

Food Prize Laureate: Prerequisites For Solving the World Food Crisis

Dr. Sanjaya Rajaram, eminent plant scientist, was awarded the World Food Prize in October 2014, in Des Moines, Iowa, for “for his scientific research that led to a prodigious increase in world wheat production, by more than 200 million tons, building upon the successes of the Green Revolution.” The prize was established in 1986 by Dr. Norman E. Borlaug (1914-2009), father of the Green Revolution. Dr. Rajaram, born in India, came in 1969 to work in Mexico with Dr. Borlaug, and became a citizen there.

Following the announcement in Summer 2014, that Dr. Rajaram would be the 2014 World Food Prize Laureate, he gave an interview on Aug. 8, 2014 at his offices in the state of Mexico, to Fabiola Ramirez and Carolina Dominguez, for the magazine “IO, Estado, Ciencia y Arte” (“IO, Statecraft, Science and Art” of the LaRouche Citizens Movement of Mexico (MOCILA), which made it available to EIR.

Q: First, we would like to ask you about the World Food Prize, also known as the Nobel Prize of Agriculture, which will be awarded to you Oct. 16 in Iowa. Can you talk to us about the research that won you this award?

Rajaram: I am truly very happy with the recognition, but I want to add—and make very clear—that the award is not just for my work. I was the lead man, but other scientists have to be recognized, especially the International Maize and Wheat Improvement Center



Dr. Sanjaya Rajaram speaking Oct. 16, 2014, at the ceremony in Des Moines, Iowa, at which he received the World Food Prize.

(CIMMYT), and another international agency on drought which is in Nicaragua, and also many other countries that collaborated. And principally, the farmers from the Yaqui Valley, from the Mexicali and Bajío valleys, with whom I have worked; and those from Punjab, India, and from other places. I will be accepting the award in all of their names.

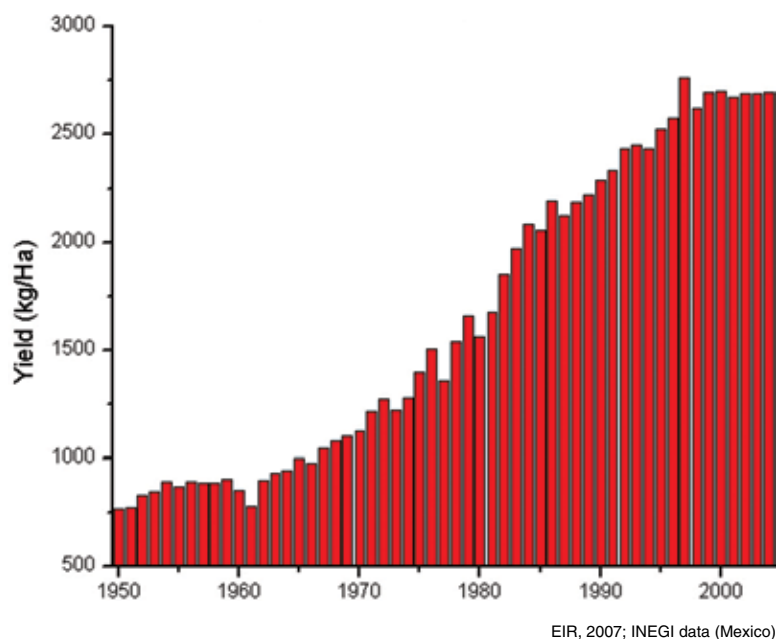
Why did the committee recognize this achievement? After the Green Revolution, during the period in which I led research into wheat and its development, the world was able to produce 200 million more tons of wheat. That

is a great advance in the availability of world food. Many countries, more than 50 of them, benefitted from this development, including Mexico.

The Borlaug Tradition

Q: With U.S. President Franklin D. Roosevelt’s Good Neighbor Policy, under the leadership of then-Vice President Henry Wallace, who had a broad knowledge of agriculture and technological improvements in the field, a process of international scientific collaboration among various nations was launched, such as the Inter-American Center for Agricultural Cooperation in Costa Rica. And of course, in Mexico, there was the CIMMYT, under the leadership of Dr. Norman Borlaug, a great scientist, visionary, and humanist, also known as the Father of the Green Revolution, through which millions of people facing starvation were able to be saved. As someone who carries on the tradition of

FIGURE 1
Wheat Yields in Developing Countries, 1950-2004



this humanist current, will you tell us about your work and friendship with Dr. Borlaug?

Rajaram: When I first arrived in Mexico in 1969, I was a youth of 27 years, recently graduated from the University of Sydney in Australia. Dr. Borlaug did not interview me, but he had heard of me through Prof. Irving Armstrong Watson, who was a professor at Sydney University, under whom I received my doctoral degree. They knew each other, and that is how he heard of me, and that's why Borlaug was interested in bringing me here, to Mexico, under a two-year post-doctorate program.

I began to work with him, knowing no Spanish, from a family which knew nothing of Mexican customs. I had to first learn the language, something my family made a priority; that was the basis upon which I became very interested in Mexican culture.

Then, at the beginning, working with Norman Borlaug, my idea was that I was just training myself to learn all I could from him of his knowledge and philosophy, because although he wasn't a Nobel winner in 1960—he received this honor a year later—I nonetheless recognized that he was the best there was in the genetic improvement of wheat. And so learning everything there was to learn from him became a challenge, and then I would have to leave in just a few years.

And yet, look, I am still here! Because in 1973—actually just five kilometers south of here where the CIMMYT is based—Norman and his assistant director, Dr. Glenn Anderson, called me in one day, and said, “Raja”—not Rajaram, which was too difficult for him—“I want you to head up the wheat flour program.” Naturally, I was very surprised, as I wasn't trained, so we struck a deal to work together in the beginning. I told him, “Look Dr. Borlaug, I don't have sufficient training to handle an international program in corn and wheat improvement. You've won a Nobel Prize. Who am I to do this? But if you promise to help me for two or three years, I will have a sense of how to lead this program.” And so I began.

I have tremendous respect for Dr. Borlaug, since he taught me everything he knew. I had a good knowledge of plant genetics, phytopathology, and other sciences, but learning with him in the field was a success. We worked five kilometers outside of Toluca or in

the Yaqui Valley, working from 6:00 in the morning until 6:00 in the evening, because that was what he was like; and in fact, he had chosen me because I could match him in the field. He not only saw my ability, but also my tenacity; someone who could do the work well.

And so we began. This collaboration lasted until 2007. Although Dr. Borlaug retired, he stayed, in one form or another. He didn't tell me what to do and I didn't have to do what he said, but we did discuss everything, especially at the Mr. Steak restaurant in Ciudad Obregón, over steak and tequila. I can tell you that these were good times, discussing agricultural questions.

Q: I saw a report about a visit you made to Obregón to talk about Borlaug's centennial (2014), and you said there, that though he was retired, he continued to follow how the work was going.

Rajaram: He assured me that he would come, because he was very wise. He read many things. (He didn't have much time to read at that time. We couldn't do everything, because we spent a lot of time in the field. But when he retired, he began to read a lot.)

I was fascinated to learn about his philosophy of how to integrate, among different disciplines, the sciences of agriculture, anthropology, archaeology, geo-



Gene Hettel, International Rice Research Institute

Dr. Norman Borlaug (right) in the field with Dr. Sanjaya Rajaram, his successor as head of CIMMYT's wheat program. They studied data at the Ciudad Obregón experiment station in the 1990s.

graphical history, weather; and I became very interested in nutrition, fertilizer, water. Norman was top notch, and knew how to put it all together.

I don't take this [award] as a follow-on or continuation of the Green Revolution. That would not have been a great success, and the World Food Prize is not to recognize the status quo; there had to be an advance. And that advancement, was not just by me as a scientist. I relied on an international organization, on national programs, advanced countries, and the farmers; together, we were able to achieve it.

We never forgot that scientists don't produce food, but farmers do, and we have to learn what they are thinking and how we are able to help them. Norman always talked with the farmers; I learned from him that the farmer is number one. I began to work in the Yaqui Valley, first with the youth, and afterwards the elders also accepted me.

Q: What kind of collaboration have you had with other scientists and international organizations, and with governments, first, when you were with the CIMMYT, and now, when you are in the private sector and your company is dedicated to researching and developing products that are tested in the field?

Rajaram: I learned at the CIMMYT, and also in what then was in Syria, but now is in Amman, Jordan, and in Lebanon and Morocco, due to the war occurring

there. I learned that we have to deal with agriculture through institutions; at times one can work with the farmers, but without national institutions, where do the farmers go?

For example, when I began my scientific work and my leadership in the Yaqui Valley, I knew that I had to work with the INIFAP [National Institute for Innovation in Forestry, Agriculture, and Livestock], which is a government office there. I thought that they should work with the farmers. I approached the farmers and told them it was very important to work with the institutions. My main success when I worked with CIMMYT is that I globalized the wheat work in the CIMMYT. Now I work for a private company, but we never forget that whether from the public or the

private sector, we all have to help the farmers. They have to buy seed; no one gives it to them as a present.

Through Resource Seeds, I have agreements with private-sector institutions, but since I came out of the public sector, out of CIMMYT, I also sometimes give my products to people who want to work with them. Sometimes I give them to CIMMYT so that they can use them in their hybrids. I work with the private sector in India, Australia, California, Mexicali, Ciudad Obregón. I wanted to complement current technology in the Yaqui Valley, not replace it; to complement what the government and the CIMMYT were doing. I saw that we could create something which could complement that.

Look Ahead, Prepare the Youth

Q: Norman Borlaug once said that we believed that we had discovered everything about biotechnology until what he called the "monster UG99" appeared in Uganda. Surely there are other diseases that we don't know about yet. The concern is that we are not preparing the next generation of youth in the relevant areas, encouraging creativity so that they can make the discoveries of new technologies that will defend humanity from those monsters that want to eat our food. So, for the coming generations, what do you think about the research into nuclear mutations, and your opinion about NASA and space science with regard to research into

cultivation on board space stations? And what do you consider the priority for research as a challenge to youth?

Rajaram: You have a whole mix of questions there. Norman was convinced, and I am as well, that if we do not correctly prepare the youth, if we do not inject new ideas and inventions, we are not going to move forward. The question would be: Do we have sufficient, good educational institutions to be able to train new generations of researchers, so that they can confront new problems?

For example, we all know that there are climate problems, which are going to change. Some don't accept that; I do. Climate change is going to be very drastic. Perhaps the temperature average will stay the same, but even a slight rise or decline of 2-3° might, perhaps, destroy crops through frost. This kind of problem requires a different scientific focus. This is one example; it could be something else. It could be a lack of nutrients in the soil; our soil is already depleted. We need well-trained agronomists to do good work.

Therefore, train youth in the reality that the climate is going to change. There are more people, nutrition has to increase—things like that.

So, we have to make sure that our youth are coming out of the universities well trained, and if they are not, what are we going to do? You can answer this question. I see that there are many institutions, but few are prepared to achieve this. We are not talking about the number of scientists that are graduating, the youth that graduate; we need quality. We have to say this, without naming anybody.

Now, speaking of biotechnology, as I said, there have been many inventions in the past 100, 200 years, but there is always resistance on the part of people to new things. Remember that they wanted to send Galileo to jail, or to execute him. So the attacks on biotechnology today do not surprise me.

I say that we can base our policy on science, on knowledge, good knowledge which protects our nutrition, our environment, everything. And at the same time, if production is being increased, if we want this kind of science to be applied, we can't reject it. We have to study it well, to prepare ourselves. Not me anymore, but young people have to know what's what and what must be done.

What I can say, is that today, we have to manage our resources and train people well, so that they will work with the farmers—not just working on crops but also

with the farmers—because, as I said, they are the ones who produce the food. They are the ones who take care of the soil; they are the ones who have to apply the water; they have animals in their homes and surroundings.

And we also have to take care of all the resources that are on our planet, and all the things in the sea. I don't know how to fish. I've never caught a fish, but I like fish. We must take care of our resources.

I'm convinced that the planet can support more people, as long as we manage our resources well; we can implement good policies, in economics, as you talk about, and in our universities, and have good educational systems so that we are up to standard.

Yes, that's what we have to do, and we have to do it soon, if we—all countries—are not to lose the battle.

Food Sovereignty

Q: I want to address the question of state intervention—the participation of sovereign states with respect to the food crisis—in order to achieve food self-sufficiency.

The World Trade Organization met in Geneva, Switzerland, on July 26, where India decided not to sign the WTO's trade protocol, which asserts there are to be no subsidies for farmers, nor for food stocks for the poor of that nation.

The WTO asserts this genocidal policy in the name of free trade. The WTO doesn't speak about food self-sufficiency, but about food "security," by which they mean only "market access."

In this regard, I read an interview with Dr. Robert Zeigler of the International Rice Research Institute (IRRI) in the Philippines, where he spoke about the crisis of 2007 as regards access to markets, which didn't work. He said, "In 2007, Vietnam did not produce what it was going to, they stopped exporting; a hurricane or a weather event hit Bangladesh. India knew that it was going to need food, and they were not going to export. The Philippines requested millions of tons, and that caused an international panic." Zeigler made the point that, even if people have money to buy food, what if there is no food to be found?

Would you comment on this distinction between food self-sufficiency and food security, which is not at all a subtle difference?

Rajaram: Look, we need both. We need food security within nations, utilizing all possible resources. We can't have a policy that goes against this, because oth-



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A farmer in Mexico in 2010, tilling his field with an off-set disc.

erwise, we end up with a lot of unemployed people. For example, a change in policy is possible in our country, but at the same time, to some degree we do have regulation of free trade so that food can be moved around when needed, in order not to depend completely on foreign sources. Where is the separation between the two? There has to be a combination, because, as I said, climate change is going to be devastating.

There are problems, even if a country is able to export its surplus. Let's take the example of Australia, which exports between 12 and 20 million tons of wheat a year. However, a drought could dramatically reduce this. Then a controlled chain reaction begins. For another example, the decline in production in Russia several years ago led to a wheat shortage worldwide. It is very important to know all this, to be able to deploy. Naturally, a country that produces more has to sell at a price that is fair for its farmers, without blackmailing them.

I do agree that merely having sufficient grain in a country does not necessarily guarantee that the whole world is going to have food. To achieve this, we need jobs, and we also need to train youth so that they can take better jobs, because some youth don't know how to do anything, and then what are they going to do? Grow crops with a stick? It can't stay that way forever. From my viewpoint, we have to mechanize agriculture if we want to be efficient, and this means we are not going to have a lot of people in the countryside, so those people

who leave have to be trained in other areas, to provide other services, perhaps working in a hotel, building a highway, maybe constructing a dam, or anything else. They have to have opportunities.

So, we can talk about when there is food, or when we have to import food. We can talk about that, because we are not going to *give it*, they are going to *buy it*. And here is Norman's great criticism of the Indian government: They thought of producing such an amount [self-sufficiency in 1974], and that then the world would be fine. And that was pure "blah, blah, blah," since millions of people are dying for lack of jobs; that has to be thought about. Every country has to think about jobs, Mexico included.

Q: During the 1980s, Mexico achieved food self-sufficiency under President [José] López Portillo's Mexican Food System (SAM), which increased production. By the end of that government, we had achieved unprecedented economic growth, and President López Portillo issued an international call, during a speech at the United Nations, asking for the creation of a new, and more just, financial system that would allow nations to grow in all basic areas. What do you think of that period of food self-sufficiency under SAM? Could this be revived to begin a new policy of food self-sufficiency today?

Rajaram: It is very difficult for me to answer that question. Look, whatever policy is taken and whatever government decision is made that allows us to efficiently produce food, and also for the farmers to live better, I'm all for that policy. Sometimes there are changes, sometimes a policy could be very good, but it has implications.

I am not criticizing President López Portillo's policy. Actually, I am not very well informed about the period you are now telling me about; but I would like to see the best technology, and better inputs for the farmers, be available when needed; training for the farmers to know how to do their work better; that the policy be that of providing prices which enable farmers to move forward, too.

The farmer can't just have losses; he has to educate

his children. When we talk about food, we can't just talk about having three meals a day. We need clothing, we should have a house, we must send our children to school, give them opportunities. We won't be able to move part of our population into other kinds of services or jobs if we don't do this.

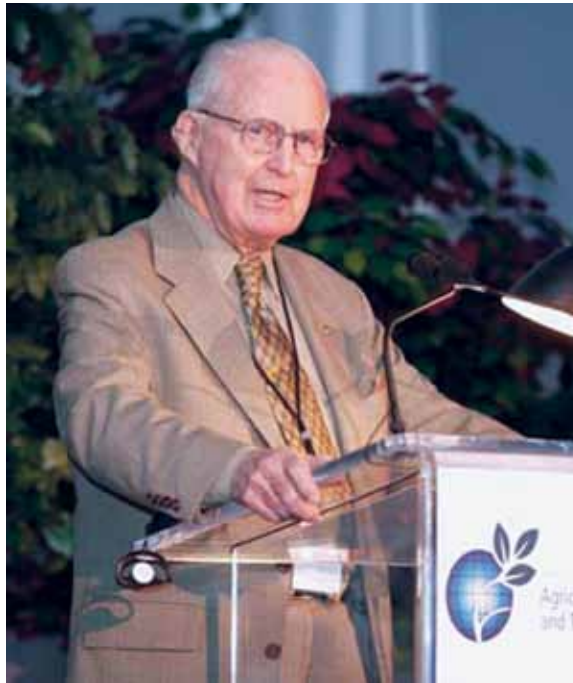
If we don't do this, there will always be division in the country; we don't want this. There must be a policy so that if the population is leaving the countryside to work in other areas, to have other kinds of work, so that the quantity of our arable land remains the same or is greater. I want any government, current or future, to do its best for Mexico.

Immoral Attacks on the Green Revolution

Q: The organization called GLOBE (Global Legislators Organization for a Balanced Environment), is a group of legislators founded on the initiative of former U.S. Vice President Al Gore. In its document called "Natural Capital of Mexico," it attacks the Green Revolution, saying: "The results of the Green Revolution enabled production to increase notably, although it had no impact on the poorest of the poor; whereas its environmental consequences were very harmful because of the contamination of soil and of water produced by the abuse of agrochemicals and, moreover, they are inefficient energy systems." How would you respond to this?

Rajaram: It is very easy, perhaps, for an organization whose people probably live in an ivory tower, to say that this was bad, that it hurt the poor. This isn't true.

Take the example of India, whose wheat production has increased almost nine times since 1965, when it began its Green Revolution, which was transplanted Mexican technology. This involved not just seeds, but also the use of water and fertilizer, which enabled this



Dr. Norman E. Borlaug, giving the keynote address at the Ministerial Conference and Expo on Agricultural Science and Technology, June 2003. He said, "The world has the technology, either available or well-advanced in the research pipeline, to feed 10 billion people. Extending the Green Revolution to the Gene Revolution will provide a better diet at lower prices to many more food-insecure people." He received the Nobel Peace Prize in 1970 for his wheat improvements.

growth to happen.

So, tell me: Today, if we had not implemented an advanced technology, or if we do not continue it in the future, who will be the first to want to die? Because this planet isn't producing enough for everybody. Someone has to say, "Look, I'll go first." That's my answer.

Q: As it happens, they aren't saying that!

Rajaram: But at the same time, we have to be very aware that, at first, we didn't know the consequences of the Green Revolution on our land, water, and the rest. We didn't educate the farmers on how they had to apply nitrogen; how much? Sometimes the farmer used a lot!

Naturally, that way, the water is going to be contaminated. But today we do know. The American Society of Agronomy itself knows all

about crops, about soil. We are getting close to having an excellent simulation technology for all the things we can do, and that we have to do! Ultimately, if we don't educate our farmers to do things right, we are going to come out wrong.

Therefore I say this: I cannot accept this philosophy.

But I am a very convinced proponent that we have to protect our biodiversity, all the resources that we have, one way or another; and we also have to bring in the most advanced technology possible to be able to produce, while conserving the environment and soil and water. What doesn't contaminate! There is science!

We have learned something in 50 years. Yes, we polluted, but this was an oversight. No one knew! We talk about micronutrients in the soil: The more we have, the more we can grow. But we have to keep adding them to maintain a healthy, viable soil, and to not contaminate the environment.

So, let these people tell me: Who is the first of them to go because there is no food? Are they going to say the

FIGURE 2

Mexico Water Projects: The PLHINO and the PLHIGON



The PLHINO (Northwest Hydraulic Plan), and the PLHIGON (Northern Gulf Hydraulic Plan) were first proposed in the 1960s, and have been held up since then.

poor should die first? Everyone, including the poor, has the same right! The Catholic religion says that we all have the same rights, correct?

Q: Exactly! That is why we singled out the GLOBE report, because it is truly oligarchical thinking. It is very tilted to say: You cannot develop. It is like not having a right to exist.

Rajaram: We have to give opportunities to the poor. We must! We have a moral, ethical total obligation not to deny them. If we deny them, they are going to be the first to die, in some way or another. All the problems of disease are also problems of nutrition, in the main.

Q: Exactly! In the face of the greatest food crisis

ever, GLOBE’s statements sound like a death sentence for those in our country and in the world who have no food.

Build Projects, Build the PLHINO

To produce what we need in the way of food, great infrastructure projects like the ones we are proposing, the PLHINO are needed, and also to activate the principles of the Green Revolution, which has nothing to do with the arguments of the Natural Capital document.

What do you think of creating these kinds of projects worldwide, and especially, the PLHINO for the northwest of the country?

Rajaram: I am very in favor of the PLHINO plan. I believe that this kind of project is going to substantially help us in the production of sufficient food for the entire

FIGURE 3
Mexico's Major Rivers, and 'PLHINO Rivers'



TABLE 1
Mexico's Major Rivers

Name	Mean Surface Runoff (km ³)	Runoff as % of Total
1) Grijalva-Usumacinta	115.5	29%
2) Papaloapan	44.7	11
3) Coatzacoalcos	32.8	8
4) Balsas	24.3	6
5) Pánuco	19.1	5
6) Tonalá	11.4	3
7) Santiago	7.8	2
Others	139.5	35
Total Mexico	395.1	100
—Empty into Gulf of Mexico	272	69
—Empty into Pacific Ocean	116	29
—Inland rivers	7	2

Source: CNA 2006 (Mexico).

country. It is going to be an example for other countries as well, of how to manage water.

At the same time, we need to look at the other implications. Remember that the PLHINO will be more or less along the coast, but there is also a mountain range.

I would like for us to be able to maintain the biodiversity all along this route, both for the animals, as well as for the natural Mexican vegetation.

Q: Of course! You mentioned earlier, that more technology will enable us to do this; less technology, no. With greater understanding of these things, right?

Rajaram: Yes, today perhaps we are better prepared: The Mexican engineers, agronomists, scientists, and the government itself, are better prepared.

Imagine if we had done this 50 years ago, perhaps a habitat would have been destroyed; but today we are better prepared

and know how to do this. All we need is a government decision and a will on the part of everyone to collaborate.

Q: Our associates in the Pro-PLHINO Committee, who are working the most actively with farmers there—what would you advise them to do in pursuing the fight to get the PLHINO project done?

Rajaram: Naturally, we are a democratic country, and if our Congress, if our government, agrees, I don't know why should we have to have any fights in order to achieve it, because it is good for everyone. As they say in English, sharing the resources among all, for the good of all. This will be good for all.

However, I would say that in this sharing, we have to make sure that the resources or benefits don't stay in just one place without reaching other places, because we have to look after all the people, not only the farmers, but also the ranchers, who produce the best beef in Sonora.

Q: In the country, doctor!

Rajaram: We may have to look after the tequila producers, also!

Frontier Science

Q: There are important scientific research questions. For example, in developing desirable plant traits, and transferring a characteristic of one species to another, what about the work underway to upgrade rice from a C3 to C4 plant [higher-level carbon-fixing—ed.], so that it would share this characteristic which corn has, with respect to photosynthesis. What is to be said about this?

Rajaram: There are other genes which we could manage more easily. As an example: resistance to resins, high protein content—transfer this from one species to another. Add a colorant to help the assimilation of vitamin A, when it is one place, and not in another.

Many people think that we can convert all products into C4; in my view, that is too optimistic. I would like to keep it as it is. There's a lot to do within C4 or C3. Because, imagine, if we had a wheat plant which is C3, and we turn it into C4, it should also be adapted for tropical conditions. There are a lot of implications. We also need wheat in temperate climates.

There are many other things that could be done. I wouldn't like money to be spent on that now. Instead, we can increase, with good genes, the amount of lysine in the wheat, corn, or other crops.

Q: What about farming advancements—hydroponics, or farming without soil, farming in a controlled environment?

Rajaram: I agree. I think we could speak about this on a family scale. I don't mean that each family could harvest their own vegetables—very few could do that. Large-scale hydroponics to provide a lot of food wouldn't be very effective for cereals, but it would be for vegetables. Particularly if the vegetables could be produced at home, on the roof, it would be good, because it is very efficient, non-polluting. The water could be controlled, and little water is needed.

Also, with protected farming, under big greenhouses, flowers, tomatoes, cucumbers, or chili peppers can be grown. It is also very efficient. It's more efficient than when we do it in an open environment.

Q: What about rhizomes for wheat, this idea that the plant can be made to self-fertilize, by an ability to capture nitrogen? Is this something which is being investigated? Is it being done?

Rajaram: There was an investigation in Brazil, in the 1970s, by a plant scientist there. She did a lot of

work trying to transfer the bacteria that form nodules in legumes, and she wanted to stimulate that characteristic in wheat roots. But I don't know what's being done currently. Perhaps biotechnology may open this frontier. If we could supplement something, because we have a lot of nitrogen in the environment, it would be very beneficial.

But this is something I call frontier science. Frontier science opens many, many possibilities, if we have the resources to do it. But I say that cautiously, because there are priorities. For me, the priorities are issues related to weather, because of climate change: high temperature, drought, floods, etc. These are the most important things biotechnology may help us to deal with, problems that we will face in 10 to 15, 20 years.

Q: For rice, Dr. Robert Zeigler has stressed this climate change concern, for example, in talking about everything that could be done to provide resistance to floods, drought, and salt. Much rice is produced in deltas, so if sea levels rise, we have to consider flooding, but also salt.

Rajaram: Here the problems are frosts; in the valley of Toluca.

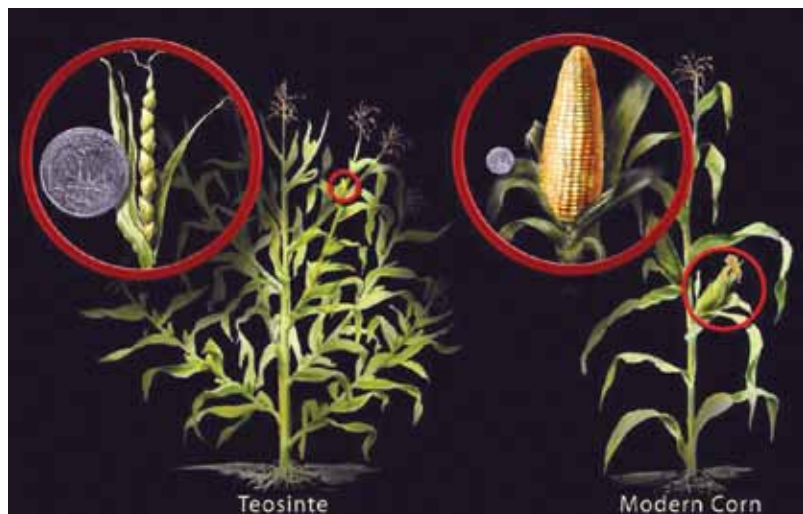
Don't Patent Life-Forms

Q: In the days of Dr. Norman Borlaug, and Henry Wallace before him, there weren't patents for living organisms, and there was public funding for research. In this regard, we had the opportunity to attend, on July 18 of this year, the forum on "Reforms for Transforming the Countryside" in Irapuato, Guanajuato, organized by the Ministry of Agriculture, Livestock, Rural Development, Fisheries, and Food, whose subject was biotechnology and its applications to improve agriculture. The general call of the meeting was that, now that some patents are about to expire, we should use them for our benefit, to produce food, etc. What do you think about private companies being able to patent a form of life?

Rajaram: I don't agree. I'm not happy about big multinational companies patenting, or being able to patent, anything they want, like a gene or something; because these genes and these plants come from thousands of years ago, in which many people have worked to develop and maintain them. Thanks to that, we have today thousands of different varieties of corn in this country; and somebody coming along now and saying, "This is mine"—no, I do not agree.

I would like, although I know it's not possible, for

FIGURE 4



NSF/Nicolle Roger Fuller

The ancestor of modern corn was the wild teosinte plant, in Mexico.

natural genetic resources to be available for everyone.

Let me put it another way: There are 26 letters in the English alphabet, and 27 or 28 in the Spanish alphabet, with the *ñ* and the *ll*. All this is basic, they are letters; it's like the gene. These letters are available; they are in the dictionary. Along with these letters, there are words, and these words are available for everyone in the free market. They are in the dictionary for everyone; they are free. But when a writer writes a novel, writes a book, those have different values: There's more of a market for one book than for another.

The private companies or the international governmental institutions should have complete freedom to use it and to make the best products with them. In the end, the farmer will decide which is good, and which is not. Those who make something better will sell more, but it has to be available.

What I hear today, is that somebody says, "I found this bacteria gene, and it's mine." No! This bacteria gene was already there, and somebody preserved it for a long time; or some link in the maize that Mexican farmers preserved that way over thousands of years. A farmer in the Middle East kept an offshoot of wheat; a species of potato in Peru or somewhere else; rice in South Asia. All these people have kept this for thousands of years. Nobody has the right to say, "It's mine." I would say that it sounds very radical for everybody to say, "We should protect," but, protect what? It is not yours to protect; it should be free.

That's why I'm very grateful for various interna-

tional centers, such as the CIMMYT, because they say that their germplasm is for everyone. Sometimes they sell it and we have to pay for it. That's not a problem, because international centers like the CIMMYT need to be maintained, because they have done such a great job for mankind. Dr. Borlaug was there; I was there. And yes, Henry Wallace's policy was fundamental for the CIMMYT to exist. I don't know where this man came from!

Q: Iowa.

Rajaram: I know, but I mean how he thought, how he managed to leave this heritage.

Q: That's because Henry Wallace's family was tied to agriculture, and since he was a child, he thought that it was a mistake that farmers took the biggest ears of corn, thinking that they were the best. He felt that it's not about size, but about quality.

In the vacation he took after the 1942 election, after helping Franklin Delano Roosevelt for three terms, to save the economy after the whole crisis of 1929, Wallace traveled to Mexico, in his own old car, because he wanted to get to know Mexico, because it was the land of corn. When he drove through the countryside, he realized that Mexico really didn't have the infrastructural and technological capacity to produce.

What surprised him—and this relates to the cooperation principle behind the Good Neighbor policy, which says: When your neighbor is doing well, you'll be doing well, too—is that, as he said, "I can't believe there is so much hunger so close to our home." Hence, his interest in increasing cooperation, and sending Norman Borlaug.

Rajaram: Well, he didn't send Norman Borlaug. That should be corrected. Norman Borlaug was selected by Dr. E.C. Stackman, a professor of pathology at the University of Minnesota, a very good professor. Norman worked with him, and Dr. E.C. Stackman and two other researchers were commissioned to do a study in Mexico in order to establish this collaboration that we are talking about, because the CIMMYT didn't exist at that time; it was the Office of Special Affairs, in coordination with the Mexican government, which authorized it.

But the idea came from Henry Wallace, and it was

the President who wanted this the most. The President was good—not all the American Presidents are like that—and he wanted to establish this kind of situation to help Mexico. It is exemplary, and out of this came the International Centers, many other projects funded by Rockefeller and Ford, and it was in this way that Norman was sent, along with another scientist specializing in corn, Edwin J. Wellhausen, and another specialist in potatoes, whose name I have forgotten, but he was an American, also.

They came, and they were young, but were very good working with Mexicans, and they all learned the

language. That’s why I learned the Mexican language! When I saw Norman, I said: “Wait, if he can speak the language, why not me?”

Q: Thank you, Dr. Rajaram, for your remarks, which will help people understand in more detail the true role of biotechnology in developing food production, and the role that we should have as scientists, researchers, politicians, students, etc., to help these projects get done.

Give us a last message for the youth, so that your words may help them to decide their future.

Rajaram: I would tell the youth who are in the university, or who graduated from the university and are already working, not only in agricultural science, but also in other sciences, or art, or geography, it doesn’t matter which one—that they all must have a very broad vision. We can’t look at agricultural science through a very little hole. We have to focus on having a very broad interaction. We have to be open to learning, much more, much more than we were taught in university. Broaden knowledge, and apply it. And work hard. Because we can be very intelligent, but we won’t accomplish much if we are lazy. We have to work hard. But we also have to look after the family; I don’t mean you should neglect the family. But you have to work, and work, and you have to apply science with a broad vision. And that way you will be successful.

The future of Mexico and of many other countries depends on their young people.

And that’s why I would like for them, once they have graduated from university, to get some training, which is good for applications, so that they can do good work.

They need to be well paid, also. Because if they are not well paid, how can they be expected to do good work? They have to earn a living, too.

Translated from Spanish by Valerie Rush

FIGURE 5
Wheat Yields, 1950-2004, in Mexico, India, and Pakistan

