Changing Hearts & Minds: Talking to the Skeptical Indian Public about Gene-Edited Food | CIRCLE | Text Transcript

This is a text transcript for the recorded webinar “Changing Hearts & Minds: Talking to the Skeptical Indian Public about GMOs and Gene-Edited Food” presented by the Canada India Research Centre for Learning and Engagement (CIRCLE) at the University of Guelph. The guest speaker was Dr. Channa Prakash. The webinar was recorded on September 22, 2021.

Transcript:

Jay Subramanian:

Okay let’s get started. First of all, I welcome you to all to the webinar organized by the CIRCLE, my name is Jay Subramanian. I’m a faculty with the department of plant agriculture at the University of Guelph.

A few words about CIRCLE, CIRCLE was established in February of 2020 at the University of Guelph. The full name for CIRCLE is Canada India Research Center for Learning and Engagement. And it aims to be an interdisciplinary nucleus in Canada for cutting edge research on India-Canada related work, particularly related to Indian diaspora.

Today’s speaker Dr. C. S. Prakash, I mean he has an extensive resume and if I start reading all his accomplishments, probably that will be longer than the webinar, so let me keep it short. Dr. Prakash is currently the Dean of the College of Arts and Sciences at the Tuskegee University of Alabama.

And has been a global leader and has been sought by very many international forums including the United Nations World Food Prize and all others for expressing the views on GMOs and the advantages of GMO over others.

And among many other awards he has received one of the recent ones that is well that kind of covers all these things is, the cast award communication for agricultural science and technology award. This is one of the major awards that he received I believe in 2015, Right? 2015.

Channa Prakash:

Yeah.

Jay Subramanian:

And he is one of the very few recipients to get that one and he has been recognized as one of the top 30 social influences in biopharma and biotech by several journals.

Without going on and on about Dr. Prakash which could be pretty lengthy, just a few words about his research.

I came to know him somewhere in the 1990s as a graduate student when he came and gave an exemplary talk at the society for invitro biology, and since then I have been following his growth. He is kind of one of my role models to emulate with that few words, I will stop, and I will turn it over to Dr. Prakash and looking forward to an exciting webinar session.

For those of the question and answer, please put your questions in the chat since we may not have a lot of time to talk one-on-one, please put your question in the chat. It will be answered on the first come first serve basis. Thank you and enjoy the webinar. Prakash, all over to you.

Channa Prakash:

Very good, thank you very much Jay, I'm really delighted to be here. It is a big honor for me to be speaking for the CIRCLE, in organizations that I've come to learn and have considerable appreciation for what work you do, and so I want to think you Jay and Dr. Sharada Srinivasan, and the University of Guelph for giving me these opportunities. I was there a few years ago in person, at your beautiful campus and I wish next time I'll have that opportunity to visit again.

So I'll just go ahead and start sharing my screen with my slide. And that way I will, I'll just go ahead and begin my lecture with the slide, but what I do want to do as you could look from my title – I want to talk about India. Indian agriculture and specifically on the role of some of the new genetic technologies. What role they could play in improving the food and agriculture situation in India.

And what are some of the potential opportunities that we have over there, and what are some of the challenges why we are not able to integrate these innovative technologies into the cutting-edge agricultural research in the country. And then share with you, some of my thoughts on what we can do about it as scientists both diaspora, and also the scientific community within India.

Many of you who are Indians here in my audience don't need much introduction of India, but for a lot of us, India means many, many different things, but India has a great history and it has a great scientific history and not many people recognize that India was forefront in science for literally thousands of years.

And our ancient Indians contributed enormously to the global advancement of science and especially mathematics because Indians practically invented mathematics. The idea of zero, the decimal system, and how we put the numbers. The contrast is the roman numerals and what is called as Arabic numerals really came from India, Arabs simply took that idea from India and then introduced it into Europe.

Even the heliocentric theory that the sun is the centre of the solar system around which all the planets, including planet Earth moves, was there much before Copernicus came up with the theory.

In India and so was the theory of atoms, the plastic, and cataract surgery were invented in India along with, of course you all know the yoga meditation and ayurvedic medicine. As India moved forward from that, and even during the 16th and 17th century under the rule of Moguls, India prospered economically.

India was globally it was, the GDP of India along with China, was about 50 per cent of the total GDP was just between India and China. And India had about 25 per cent of the global GDP and then say after that, it went into a kind of decline.

Especially under the colonial rule and highlighted the great famines that we used to have in the 18th and 19th century and most recently the Bengal famine in 1943. So, while India exported a lot of its agricultural produce earlier, and was a global power in agriculture, India, I think fell into its doldrums for a variety of reasons.

Once India got independence, it still was in very poor shape, especially in food production. Indian, as a child growing up in the 60s India, one of my most profound memories was our prime minister at the time, Lal Bahadur Shastri, asking us to fast on Mondays just so that we could conserve the food. Because, simply, there wasn't enough food and this was almost all Indians of my age, and even younger like Jay would remember that.

On screen content:

"India 1960s Green Revolution. Progress in Farming is Levelling Off. India made steady gains in farming during and after the Green Revolution – a global development effort led by scientists and American foundations in the '60s and '70s. But in recent years, that progress has been slowing, creating domestic shortages and exacerbating the global food crisis." Two graphs show the rapid increase of crop yields in India between the '60s to '07 – periodic peaks and lulls for both the rice and wheat crops.

Channa Prakash:

So, if you can see in this, the slide over here in the 1960s the wheat production, India produced about 6 million tons of wheat. And it probably produced about 25 million tons of rice at the time, because of the drought we were, the production was so low and American's generosity literally helped keep Indians alive, there were dozens and dozens of ships brining food under the PL 480 program from the United States to India.

That helped keep many of the Indians alive and it was rather embarrassing for a young prime minister, Indira Gandhi, at the time. So, when an opportunity came around in the form of introducing new varieties of crops, brought by Dr. Norman Borlaug, she with her agriculture minister at the time, C Subramanyam, a remarkable leader.

Together they put in place – with the help of a very young scientist at the time, Dr. Swaminathan – the Green Revolution. Which essentially transformed India's agriculture where they introduced not only the high yielding varieties of seeds or wheat to begin, followed by rice, but also helped open India through the input the forming inputs the forming missionary and the credit through the nationalization of the banks.

And also, the starting of agricultural universities. Along the model the land grant system here in the United States and with a very robust agricultural extension system, so much so that just in the matter of 20 or 30 years, you can see how the crop production continued to increase in India.

It was also accompanied a little bit by an expansion of the area under agriculture, but also the productivity, the amount of crops that could be produced per acre jumped from one ton in wheat to almost three tons in wheat and similar increases in the rise. As we look forward, in terms of the Green Revolution, and these are true, I was very fortunate to have known both the architects of Green Revolution in India, Dr. Norman Borlaug, who visited me at Tuskegee University in 2004.

And Dr. Professor Swaminthan, who is still around, he's 94 years old and he graduated from the same agriculture college as Jay, in Coimbatore, and is still in a great donor of Indian agriculture, still guiding Indian agriculture. So today when we look at India, it is literally a superpower in agriculture, after the United States and China. India is the third largest producer of food grains in the world. 20 million tons in the 60s, today India produces 120 million tons of rice.

India produces about 110 million tons of wheat today. And this is remarkable considering India was only producing over 6 million tons of wheat in 1960. And this has led to a neglect of food grains in India, and so much so, India exports about 4 billion dollars' worth of rice, but this is again – one needs to look at this, but look at the context.

While we have increased the production of rice and tremendously this has been not the same in many other cereals, especially course cereals like what we call as pearl millet, and finger millet, and sorghum. These are some of the very important drought tolerant crops that feed India and they have not increase, the maize again has not increased very much. Many of the other crops, especially those grain legumes that help provide protein to the large Indian masses because we tend to be primarily vegetarian.

We derive our protein from plant sources, and they have not increased, and again there's so much so is the similar story with vegetables and fruits that Dr. Jay is an authority on might tell more about.

So, the point I'm trying to make is while we have had the Indian Green Revolution, in many ways was lopsided, it was primarily dominated by two crops. In certain regions of India, such as Punjab and perhaps many in Tamil Nadu, but many other parts of India did not have the kind of agricultural growth as in other areas, and so much so that you saw the farmers strike a few

months ago. In India for a different reason, nevertheless, moving forward, India needs to look at its agriculture very carefully.

And see how we can continue to improve Indian agriculture considering many of the challenges that face Indian agriculture today. So that this is just to show that billions of dollars' worth of agricultural produce that India exports, it's close to about 40 billion dollars today.

Much of that is marine products, but also rice and spices and cotton, again thanks to biotechnology, India which used to be a net importer of cotton now exports raw cotton to other countries. There's one guar gum that many of you may not realize what it is, this comes to Canada because it goes to your Canadian tar or oil tar sands in Alberta.

This is used in the purification of the petroleum in the fracking, and this comes from a vegetable that is grown in India. So, India is moving forward in many ways and thanks to the science and technology, but it needs to do more because our agricultural, while it has had impressive growth, but the agriculture constitutes only 16 per cent of India's total GDP. Yet, it employs 60 per cent of all people in India, and so most of them are underemployed.

India population is going to overtake China's 1.5 billion people, and India needs to produce a lot more food in a more predictable manner and with less destruction of the natural resources because Green Revolution, while it helped increase food production, has also had a lot of impact on overuse or indiscriminate use of agrichemicals such as fertilizers and pesticides in certain parts of India.

And so, the current challenges for Indian agriculture is very small holdings, and average size of the farm is about 2 acres. Many of the farmers are very poor and the productivity of our crops, despite the impressive gains that we have seen in rice and wheat, still many of the crops are very poor.

Then we are still plagued, you know, we are fourth or fifth largest economy in the world. Yet, when you go out of the big cities such as Bombay or Bangalore or Chennai, you will see very poor infrastructure in terms of the roads. And especially as it affects agriculture, the storage, the coal chain, and then the lack of access to the credit and the market.

Then, many of the other factors like climate change, that we already see in every part of the world – including Canada – that is going to even make it further the other problems such as diseases and pests, and wheats even worse, a lack of value addition, only four or five per cent of Indian food is processed.

Then there's a lot of state interference into Indian agriculture center as price control and transport control. The transport of agricultural goods. Then another big problem is most Indian families who are farming now, their children just don't want to go into farming anymore.

These are all some of the issues and having that background, I just want to see how, you know, the technological solutions can play a role. Obviously, the problems here are very complex and

what I'm talking about is the genetic technologies would not be able to address many of these. Except in those instances, which affect productivity such as climate change or diseases, pests, and weeds. And then the poor productivity these are the areas from which improved varieties of crops aided by genomics.

Other new technologies can help here, and I just want to talk about that a little bit, but before going forward, I just want to remind our audience that when we talk of modifying food. Genetically modified food must understand that if you don't have an agricultural background, you may not appreciate that almost all our food; every food that we grow today has been modified over thousands of years by a slow selection of picking up the good seed.

Then carrying it to the next generation and through a slow selection, this is how the corn in the Americas evolved and this is how the banana evolved in Asia. You'll see this example in every crop, but in the past hundred years, we have used more scientific way to improve those crop plants like breeding mutagenesis like radiation and chemicals.

Also, more recently, biotechnology such as transgenics, and that is the GMOs where you take a gene from one organism and put it into another organism. One of the techniques of that is RNA interference, but more recently, we have a new technique that has a wall called gene editing.

I'll talk a little bit about that too, so the GM crops the genetically modified crops for which Canada is one of the pioneers along with the United States in developing and adoption of these crops. Also, to some extent, in India too. Now we will grow about 200 million hectares of these biotech crops are grown in more than 26 countries around the world – by about 17, 18 million farmers, so this has been a spectacular success.

This technology, wherever it has been adopted. If you go to Brazil, if you go to Argentina the whole economies have been transformed by this technology and nevertheless the adoption of this technology has been lopsided if you go, for instance in Europe, are very few countries grow these GM crops.

In Africa, they are slowly beginning to grow these GM crops, starting in South Africa and then later Kenya, Nigeria, Egypt. They have just started to plant some of these crops in a very small way and India adopted this crop in one crop with this technology in one crop important but has not approved any other crop.

A GM crop to be grown by its farmers and nevertheless, wherever the GM crops have been adopted, it has provided tremendous benefits in improving the crop productivity in conserving the biodiversity by minimizing the expansion of area and agriculture, decreased use of insecticides, and reduce carbon emissions.

Because of the less use of equipment on the farm and so for many of you, who may not know what a GMO looks like this is one, but extreme example of a photograph. My friend Wayne Parrott from University of Georgia took this picture in Honduras of one very poor farmer who's grown corn.

If he did not spray pesticide in a normal unmodified corn that is what it would look like because of the attack of the insects. You can see how a biotech corn would be completely free of the disease, it has a single protein that is produced from a gene from bacteria that keeps it very healthy and nevertheless very safe for animals and humans who eat this corn and similar example of soybean, with similar gene in the laboratory.

You can see all the insects migrate to the non-GM soybean where the GM soybean is left very healthy and this is again a cotton from Australia, looks day and night I don't even need to label which one is GM cotton here and which one is not. So, when this was introduced into India in 2002, it proved very popular, so much so, about 95 or 98 of the Indian farmers grow this cotton and since its introduction, Indian cotton productivity has more than doubled.

And the pesticide use has come down dramatically in literally two or three million Indian farmers who grow but nevertheless, when India tried to introduce a similar technology in brinjal or eggplant in India which is a very, very popular vegetable there was a tremendous opposition to that. It was primarily orchestrated opposition, but nevertheless, the minister at the time, Jairam Ramesh, the environment minister put a moratorium on the commercialization of this crop and so this technology was adopted by India's neighbour, Bangladesh.

It has proved very popular since his introduction six or seven years ago so much as, hundreds of thousands of Bangladeshi farmers benefit from this technology, where they don't have to use any pesticide, and yet got a clean crop. Slowly this technology is spreading into other countries such as Africa, like you see the poppy here and they're also experimenting with potato.

Very important crop in Africa and you can see in Uganda, a friend of mine sent me this picture, Dr. Kiggundu in the experimental plots in Uganda. Every potato plant that has survived here is a genetically engineered potato and all the gene that it has is one single gene from another wild potato that you can see from Dr. Jonathan Jones of John Innes institute holding here. Similar research is going on in plantain and bananas, again is very important source of calories in Africa.

Banana is very difficult to breed as you can imagine because it has no seeds. And yet, by using genetic engineering, we can easily improve banana very quickly. Papaya, a very important crop that was grown in Hawaii was completely eliminated by a nasty virus and it was a resuscitated. Rescued by a genetically engineered papaya that means 100 papayas grown in Hawaii now.

GM papaya, and scientists are also trying to bring back chestnut, a beautiful magnificent, majestic tree that was there all around the United States and Eastern Canada. And was destroyed by a chestnut blight, now there is, through engineering scientists in Syracuse, are trying to bring that back.

Just to show an example of how genetic engineering can help, another example is to introduce vitamin A into rice, but also other crops such as maize and soybean. Vitamin A deficiency is very nasty, and it can help, but also when you consider 50 of all our fruits and vegetables in India goes bad because of lack of storage and lack of processing and refrigeration.

Trying to delay the ripening of tomato would be of value of most of the vegetables and again by silencing the ripening gene, we can do that. Also, technology to reduce browning in potatoes and apples. These are already released in the United States and Canada, and it's proved very popular. Growing pharmaceuticals and Canada again is a leader in now producing coronavirus vaccine.

In Quebec, that a company called Medicago is doing that and a similar research that was done to produce antibodies against your Ebola, help bringing down this disease. So, there's quite a lot of applications of genetic technologies including developing beautiful rose or beautiful looking pineapple; but the biggest problem when it comes to GMOs is really not the technology or what it can do, but it's acceptance, it's kind of like Rodney Dangerfield, it has a very poor image in the public, amongst the policymakers, and the media.

That is why it's very important for us scientists to help to clear many of the myths and misinformation against GM food particularly when it comes to its safety.

Then help them understand that it is as safe as conventional food and it's very highly regulated and we have not had any problems with the use of this food. Nevertheless, there's one technology that has just arrived on the scene that whose inventors got the Nobel Prize last year called gene editing that is creating a lot of amazing wonders in biomedicine like curing sickle cell anemia, even helping the blind mice see for the first time.

Many things like that, even talk of curing cancer through genome editing and we also use this technology in the plants. This is simply unlike GMOs where we introduce a foreign gene, her we do not introduce a foreign gene into it, but kind of like how you do the editing of your text messages on your cell phone through auto editing.

We can just edit some of the nucleotides that are causing bad diseases and to improve that without using sophisticated gene transfer technologies that are involved in GMOs. This particular one, this technology, called CRISPR technology, was the one that got the Nobel Prize is proving itself very popular also in the use in agriculture – both crops and livestock just to give an example of its application.

For instance, in tomato, just by altering a few nucleotides, they were able to make these tomatoes that were quite susceptible to your disease called powdery mildew into a resistant tomato. And the similar research also done in rice, where they were able to create resistance for a nasty disease called bacterial blight that literally costs billions of dollars' worth in all the rice growth regions in Asia.

They were able to develop resistance and in just a matter of few months, it's a very precise technology, very rapid and it also can be used in improving productivity in many applications, it's one of the hottest technologies right now with literally hundreds of papers being published on a daily basis.

The tomato that I showed you of fruit ripening with GMOs, we can also do that by slowing down some of the fruit lightening genes through gene editing. This is another example where they were able to slow down the cell wall degradation enzyme activity in tomato so that it could stay fresh for a long time.

Again, another example of tomato with high lycopene content that is known to help men in preventing prostate cancer and also you can change the architecture when you recognize that the Green Revolution happened simply because of alteration of just two genes of related to dwarf stature in both.

Wheat and rice, the similar statue, the architectural changes can easily be made using gene editing and gene again, a tomato example that was shown before. And again, talking about global warming with its impending problems of drought or even the flooding or heat.

Gene editing technologies have tremendous potential to help improve crops to make them more hardier and just make them more climate ready in the face of this. Many other traits that would be altered make our rice more diabetes friendly, with them made with a low glycemic index.

This is something many of us would love, would say an improved beer. With the gene editing that was done in Australia and Japan just approved these tomatoes just last week. These are called high GABA tomatoes, and apparently, they are quite helpful in reducing your blood pressure.

So these are all the kind of fancy products that are consumer friendly, with specific applications for consumer uses are coming along even the golden rice that we saw earlier; it could be it has been done not with the transfer of genes, from maize as you saw earlier, but with simply turning on the existing vitamin A, pro-vitamin A genes within the rice, the gene is present in the rice endosperm but it's not turned on.

And by genetic editing we can turn it on, not just in rice, but also in the banana that you see here and so the many such gene altered gene edited plants are now being either grown in the United States on experimental basis.

Because they are not regulated as GMOs the one needs to simply check with USDA to see if they need to provide regulatory information, or with the Canadian regulators, and so they have a very small regulatory footprint and so much so that many small companies are producing lots and lots of products.

And the list really goes on, that you can see with the improved taste and better improved marketing, barley canola with low phytate and tomato that helps in mechanized harvesting. Better tasting mustard, high yielding potato and so the list is literally if you took around the hundreds and hundreds of traits being modified and through a variety of very fundamental intriguing mechanism at the molecular level.

What this technology can do for which, I just don't have the time to explain, but nevertheless, the gene editing is going to be increasingly popular because it's fast it doesn't cost as much especially because there are low regulatory burdens.

And then the opportunities are endless as to what it can do with it and so when you apply these technologies in Indian agriculture it can help improve crop productivity, improve develop crops with climate resilience reduce pesticide and fertilizer use. Extend the surface of fruits improve the food quality, eliminate a lot of the toxins that are present in our food and overall, I believe it will help in increasing the farm productivity.

And today, there's a big day because the United Nations talking about the food there's a Food Summit going on all the global world leaders from 122 countries are talking about it. I'm also involved I one of the committees that way, and as you can see, I hope they will see that we have these tools and these tools are not being used not because they are not safe, that's not safe, but just because of the perception on that.

So, this is the well those countries that are green here have widely accepted this technology. Many countries including red and yellow are sitting on the fence when it comes to this technology and so we do have a moral obligation to help advance understanding of this technology.

The government, like China has already come very far forward and spent more than 100 billion dollars in support for gene technologies, and we need to streamline the regulatory system. Academic scientists like Jay and myself will need to continuously speak up and Indian seed industry, you know, which has really benefited billions and billions of dollars and been important and really hasn't done any much basic research needs to chip in.

And to research on areas such as gene editing and a lot of stakeholders, we need to engage them, work with them to see help them understand the technology and its benefits and its safety and used tools such as social media to bring about change in the understanding.

And finally, I want to close my talk by saying, that you know, historically if you see there are many technologies have always had a delayed acceptance. Pasteurization it took like 100 years before it was accepted by the public, I look around canning preservation, even microwaves, and use of irradiation in food safety, all of them.

And so, the apprehension with GMOs is not very surprising, but what is important is that we must help the society understand that these technologies can provide solutions to some of the problems facing agriculture in countries such as India.

We need to be very open-minded in evaluating that and we should not just dismiss them based on some emotion or what some activists somewhere such as Dr. Vandana Shiva who has been very opposed to that, says about it, but look at it on a case-by-case basis and make that individual decisions based on science and based on reason and based on data. Thank you very much Jay.

Jay Subramanian:

Thank you Prakash. Questions can be posted on the chat, I think, we have a relatively small audience. I have one question from Bharat, which is something that even I had, what is the importance of science communication and journalism, especially in the biotech field in India?

I'm sure you will agree with that, that the science communication is generally poor. Not just in India, but in many parts of the world, but particularly in India. What are your thoughts?

Channa Prakash:

Exactly, I think it is even more important in India because there is a lot of pseudoscience in India that you know, even when I go back, I started working in Indian Institute of Science, some of the most premier institutes in the world.

Globally ranked with a Nobel laureate Dr. CV Raman used to be the director of that institute and even in such an intellectual place, where you find so many members of National Academy of Science and Fellow Royal Society. There is a certain, there is easy Indians tend to indulge in pseudoscience and just harking back to our past and bringing Mahabharata Ramayana into our conversation.

And so, and currently, and again without the current head Modi and the RSS being very dominant in India, there is a resurgence of the past pride which is good because I started my slide with a great past that we have in science in India, but what is important is to make sure that we try to separate those of those myths and mythology from science.

That is where science communication beyond science communication it is the rational thinking amongst Indians that is very important because even during the COVID pandemic, I'm sure Jay, you used to get WhatsApp messages and all kinds of treatments like COVID right?

You smell, you know, you just have a steam inhalation, or you put some lemon in your nose or whatever you see, so there is quite a lot of such things that happen all over the world.

And that is where having science communication and trusted voices of science coming along like Dr. Schwarz in Canada, for instance who has been at the forefront in fighting chemophobia is going to be very important, so I cannot, you know, emphasize that enough, in terms of science communication.

Jay Subramanian:

On the same terms who you should, who you think that should take the lead on science communication is it on the scientists or it should be on the journalists to take it up?

Channa Prakash:

I think–

Jay Subramanian:

Because you have very few scientists like you, who can go and talk, or who is invited to talk in several higher forums, but who should be bearing the change for this one?

Channa Prakash:

Right, I think because the knowledge of this you know, this is a technical issue when you're talking about the safety of coronavirus vaccines, COVID vaccines, only the scientists can understand why, where the safety is those who have done clinical studies.

Are those who and those who have helped developed. And so the first, the initially the communication should come from the scientists, but the journalists have an even greater role in transmitting that communication because they are the ones who can take it to the public.

And we have very few, as you said, there are very few scientists of this stature of, you know, that we see on the and the media. That are in that even when you ask a layperson, can you think of any scientists?

Very few names come to their mind, but they can, but then there are many others there are trusted people in the public arena who could talk about these things.

I remember for instance, in the United States there was a big controversy about apples that was 30 years ago, there was a lot of controversy.

There was one news media by 60 minutes that said this is carcinogenic, there's spray this, you know, this is a plant physiologist and you know and as in fruit scientists what alar was used in ripening of apple, right?

Jay Subramanian:

Yeah.

Channa Prakash:

It is to promote ripening of the apple. [There] was absolutely no evidence that it was posed any harm to people and yet based on some hearsay, and the 60 Minutes put it up and suddenly people stopped eating apples.

For the fear and the C. Everett Koop, who was the surgeon general at the time, then came on a series of television interviews and said, look that's all nonsense, there's no problem with alar and it is safe.

And the controversy went away because they trusted this person, although he was not a client scientist, he was not an apple researcher, but nevertheless, hearing from somebody whom they trust was very critical in getting the controversy to ending that controversy. So, we need such spokespersons.

Jay Subramanian:

Yeah exactly, there's another question here, a very key issue which is kind of stopping or slowing down all the progress in India, is who wants and controls the technologies?

Channa Prakash:

Right.

Jay Subramanian:

Is food sovereignty under threat because of this monopoly this is perceived?

Channa Prakash:

Right, I know, that's an important topic and I'm familiar with that. That has been, you know, this has been advocated as one of the reasons why we should not be embracing this technology because country companies like Monsanto which doesn't exist anymore, but it has now been bought over by Bayer. They control the technology and so if we just get into, you know, if we just accept this technology, then we would become subservient to them.

They will control the country by controlling the food, you know, look at 30 years what has happened, you know, Monsanto was dominant, and it still is through Bayer. And they came to India for BT cotton in 2002 and what's happened? You know, what happened to the cotton?

Cotton there used to be handful of cotton varieties that were being produced and today if you go to India and you can have something like 250 varieties of cotton with BT genes that are available. And again, the technology providers when they provide out of 750 rupees for one packet of seed. The amount of money that goes to Monsanto which provided the technology is really six rupees.

Okay, and it's very minor and then it's only for 18 years and so this, all of this, thing about food sovereign put has been, you know, has been exaggerated and blown up beyond proportion well there is an element of some ownership of that, but as long as we have good laws and for monopoly and manage that I'm not saying these companies are good intentions or, you know, they're all here to make profit just like Facebook.

Or like any company, Apple, any of them that we need to control and regulate them, at the same time it doesn't mean that we do not benefit from the technology that Apple or Facebook provides by fearing on what they can do. We just need to be reasonably informed as to what are the limitations when we bring in those technologies and how we can manage that.

Jay Subramanian:

Okay, another question in fact it is a series of questions, but all centering around the same point, more or less. Why there is so much opposition to GMO in India? It is legitimate, or is it just speculation, or is it fueled by poor communication and where is it coming from, and why is it still lingering in spite of all these technological advances?

Channa Prakash:

Right, if you ask the farmers who are growing these, they're not worried about it because they know they live with it, if you're going to have a very good friend Mr. Ravi Chandran, a farmer, about a hundred miles from Coimbatore at 30 acres of cotton since last 20 years, he has planted cotton.

And you ask Ravi, are you worries about it? He said absolutely not, and you're asking why are you growing this monstrous Frankenstein cotton? He says that has made my life much better by growing this cotton that he's able to get, you know, much more income.

He doesn't have to spray these deadly pesticides anymore, on the farm and also the cotton seed oil, remember, it's used, it's a food, so cotton is not just a crop – was fiber crop – but it is one of the largest cooking oils in the world where they remove the chemical, the cottonseed, all within that and then it is a very healthy oil.

And so, it's used all over India without their knowledge and yet the opposition to GM foods comes from a handful of mischief mongers who simply, you know, and you know many universities including Guelph invite, many of them, these people from India give them 25,000 speaking fees and they insist on flying first class.

And they come and spread and talk nonsense. Saying that we Indians need to keep, be kept backwards, we need to be, you know, use only growing our crops with cow manure. And we don't need any new innovative technologies, which is not right, which is not correct.

Any countries like India and China need innovative technologies more than Canada and the United States because we have the, you know, larger population and a very small amount of land and so much other problems that I've described.

And that is what is really fuelling in India, it is not because of factual evidence that there's any problem with these crops, it's also combined with fear of foreigners and as I remember in Bangalore, when the first Kentucky Fried Chicken was opened, a group of thugs came and put stone to that.

And now, you know, if you go to India, it's like you're in some part of United States in terms of choice of the food that you can get. So again, many of those concerns that were there initially against outside control have all vanished.

Jay Subramanian:

Okay, other question is also very interesting in the sense that, you know, European countries are equally advanced as America or Australia. Why among all those so-called developed countries, why is there so much resistance in European countries not encouraging the GM crops as much as America or Australia or China?

Channa Prakash:

Right, that's an enigma and it's a very good question. There is a variety of reasons for that, and it really is because of European Union. European Union kind of made inwardly of the 27 countries that came together, made single policies for the whole Europe and it kind of stopped the divergence of opinion on that and just look at England.

Now three years ago, it got out of the European Union and today England is moving forward, it is testing GM crops now for the first time and it has publicly said that they are going to eliminate many of the regulations that are there for GM crops, for gene edited crops, and so England is moving forward, but Europe is not technophobic, remember.

This modern vaccine was developed in here, in the North America, but the counterpart, the Pfizer was developed in Germany. And biotechnology is thriving in all over Europe and biotechnology products are in those instances which matters to Europe like cheese, you know, which is so central to the European culture.

You know that ninety percent of all the cheese made in Europe uses genetically modified enzymes? Chymosins, and then 99 of all the insulin consumed in Europe comes from genetically engineered organisms.

The reason why they're not promoting GM crop is particularly because of politics. European Union, half of European Union's budget goes in paying its farmers not to grow crops, you know, because there's just a lot of food production. The farmers are worried that if GM crops come, their subsidy would end and there's also when this started in the 1990s, GM crops got a bad name because of the way Monsanto handled it.

There was the Madcow disease coming along over there which, you know, which was associated with GM crops for some reason or other and so anti-Americanism also played a role in why Europe went its own way. But trust me, if tomorrow, if European, like grapes in France, gets lost or potatoes in Ireland gets a disease again, they have their wherewithal and technology to bring back GM right away. So, Europe is not far from using GM crop technology, if it's necessary for them.

Jay Subramanian:

So another interesting question is: where and how did this conspiracy against GM emerge? Can anyone trace the roots of it?

Channa Prakash:

Yes, yes. You can trace it to one individual in Delhi, called Vandana Shiva. And before a few people like that, you know, I'm sure I can name, you know, it's a lot of Canadians who have contributed to that, including David Suzuki.

But it's a handful of people and who is that farmer in Saskatchewan? They made a movie out of that, I mean, I know, I met him, suddenly not able to remember his name. It is truly a handful of people and, a great Canadian institution exports to the rest of the world, called Greenpeace.

Also helped in creating this misinformation against this technology against this technology for self-serving reasons. This was a very deliberate and it was highly orchestrated, and it was well funded opposition, but it's very sad though.

Jay Subramanian:

One final question I have here is this is something, you know, everybody can kind of relate to. People accept insulin, which is coming from a genetically modified enzyme, basically but why not brinjal for instance? This is particularly true in India.

Channa Prakash:

That's true, and again you know, I must acknowledge the great Canadian contribution in the discovery of insulin 100 years ago that saved literally hundreds of millions of lives today. Insulin was one of the very first genetically engineered products to be commercialized, way back in 1983 by Eli Lilly and still today. As I said, 99 of all insulin in genetically engineered.

It's I think people who have a hypocritical attitude when it comes to food and when it comes to medicine, you know, people will eat and will take anything if it helps cure them, you see what I mean?

But at the same time, when it comes to food, you know, we believe we have a choice, so we have the luxury to say no. And so, I think there is again, and we must try to help the people understand the safety of this technology and the benefits that it can bring. And I'm quite confident that over time people will begin to understand that, and this controversy would just simply go away.

Jay Subramanian:

Okay, I don't think there is any other questions, any other questions from the remaining audience? We have three or four more, five more minutes.

Okay, if not, thank you very much Prakash, it was as always, a very entertaining, enterprising talk and very enticing. I hope so many of these students and others in the audience got some very good information on genetically modified organisms, what are the misinformation that are going on. And once again, thank you for taking time amidst your busy schedule to come and talk to us.

And our next event in the CIRCLE Webinar will be presented by Dr. Jeji Varghese, and this is next Wednesday and that would be on strategies for increasing rigor in community engaged teaching and learning.

Okay thank you all for joining and have a very good day and a good rest of the week, and stay dry, thank you, bye.

[End of transcript]