Lord Taverne and Professor Chris Lamb

Thank you for that kind introduction and for inviting me to speak to you today.

The last time I spoke here was to launch the Runnymede Trust Commission’s report on ‘British Muslims and Islamophobia.’ Not long afterwards, I became President of the Rockefeller Foundation. We are situated on 5th Avenue and on September 11th 2001 my staff watched from our windows as The World Trade Center collapsed.

Many have asked whether that dreadful event has changed our grant making. In some respects it has, but in other important respects it has not. We are a Foundation devoted to enriching and sustaining the lives and livelihoods of poor and excluded people throughout the world. Poverty is rarely a direct cause of terrorism, but removing poverty and hunger is necessary if we are to achieve a just and secure world.

The Foundation is 90 years old this month. Since our earliest days we have worked to eliminate hunger and to reduce the burden of disease. And in the United States we have addressed the poverty of the inner cities, through programs on housing, employment, education and racial integration.

I have deliberately chosen the title of my remarks as Biotechnology and Hunger, since the conjunction offers a degree of distance. At the Foundation our goal is the reduction of hunger. We are not interested in biotechnology per se, only if it helps further the goal of reducing hunger, and in ways that are effective, affordable and safe. We are not part of the biotechnology industry. Indeed as an independent Foundation with our own 90-year-old endowment we are not beholden to anyone, whether in the corporate sector, government or civil society.

Nevertheless we have experience and strongly developed views, and despite the neutrality of the title, I intend to have at it. If we had been selecting a topic for debate I might state the issue I want to address with a question mark:
“Can biotechnology help to reduce hunger and hence help development?”

It is an important question. I am trained as an applied ecologist and have devoted my career to trying to help poor and excluded people. So I believe our discussion should focus on whether this scientific tool -- biotechnology -- can help the poorest of the poor. And because I suspect that is what a good many of us are really concerned with, it is the first question I want to engage.

But there is a second question that I also intend to speculate on, which is “what stands in the way of biotechnology helping development?” By this I mean, if the technology can be first shown to have the potential to help, what might prevent that from happening?

Finally, I hope to address a third question that I believe is of the greatest importance. That is, “who should be deciding whether biotechnology can help development?” To me, that is the crucial question and its answer holds many of the clues for what I think we need to do – and in particular what the role of philanthropy can be in this modern, globalized world.

But let me first address the basic question, “can biotechnology help reduce hunger and hence help development?”

The answer to this lies in the facts of our world’s predicament.

Let me give you a short report on where we are, and what biotechnology might accomplish, as well as what it will not.

There are currently about 800 million chronically malnourished human beings in the world. We don’t have very exact numbers, but we know that is about right. About 200 million are in Africa, a third of the population of the continent.

Most studies indicate that a great deal of the hardship is borne by women and children, most of them in Africa. 65% of African women of childbearing age are anemic, 40 million children are severely underweight for their age and 50 million are vitamin A deficient. One estimate puts the number of children who die every year of illness related to malnutrition at 6 million.

So far, programmatic and governmental solutions have come up far short of what is necessary to solve the problem.

The United Nations has issued declarations, held meetings, and released plans to cut hunger in half by the year 2015, but no experts I know believe the problem will be any smaller by that time. Most expect it will get worse. Maybe as many as 2 billion will be chronically undernourished in 2015.
The great agricultural advances of the 1950’s, 60’s and 70’s – what we call the Green Revolution – have not really helped Africa which is why in this speech I am referring to development in the African context only. I document the different outcomes for Africa and Asia in my book “A Doubly Green Revolution” but let me offer some summary facts.

While average agricultural production in Asia after the Green Revolution has skyrocketed to nearly 3 tonnes per hectare, Africa remains trapped or falling backward at a production level of about 1 tonne per hectare. As a frame of reference, that is probably about the productivity a British farmer enjoyed during the reign of the Roman Empire.

And the old Green Revolution has little to offer. Indeed, the increases in farming yields we saw then are slowing, they are now about half of what we saw at the peak of the Green Revolution.

There has been a debate over what I consider a tangential issue – which comes first hunger or poverty? This a bit like the argument over which came first: the chicken or the egg, except we know that in Africa poverty is essentially rural and the only way out of poverty is through development based on agricultural and other rural resources.

- Seventy percent of African employment is on small-scale farms.
- Forty percent of all African export earnings are from agriculture.
- One-third of African GNP is based on agriculture – and for most Africans there is really not a choice of employment. Either your farm succeeds or you are jobless.

The typical farmer in Africa is a woman with a family who has one hectare or less of low fertility land to harvest with erratic rainfall and no irrigation. Her farm faces numerous pests, diseases, and environmental stresses which would severely vex an EU farmer who enjoyed plenty of equipment and resources.

But of course she lacks any real capital and her income is too small to enable her to maintain a sustainable livelihood, or provide adequate food, education, or health care for her children.

Today, she can potentially harvest 2 tons from her hectare, given the low fertility of her soil and her lack of fertilizer. African farmers pay the highest fertilizer prices in the world. Prices in Western Kenya are $400/ton of urea vs. $90/ton in Europe. On average -- and many use none at all -- African farmers use only 10 kg/ha of fertilizer while European farmers use over 200 kg/ha.

Her staple crop, maize, is attacked by the parasitic weed Striga that sucks nutrients from roots, by boring insects, which weaken stems, and by streak virus.
Her cassava crop is devastated by cassava mealybugs and a new super-virulent strain of mosaic virus. Her banana seedlings are infected with weevils, nematodes and the fungal disease black Sigatoka. Her beans suffer from fungal diseases that shrivel pods and lower nitrogen fixation. And more often than not, she faces a drought during the growing season, reducing the yield of everything.

Even if she produced some surplus harvest for sale, she would face stiff competition from highly subsidized farmers in Europe and America.

There are a variety of solutions to her problems. At the Rockefeller Foundation we are helping to provide small scale input markets for seeds and fertilizers, we are supporting sustainable agriculture programs that improve soil fertility through intercropping and rotations, and we are funding conventional crop breeding programs to tackle some of her problems.

We now have cassava varieties that are showing resistance to the new virus, and are introducing through conventional breeding the new high quality protein varieties of maize.

But many of her problems are difficult to solve by conventional means, or are even intractable. Examples include: resistance to Striga, tolerance of drought, cowpeas resistant to pod borers, more nutritious maize, rice and cassava, and resistance to herbicides.

Sometimes, conventional breeding, simply takes too long. The high protein quality maize’s took 16 years to develop and they are only just getting into the hands of African farmers.

It is to solve these problems, in a timely and efficient manner that we need to turn to biotechnology. And there are already indicators of success.

Biotechnology, I need to remind you, is not just about GM crops. It spans the full range of applications of the extraordinary discoveries of modern cellular and molecular biology – the fruits of a revolution that was begun by the Foundation over 60 years ago.

Tissue culture, one of the key applications, has already produced crops that are in the hands of African farmers. In East Africa tissue cultured bananas, a staple food, are being produced free of pest and diseases and yielding over 50 tons per hectare in the hands of poor farmers. On the other side of the continent, in West Africa, the new rices, crosses produced by tissue culture between Asian and African species, are spreading rapidly. They are resistant to pests and weeds grow in relatively dry conditions and yield 3 tons per hectare or more with little or no fertilizer.
Most significant about both these new crops, is that they were largely developed with public money and hence have been made cheaply available to poor farmers. It shows what biotechnology can do if the circumstances are right.

And the same is and can be true of that other product of biotechnology - genetically engineered or GM crops.

For instance, China has had a lot of success with GM crops, and it clearly won’t stop. Some 5 million small farmers in China have been growing GM cotton for 6 years. They have higher yields, greater returns and, most important, they no longer have to rely on the backbreaking and hazardous spraying of their cotton crops. As a result pesticide poisoning is declining.

There have been similar successes in Africa, for example in the Makhathini Flats in South Africa where GM cotton has been grown for the past 4 years.

So when I ask myself the question again – “can biotechnology help reduce hunger and hence help development?” I see the answer as “Yes” -- if we can help increase farm productivity so there is a greater economic return from an African farmer’s labor, they will be better off. The toolkit of biotechnology – with its range of scientific tools from diagnostics through tissue culture and marker-aided selection to genetic engineering -- could help farmers’ succeed.

It could help farmers have more cushion in their lives, more food, more money, more ability to compete in the marketplace. It can literally change their story from a fight for survival to a chance to live and even prosper.

But this brief review introduces the question, if biotechnology can be helpful, what obstacles stand in its way?

My short answer to this is that:

- there are scientific barriers,
- there are barriers to market entry that particularly disfavor developing countries, and
- there is the obstacle of international politics.

This last challenge is a bit like a game of American volleyball among large institutional interests in which the debate over new farming technologies goes back and forth with each side responding for fear that the ball will drop on their side of the net and they will lose a point. But this is not a game – literally billions of lives are at stake -- and the idea that it is all about not losing any debating points effectively rules out the idea of a useful dialogue.

I will talk first about the obvious barriers to biotechnology in the scientific and market realms.
New sophisticated farming techniques are usually expensive to develop because they generally require large research infrastructure, as well as the ability and resources to navigate through extensive regulatory structures.

The field is dominated by merged global entities from the seed industry and the chemical inputs industry that have combined into 5 very large multi-national corporations.

For these corporations, there is no profit to investing in expensive research on new products that can only be purchased by subsistence African farmers with little money.

So quite logically, these companies are not focused on improving the basic crops of the developing world such as millet, sorghum, cowpeas, yams or cassava.

The absence of a profit motive results, unfortunately, in more than just benign neglect for the field of developing nation agricultural research. Because of the rise of a sophisticated global intellectual property system that covers many of the building block technologies in this area – publicly minded researchers often have little access to new ideas and technologies in their field or are legally blocked from using what they do know.

The Rockefeller Foundation is trying to do something about this problem, and I will describe that effort shortly.

But my point is the modern marketplace is not functioning in a way likely to produce useful biotechnological innovation for poor people. Indeed, left to its own devices, the gap is likely to grow – with wealthy nations' farmers using ever more sophisticated techniques and poor farmers left with the same tools they have used for centuries or even millennia.

So that is the second obstacle I would identify that limits the usefulness of biotechnology for development -- our free market structure is skewed to serve the wealthiest producers. Further, intellectual property rules discourage the sharing of ideas and innovations that may be helpful to those working on behalf of farmers in developing nations.

The third, and more famous obstacle to biotechnology is the debate over the safety and environmental impacts of this science. The issue has become a political football, or as I put it earlier, political volleyball, in the development debate.

There are real and serious issues regarding the appropriate uses of biotechnology. In the case of genetically modified organisms, for example, there are legitimate concerns about allergenicity, toxicity and antibiotic resistance, and about gene flow and the threats to biodiversity.
But these are problems that should be dealt with through reason and analysis – yet that is often not what has happened.

The bare facts are that:

- antibiotic resistance is not an inherent part of biotechnology and we can eliminate the need for these genes
- allergenicity and toxicity are issues with all crop varieties and biotechnology could actually reduce such hazards
- the risk of gene flow to other crops and wild plants is a real one (as is also true of conventional and organic crops), but with care there need be no significant unwanted effects
- more generally, biotechnology has the potential to increase food safety and actually lessen environmental problems by allowing reduced levels of pesticides and
- at the same time it can make food more nutritious

But these potentials are not the focus of the current attention. No one is asking what does it take to make biotechnology work in this way.

Instead, we have forums that tend to generate more heat than light.

Instead of a discussion with many voices participating there is often an argument dominated by the extremes. In its simplest form, one side supports biotechnology, declares it safe, ridicules those who oppose it or support more regulation, and complain opponents are holding back progress. The other side responds by attacking biotechnology, employing imaginative horror stories about what will happen, and ridiculing biotechnology proponents as destroyers of the natural world.

And this unproductive game has now been exported to Africa.

These arguments are excellent fodder for the news media, and provide a healthy living for public relations specialists on both sides, but they don’t do much for very poor African farmers.

I want to say a bit here optimistically about how I think we in England, in mainland Europe and America can have a more useful exchange with each other and suggest some principles that might do us all well. I will just offer four quick suggestions without much elaboration.

1. First of course, we need to put down the boxing gloves, and enter a discussion on realizing the potential of biotechnology in a safe and effective way.
2. Second, we should acknowledge the complexity of various positions, which often takes more time and effort than adopting a simplistic outlook.

3. Third, when we hear calls for a unilateral, single party approach, instead let us explore the possibility of partnerships, and

4. Finally when we are faced with real ideological differences we should recognize them, but then move on to test our beliefs with empirical data and listen to what the other side says.

These are not revolutionary, but they may help us move from stultifying argument to useful discussion, and perhaps even to a shared plan.

All of this brings me to the ultimate question I wanted to discuss: who should decide whether biotechnology helps development?

We have established that there is a terrible problem of hunger in the world that is not likely to diminish on its own, and that improved agricultural techniques could be helpful.

I have also made the case that the current market and scientific structures are hamstrung, and in addition there is a highly polarizing debate in Europe and America over the safety of biotechnology.

This leads naturally to the question of how will we resolve this debate? Who will decide whether biotechnology can be helpful to developing nations in Africa?

And the answer, I believe, must be that Africans will decide.

That is a simple answer, and it raises other questions. But I think it is a significant conclusion.

Weighing the risks and benefits of these new technologies is not our job – it must be the task of the people who will use the techniques, suffer the risks and enjoy the benefits from them, to do the calculations for themselves.

I believe this for moral reasons and practical ones. People, and their elected representatives, should be free to make decisions for their own lives and community. But they have to do this with all the relevant information at their disposal, and without pressure from outside vested interests whether they be governmental, corporate or those of activist groups.

Now there are clear problems with my answer. Not least because, once African societies have decided to investigate the potential further they lack the means, in particular they lack access to the intellectual property needed to make
appropriate biotechnology. And African governments and regulators lack resources needed to make regulatory decisions and enforce them.

Those are important challenges, but they are hurdles we can overcome once we decide the answer is to be determined for each nation or region by themselves.

Just as Americans have determined they will use this science – already more than 75 million acres in the States are planted with genetically modified crops -- and some French have inveighed against their nation’s acceptance of GM, so should Africans be allowed to make their own choice.

At Rockefeller, we’ve devoted a good bit of our work to the purpose of helping Africans be in a better position to make their own choices. I’ll give you one recent example and I will be brief.

This year, we will help launch an African-led, African-based organization designed to resolve many of the barriers that have prevented smallholder farmers in Africa from gaining access to agricultural technologies.

We have helped bring many of the large Western companies I talked about to the table and helped obtain commitments that they will make their research available to African and public scientists who can study it for use in alleviating food insecurity in sub-Sahara. The products will be available either free of charge or at rates poor farmers can afford.

We have also worked to help strengthen African regulatory bodies and train thousands of African scientists.

Our goal here is to help poor and excluded people; our means is to give them and their representatives the tools to decide what is helpful.

I believe our purpose is all the more important because of the nature of the emerging global world. It is a world where the poor and excluded need a hand up to the first rung of the economic ladder more than ever – but once there, may be in a better position to take advantage of real opportunity.

Global free markets hold out the chance for prosperity for many poor people, but the deck is often stacked against them. Large multi-lateral institutions like the UN hold out the hope of improved bargaining power, but cannot make decisions for specific countries or regions – especially when those countries currently lack the resources to evaluate scientific data.

So I urge us to take a renewed interest in giving Africans the tools to make their own choices. In the case of biotechnology, there is clearly both great opportunity and responsibility.
But throughout the entire development discussion I think we would do well to chart a course based on the values of partnership, rejection of ideological extremes in favor of results, and approaches that give to Africans the right and opportunity and responsibility to make their own choices.

Near the end of his life, Albert Einstein reflected not on his native field of physics but on the nature of progress. He concluded, “Everything that is really great and inspiring is created by the individual who can labor in freedom.”

We have the chance to help billions more people enjoy the greatness of laboring in freedom – freedom from hunger and from the constraints of our decisions about what is best for them. I hope we have the courage to do the right thing.

Thank you.