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LESSONS LEARNED FROM INVESTMENTS IN AGRICULTURAL DEVELOPMENT

October 17, 2008 – 9:30 to 10:30 p.m.

Conversation: Joaquim Chissano – former President of Mozambique

Rajiv Shah – Director of Agricultural Development, the Bill & Melinda Gates Foundation

Rita Sharma – Secretary to the Government, Indian Ministry of Rural Development

Moderator: Roger Thurow – Senior Writer, the *Wall Street Journal*

INTRODUCTION

Ambassador Kenneth Quinn

President - World Food Prize Foundation

I would like to now invite the members of the next panel – after having this vision of Africa – on the lessons learned from investments in agricultural development. So to invite Her Excellency Rita Sharma to come up and join with us and also Roger Thurow and Dr. Rajiv Shah. Please come up.

I have already introduced President Chissano, whom you just heard from. I introduced Her Excellency Rita Sharma yesterday, but I haven't introduced Rajiv Shah or Roger Thurow. So let me just take one minute to tell you about both of them.

Rajiv Shah manages the Bill & Melinda Gates Foundation's portfolios in agricultural science and technology, agricultural productivity, market access and agricultural and rural policy and statistics. Previously served as a Director of Strategic Opportunities, launching the Foundation's Global Development Program, and as Deputy Director of Policy and Finance for the Foundation's Global Health Program, helping develop the International Finance Facility for Immunization that has raised more than \$5 billion for child immunization.

Dr. Shah previously served as policy aide in the British Parliament, worked at the World Health Organization, serves on the boards of the Global Development Network and the Alliance for a Green Revolution in Africa. A graduate of the University of Michigan and the London School of Economics, holds an M.D. from the University of Pennsylvania Medical School and an M.S. in Health Economics from the Wharton School of Business. The World Economic Forum named him a "Young Global Leader" in 2007.

Roger Thurow, a longtime foreign correspondent with the *Wall Street Journal*, writes largely about humanitarian and social development issues. In his more than 30 years with the *Journal*, he has reported from over 60 countries, writing on a number of subjects ranging from the culture of the business of sports to race relations in the United States to hunger and food security in Africa.

In 1997 Mr. Thurow received the Bronze Prize for Print Media in the Olympic Media Awards and was a finalist in the Deadline Club of New York's awards for Best Feature Reporting. In October 2005 he was honored along with Scott Kilman with the AH Burma Award from the FAO. Mr. Kilman and Mr. Thurow are also co-authors of a forthcoming book on global agriculture and hunger.

In 2006 it was our privilege to have both Rajiv Shah and Roger Thurow here to make presentations and to have an opening conversation in the Gates Foundation Program to develop global agriculture.

So it's my pleasure to introduce them to you and to introduce Dr. Shah and Roger Thurow and our panel members.

Roger Thurow

Senior Writer, the *Wall Street Journal*

Thank you, Ambassador Quinn. Good morning to everyone. President Chissano, I think, keyed up our discussion very well. And our panel on investment in agricultural development, lessons learned.

And, well, Raj, after several years and a billion dollars of investment in Africa, the Bill & Melinda Gates Foundation has learned plenty of lessons. Few have plunged into agricultural development so aggressively and with such determination and passion as the Gates Foundation over the past couple of years.

So to get us started here and to tell us some of the other lessons that they learned, Raj will start us off with a little bit, and then we'll continue the conversation with President Chissano and Rita Sharma. And I guess we'd even entertain some discussions on the baseball playoffs if anybody has that along the line. Otherwise, we'll keep it to investment in agricultural development, which is of vital importance. Raj.

Rajiv Shah

Director of Agricultural Development, The Bill & Melinda Gates Foundation

Great, thank you. It's great to be here and to have the opportunity to do this with this particular panel. The first lesson we learned is: When you have the opportunity to hear from people like Her Excellency Rita Sharma or President Chissano, you should be brief and listen. And so I'm going to take that to heart and be relatively brief.

But Ambassador Quinn did ask me to share some observations, some learnings, and some challenges that we are facing as a Global Development Program and a program focused on agriculture and agricultural development. And so I'll take just a few minutes and lay out some of that experience.

Since most people here were able to hear from Sylvia Burwell yesterday talking about the Foundation's program, I won't go into an introduction of what we're doing. But we are very focused on trying to make investments that will improve agricultural development, agricultural productivity, and in a way that specifically helps reduce poverty, hunger, and suffering around the world, and with a particular focus on sub-Saharan African countries.

So I was thinking of five basic lessons that we've essentially learned in the last several years.

The first is: As we've looked around at a number of other partners making investments in agricultural development, it seemed that one determinant in being successful in those projects and those investments, and being perhaps less successful over time, was really designing programs and activities that were very focused on the customer. And we think of the customer as small-holder farmers in particular.

In order to be focused on the customer, our crop-breeding programs and science and technology programs will employ participatory methods so that farmers can comment to breeders on the types of preferences they have for taste, color, and texture of various crops. They can talk about what their demand characteristics are and then breeders and scientists can really work in a way with them to develop things that really meet their own specific needs and aspirations.

We also implemented a gender strategy because we all know that the majority of labor provided in small farms in sub-Saharan Africa and South Asia come from women. And yet a number of the larger public programs and larger existing programs were dominated by extension systems and other service-delivery systems that were very focused by men or implemented entirely by men. So we felt it was important to try to bring in strategies that would help women take more of those roles as extension officers and researchers, working with farmers – because we thought that would be more effective. And we've seen some of that work in our program.

The major challenge we face in trying to design a program and an effort around small-holder agriculture is that we run the risk of not fully leveraging the capacity of large farms and mid-size farms and large farmers to bring credit and resources and organization and knowledge to bear to transform agriculture in those areas. And so one concern and one question we have is: What is the role of large-scale agriculture in a program designed to reduce poverty by investing in small-scale agriculture?

A second primary learning is that, as was noted previously, we cannot just invest in science and technology and production. We really believe you have to also have market-access programs and initiatives so that small farmers in particular have the ability to market their crops, earn incomes, reinvest in their agriculture, and have the incentives to purchase and adopt improved seed varieties, fertilizer as appropriate, and other types of perhaps costly inputs that are critical to improving agriculture.

For our program efforts – and we’ve spent approximately \$900 million so far in agricultural development – 40 percent of the investment, just under 40 percent – is in science and technology. And the remainder are in a series of programs to help support extension efforts, to help support farmers’ organizations, to help farmers market crops in high-value product value chains like coffee or dairy. And we’ll expand that to include a few others, like cocoa and cotton. So that’s been a learning for us.

A challenge for us has been: How do you geographically overlap the various things that we support and we do with, frankly, the more numerous and more important program activities happening in countries implemented by governments. We’ve noted that in a lot of previous efforts that have been unsuccessful, one donor will do a market-access program in the northern part of a country, another donor will do a seed-breeding program in the southern part of the country – and people aren’t benefiting from the synergies of those activities.

A third – and maybe I’ll stop here for now – a third major learning for us has been around partnerships. We are a funding organization based in Seattle. We rely on so many outstanding partners to actually execute and implement the programs that we employ.

I look around the room here, and, over the past day and a half, having the opportunity to see so many of our partners here is just wonderful – because that’s the group, and you are the group that we rely on for both knowledge and for implementation success.

But I also realize that many of our early grant investments have been through major partners – the Alliance for a Green Revolution in Africa is our biggest program partner; the CGIAR system of research institutes has been our second-largest program partner. And those two partnerships and the work we do through those two systems account for nearly half of our spending so far.

As we go forward, I think one big challenge for us and one thing I’m eager to hear from, from our panelists, are: How can we work in a way that fosters new partnerships and particularly engages better South-South partnerships? We have recently made efforts in China to invest in hybrid rice, efforts in India to explore really innovative uses of information technology, and can you have technology-enhanced extension systems and extension programs that would be transformative.

It’s often the innovations and the excellence and the knowledge and the implementation capacity in India or China or Brazil might actually be far more relevant to sub-Saharan African agriculture and agricultural development that targets smallholders than what we have in other parts of the world. So we would like to push ourselves to do a better job at facilitating those learnings and those relationships, and we feel like that’s an area where we would like to concentrate our efforts going forward.

So I’ll just leave it at that for now, because I’m eager to hear from the president and from Rita. But I’ll say just one thing in closing, is that although it seems as though the Foundation, with our ability to employ significant resources, has the ability to really do a lot in this field, we feel we can make investments that are catalytic – we can invest in models and programs and technology development that might change the landscape in terms of what’s possible over time – we’re also very cognizant of our place. And our place is, relative to the needs that are out there in agriculture and infrastructure, which is of course completely intertwined, we are a very, very small part of the overall puzzle.

And so I think for us and for all of our partners and partnerships, a core element of success going forward is for us to better understand that, for us to better work with country governments and leaders like President Chissano and others that can really move the needle and have impact at a level of scale that is simply unattainable to a private foundation. And so we look forward to doing that in the coming years.

So thank you.

Roger Thurow

Thanks, Raj. I know that when you guys started – and we’ve talked about this – a lot of review and research into the past and the history of the Green Revolution and what worked and what didn’t work and believing that past can be prologue and we don’t obviously repeat the same mistakes and what can you learn.

I think one of the more fascinating things that I learned in kind of reviewing what went on in the Green Revolution, particularly with partnerships and with government partnerships is that, to support the efforts of Dr. Borlaug and the Rockefeller Foundation Indira Gandhi, then the leader of India, she tore off her front lawn and back lawn, I guess, and planted Dr. Borlaug’s wheat varieties, basically as an example to the rest of the country that this is something that’s very important and vital for us to do.

So I’ll ask President Chissano – I don’t know if any of the Mozambican residences of government ministers or heads of state have been torn up to become farms or bigger gardens. But just to address Raj’s greater question about the possibilities of partnerships and the example that African governments can set in terms of working with foundations like the Gates Foundation and the work that they’re doing.

Joaquim Chissano

Former President of Mozambique

Well, I think that the foundations like the Bill & Melinda Gates Foundation are very important for the work of Africa, for development of agriculture, not only working with the states but with the many organizations of the civil society who are pursuing the same objectives and who are lacking resources.

The challenges to work with the donor organizations is that they require a presentation of projects, and sometimes they expect projects to be presented by people who hardly know how to write or read. And even those who know how to write or read, they are not living in this world where many concepts are put. They just need to have help. Therefore, they may even need help to put together these projects to be bankable. And this has been a challenge.

But today, the government of Mozambique, for instance, is still dependent on its budget, and this is by donations. I don't know what is the percentage now of dependency; it used to be, when I left the office in 2004, it used to be around 50 percent. And so this partnership, when it comes to partnership, has to take into consideration these constraints.

But one thing that's very important is the education and training in all levels – first, for conception of projects; second, for the – I like what you said about the participatory programs and the role of the big farmers. I think that the role of big farmers would be mainly to serve as schools of how to bring the new technologies, because the peasants are very conservative. We try to tell them that, “Look, you have to put only one seed in each hole of maize, so that you have a strong plant.” But you will find that after the extensionist goes away, they will put five seeds, they will put four seeds; three seeds is the minimum they accept to put.

The second is that the peasants don't appreciate when we speak about putting fertilizer or manure to the maize when planting. They could put for cabbage, for tomato, for onion; but when it comes to cereals, they will say, “Why? We never did this.” But if they see a big farmer who does things correctly and has got expertise, then they would believe; because a peasant wants to see the results before he copies anything. So it's a need of a cultural change.

So foundations like this one can help, because we need patience to bring this culture in agriculture. The idea was spoken about today, biotechnology, and the secretary of agriculture spoke about resistance to better technology. But I don't think it's a question of resistance. It's a question of understanding and of having this as your way of doing things. Biotechnology is something that you tell the peasant, “You do this, do that.” But if he takes the seeds, he plants it and then he has the crops, he selects the best ones. And he puts it together and then he puts it in the field and they don't grow, he will not know that they won't because the seeds were genetically modified. He will just say, “I will not do what they're telling me to do.”

Well, I think I do not want to monopolize the microphone. Please.

Roger Thurow

Yeah, it's remarkable to see African farmers and the small African farmers, and they behave precisely like farmers in the United States and elsewhere did, with the introduction of the hybrid seeds early on, they want to see, “Well, that farmer's crop is doing extraordinarily well – what did you do?” And so they learn from each other and then from the example that you guys are doing on the ground that I've seen in Africa. It's that kind of learning and experience process.

And, Rita, I know that in India you have years and decades of experience working with a number of organizations that have come with investments and a lot of pilot projects that we were talking about, and as Raj mentioned then, the step to go from pilot projects to scaling up nationwide and how you scale up those projects. So if you'd like to talk about that a little, that'd be great.

Rita Sharma

Secretary to the Government of India, Ministry of Rural Development

Thank you, Roger. I'll take up from where Raj actually concluded his comments. And he said we have a very small organization. We recognize that we play a small part in the overall puzzle. And I endorse that, that foundations, bilateral investment agencies, play a small part but a very vital part.

And I take you back to the mid-60s, when the miracle seeds and the high-yielding varieties were coming to India. There were two foundations at that time which played such an important role in helping to take this technology to the farmers. And I'm referring to the Ford Foundation and to the Rockefeller Foundation, whose contribution to the Green Revolution has also now gone down in history.

So the organization or the foundation may be small, but if they are on the cutting edge of demonstrating either new technologies, or demonstrating new ways of doing things, or demonstrating new delivery mechanisms, working with farmers, they have that flexibility, which very often huge, bureaucratic systems don't.

Therefore, when we work with smaller organizations, when we work with foundations, when we work with bilateral organizations, it is not in the total amount of resources or the financial resources that they bring to the project but more the flexibilities that they bring, the ability to work with grassroots farmers that they bring, and demonstrate new ways of doing things.

And it is these new ways of doing things and the lessons that we learn from them – if they're successful, we are able to very quickly mainstream them and then put it into the regular government format and upscale the effort.

So I think from that point of view, it's a very important role and a very vital role which organizations play.

Having said that, I would like to endorse the areas in which the Gates Foundation is now working – because we all know that from the mid-60s, when the miracle seeds led to the dramatic increases in production, and between this period, a large number of other lessons have also been learned. And we recognize that Africa, which is now on the verge of a Green Revolution, needs to take into account some of the mistakes which were made during the implementation of the Green Revolution in Asia.

We all know that there were very, very dramatic increases in production, but we also know that the technologies were suitable to the irrigated areas of the country. And the rain-fed areas were by and large bypassed because the technologies didn't respond to the rain-fed systems; they needed assured irrigation, they needed timely application of fertilizer, and so on. So that was one of the things that – even in India today, 60 percent of the area is rain-fed, and therefore that is one of the areas in which a lot of work still needs to be done.

Another thing was that the technologies were restricted largely to the wheat-rice kind of commodities. And a large number of other areas or other commodities were not, the technologies were not up to responding to those kind of requirements.

We also recognize that with incomes increasing, the consumption patterns of the consumer are changing. And therefore more horticulture, more vegetables, more dairy products are coming

onto the table. And therefore the demands are changing and therefore a need for responding to the market, as they said.

We also recognize that pesticides and the use of fertilizer, an indiscriminate use of fertilizer – maybe also prompted by certain policy decisions – also led to the situation where you had the soil health declining. And as a result of that, even in the irrigated areas, there was stagnation of productivity.

So natural resources then became a very important dimension of the management scenario in the new dispensation. And, therefore, sustainability, or the Evergreen Revolution, or the Doubly Green Revolution, now becomes center stage. And I'm happy to note that some of the areas in which the Gates Foundation is already working is in the area of participatory extension, learning from farmers, traditional knowledge of farmers, recognizing that there is a feminization of agriculture taking place; and therefore there is a need to talk directly to women who are actually doing the agricultural operations in the field, rather than capacity-building or training of the men farmers who, in turn, would convey that information to the women.

And most importantly, recognizing that the new and the more sustainable Green Revolution that we are talking about will come when we look at nutrient management rather than just fertilizer application, that we look at integrated pest management rather than pesticide application. And we look at conservation agriculture with zero tillage, with laser levelers, with the systems of rice intensification, which are using lesser water.

So you are looking now at not just optimizing productivity per unit of land, but you are also talking about “more crop per drop,” that is, optimizing productivity per unit of water – and now also optimizing productivity per unit of energy. So these are the things in which the newer and the more frontiered areas – of course, the regular and formal research systems and extension systems are also there – but the foundations, like the Gates Foundation, need to be working on some of these areas as well, so that we can be learning lessons from what is actually required at the field level.

And the most important issue which you raised was, in the participatory extension and the farmer-to-farmer extension, again the concept of – what about the large farms? How do they come in? And we found in a very major survey, conducted in 2003, which indicated that small farmers still learn and get most of their information and technology from the large farmers. The extension workers, the television, the radio, the newsprint – this comes much lower down in their hierarchy and in their priority.

They learn from the big farmers and therefore institutionalizing institutions such as the farmer field schools, I think, are an excellent way of beginning the large farms and learning from those who have the ability and the risk-taking capacity to try out new technologies. And then the ones which are successful are the ones which can then be taken out. So I stop at this point.

Roger Thurow

Thank you. See, these are good lessons that have been learned from history, and wise to pay heed from them. Raj, you're taking a lot of notes. Do you have questions? You're here to primarily learn also, so go ahead and fire away.

Rajiv Shah

Well, I was just going to react to a few things – I think President Chissano’s comment and also Rita’s – about large farmers. And I had the opportunity to visit one of our partners, the World Food Programme, that is implementing a Purchase for Progress initiative, a real effort to buy food locally from small farmers.

And although they are targeting, and they’re trying to reach in ten sub-Saharan Africa countries, 350,000 small farmers over the next four years to buy food products from – and they will invest in helping those farmers organize; they’ll work with those farmers to gain access to the kind of post-harvest processing systems, aflatoxin testing, improved drying and processing, improved packaging, and then bulking so that those farmers can participate in a formal, regulated, commercial market and therefore earn higher prices.

But the program I visited in Uganda had 40 small farmers in a group. The group was organized by the one large farmer who owned something like 700 acres of land and was able to be the kind of point of interaction between the World Food Programme’s bidding-and-procurement system and the 40 small farmers who did follow his lead in that situation; when he adopted improved hybrid varieties, they adopted improved hybrid varieties. When he started using fertilizer, they started using fertilizer. And they followed his post-harvest processing in terms of getting access to the World Food Programme’s market, which offered them in that situation about a 40 percent price premium over what they were getting previously just selling to local markets.

And so I just, I hope that we, as a community of people working on agriculture and thinking about smallholders as the primary customer, can continue to learn how to bring those examples to bear and how to leverage large-scale farmers and producers.

And I wonder if there are other examples or are there other ways that we should be working so that we can work with large-scale farmers, but in a way that avoids some of the mistakes of the past, where small farmers are excluded from the process; doing it in ways that really brings them in and allows them to learn from and gain income and other programmatic benefits.

Rita Sharma

I’ll just very briefly respond to the issue which has been raised here. I think one of the strengths of foundations like the Gates Foundation is in the area of capacity-building, for people to come together for the social mobilization, which helps with economies of scale.

So on the one hand, while you have a learning process from the large farmers, in terms of bringing people together, in terms of economies of scale, especially as it relates to markets, I think there is a great strength in people and small farmers, especially small women farmers, coming together.

So if organizations like the Gates Foundation could build capacities for coming together, develop these capacities – people can keep small accounts, write books, learn to keep accounts –

then both in terms of input management for that small group of farmers, whether it is fertilizers, whether it is seeds, whether it is credit, the self-help group credit movement has taken off in a very, very major way. And that is largely because small farmers have been able to come together, whether it is through microfinance or whether it is linking up to the instructional finance, big financial institutions. It is these intermediate institutions, the self-help groups, which are being able to manage inputs much better than if they were doing it individually.

So building capacities for coming together is one of the major areas. And it also then helps for marketing, because individuals may find it difficult to reach markets which are farther away. Whereas, if people are able to pool their resources together, they can achieve marketing and achieve much higher prices and better value for their produce.

Joaquim Chissano

Well, I will just add, because I said a lot in my speech there, but now maybe it would be more clear here. I would say one of the things which are necessary is, first, education. But the education has to be reorientated in Africa, because I know of cases when agronomists go out of the university and then they come and tell me to help them to find jobs. And they are jobless.

My answer to them is, “Why did you go to school? You are the ones who are responsible now to make things change in our country. So you have to apply what you have learned in school. You should ask me something else and not jobs.” And if they had to ask me for something else, it would be financial support, so that they could start applying their knowledge.

But of course we have to change their perception of things, because our education in Africa still does not gear people to be entrepreneurs. And this entrepreneurship should come, and I think that foundations can support that.

Myself, I have a foundation, which I have created, and now we have been offered land and some small infrastructures, and we’re thinking what to do with them. And we said no – maybe it is in here we can train people to become entrepreneurs, those who come out from universities. So foundations can help this kind of initiative.

And the other thing which hinders the development, the rural development, is that today the educated people tend to remain in towns because they don’t have incentives to be in the countryside. Well, to link with the agriculture, I think that food processing is an element which is very much important. Because nowadays our peasant – because here we’re speaking about small and big farmers. In Mozambique we have another category – we call them “family sector.” That’s not just a small-holder; they don’t care much about markets, about packaging to sell and so on. They want enough food to eat and then to sell what remains. It’s the family sector. But we want to help this family sector develop into small farmers who care about trade, and then to go up to the big farmer.

And if there were processing in the countryside, in the rural areas, then you would pin down a lot of youth, and you’d avoid emigration into the towns. Because the youth is increasing population in slums, in towns, instead of being outside. Because to make agriculture, they think that it’s something for uneducated people. We want educated people because we cannot speak about

Green Revolution if we don't have educated people participating in agriculture. You cannot speak about biotechnology if the educated people are not there. We cannot speak about fertilizer if the educated people are not there.

So we have to have an activity in the rural areas, activities which can pin down them. And we can start with things that are related to developed agriculture, which is food processing, crops processing, crops preservation, and storage, and so on.

Now the last one is – foundations like this, and donors in general, can help to create the commercial network where small peasants or the small farmers or the peasants or the family sector can sell their products in small quantities. And then these would be carried out, if infrastructure is there, into the towns to be sold in the towns. So there's a lot of things which we can speak about related to the cooperation between the state and the foundations, state donors, and civil society.

Roger Thurow

Thank you. It's interesting, thinking of commercial transactions and markets, because I think one of the missing links – and the Gates Foundation folks have also discovered this – one of the missing links in the African Green Revolution, or bringing the Green Revolution to Africa, has been markets. And because the work of the Sasakawa Foundation and Dr. Borlaug in Africa, where they were able to have tremendous increases in production in a number of countries in Africa, including Mozambique, Ethiopia, some of the West African countries. But then that almost toppled on itself because, when production and the bumper crops actually came, there were no markets to absorb all that and the prices collapsed and the farmers lost their incentive.

So I was also going to ask President Chissano that, as small farmers learn from the bigger farmers, as they learn from pilot projects of what can happen, are governments also learning from each other? So, in terms of new impulses and programs that are going on in Africa, the Malawi government started its own fertilizer and seed subsidy program, against the advice of the World Bank and other organizations there, because they basically felt, "Enough is enough – we're not going to have our children on international television begging for food anymore." So they started that program. Ethiopia began a commodities-exchange, much with the support of the government.

So I was wondering – and Raj had asked the question about South-South lessons – what are you, and also in India, what are you learning from yourselves, programs that you see can be scaled up in your own countries? And if not just within Africa, what you're learning, what you may be learning, from India or China or Brazil?

Joaquim Chissano

Well, now, taking the example of Mozambique, we are having a lot of connections with countries like India, China, and Brazil – precisely. We are looking here for other countries, because we know that they started from all levels, and we are trying to go back to see, as Madame said here, we have to learn from their mistakes as well, and it would focus on that.

And so we have the Indians working in our country, for instance, for rice, because we know that they had very successful experiences. And we have Brazilians who are – it's a recent cooperation in the field of agriculture; we are working with Embrapa, for instance, and other institutions.

Even in this field of food processing, drying tomatoes or banana or even onions – we are learning from both India and Brazil. We have China also, but in a lesser degree, because we know that they are big numbers, and so whatever they do, they tend to base in intensive labor, which we may not have. Well, India also they have got big numbers, but their technologies are accessible to us.

The other area where we're taking experiences is the area of machines. The three countries do produce small machines to be used by household family or a small community. I know that in states also there are some pumps which are pedal pumps, which have been produced, some of them, in Mozambique.

But one thing which is outside of your question – Madame, you were saying about the...how did you call it? Not fertilizers but nutrients, nutrients. It is a very important thing. When we speak about the forthcoming fifty years, that is a very important notion, because our land is beyond tired. And so that we can utilize the same land for a longer period, so that we don't have to cut up forests and so forth, we have to feed the land, first of all, to feed the land, not only with the fertilizers but fertilizers that can create the progress but also to give potential to the land itself to be productive without a lot of cultivation and a lot of putting pesticides and so on and so on. And so I liked very much what you said, because this is the perspective. If we want to present our land to be fertile for the next fifty years, we have to do that.

And we have to also look into the demography. The growth in some countries in Africa goes beyond three percent per year, and so it's too much. So you may increase production and even productivity, but you have new growth of population, which is much higher.

So this is something which one has to take into consideration. In that we also have to learn from how these big countries like India are coping with this demographic course, and China, and still they can feed their people.

But we have to learn also from small countries, like Japan. Japan, sometimes they supply us food, but when you go there, you ask yourself, Where do they grow this food? because the country is so small. How do they manage with that big population – they feed their own people, and they still contribute. In United States of America we are not astonished because they have got enough land. But for countries like Japan, it really is something which we have to learn from.

Thank you.

Rita Sharma

Just two very quick comments. The first one relates to the issue which you raised about, how do we share these success stories, or how do we learn from each other's mistakes? There are, of course, as we know, formal and institutional arrangements for that. And I basically would categorize them into two categories.

One, as the president has mentioned, that we have bilateral programs with state governments in which there are exchanges of scientists, there are exchanges of extension personnel, there's training, there's capacity building. So there's one set of institutional arrangements for that.

The other, of course, is also true multilateral organizations like the World Bank, the Asian Development Bank, who, when they invest in a country, also bring technical expertise from different parts of the world and some of the best lessons, which are there on the table, to learn from that. So I think there are good institutional arrangements by which we can learn from one another.

The other point that I wish to make was, one of the areas – it's not a very obvious one right now, but I think it's going to become more and more important as economies will grow. And I take the case from India where last year the economy clocked almost 9 percent growth, and if the financial crisis is going to hit us as is being expected, maybe this may come down, but we had targeted another 9 percent growth and around about 9 to 10 percent in the eleventh plan.

But when we're looking at that growth, we are also looking at certain sectors of the economy, largely in the services sector, which are growing and where jobs are being created for people who may not have very high level of skills. Now on the one hand, we know that there are surpluses in agriculture, and, despite the fact that we may have new technologies which would lead to higher productivity, we need to draw away those surpluses from the land, because the land and the demographics is not going to, in the long run, allow for the agriculture to sustain such a huge number of people.

And one of the areas I think in which the smaller foundations can help is in the skill and capacity-building of the rural youth who don't want to be so much in agriculture but who have no other means to be able to develop their capacities in a large number of services sectors – hospitality, retail, information and communication technologies, computer, data-entry operators.

There is a huge demand for young people, and if organizations like the Gates Foundation could work with the private sector – and most of this training and skill development is being done in the private sector – work with the private sector to develop the skills of these young people, then together with the incomes which are generated through agriculture and agricultural labor, there would also be a diversified portfolio of the small farmer, the small-holder family income, in which one member would be working in an off-farm situation and be able, to that extent, insulate the home income from disasters and from other risks which the agriculture is subject to.

So I think skill development and training is one major area where these young people could be trained in, you know, three-month, two-month courses, and then quickly be placed in some of the emerging areas where jobs are coming up.

Roger Thurow

Yeah, that's pretty interesting. I remember Dr. Swaminathan once telling me at his institute, I said, "Well, where do you go from here?" And he said, "Through the Green Revolution we've conquered the famine of food. Now we've got to conquer the famine of jobs." And that's the next step, as you guys work your way through, that's part of his Evergreen Revolution and the second revolution. Raj?

Rajiv Shah

I was just going to build on that say that some of the best examples we've seen of that have been in India, with Reliance Fresh or ITC with the e-Choupal, and these efforts to use information technology to bring information and market connectivity and to help communities diversify has been great. So we've been trying to work with those partners and explore whether there are ways to build on that.

Roger Thurow

One thing that I wanted to ask, Rita, when you were talking about, and also President Chissano. As you were both addressing the issue of soils and feeding the soils and the issue of nutrients and fertilizer, I was also wondering from the experiences of India – because I think this is also something that Africa will have to face – the limiting factor of water and the stresses that the Green Revolution had put on water – what Africa and the Gates Foundation should be paying attention to in terms of proper use and management of the water resources?

Rita Sharma

You're very right about the limiting factor of water, and now looking at nutrients, also. One of the issues which our country faced – and I think that is a lesson which Africa should learn – is that subsidizing electricity and subsidizing water without taking into account the soil requirements, the agroclimatic conditions, very often led to overmining of these very scarce resources.

In making populist decisions, governments often said, "We will give free water and free electricity." And this led to overuse of water, which has led to groundwater tables falling very fast. And we've had situations where they're growing rice, or they're growing sugar cane, in areas where the water table has already been depleted very significantly.

So one of the things that we need to guard against, and we need to be cautious of, is that our policies should be such that they do not lead to overexploitation of the natural resources and that they should be in conformity with the sustainable use of resources.

And we are now, of course, trying to correct that and are looking at issues of nutrient management as a whole, looking at cropping patterns, which are going to be more in conformity and more in line with the kind of water which is available there. So that we have the eastern part of the country, where we are sitting on very, very high tables of water, looking at more intensive water crops, whereas, in the dry land rain-fed areas, you are looking at crops and looking at technologies which are going to be much less water consuming.

So I think that is one of the things that we need to guard against, so that the kind of situations which developed in India are not going to happen in Africa.

Joaquim Chissano

Yes, water is essential for agriculture and for the life of human beings. The perception about water in my country, of the ordinary people, is that, “Water belongs to everyone. God produced the water for us, and our great-grandfathers and grandmothers lived drinking water from this well, from this river, from this lake – why should we pay for water today? The water is ours. No one is fabricating water. So why should we pay?”

So this is the perception, the cultural perception, which has to be changed, and it's very hard to change it, very hard. But it has been in many cases a hindrance to production. We have an irrigation scheme in the Limpopo Valley and the Xai-Xai area in the Limpopo River, in Chokwe and Xai-Xai. And for some years this irrigation scheme was not being properly utilized because the peasants were going out – because it was designed for commercial farmers. Now, the peasants were made to work there, and they were putting the same question – as it was very expensive. So a balance must be put there to give incentives for people to use water and make use of land. But, of course, we must be careful. We had committed the same mistake, when we became independent in Mozambique, to have free medicine, so then we had to correct this. But it's very difficult. We have to subsidize all the time.

Now, this has to do with also the seeds. We cannot indefinitely receive seeds from outside. Actually, a country has got different donors, and sometimes there's a conflicting thing there with the seeds. When the productivity in a certain crop goes down, we don't know what was the reason, but sometimes it is the seeds, which we received from a given donor which were not appropriate for that, and the peasants are not accustomed [to them].

So we should produce in our own country, through research, seeds which are more resistant to drought, so that we make less utilization of water and get the same results or better results.

The same as fertilizers – I think that we should try to find ways of producing fertilizers in our own countries. For instance, Mozambique has got gas, but we are importing urea, ammonia. Why? We have the gas there. And we have phosphates, and we don't have them. But also organic fertilizers – why don't we produce locally? Well, the answer is lack of knowledge and lack of capital.

And, so the same for water. The water, we can multiply our resources of water because in Mozambique we have so many rivers. But the water – my predecessor, President Machel, used to say that our rivers are undisciplined. So what we need is to bring discipline to the rivers. Because in Mozambique you have the droughts and floods in the same year – droughts in the south, floods in the north, and vice versa. And because the rivers are not disciplined. And for this it would need knowledge and capital. Thank you.

Roger Thurow

Yeah, we're going to wrap up; thank you. Raj will have the last word.

Rajiv Shah

Well, I just wanted to build on that point and say that one of our, one observation, of course, when we launched the program with AGRA and with the work in Africa was just, at the beginning of the Green Revolution 30 or 35 percent of arable land in India was already irrigated, and the number in sub-Saharan Africa is, of course, probably just under 4 percent. And so the top priority for our crop-improvement programs has been drought-stress tolerance or water-efficient products.

And water-efficient maize is a program where we have a partnership with the African Agricultural Technology Foundation and Monsanto. We have a number of projects with CIMMYT that are developing drought-stress tolerant maize using conventional technologies. And just recently we got some data back from a seed company in Nigeria that's been already commercializing some of the products out of that CIMMYT project and finding that they're performing very, very well in parts of Nigeria. One company in particular tripled the metric tons that they sold in this past year in just two growing seasons, based on just strong performance of those varieties.

So it just speaks to that earlier point about doing things that farmers tell the breeders and researchers are their priorities, and then when you meet those priorities, you can get relatively rapid adoption of those types of varieties. And hopefully they will remain robust in locally adapted environments.

Roger Thurow

Well, thank you. Thanks for your attention, thanks for all the great comments and the lessons learned; and hopefully, not repeating the mistakes of the past, we'll move on to the next – someone up here made reference to the Doubly Green Revolution, which is a good segue to Gordon Conway and his operation. So we'll yield to them. Thank you very much.