

## **Rajul Pandya-Lorch**

*International Food Policy Research Institute*

Actually, the current status of global food production is relatively good. If you look at the population increase that has taken place in the last three decades, despite the addition of almost three billion people we have actually increased the available food by almost 20%. Do we have enough food to feed the world? Yes. 2,800 calories per person per day are available throughout the world. Does everybody have access to that food? Unfortunately, No. About 800 million people still go hungry today and that's a reduction in population share by half over the last 30 years, from 37% to 17%. But, the number of people who are hungry has not really declined.

Over the last 30 years or so we have increased the world's population by almost three billion and even then we have managed to increase per capita food production and food available by almost 20%. Our projections suggest that we will increase world food production, plant food, animal food, even fisheries food in the coming decades. If we want to make a serious dent in reducing the number of people who are hungry, you're going to have to do business that is NOT "as usual" and we're going to have to make it more accessible for people to have this food either by growing it themselves or by having enough income to purchase the food that others have grown for them.

By business NOT as usual I mean, that, if we want to even just maintain our agricultural yields, let alone increase them, we are going to have to invest as much as we have in the last few years. If we are serious about wanting to increase the yield we have to scale up our investments in agricultural research. We have to scale up our investments in transmitting that research knowledge to the farmers. We have to scale up our investment in infrastructure so that when food is produced, it is able to reach the marketplace. We're going to have to scale up our investments in education and so people have access to remunerative jobs and thereby earn sufficient income to purchase the food in the marketplace. So it's not just a question of increasing food production or increasing production on the farm; it is getting that production out to the people and in cost effective ways.

Let me talk about two types of breakthroughs. One is the breakthrough on the production side and two very exciting things that are looming up. One is what is called bio-fortification of crops - breeding crops to have essential micronutrients already in them so that when people consume these crops they are able to basically get their vitamin A, vitamin C, the iron, the zinc and the other essential micronutrients. A major investment is taking place in that today. You may have heard of golden rice. That's one such example but there are many other different types of crops. Investing in those crops will help us to short circuit the transmission of those micronutrients. And remember, we are not just concerned about calorie intake but also the quality of the calorie intake in the micronutrients.

Another very exciting breakthrough that has taken place is the new rice for Africa in combining traditional African rice with new strains of Asian rice. One of the breakthroughs there is not just in the genetic or in the technological composition of the crop, but in the means by which that crop is developed and by the means in which it is transmitted to farmers.

And, another very interesting breakthrough is on the marketing side. Once you have farmers who are producing that food, how do they get it out and how do they take advantage of market developments? In Kenya, for instance, something has come up called the Kenya Agricultural Commodity Exchange, where they are making cell phones available to farmers in remote, rural, marginal areas. Farmers are able to access information on prices basically instantaneously so that they know where they have more profitable opportunities for marketing the crops. They are able to access prices on fertilizers, on seeds and other inputs and basically are able to cut down some of the transactions' costs. These costs are so high in Africa that any reduction of these costs will make a major difference in the food security of the farmers and of those who depend on the farmers for their own food security.

Water is emerging as the key constraint to food security in developing countries today. We used to think that land was the major constraint. Land is an important constraint, particularly in terms of soil fertility, in terms of marginal lands, but water is emerging as the key constraint in two or three different ways. Agriculture is the largest user of water today, but as populations increase and as their incomes rise, as the aspirations rise, the demand for water by households and the demand for water by domestic industry is escalating very sharply. And agriculture will be not able to compete as effectively as it has in the past.

So one major source of tension is, will there be enough water for the farmers of the world? The quality of the water they will have access to and the price of the water is becoming a major issue also. Water has tended to be under-priced in many agricultural areas of the world and as the competition for water escalates, it is going to have reverberations or repercussions for the price of water that the farmers have to pay. And that in turn may have some implications then for the price of their food. One of the big questions will be is it cheaper for people in the developing countries to import the food that has used the water elsewhere and basically pay the cost of that water, through imports or through growing the food themselves and paying the cost of the water downstream? But it is not just an issue of competition for water - it is also the quality of water over time that is going to be an issue. Will farmers have access to good quality water or will they be giving up some of that water for the domestic and household uses also? So, water is a major constraint and we should not take lightly.

Africa, in a sense, is a continent that has basically lost out thus far in the agricultural production and food frontier. And it's a continent where many of us have for years tended to have feelings of despair and hopelessness. But I think very many Africans today are feeling much more hopeful than they have for decades about the prospects for food security in Africa. And they're feeling hopeful for several different reasons. One is that

there is finally a critical mass emerging of leaders and of other key actors, not just leaders in government, but leaders in business, leaders in civil society, in media, where you feel finally that there is not just informed knowledge and informed decision making but there is a desire to make informed decisions. You see that in something called the new Partnership for Africa's Development, NPAD, that has catalyzed and has basically created a momentum, an African momentum, for change. This is coming together with the momentum for change outside Africa. And I think that this is Africa's opportunity to make a difference. I hope Africa takes advantage of this increased attention.

China is also a very, very exciting country in terms of food security. It is about the only country in the world where you have seen major reductions take place in hunger and poverty over the last two decades. And if you look at the world progress on the numbers of people who have slipped out of hunger worldwide, that has happened because of China. If you remove China from this world picture, actually the picture for hunger is very dismal. In fact, hunger has increased in the rest of the developing world. China has made major investments in infrastructure. It had made major investments in policies. It has made major investments in incentives and in prices and you see that in year after year, people basically moving out of hunger and poverty. To me, China is a very exciting case study in terms of the progress that can take place, but the challenge is how do you replicate the Chinese experience across the rest of the world? What are the key ingredients in China? Is it governance? Is it investment? Is it economic growth?

How can the rest of the world mimic the rate of economic growth that China has had? You know, China has been feeding its population largely through its own increased agricultural productivity and production but it is also importing more food from the rest of the world. This is not having devastating consequences and should not have. So that's not the message I want to send - that China is feeding its people by calling upon resources from the world. It is a transformation that has taken place basically in that China sees an opportunity to feed its people not just by improving its own production and its own productivity but also by opening up and making use of world markets. And that, I think, is, something we will see more and more of in the coming decades - a greater dependence on world markets to feed your domestic populations.

The green revolution is essentially a trinity of three factors coming together. One is improved seeds. Back in the 1960s and '70s a lot of investments were made in developing hybrid wheat, hybrid rice and even corn. This was coupled with increased investments in fertilizer and with increased investments in water and irrigation. But this green revolution has essentially really not taken off in Africa for several different reasons. One is that the African crops are not necessarily the Asian crops and making the increases in yields for some of these traditional crops has required much more investment. So you've not seen corresponding leaps as you have for rice and wheat, as you see in the case of maize or as you see in the case sorghum or barley or some of the other African commodities.

Investments in fertilizer, access to fertilizer, is a major, major constraint in Africa today. The cost of fertilizer is very high, two to three to four times as high in Africa as it is in

Asia. One of the major reasons for that is infrastructure challenges. In Asia the green revolution basically flourished because there were infrastructural investments that took place, primarily road coverage, rail coverage. The cost of the inputs was not as high as you see in Africa today.

Irrigation, the third leg of the green revolution, again, poses major challenges for irrigation to take off in Africa. In Africa, which is a much more spread out landscape, people do not have easy access to irrigation. Only about 4% of African agriculture today is irrigated. We hope that it will go up to about 8% or so by 2020. But, it will require a major investment in new sources of water, in infrastructure to be able to communicate or transmit that water, and today Africa does not have those. So what people are talking about is finding pockets of successes in Africa, building up those pockets of successes in African agriculture, scaling them up, and you may have these different evolutions in different parts of Africa, taking advantage of Africa's very wide ecological diversity and taking advantage of a different circumstance.

The monoculture has helped to feed the world. Let's be honest. We had a major constraint in the '60s and the '70s and one of the ways in which we have managed to feed the world is by investing in increasing the productivity of a number of different varieties. But if you want to increase food production on the mass scale you invest in certain varieties and in basically making those varieties accessible. In the process some have complained, rightly, that you have basically corrupted the biodiversity of farms and of farmers around the world. You see two different things happening. It doesn't have to be that way. You have more informed consumers coming up. You have consumers that want more diverse foods and are ready to pay a price for some of that diversity. I think that is a very happy set of news for preserving some of the ecological biodiversity. In one sense you do need some of these monoculture types of agriculture, but you are also able to capitalize on some of these biological diversities and thereby preserve them.

People are concerned about the climate change and whether that will have implications for food production. Climate change can affect food production in several different ways. It can affect it by the changes in the growing seasons, thereby in terms of the grain yield and in terms of where agriculture production can increase or decrease. Let me give you an example. A lot of the modeling work we see converging is that the implications for climate change will basically lead to decreased agricultural production primarily in the tropical areas and increased production in the subtropical and temperate zones. There is an increasing consensus that climate change will make the areas that are already sort of moist, more moist, and the areas that are semi-arid, more dry. Sea levels are also rising. That will decrease the amount of land available for agriculture as the seawater encroaches into some of the coastal areas, making them less suitable for agricultural production.

Climate change has implications for fisheries in several different ways. Fish itself is an important source of calories, an important source of micronutrients to many people around the world, particularly to those people who live in coastal areas. Fish production, through marine catch, is becoming increasingly threatened and the major source of expansion for fish production and consumption is in the aquaculture arena. As

aquaculture becomes a major source for fish production, concerns grow about the implications of aquaculture on available agricultural land. You see a competition for land between aquaculture uses and agricultural plant or animal uses. You see an increasing source of tension about the encroachment of some of the aquaculture water and what it does to the ground water and other components of soil in surrounding areas and how that threatens agricultural production.

One of the points I wanted to get back to, in terms of population pressure, was about environmental degradation. We talked about water being a key constraint. We talked about land being a key constraint for agricultural production. And there are several different issues here. One is the constraint on farm size. Farm sizes around the world are diminishing and more and more people have less and less access to land. You see a rise in landlessness today in the developing world and you see a rise in near landlessness, people having access to some land but not sufficient land to meet their own needs, either through their own production or production for the market. And this is, I think, something of concern. Conversely, even though the average size of farms is declining, you are seeing the rise of larger and larger and larger farms as commercial agriculture takes root, particularly in developing countries. You see that in China, for instance, but also all across the developing world. To be commercially viable farms have to be larger. To be larger, people need to be able to buy land and consolidate land. In a number of developing countries that is a challenge. The land tenure and the land policies do not make it easy for people to consolidate land and because rightly, there are some social concerns.

One of the major hot issues, I think, that we, as a developing community are going to have to grapple with in coming years, is whether there is a future for small farms in developing countries? How small is small? As farms become smaller and smaller, with population growth and not enough available land, at a certain point is small too small? And if small is too small, what happens to the people who are engaged in these smaller and smaller farms? Is it viable for them to remain engaged in farming? Do they get pushed out? Where do they get pushed out to? To marginal lands? Are you then going to see environmental degradation in these marginal lands and what are you going to do with these lands in the future? Are they getting pushed out to the urban areas? As they are pushed out to urban areas, how will they feed themselves? And what are their employment and other choices?

But even as we do that, the real concern becomes that if we are serious about wanting to tackle hunger, entrenched hunger, hardcore hunger, hunger in developing countries, what are our avenues? Agriculture is the major engine for economic growth in developing countries. As farm sizes become smaller, is agricultural growth a serious engine for growth? Is agricultural growth a serious engine for poverty and hunger reduction? And if it is not, what do we do with these people? To me, the real question is, what is the future of small farming in developing countries and do we want to preserve it? Why do we want to preserve it? Do we want to preserve it because of cultural values? Do we want to preserve it because it is a source of employment, of income, of livelihoods? Do we want to preserve it because we just love small farmers? Or do we find some real, viable

solutions for these farmers that help them to get out of marginal farming, small scale farming, and yet keep agricultural productive? I don't know what the answer is but I do know that we are going to have to face this challenge in the coming years. What do we do with our small farms? What can we do with our small farms?