I would therefore like to congratulate all of you for bringing us to this position as GM crops were supposed to be in the ground commercially in the UK as far back as 1998 and here we are in 2004, not only is commercial growing of GM crops not here, but the companies are pulling their crops out of the approval process! Right now there is only one field trial of GM crops in the entire UK and that is GM peas, growing in a greenhouse at the John Innes Centre near Norwich. So it is an amazing position to be at.

Where is the future though? I heard Sir David King say at our final meeting of the SRP that he thought that the public would accept GM crops if they could be perceived to have a more immediate benefit to them, because up to now the GM crops that had been approved were for altered agronomic performance. Sir David King thought GM crops would gain acceptance with the introduction of the 2nd and 3rd generation GM crops, where the actual nutritional quality of the food is intentionally altered. So when we have a high vitamin rice or sweet potato, he thought that the public would see the “benefit” of these nutritionally altered foods and come round to it. However, I can reassure you that when you tinker with the actual core biochemical processes of an organism, as you would in trying to nutritionally alter the crop, that's when you end up with a real high risk of producing toxic side effects with potential negative health and environmental consequences and so we should fight these developments even more strongly. You have to remember that Sir David King is the Chief scientific advisor to the government and if he thinks the 2nd and 3rd generation crops are really going to be more acceptable to the public, you can bet that is the sort of advice that will be going to Tony Blair. So even though we have won major battles in the GM campaign over the years to be where we are at the moment, the GM food war is far from over and we still have to be very vigilant as the likes of Bayer, etc haven't given up, they are still developing crops, especially the 2nd and 3rd generation crops. We need keep fighting and then this will go away forever I'm sure. Thank you very much.

Alison

Thanks very much Mike for those insights and it is interesting to get an inside view. Li Ching is a member of the Third World network and editor of Science & Society magazine.

Li Ching

Thank you very much for inviting me to speak here today, especially to Martin. This is my first Heart to Heart and I'm told the Heart to Heart is about something that one feels deeply and strongly about. I'm going to talk about GM crops and some of the implications for developing countries. I myself come from Malaysia and it is something I feel strongly about and I hope that at the end of my talk you will understand why this is an important issue not just to food and culture in the UK but in the whole world. We are talking about something that is happening globally and

many developing countries are actually facing applications to import GM food and implications to grow GM crops in their country. Many people are in the situation where it is very difficult to know what to do, very difficult to know what choices to make. We know there are many concerns about GM crops and some of them have been raised already. Michael talked a little about it and I feel very strongly about it that there is no scientific consensus on the safety of GM crops; there are lots of concerns about the implications for the environment, for human health, for animal health for bio-diversity. Terry mentioned the whole corporate control of the food chain, the patenting of living organisms, patenting of the genes and the by extension to the plants themselves. Lets remember the technologies that we are talking about currently, we are really looking at two traits, which are herbicide tolerant and insect resistance and how insect tolerance has little relevance at all for developing countries. We are looking at 3 countries that grow over 90% of GM crops which is the USA, Canada and Argentina and looking at 4 crops, canola, maize, Soya bean and cotton none of which are food crops, not as much important to developing countries or to poor people around the world. We are also talking about 5 corporations that control the bulk of these technologies, Monsanto, Singento, Bayer, Dowe Agri Chemicals and Dupont and lets not forget that they come from Agri chemical backgrounds and the main GM crops that are being sold, herbicide tolerant crops, are being sold in conjunction with the herbicides so that they can be sprayed on the crop without affecting it. I am going to talk a little about that and a case study of Argentina to try and explain what has been happening there. But before that I would just like to introduce this report by the Independent Science Panel, which was established last year. Basically the report is entitled 'The Case of GM-Free Sustainable World' and I am very pleased that Michael is part of this initiative as well and is quite a simple summary of all the evidence and problems with GM crops, not just from a scientific perspective but also from the agronomic performances and Michael mentioned there was quite a lot of evidence out there, they might not be in peer reviewed journals or published papers, of how crop failures have happened in India and Indonesia and whether they were peer reviewed or not, they have affected the lives of people and they have affected the livelihoods of poor farmers in developing countries. It also looks at a whole range of issues as to the benefits of sustainable agriculture are and this is in this report that we are actually trying to sell – that's my book plug! The book summarizes a lot of the hazards that are associated with GM, I'm not going to talk about the scientific aspects but I really want to focus on Argentina, why Argentina? It was one of the first developing countries to grow GM crops and doing so since 1996, 8 years experience and world's 2nd largest GM producer after the USA. It's mainly herbicide tolerant Soya, which means that when the crop is grown, farmers can spray Roundup, which is the herbicide and that won't affect the crop but it kills weeds. It was popular with the farmers and they took it up as it fitted in nicely with the farming system, Conservation Tillage that was being developed at that time in the 1980' s-1990. Now almost all the Soya that is produced in Argentina is Roundup Ready or RR Soya, approximately 14 million hectares this year and is mainly exported as oil or animal feed. Now Argentina used to be called the bread basket of the world and to me this conjures up images of a country that was able to produce enough to feed itself and 8years ago it produced more than 8 times of food that can feed its own population. But what has happened in the last decade or so or even further, there was a re-focussing on agriculture on export, models of agriculture, intensification, and industrial monoculture and very much so this whole GM crop uptake fits in very nicely into that mold. There has been a loss of land to Soya monoculture and when

you look at government figures, the area devoted to Soya from approx 13,000 hectares in the 1970's is now over 14 million hectares today and from when GM Soya was first introduced in the 1996 there has been a 17.4% increase in the area devoted to that. Correspondingly though there has been a decrease in other crops, food crops like rice, 40% fall, and maize 26%, wheat 3.9% and so this has very much displaced the traditional food crops that used to be grown and traditional mix rotation farming have been replaced by monoculture. Now Argentina has to import what it used to export and crucially for a lot of local communities the impacts have been even more devastating. For the smaller farmers, peasant communities, they have lost their land, as they just can't compete with the large landowners. We know that 24million acres belonging to bankrupted small farmers are about to be auctioned off by the banks and due to large conflicts, communities have actually been driven off their land, which they have been living on for generations by force with the compliance of the large companies who are into the production of the RR Soya. During the 1990's more than 500 villages had been abandoned, a 1/3 of the population has migrated to cities, in shantytowns living in poverty. Two of the main arguments the GM industry has used in selling GM crops is that they are going to increase yields and reduce herbicide/pesticide use. We have seen clearly with RR Soya there isn't actually an increase in yields as studies in the USA have noted a 5-10% decrease in the yields of RR Soya and in Argentina there wasn't an initial rise in the yields and according to government figures, the most recent figures show the RR Soya, calculated at kg/hectare was reduced by 15% in 2003/2004 compared to the previous year, so we are starting to see a change now of reduced yields now in Argentina. Mainly the increase has been at the expense of an increase in acreage and this expansion of land is encroaching on the line of peasants, local communities, throwing people off their land, its increase deforestation and in some areas up to twice the rate of deforestation and that's acknowledged by the government as mainly due to RR Soya expansion, there was a report produced by the Ministries of Health and Environment and Forestry about this. Of course with the deforestation there had been floods and the companies claim was planning GM crops was going to reduce herbicide crops, hasn't actually been the case and if you look at the figures it was 28 million litres in 1997/1988, 56 million litres in 1998/1999 and over 120 million litres today. Well we can say we have seen a large increase in the land devoted to Soya but researchers have actually documented that the herbicide use on RR Soya is more than double the use on conventional varieties in Argentina. We have seen information from the USA that this is the case particularly with herbicide tolerant GM crops, that there might have been an initial decrease in the use of herbicides, now because of resistance developing in weeds, we have seen a necessity to use more frequent applications or a cocktail of applications together to try and get rid of this resistance to weeds. In fact farmers in Argentina are resorting to older and more toxic herbicides such as 24D, Paraquat and a whole range of other herbicides. This has an incredible impact on communities to live around RR Soya fields because of the drift that happens and quite often planes are used to spray/fumigate these plantations of Soya. I don't know if you read a report in The New Scientist recently that talked about poison got blown into the fields, our eyes started smarting, children developed rashes, lost livestock and some communities in the north of Argentina lost 100% of their crops, their animals infected, deformities in their animals later in the year. Sadly although there was legal action taken and a judge banned the fumigation of the RR Soya fields, it was abolished and the large landowners kept on doing it. The main culprit has been because of the resistance of the weeds to the herbicides that's why farmers have to use more powerful herbicides

to get rid of the weeds. Now even Sangenta, one of the companies in Argentina, has an advertisement in the local newspaper which says 'Soya is a weed', not Soya is this miracle crop and they are referring to RR Soya volunteers that are left behind from previous harvests and which grow through the non-planting season. So they promote the use of Gramoxin, this paraquat that Sangenta sells and other pesticides that are banned in many other countries but are trying to be promoted in developing countries to try and solve this problem. This is not confined to Argentina alone and sadly in Paraguay the same situation has happened and about 300 families have been affected by Agri-chemicals. I actually have a very sad picture of an 11yr old boy whose whole body is covered in lesions because of the Agri-chemical exposure and because of both the GM and conventional Soya plantations in the area. I was in Uruguay recently and we met up with some Paraguayan NGO campaigners and they told us earlier this year an 11yr old boy had died because of the pesticide poisoning and the communities have been fighting so hard to get some re-address and is going to be held responsible for all of this? This wouldn't be reported in a peer review science paper but the lives that are affected are so real, the communities are fighting so hard and trying to bring legal action against the companies who have promoted both the herbicides and the RR crops. It has been very difficult in Paraguay because the RR Soya that is planted there is actually illegal, not supposed to be planted but the government has given out the seed to plantations that come in and is a very difficult situation for many people. They hold the farmer liable for what they call inappropriate use of pesticides, but legal action is pending and exploring the avenues of how they can bring the companies responsible for this, to justice. We often hear all these claims on how GM crops are going to benefit, but when I look at the reality of what is happening in Argentina and also India, Indonesia, where farmers were given all these promises about how these crops were going to save them and when we talk about small scale cotton farmers for example in Indonesia, were given all this hype about how it was going to triple your yield and when they planted it the crops failed, or didn't work, had to use more pesticides. At the end of the day, the company in Indonesia for example pulled out and they were not held liable – who was left holding the fragments of the shattered dreams and lives – it was poor people, farmers and local communities – it makes me very angry. In Argentina a few years ago they were able to feed 8 times their population, today they can't, this was known as the beef country but the poor are now being fed with Soya. Scientists are now starting to worry about fungal infections associated with RR Soya and how the fungal infections can affect the crops, so there are more problems happening. Of course some people have benefited, but whom, it hasn't been local communities, small farmers, peasants or land peasants and there has been increasing conflicts between the large landowners owning these RR Soya plantations. In Paraguay earlier this year, peasant communities tried to stop the spraying of Roundup on the crop, it escalated and 2 people were killed. We don't hear much about this in the news here, but these are the realities that the people are facing and the groups we know in Argentina have told us of many people dying because of the use of pesticides and the overuse of herbicides. This clearly tells me that something is wrong with this model of agriculture that has such a devastating impact on people around the world, but in many developing countries we don't have this type of system and ok it may be productive on a single dimension of yield but it misses out on all those important issues on agriculture; about diversity, about using renewable resources about not using chemical inputs and when I ask is there an alternative to using GM crops, the answer is a resounding yes, there are alternatives because there are many countries

and millions of farmers in the developing world today that are practising sustainable agriculture, that are able to feed themselves and they don't need hi-tech fix like GM crops but they need is accessible technologies, that are simple and low cost and can readily improve yields and increase production. That's what gives so much about certified Organic production, which we are all quite familiar with here, by talking about what's known as Defecto Organic production, or agriocology which is practised by millions of farmers around the world and this is a very diverse and locally specific type of agriculture, which is based on the knowledge of farmers, knowing their local conditions and integrating natural and regenerative processes and biodiversity. I will quickly say that I was in Ethiopia last year and as we know they had terrible droughts and the famine in the 1980's, but there are success stories in the last decade, just with some simple techniques and recovering indigenous systems of agriculture, they have been able to do a lot more than you think. We visited some farms and it was incredible, in a small space high productivity. Many products are used; medicinal plants, spices, coffee, indigenous crops all in a small space, using varieties and traits that the farmers themselves selected. Also integrating the livestock for milk and beef, traction for ploughing, threshing the crops and this to me is such a complex system that many people are just trying to put the research into. The research that has been done already shows there is productivity, it can produce enough and unfortunately with all the attention on GM technologies, research funding is being skewed into a certain type of technology in agriculture and quite frankly I think it is irrelevant for many developing countries. For example, encep which is an indigenous crop in Ethiopia, (which looks like a banana plant, but not) it is a very drought resistant crop and is incredible because it can be harvested anytime between 2 and 15yrs and the farmer can stagger the time of harvesting according to when they need the food. This ensures availability of the food throughout the years and it can be processed; the fibres to make rope, leaves to make plates and building materials. It can also be stored underground in pits for months, even years and ensures food availability and of course sadly during the drought these farmers also suffered because they hadn't been at the time encouraged to plant cereals and they lost the knowledge and tradition, but thankfully this has been recovered now. In this book there are many examples from developing countries and there has been a big review by Professor Pretty of over 200 projects in 52 countries, where 9 million farmers have practised sustainable agriculture on 30 million hectares, Africa, Asia, Latin America and they are incredible success stories of how local food production has been increased, communities shifting from deficits, 6 months of food shortages, to producing an annual surplus of over 150kgs and this is just by adopting local, low cost simple organic techniques such as water conservation, using animal manure. So I think there is whole lot of knowledge there with farmers working with scientists and for me, we need to re-think agriculture and this has to go up the policy level and scale up these examples of how agriculture can be sustainable at a local level. Are there alternatives to GM crops? – YES is the answer, thank you very much.