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# GRICULTURAL TRANSFORMATION In Africa

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*A Round Table Discussion with Chris Ackello-Ogutu, Michael Carter, Kevin Cleaver, Chris Delgado, Elon Gilbert, Benjamin H. Kaestner III, Carl Liedholm, Mike Maynard, Pauline Peters, Tom Reardon, David Sahn, Asif Shaikh, Peter Timmer, and Africa specialists of USAID and Winrock International*

EPAT/Winrock International

*Thursday morning, May 28, 1992*

## What is Happening in Africa in the 1990s?

Panel: Pierre Antoine, Elon Gilbert, Peter Timmer, Chris Ackello-Ogutu. Chair: Tim Bork.

### *Antoine*

I realize that I may be one of the few biological scientists around this room and I am going to undergo brainwashing in economics and trade and policies a little later, but I hope that you will accept something, which is indeed closer to the ground. It's difficult in 15 minutes to talk about a continent that is so diversified and has so many ecosystems. However, I believe that there are a number of trends and constraints that are similar in West Africa, East Africa, and southern Africa. Before we go into the chemical and biological factors per se, let me review a few statistics.

Population in sub-Saharan Africa is around 500 million people. With an average growth of about 3 percent, population will likely triple during the next 30 years before a substantial slowing of the growth rate takes place. Eighty percent of the world's poorest countries are in Africa. Levels of illiteracy are quite variable of course, but on the average 70 percent of the population is illiterate. There is definitely a deficiency in the human condition: a lot of poverty, malnutrition, and also many endemic parasitic diseases. To this list we can add

recently the catastrophic threat of AIDS, though no one is very sure how to interpret the data or how it will influence human resources in the countryside.

Seventy-five percent of the population is employed by agriculture. The exodus to the cities is not really justified by attractive employment opportunities. Since 1960 the standard of living has stagnated or fallen. This is unlike Asia and the other continents. Agricultural output has not been able to keep pace with population growth. That means that there is a decrease in actual agricultural output per capita.

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#### Questions posed to the panelists

1. What are the trends in production, land and labor productivity, agricultural prices, rural incomes, nutrition, commercialization?
2. What is happening to population pressure on the land, size of holdings, land tenure, conflict over land use, soils, and fertilizer?
3. Is agriculture releasing labor to nonagricultural activities? Are rural nonagricultural manufacturing and services developing? How are gender roles and division of labor within the family changing?
4. Are there signs that agricultural transformation is occurring in terms of commercialization, technology changes, land-labor ratios, productivity, and intensity of production? Where? How important is it?
5. What are the interrelations between extensive/intensive agricultural systems and the environment: pollution, wildlife, biodiversity, and ecotourism?

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In the past 20 years, the African countries have substantially lost agricultural markets to Asian and Latin American competitors. They may have lost 50 percent of their exports on a relative basis. Only tea exports have increased on a percentage basis. This is a rather bleak view, yet, I believe that agriculture remains the centerpiece of African development.

Let's focus now on the resources. I have resources of three types: biological, water, and land or soil. First, let's look at plant resources: germ plasm and seeds. I think that the attitude of the Afri-



can farmer is very different from the attitude of the Asian farmer and that his first objective is to minimize risk. The farmer is generally little interested in high-yielding varieties, such as those developed in Asia in the context of the green revolution, because they generally perform well only under a controlled environment where there is no shortage of water and where chemical inputs can be widely used. That situation is not typical of Africa. In general, there is little irrigation available and inputs are scarce.

So the problem is not so much to develop high-yielding varieties that take a lot of care, but to develop the varieties that will adapt to a difficult environment and eventually will be disease resistant and will yield moderately well despite nutrient deficiencies. There are plenty of those varieties available on the shelf. One of the problems of the international

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agriculture research centers has been that they focused on plant breeding programs. That's true for the national systems as well. The difficulty is their availability to the farmer. They exist on the shelf. They exist in the stations. But the bottleneck is at the level of seed availability, multiplication of seeds, and whether the farmer knows how to get access to those varieties and how to grow them.

What remains a serious constraint in the area of germ plasm, therefore, is that 90 percent of the African farmers, according to some surveys by Mississippi State University, are still growing their seeds themselves and the know-how is not there, the germ plasm is not there. I believe that it is possible to develop large seed marketing systems with a few crops like corn, for example. There are some big agribusiness concerns that focus on that. But, for the most part, the farmer must be helped to be more self-sufficient in gaining the seed base. You can have all the necessary knowledge of cropping systems and land management, and so on, but if you don't have a good seed base to start with, you're in trouble. So seeds are the constraint, not the availability of varieties.



The second biological component in resources is livestock. I won't say much about that except that a slow evolution is under way in this sector. Until recently the human population densities of Africa were low. As a result, specialized crops and livestock production were considered the most efficient means of producing both crops and livestock. Since mid-century, however, human populations have soared, resulting in increased competition for land between livestock and crop production.

Winrock has just prepared an assessment of animal agriculture in sub-Saharan Africa.<sup>1</sup> I quote from the conclusions:

When population densities are high and markets, technology, and inputs are not readily available, intensity of land use increases and mixed crop livestock production becomes the most efficient and sustainable mode of food production because of complementarities between crops and livestock raising. Key elements in the contribution of livestock to intensification are traction (power), manure (fertilizer), and enhanced income per unit of land.

As a direct consequence of increased population pressure on agricultural land, both crops and livestock have essential and interconnected roles to play in the future development of agriculture in sub-Saharan Africa. Crops and livestock can no longer be viewed as separate and inevitably competitive enterprises. If food production is to be increased to the level needed to feed the region's growing populations, if greater agricultural sustainability is to be achieved, and if adverse environmental effects of cultivation are to be minimized, livestock must be properly utilized in agricultural development processes.

This is something new. Until now I think we talked about livestock. We talked about crops. I think that more and more, because of the population pressure on the land, there will be a need to integrate the livestock into the system. And it is obvious that this will affect the population and create a number of social pressures.

Water resources in sub-Saharan Africa are the most unpredictable of all the inputs necessary for agriculture production, and yet the very source of life. The areas subject to high risk of drought are estimated to cover about two-thirds of the subcontinent. Irrigatable land is less than 20 percent of the entire area. In practice less than 3 percent of the total land is irrigated, and most of it is in Sudan. This parameter alone explains why a comparison between Asian and African agricultural challenges may be worthless. Africans don't practice irrigation. There have been a few intensive large-scale irrigation schemes. Many have failed. The cost is very high. The December 1991 issue of *Spore* reviews the advantages and disadvantages of large- and small-scale irrigation. Their conclusion is definitely in favor of small-scale irrigation.

**"Soil fertility maintenance and improvement is the most underrated problem in Africa."**

Last, I believe soil fertility maintenance and improvement, that is, the physical and chemical component, is the most underrated problem in Africa. Soils are taken for granted. People think that they will always be there, that they can mine nutrients. In fact this is not the case. The World Resources Institute says that in the past 20 years, 10 percent of the soils have been degraded beyond repair.

Soil fertility could be maintained by using a variety of techniques: biological soil improvement, organic fertilizers, inorganic fertilizers, and of course soil conservation measures. On the average a food crop in Africa uses between 300 and 600 kg/ha per crop (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, MgO, S). Right now the average use of chemical fertilizers is about 7 kg/ha per crop. Organic fertilization, use of manure, mulches, and so on certainly cannot compensate for the difference. We have a gigantic problem because fallows are getting shorter. The population increases. Physical degradation sets in, along with compaction, overgrazing, and so on. Despite the fact that we could say, well, we can start a fertilizer industry, we can help the farmer in using fertilizers, the development of that industry is so complex, we've lost so much on problems of supply policies, access, know-how, and so on, I believe that it cannot really be achieved in the next 20 or 30 years.

My conclusion is that we have some very serious constraints—seed, water, and soil fertility—that are not going to go away overnight. If we ignore them, I think that we're committing kind of a crime, and we're certainly not helping people who are expecting our help.

### *Gilbert*

Is agricultural transformation happening in Africa? I feel it is. There are major changes in a positive direction. What do I mean by positive direction? It means improvement in productivity over what would otherwise have been the case. This is important to keep in mind because a lot of the changes that we are observing are responses to negative situations. They are in effect keeping people's situations from deteriorating at a faster rate than they otherwise would.

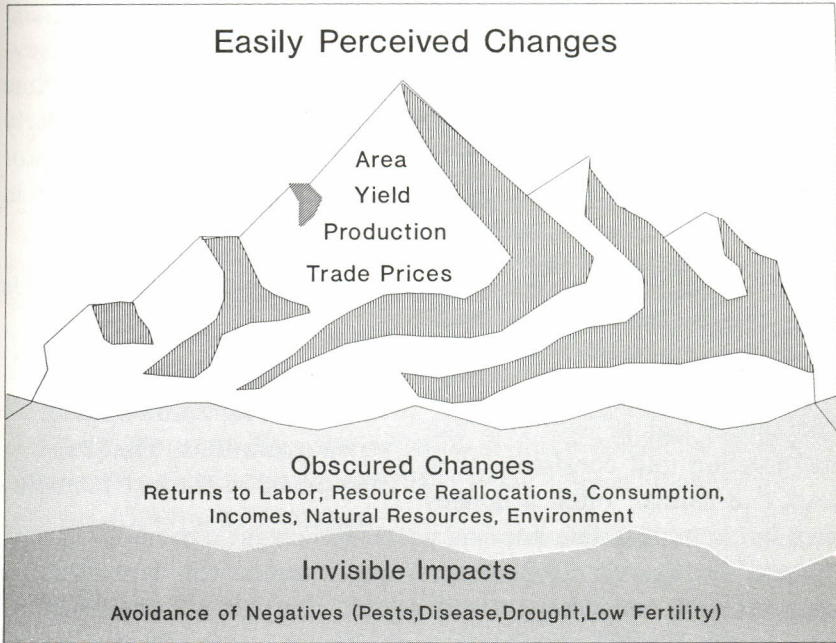
**"One finds situations in which yields per crop have declined, but where a significant improvement in productivity over what would otherwise have existed has taken place."**

What does it look like? Often you can hardly see it. You have to be careful with national statistics and yields per crop. Both suggest bad news. I'm not saying that that bad news is totally incorrect, but it can be misleading, especially yields. If it is true that in many countries farmers adopt technologies not to increase productivity of land but for other reasons, why should we look primarily at yields per crop as the measure of advances in productivity?

Instead we might better include other indicators. One of Peter Timmer's studies is very much on target in this regard—namely changes in input-output relations. Second, if we look at changes in nonfarm activities and migration, cropping patterns, enterprise mix, input mix, and consumption patterns, we can see significant changes taking place in a number of countries in Africa.

The impact iceberg (see diagram) is derived from a study for the Africa Bureau on maize research impact in Africa (MARIA) and illustrates the discovery process that we have gone through in selected countries to understand what has happened as a consequence of the introduction and dissemination of innovations for maize.





There are, first, the easily perceived changes, namely area, yield, production, trade, and prices. We should certainly look at these, but they are just the tip of the iceberg. Second, there are the obscure changes which include returns to labor, resource reallocations, consumption, consumption incomes, and natural resources and the environment. They are "obscured" in part because we don't have a lot of data in an easily accessible form. We have a number of points in time and space that may or may not be closely related to one another. To find causal relationships between those points, we often have to rely on our imaginations. Finally, we have the invisible impacts, which include the avoidance of negatives such as pests, diseases, drought, and declining soil fertility. One finds situations in which yields per crop have declined, but where a significant improvement in productivity over what would otherwise have existed has taken place.

The Gambia is an illustration of observed transformation. Over the past 15 years, there has been little increase in area under cultivation (there has been an upward movement in the last 3 years, but no clear

trend for over a decade prior to that), no trend in yields overall, and minimal increase in total production. However, there have been several changes including major shifts in the cropping patterns (decline in the areas for groundnuts and long-duration cereals, particularly late millet and sorghum), an increase in early millet, very pronounced increases in maize and sesame, and a 25 percent decline in rainfall.

What's going on here? We look a little further and we find changes in purchased inputs and a major expansion in animal traction. Fifteen years ago, 10 percent of the households had at least one animal traction unit consisting of at least one animal, often a donkey or a horse, plus a sine hoe and a planter. Today over 70 percent of the farm households nationwide own at least one animal traction unit. In parts of the country, notably the North Bank Division, the figure is over 90 percent. In other words, in portions of The Gambia, animal traction is virtually universal for some upland crop operations. That has happened in the last 10 to 20 years.

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Second, there has been a major reduction in what we call stranger farmers, migrants who come in primarily to supply labor but also to farm on their own. Third, there has been an increase in fertilizer use. The evidence is mixed because use has been influenced by erratic prices and availability, but The Gambia is among the highest users of fertilizer per hectare in the region. Fourth, there has been a reduction in fallowing. Finally, there has been significant outmigration and increases in school enrollment in this period. In parts of The Gambia, the economically active population between 16 and 64 has remained virtually stagnant over the past decade.

Now, wait. Reduction in fallowing: Didn't I just say that there had been no increase in area under cultivation? Isn't that a fundamental contradiction? How can you have a reduction in fallowing and no increase in area under cultivation? To help clarify this apparent contradiction, I suggested talking to farmers to help us understand

what's happening. Although indeed The Gambia does not have anywhere near as much unused good quality land as it used to, the reduction in fallow does not appear to be driven primarily by land shortages. Rather, it is related to animal traction. Once a farmer brings land into cultivation, he or she wants to keep it in cultivation as long as possible. It may be at least partially de-stumped to facilitate the use of traction. The use of traction, in turn, makes it possible to control weeds more efficiently and thus keep fields in production longer. Well-cleared fields plus traction increase the speed of farming. And that is what has driven animal traction in The Gambia and Senegal. The spread of traction has been in accelerated, ironically, by the decline in rainfall, which has reduced the challenge levels of the tsetse fly. The situation is more conducive to the expansion of animal traction, especially using equines, than before.

Put all of these elements together plus some indicators that nonfarm employment has increased significantly (even though we have an economy that is not very buoyant) and we have major change or even a transformation, by African standards, in The Gambia. But we can easily miss it entirely.

### *Bork*

Now we're going to turn to Peter Timmer. He's going to talk about trends that connect macroeconomics and the agricultural sector. He's going to talk about trends in productivity focusing on labor yields and land and total factor productivity.

### *Timmer*

We have talked about economic retrogression, the trends that are moving in the wrong direction, but we've talked about it as if it were a continuing and long-term process in Africa. Malcolm McPherson, a colleague at HIID, divides the economic performance of Africa at this overall macroeconomic level into three periods. From the early 1960s to the mid-1970s, Africa is not an outlier in the context of the economic performance of the rest of the Third World. It had increasing GDP, it had rising per capita incomes, it had expanding exports, it had higher levels of investment, it had low rates of inflation, it had very modest foreign debt. Until the mid-



70s, it was outperforming a substantial number of Latin American and Asian countries.

The second period that McPherson identifies is the mid-70s until 1982, until the debt shock, and we can put a day and an hour on that one. Mexico says, we're going to default. Suddenly the international financial community looks around and says, uh-oh, we've got a real problem on our hands. That triggers a whole new environment externally for Africa. From the mid-70s and until 1982, GDP growth rates declined—not GDP itself, but growth rates declined. Investment rates fell. Inflation accelerated. Foreign debt mounted rapidly, and we begin to see difficulties with debt servicing.

With the shock in 1982 until the present, most of the economies are in an actual state of decline. From 1982 to the present, per capita incomes and investments have actually fallen. There has been excessive expansion of the money supply, high rates of inflation, and lower levels of exports, not just lower export growth rate. Import capacity almost collapses, especially the capacity for commercial imports. Domestic savings are actually falling, and the external debt is clearly insupportable. It simply cannot be financed.

So those are the three periods that Malcolm sees when he looks at the overall macroeconomic environment. The situation is not one that is getting better through the 1980s. It increasingly looks like it's on a cumulative negative downward spiral since the debt shock in 1982. As I said, that's the point of view of a macroeconomist.

Where does agriculture fit in this? Interestingly, in the 1980s, agriculture begins to outperform the rest of the economy. The share of agriculture in GDP, which should go down as the economic transformation takes place, has gone up in Africa. Africa is deindustrializing. Just a few numbers to make the point: the agriculture share in 1965 compared with agriculture share in 1988 for Tanzania goes from 46 percent to 66 percent, in Zaire from 21 percent to 31 percent, in Zambia no change, in Ghana from 44 to 49 percent. Only in Senegal did it go down from 25 to 22 percent. Look at the annual growth rates in agricultural GDP in the periods 1965 to 1980 and then 1980 to 1988. In Tanzania it grows 1.6 percent from 1965 to 1980 and then agriculture grows at 4 percent in the 1980s. We don't

have the early period for Zaire, but agriculture is growing at 3.2 percent in the 1980 to 1988 period; in Zambia, from 2.2 to 4.1 percent, almost doubling; and then Senegal, from 1.3 to 3.2 percent. Ghana goes the other direction. This diversity is troubling and people have to be aware of it. This diversity is quite real.

Agriculture is outperforming the rest of the African economy in the 1980s. And at one level, it seems to me we ought to be optimistic. That says there is some production response to a policy environment that has reduced the anti-agricultural bias in overall economic policy. You free up the exchange rate. You get rid of a lot of price controls. You open some import markets. Even if these changes are very limited, agriculture has the potential to respond. And that seems to me to be what those growth rates are saying.

Unfortunately, if we go underneath those numbers, the trends are not quite so encouraging. If we look, and here I am sensitive to what Elon is saying about the kinds of data that support these numbers, at the productivity levels underneath the aggregate output levels, then things are more worrisome. If we look at the contribution of agriculture to the growth process in terms of its contribution through productivity, according to the regression results that Steve Block has put together, the patterns for agriculture in Africa looked exactly like the patterns for the rest of the world in the 1960s and early 1970s: a big contribution from agriculture to the growth process, highly significant, big coefficient, and virtually the same coefficient in Africa versus the rest of the world. When you go to the 1970s and up to 1980, the contribution drops sharply and is barely significant. And for the 1980s, agriculture's contribution to economic growth is negative. The coefficient is insignificant. This growth process that we see in the aggregate, the higher rate of growth in agriculture is not being transmitted into the rest of the economy. Now, maybe that's because the markets aren't working yet. Maybe this is a process that takes a lot of time, but whatever the reason, we better understand the failure of agriculture to connect to the rest of the economy in the 1980s in the way that it has stimulated other economies everywhere else. As different as Africa is, I don't think it is so different that it needs not to connect.



Last two points: labor productivity and crop productivity. Last year, Vern Ruttan showed us what happened when you put changes in output per unit of area, that is crop yields, on the vertical axis and output per worker on the horizontal axis. Normally, you expect those trends over time to increase up and to the right. Higher yields per unit of area as you get new technology and more productive inputs and higher yield per worker, which allows higher real wages. Eventually that moves rapidly out toward raising real wages in agriculture to be commensurate with real wages in the rest of the economy.

Vern showed Africa was going down to the left rather than up and to the right. It was doing worse in both cases. Steve and I

have tried to desegregate this type of Hayami-Ruttan diagram by crop and by country to see what is going on. And the answer is there's no pattern at all. Sometimes it's up. Sometimes it's down. It depends on the country, on the crops, on the time period. There is no apparent pattern in the data. Now, maybe it just means that the data aren't any good. But my guess is there's something more fundamental going on underneath here, and that's that the agricultural economies of Africa are simply not connected to the rest of the economy—not connected in any meaningful sense to the urban economy. I think we need to revisit the question of whether the agricultural economies of Africa are connected through functioning product, input, and factor markets to the so-called macroeconomy.

**"The agricultural economies of Africa are simply not connected to the rest of the economy—not connected in any meaningful sense to the urban economy."**

### *Bork*

We've talked a little bit about economics and what is happening there. Now we're going to turn to the social, cultural, and political aspects.

### *Ackello-Ogutu*

I think we are concerned about Africa because the performance of the economies generally, and agriculture specifically, is declining not only compared with other developing regions but also compared



with the past. And, of course, it is declining compared with the developed economies. Two decades ago it was probably better.

I would like to go through some factors relating to stability or instability. It was mentioned that there is instability caused by a narrowly based economy—instability caused by emphasis on a few enterprises. But I would also talk about instability that is arising from population growth and migration. I don't have much experience with the West African scene; I shall therefore speak basically in reference to eastern Africa, specifically Kenya.

Let me first address instability arising from production. We all know that agricultural production in Africa is confined mainly to food crops such as maize, millet, sorghum, and root crops. That restriction causes considerable problems especially because of the drought factor. Low crop productivity caused by farmers' inability to use biological and chemical technologies for economic reasons has been aggravated by frequent droughts.

Food-crop production shortfalls have led to rural poverty, instability, and apathy. Consequently, migration to urban areas has increased. That in turn is increasing the poverty or the proportion of the poor in the cities, some of which are expanding fairly rapidly—10 percent per year or even more in some countries. So, when we say that agriculture is providing food and resources to the industrial sector, in the case of labor it may not necessarily be employable labor. Poverty precludes attainment of the requisite discipline and educational background.

The other production aspect regards cash crops. I think there are good prospects in the traditional export crops such as cocoa, cotton, coffee, tea, etc. But emphasis needs to be redirected to nonconventional export products, particularly horticultural crops and flowers, which are fairly profitable and thus offer excellent opportunities for countries to widen the enterprise base.

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Livestock has been neglected but has important linkages with the rest of the economy. Africa relies predominantly on off-take from pastoral lands whose resource base and productivity are rapidly declining. There are now environmental dimensions that need to be taken into account. Issues related to use of nonfarm inputs, chemicals, and artificial insemination also need to be given serious attention in both pastoral and agro-pastoral areas. Many governments are not emphasizing the importance of livestock in the agricultural base and as a means of stabilizing food supplies and rural incomes.

Turning to the population and land aspect, although the population growth rate in Africa is quite high, wars, inter-ethnic conflicts, and diseases ironically seem to be containing the situation—I hope this won't be taken in the wrong moral perspective. But, as I have already mentioned, migration from the rural areas, despondency, and apathy are readily discernible. These are phenomena that have become prevalent only in the last 20 years.

There is, however, a lot of variability in Africa. Although population pressure is acute in the high-potential areas, there are many African countries where the land resources still are quite significant. Even within countries, there's a lot of variability. Although the pressure is mainly on the high-potential areas, there is also pressure on the low-potential areas because people are resettling in lands that were traditionally reserved for wildlife or pastoralism. Such lands are invariably not stable enough for arable farming.

Land adjudication is fairly advanced in countries such as Kenya but equity in distribution is an issue that must be deemed to be fairly sensitive in most African countries. Africans have realized the importance of land ownership especially in the face of high inflation

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rates. Governments thus use land as a weapon to dish out favors to contain discontent and as a means of rapid financial rewards to individuals and institutions considered to be faithful to prescribed views. There doesn't seem to be a direct positive relationship between land security and investment in farming aimed at improving productivity values, which are aspects that need to be looked into. Irrigation is not being practiced due largely to the heavy capital requirements, particularly in relation to low, regulated market prices for food crops. Production of food crops often constitutes the major occupation of resource-poor farmers.

On gender issues, I think in the past we emphasized the wrong aspects of equality between women and men. Women farmers are obviously overburdened by agricultural and domestic chores. Fortunately, emphasis, at least in terms of research, is now being redirected toward more meaningful aspects, such as raising the productivity of the women in order to reduce their drudgery. I think this whole issue is being revisited, and there are a lot of nongovernmental organizations now directing their efforts toward women farmers and women's groups. It is not all in vain. In West Africa, for example, you see a lot of vigorous market women and in eastern Africa there are a lot of women's groups. Although the latter are often misused by politically minded leaders, they have the potential to raise agricultural productivity at least indirectly.

In the past we stressed the problems of women rather than looking at the division of labor within the household involving all family members: school children, unemployed adults, men, and women. It is now clear that gender roles should be investigated in a proper prospective rather than merely highlighting the housewife's misery and burdens in isolation.

Finally, I would agree that there are signs of transformation going on. I've looked at transformation in various aspects—the mechanical transformation, the biological chemical transformation, institutional transformation, policy reforms—and I think lately we have been reminded of the communication and information technology transformation, which is important and should be spearheaded by governments, especially if exports are going to be improved. Of course, the



governments have to participate in creating an enabling environment for exports by negotiating with foreign governments and providing information.

In those respects, transformation is indeed taking place. There is a need for a larger role to be played by the government to provide the necessary environment. We've talked quite a lot about comparing Africa and what is going on in Africa with Southeast Asia. I don't know if that is helpful or whether it raises unnecessarily too many questions without providing answers.

#### *Hobgood*

In contrast to the gloom-and-doom scenarios regarding African agriculture, I was struck by what our missions were reporting this last year. Some interesting things seemed to be beginning to happen. Eleven out of the sixteen missions that reported on the impacts of their programs were talking about progress being made in farmer adoption of improved technologies or increased fertilizer use. It seemed in some cases to be associated with increased exports. The technologies that they were adopting were food-crop technologies but also associated with increased exports and in most cases with marketing reforms.

The question is whether we are beginning to see some impact from our longer term efforts at technology development and transfer linked with our more recent efforts in marketing reforms. I wanted to ask whether Peter is beginning to see any changes at all, either crop-specific or country-specific, that would indicate that something is beginning to happen.

#### *Timmer*

The simple answer is no, but it's because we're looking at fairly long time periods—1980 to 1990. If we begin to see an uptick in results from 1989 to 1990 and preliminary results for 1991, that's not going to make much difference in a decade-long trend. So we're going to have to pull out the last couple of years and ask in a non-statistical fashion, do we see something beginning to happen different from the trends of the 1980s? That's an important question, but it's not one for which we've seen really powerful evidence so far. I think your point is that some mission reports are not as pessimistic

as we are around the table. At one level I don't find that surprising. You can't keep doing this unless you think you're making some progress somewhere. And you surely would like to report it when you see it, and that's good. I mean, that really is good because these people are trying to make the thing happen.

Second, you note that some of these positive things that are beginning may be the result of a long-term effort to develop appropriate technologies in the African context—a decade of structural adjustment and changes in attitudes

toward markets, pricing, openness of economies, and so on. Are some of those longer term efforts beginning to pay off? I want to emphasize again that this really is a long-term process. If

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we learned anything at all from the Asian experience, it's that you have to stick with favorable development policies, not for years but for decades. The United States per capita income 150 years ago was \$850 in current dollars. That's twice as high as the average in Africa now. And it's been 150 years since we started out at double the African level.

That kind of sustained long-term growth process is very discouraging to aid agencies that operate on 1-year or 3-year or sometimes even 5-year cycles. But I don't know any other way to make development happen other than to have this long-term focus. I hope we all come away understanding that, yes, you have to live with, sort of, the fads of the day. But you also understand that increasing labor productivity over the long haul is the name of the game.

#### *Delgado*

There is an apparent opposition of views and perhaps even of facts between Elon and Tom on the one hand and the other speakers on the other hand. That seems to me germane to the subject of this session, "what is happening." At the end of the 1970s, sort of the beginning of the structural adjustment era, there was widespread consensus that the capacity to respond to a change of incentives for agriculture was low, that there wasn't much new technology on the

shelf or there wasn't a continual process for generating such technologies anyway, that infrastructure was poor, that resources were being depleted, and so forth. Now, it seems to me, to answer the question, "What's happening to Africa in the 1990s?" we do have to resolve the contradiction of Elon and Tom saying, maybe the figures don't look too good but the capacity is going up, and rural capital accumulation is going on, while other people are saying, the figures seem pretty good but look at Senegal, which goes all around the land borders of Gambia, where

you have fertilizer use that fell by a factor of four over the 1980s and where you have a complete decapitalization of the peanut base. Of course, Gambia is a country where you have had macroeconomic adjustment and Senegal is one where you haven't. Instead of looking at trends and yields and so forth, we should

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really look what has happened to the capacity for aggregate supply response. That is where we will get the answer to the kinds of policies I think we need in order to use agriculture as an engine of growth.

### *Gilbert*

I'm glad Chris interpreted my comments as being positive. I think there are many hopeful signs. Malawi is another example where we may see a classic transformation and intensification in agriculture. The big question there is whether Malawi can make the political transition without everything being blown asunder. That's where potential transformations get derailed.

### *Antoine*

The issue is not to be optimistic or pessimistic. There is impact being made. But is the impact being made fast enough while the population pressure is rising, while food production shortages are looming, and while environmental disaster is coming?



*Timmer*

I want to be sure that we don't lose the point that Chris put on the table. What is the appropriate policy response? And I want to disagree with his comment that 10 years ago we all agreed that the production response was going to be pretty small and that we all understood the weakness of infrastructure and the poor technology. If you look at what the World Bank and even AID was saying about the appropriate policy for African agriculture and development, it was, get the prices right, open the markets, and devalue the exchange rate. Bring the budget under control and you solve the problem, thank you.

**"The degree of income diversification into nonfarm informal activity by rural households in Africa is really quite high, contrary to the traditional image."**

Ten years later, we understand that didn't work. Obviously there was a debate at the time as to whether that simple approach would work, and we did not have widespread agreement within the development profession. The Berg report<sup>2</sup> was blunt about how straightforward it was going to be to do this. So I don't want us to understate how complicated the policy debate has been and still is. Part of it is factual. Part of it is obviously ideological. But it's a very complicated policy debate that's going on.

*Reardon*

On whether one may infer from GDP data that there has been a deindustrialization in Africa, I think the jury is still out. A number of studies in recent years have shown that the degree of income diversification into nonfarm informal activity by rural households in Africa is really quite high, contrary to the traditional image. I doubt that most of those activities—the kinds of dynamic informal-sector activity growth that Carl Liedholm discovers or the off-farm income activities we're finding in West Africa—are actually showing up on GDP accounts.

Pierre Antoine's comment that the farm household in Africa is mainly interested in minimizing risk is, for policy purposes and for agricultural research purposes, a central issue. I think that there are two parts to that image that need to be reexamined. The first is the



automatic characterization of the rural household as being a farm household or a farmer. The overwhelming evidence that's coming in is that these are firms that have multisectoral activities. In West Africa for example, where traditionally one thought that these were autarchic subsistence households, more than half of the income is coming from nonfarm activities. These are multisectoral firms sensitive to the terms of trade across sectors and willing to shift factor allocations among those sectors, depending on what they see. Second, when one says that they're mainly interested in minimizing risk, one has to juxtapose certain facts with that statement to really test it. Three phenomena come to mind. The first is that in certain situations there has been rapid adoption of high-yielding or high-value crops in, for example, the West African semi-arid tropics. Cotton production has increased rapidly in many areas, with smallholders adopting as rapidly as they could. Second, though, one also finds significant nonadoption of soil conservation measures, of fertilizer, etc. Environmentalists and agricultural research institutes have thrown up their hands, saying, what's wrong with these farmers? Why are they minimizing risk, acting conservatively, etc.? And yet, third, you also find significant dynamic investment in off-farm enterprises in those same areas. So they are dynamic investors in one sector, stagnant or lackluster investors in another sector, and then, in some subsectors of agriculture, they are quickly adopting new technologies and new crops and in others they aren't. I think one would have to then amend the image of the objective of the farm household or the rural household rather to be that they're interested in stabilizing and maximizing inter-year food security, bringing up their incomes by whatever means they can.

### *Bork*

You're talking about informalization as opposed to deindustrialization. What effect do you think that has on the raw data that are being used by a macroeconomist?

### *Reardon*

It isn't that there's a problem with the aggregate data that are being used if one adjusts the expectations of what one is getting from the data. From macroeconomic data you can say fairly well what are the trends in formal-sector activity. They keep good tabs on that. I think

you can say what's happening to agricultural output within 20 or 30 percent. What I don't think you can do with the data, and this merely requires an adjustment in how the results are presented, is to follow the huge amount of informal or nonfarm activities in rural areas. It's not so much that the aggregate data are so bad, but they only cover a small part of the phenomenon. I think that should be underscored in use and analysis.

### *Timmer*

We should understand there are two reasons why industrial accounts vis-a-vis agricultural accounts in the GDP numbers might give us an incorrect picture. One is that certainly before structural adjustment has taken place, we're using the wrong prices to value output. You have very depressed prices for agriculture. You have highly protected prices for the industrial sector. When you value your domestic output at those incorrect prices, it looks like you have a big industrial sector and a small agriculture sector. That's a characteristic of socialist economies, for example. Just putting simple world prices in for what you're producing can make enormous differences. In the Soviet Union, for example, you'd kick agriculture up by 20 or 30 percent and industry down by similar amounts just by doing price adjustments.

The second reason is once the process of adjustment starts and you open it to competition, then you deindustrialize in the formal economy because you start shutting down some of those things. The actual physical output goes down. And we do not typically capture very well what's going on in the informal sector. Even in the urban informal sector, small-scale workshops spring up to take the place of the jobs in the large-scale formal sector. And we don't capture very well what's going on in the rural informal sector.

It is interesting that if you look at the growth linkages between agriculture and the rest of the economy, Africa was an outlier in the 1960s and 1970s. Steve Haggblade and Peter Hazell showed that the multipliers were much smaller in the African context than they were in the Asian context,<sup>2</sup> and that's probably being changed now. My guess is that we're rebuilding the micro-connections between agriculture and the rest of the economy.

*Antoine*

When I say the African farmer tries to minimize risk that doesn't mean they are not willing to adopt proven technologies. There is a major difference. The African farmer will adopt any technology that is proven successful. They are adopting a lot of performing varieties. Yet they won't risk investment in fertilizers, inputs, and so on, if they don't have a guarantee that it's a good gamble. So I think it's really a question of defining the terms.

*Sahn*

Saying that the 1980s were a failed decade and that the early 1990s are not doing much to reverse that trend is overtly pessimistic, particularly at the macroeconomic level. If one looks at the strides that have been made in getting prices right and achieving macroeconomic stability, as measured in terms of inflation, budget deficits, trade balances, and so forth, things look better, and I don't see how one could argue with that. A lot of that has to do with the infusion of foreign financing, which in SPA countries is on the order of 13 percent of GDP. That helps a lot. But nonetheless, whether that's to pat the donor community on the back or whatever, the fact is things do look better, especially the macroeconomic picture.

Also Peter framed this discussion around the question of what it will take to make agriculture the leading sector. We've got it wrong. I think we should be talking about the reverse. We should be talking about the rest of the economy's failure to stimulate agriculture and give agriculture a chance to do what it could potentially do in terms of having linkages both with the rural nonfarm economy as well as with the urban economy. One should look at the structure of macroeconomic policies, exchange rates, and commercial policies that have discriminated against agriculture, the failure of industry and manufacturing to generate a demand for agricultural products, and the failure of policy and investment in infrastructure to enable that demand to be met through local production rather than through imports. In most African countries, it's cheaper to import rice or maize from the U.S. or Thailand than it is to bring it in from the hinterland. That's the failure of policy to stimulate agriculture rather than the failure of agriculture to provide wage goods for the urban sector or for manufacturing and industry.



We have to look at where policy has failed and that's the point of departure. Then once we get that set of questions and that set of policies correct, then the second question is how agriculture can more effectively serve as the leading sector and stimulate the rest of the economy.

I think Pierre Antoine's comment about the availability of seeds and the multiplication of seeds is important. But I have a little trouble with the characterization of that as the overriding problem in adoption of technology or better performing varieties in Africa. I think agricultural research has failed to a large extent in Africa and that the technology and the germ plasm has not been available to promote technological change. Malawi is a good case in point. There was basically no adoption of new technologies until the past 2 years. And what made the context change was the availability of new types of germ plasm. So there is a question whether the appropriate technology is even available. I don't think we have the proper seeds in many cases.

**"We did a review of all the major crops—sorghum, millet, corn, cassava, and rice—and for very few were we able to identify severe problems in germ plasm. I have come to realize that there has been an overemphasis on plant breeding work."**

### *Bork*

I would like someone to comment on the data we get out of Africa. It's a serious problem. The southern African drought shows that even areas that we think have a relatively good situation are fragile.

### *Antoine*

I would like to disagree on germ plasm. I have been raised in the mentality of the international agricultural centers. I have also worked in national research systems. And I thought until recently that development of the germ plasm was the number one priority and the one that would resolve the problems. But in a study sponsored by the World Bank and published last year,<sup>3</sup> we did a review of all the major crops—sorghum, millet, corn, cassava, and rice—and for very few were we able to identify severe problems in germ plasm. I have come to realize that there has been an overemphasis on plant

breeding work. Many of my colleagues in international centers would agree, not that they want to stop the program. The problem is for the germ plasm to reach the farmers. It's an effort that must take place on a continuing basis, but we have not paid enough attention to the problems of cropping techniques, soil fertility, and so on.

*Timmer*

I don't think I'm disagreeing with David Sahn on which direction the causality ought to be going now. I was arguing that the empirical evidence says that in the 1980s, agriculture ceased to be a contributor to the growth process in Africa, whereas it had been a significant contributor in the 1960s and early 1970s. But in the 1980s something structural changed in a fundamental way.

**"Maybe we shouldn't try to follow an Asian model of agricultural development. If you really believe that, then we have to find another way of developing without putting agriculture as the base."**

Now, David's interpretation, and I agree, is that the macroeconomic environment that would support agricultural growth collapsed, and in return agriculture could no longer support rapid growth. But I don't think we should underestimate what a pessimistic conclusion that is, because it means we really have to go back to the Mosher stage of the agricultural transformation. We have to go back to getting agriculture moving. And I say that's pessimistic because in that early stage it takes large investments to get the agricultural institutions, the infrastructure, the irrigation, all the things that are going to allow agriculture to grow rapidly, and you cannot have the overall economy growing rapidly in that phase of development. It's only when you get to the second stage that you can begin to suck resources out of a rapidly growing agriculture and that you get rapid overall economic growth. Africa has retrogressed from the second stage in the 1960s to the first stage in the 1980s and 1990s. It's going to be difficult to restart the process of rapid economic growth until we put a lot more resources into agriculture.

*Wolgin*

It's extremely important to know what's happening in order to decide the next steps and what to do. It's not really a matter of pes-

simism or optimism, although, it seems to me, if you come up after listening to Pierre and you start saying, wait a minute, all these things are happening. Maybe we shouldn't try to follow an Asian model of agricultural development. If you really believe that, then we have to find another way of developing without putting agriculture as the base. Although I want to keep that open, I don't want to yet accept that.

It seems to me that there are three issues. One issue is, is something happening now? Is there a supply response to policy changes? Is there a supply response to institutional change? Are farmers behaving the way one would hope they would? Are they investing now? Some things that Tom said suggest that if we look at it from the perspective of farmers and cultural attitudes and their ability or willingness to make big choices, to take risks, trading off risks against expected returns, by and large farmers are rational folks and they make investments where it makes sense and they save where it makes sense. And one can expect farmers to be fairly responsive to an environment that encourages them to make investments.

**"Part of what has happened in Africa over the last 25 years has been the total destruction of government capacity to do almost anything, and in particular to maintain roads, to do agriculture research, to maintain credit systems, to do policy."**

The second issue is the difficult things that Pierre talked about, the underlying conditions, the importance of rainfall, the variability of rainfall, the lack of good soils, and the increase of population and that pressure on the resource base, and the declining soil fertility. That suggests that high rates of productivity change are needed just to stay in place. And that gives some suggestion as to what we should be doing.

The third issue is the creation of the policy and institutions to link agriculture to inputs service and markets. Part of what has happened in Africa over the last 25 years has been the total destruction of government capacity to do almost anything, and in particular to maintain roads, to do agriculture research, to maintain credit systems, to do policy. If we're going to depend on governments to pro-



vide a lot of these services, we're looking for a total restructuring, redevelopment, recreation of government capacity, and that may take some time.

On the other hand, there are a lot of institutions that are able and may be able to provide some of the needed inputs. For instance, it's my understanding what happened in Malawi was not only research output from the research station, but also there was a privatization of seed. It was a liberalization of marketing and that the synergism of macroeconomic policy, agricultural marketing policy, privatization of input delivery, and work at the agricultural research center all came together at the right time to create the environment where farmers are now able to make choices.

**"One of the problems with macroeconomic data on agriculture in Africa is that it is almost impossible to get really good data on root crops. And in fact root crops have been shown to be increasing."**

We ought to take a look at some of these institutions that are needed in order to get agriculture moving more quickly. Some of them are already in place. Agriculture in the worst times of decline did much better than perceived because people found ways of coping because they were moving into nonagricultural activities in the rural areas. But it seems to me that the focus needs to be finally on the kind of investment you need to make these linkages.

### *Peters*

I think that it's incumbent upon us to try to bring together what seems to be a difference between Gilbert and Timmer. My experience working at the grassroots level is very much the same as Elon Gilbert's. There is enormous adaptability, enormous experimentation, enormous responsiveness, even in the face of extremely difficult economic and political conditions. I agree with Tom Reardon who pointed out that most farm households are multisectoral firms, which means then that we're having to deal with not just an agricultural sector but other sectors at the same time. The linkages between agricultural work, employment, informal activity, and so forth are often the keys to understanding what's going on.

One of the problems with macroeconomic data on agriculture in Africa is that it is almost impossible to get really good data on root crops. And in fact root crops have been shown to be increasing. They're very responsive to changes. This was pointed out after the Berg report<sup>5</sup> came out. There was criticism of the fact that it focused on cereals and ignored root crops.

A second problem is multi-cropping, multi-sequencing of crops. In southern Malawi, in the area where I work, there are very complicated systems with multi-cropping and crop sequencing, so that fields are used in many different ways. But the agricultural extension staff who measure yields, record only the maize if they think that maize is the major crop in the field. Now, there may be three or four other crops growing in that same field. We already know in Malawi the tremendous responsiveness of farmers to price changes, but it is a responsiveness in the sense of shifting between crops. Given the complex cropping system, this means it is difficult to assess the implications of such shifts. African agricultural systems are heterogeneous and complex. Therefore, it's difficult to come up with a single measure of output or productivity.

Another thing that's important to reinject is political change. At the microeconomic level, the responsiveness and adaptability of farmers circumvent extremely difficult political situations. Sara Berry has documented for Nigeria a lack of investment in many cocoa plantations precisely because there's a lot of political insecurity affecting land tenure with specific gender implications; thus, women find it difficult to press their land claims.

In Zambia and Tanzania, there is documentation of the fact that people have withdrawn from the formal mechanisms and that there has been an explosion in the informal transactions and an enormous amount of movement across national borders. There has been a huge movement of maize from Zambia into Malawi at certain points and also into Mozambique. So a lot is happening there that is invisible at the national statistics level. And there are more subtle effects. Even in Malawi where there has been a relatively positive performance, the disproportionate direction of agricultural and other support to the estates at the expense of the smallholder has deterred adoption of

various forms of maize and other forms of crops. Therefore, the political environment, the pattern of allocation of resources that depends on the political structure, is crucial to our understanding.

Finally I was interested in Pierre Antoine's remark that crop-cattle systems seem to be becoming more important. In Botswana the research shows clearly that although one's focus normally is either on diamonds or on agriculture or on cattle, in fact the cattle-crop nexus is far more important for most of the people. And in northern and central Malawi, there are clear indications of the fact that this particular relationship of crops and cattle or goats is very important. That is another part of the changing structure of agriculture that is a task for us to try to document more carefully.

*Bork*

You seem to be questioning the data that we're using.

*Peters*

At the national level, yes.

*Bork*

You also are questioning how we measure productivity. We've got kind of this macroeconomic viewpoint that paints a bleak picture. How we do measure productivity or how do we know what is happening outside of this kind of broad-brush macroeconomic approach?

*Peters*

The key is to recognize that any aggregate statement is always smoothing various peaks and troughs. Often the interesting things are precisely in those peaks and troughs. I referred earlier to this adaptability and responsiveness. One sees the same thing in Elon Gilbert's research on The Gambia. There is a great deal of dynamism going on in agricultural systems. One of the problems is that because they are so heterogeneous at a national level, let alone a pan-continental level, one is comparing apples and oranges. And that I think has been the frustration with talking about Africa to people coming from Asia because when you're talking about countries that have millions of people and a relatively homogeneous system of agriculture, usually rice, there are certain parameters that are in



place over the whole region. In Africa one has microclimates, micro-niches, and diverse cropping and stock systems. This makes it important to capture such diversity before assessing on a national level.

*Shaikh*

It seems to me we are talking about fundamentally different agricultural transformations when we talk about Africa and Asia. I'll talk just about the Sahel because that's an area that I know better. We are dealing with an agricultural system that is by and large a low-input system—extensive agriculture, rainfed, by and large nonmarket with increasing transformations toward pockets of market. And in many respects it's too early to judge from what we do or do not see at the level of

**"What's very interesting is that a lot of the bad performers in the 1960s and 1970s, like Tanzania, became good performers. And a lot of the good performers, like Cameroon and Côte d'Ivoire, became bad performers."**

national statistics or, I would argue, at the microeconomic level in terms of promising trends because the base, the actors, are in rapid transformation including the social base, the village structure that we're talking about, the administrative structure, and the entire economic framework. How the power relationships shake out over the next 10, 20, 30 years is going to be a critical determinant of what happens in the sector and what kinds of trends affect the macroeconomic level.

I'd like to see us focus on what changes are inevitable when we look 30 years into the future, and what policy makers can do to influence them. It's not just a matter of dealing with individual farmers. I don't think that our macroeconomic statistics are yet giving us the kinds of data that would be a reliable indicator of where things are likely to go over the next generation.

*Cleaver*

I'd like to speak to two things: trends and urban policy. The World Bank just finished the African indicators project. We updated some of these trends to 1990 and found that in the 1980s there was no change in growth of agricultural production at the aggregate level.

The figure is about 2.1 percent per annum on average in sub-Saharan Africa from the 1980s to 1990. It was 2 percent per annum from 1965 to 1980. So you have a pretty constant aggregate figure. What's very interesting, however, is that a lot of the bad performers in the 1960s and 1970s, like Tanzania, became good performers. And a lot of the good performers, like Cameroon and Côte d'Ivoire, became bad performers. So you had quite a lot of variation even at the aggregate level. And I agree with the statements that the aggregate statistics aren't very good, but they're the best that we have.

Associated with this, however, are some worrying trends. The best figures that we have indicative of food security suggest perhaps a doubling of the percentage of the African population that is food insecure by our definition. Perhaps up to 40 percent of the

population of sub-Saharan Africa now doesn't obtain enough food. We have a fantastic increase in food imports. Despite the decrease in the levels of food security, you have something like a 7 percent per annum increase in imports, including food aid. So something out there is obviously not going well. If you associate these figures with things like stunting, infant mortality, education of females, the aggregate picture, not just from national accounts figures, is very bleak indeed.

It's interesting, however, to separate those countries that are doing much better from those that are doing much less well. One of the categories that we have tried to do is countries that are an adjustment and those that aren't. In fact, countries that are in adjustment are performing agriculturally better than those not in adjustment. The down side is that on average even the adjusting countries aren't hitting that 3 percent per annum agricultural growth rate. So it's better to be an adjustment than not from an agricultural sense, but it isn't sufficient.

**"Countries that are in adjustment are performing agriculturally better than those not in adjustment. The down side is that on average even the adjusting countries aren't hitting that 3 percent per annum agricultural growth rate."**



I found Peter Timmer's statement about the lack of linkage between agricultural growth and what's happening in the rest of the economy worrying. After all, agriculture is growing at 2 percent per annum on average. We operate under the assumption that if you have agricultural growth, there's going to be an impact. His point that in fact the linkages may be becoming less is new to me.

In relation to urban policy, I have a hypothesis that I'd like to put on the table. In the past in Africa, it seems to me, there has been a very powerful urban bias in policy—public expenditure programs, for example, that are excessively directed to the mega-cities. It is not just an urban bias, it's a mega-city bias, which has effectively put infrastructure development in the mega-cities. There is little in the hinterlands, exacerbated by the fact that you have overvalued exchange rates, very commonly a price policy that is confiscatory, and subsidized food consumption in many cities that has exacerbated that lack of linkage to agriculture. In the countries that have had that problem in a big way, you see a not too curious thing and that is that rural populations are essentially producing for their own consumption, with a little bit of commercial stuff in local areas. And it's no surprise that you get agriculture growing at about 2 percent per annum, because that's what the rural population is growing at. Agriculture is growing on average at a rate that feeds local population. It's no surprise that Pierre Antoine finds that agricultural technology is out there, but it isn't being used. I agree with him, but I think that the reason for that is that it's not in demand. Farmers haven't demanded this new technology because of the lack of linkage to the urban market.

So I would like to put a sound urban policy on this agenda as a necessary condition for agricultural growth. A sound urban policy being one that is more neutral, that allocates funds to secondary towns and cities, not just the mega-city, that doesn't look to simply low-cost consumption of foodstuffs for urban population, but also looks to the rural population. As I've studied this myself, I've increasingly notched up the priority attached to what I call sound urban policy, as an important ingredient for agricultural growth.

An interesting experiment would be to see what has happened in those countries that have a sounder urban policy. I would submit that countries like Kenya and Zimbabwe have had a sounder urban policy, that is, one that is much more neutral. Price policy has been better. Exchange rates have been less out of line—public expenditure programs in particular. If you look at Kenya, there has been a lot of public expenditure in rural roads and in secondary towns and cities. They have secondary towns and cities in Kenya. You don't just have the Kinshasa for example or an Abidjan, which you do in the CFA countries.

*Timmer*

I buy basically everything that you say. It corresponds to a conversation I had on the distance between the large cities and the countryside in most African

countries. The two exceptions are Harare and Nairobi. But how to reverse that is going to be a really difficult question. It's not just the domestic policies that have led to that subsidization of urban consumers. We as donors have helped with that and, indeed, we as industrial countries that subsidize our agricultural exports have helped with that as well. That cheap grain available to the African cities has to be a severe disincentive to looking to the countryside to provide food. And if you don't look to the countryside, as Asia did to feed its cities, then the traditional links between the agricultural economy and the urban industrial economy simply aren't going to be there. The evidence that Steve Block and I have put together suggest that those linkages progressively deteriorated in Africa through the 1970s and 1980s.

*Reardon*

While I agree that there is a competition perhaps between secondary cities and major cities in rural areas for infrastructure funds, and while I agree that there might be less than the optimal amount of connection between the cities and the countryside in the product markets, it would be a mistake to say that the cities are disconnected from the rural sector, from the factor market side. For example in

**"If you don't look to the countryside, as Asia did to feed its cities, then the traditional links between the agricultural economy and the urban industrial economy simply aren't going to be there."**



Senegal, a large share of rural incomes is coming from work in Dakar. It's relatively easy for rural households to have access to the hypertrophied tertiary sector in Dakar. And if you hit that sector through employment policies or structural adjustment policies or whatever, the food security effects won't just be in the urban sector of the Sahel, for example, it will also affect the rural food security situation. So they are very much linked on the employment side.

Second, while I agree with David Sahn that good macroeconomic policies can be important to agricultural performance, I think it's important to note that these are necessary but not sufficient.

I'll finish with an anecdote that I heard at a conference several years ago comparing Indonesia with Kenya. Ammar Siamwalla was pointing out that there's less instability in prices in Indonesia because Bulog, the state marketing agency, has merely to tell traders that they are going to stabilize prices next month. The traders believe them because Bulog has an open window at the Central Bank to draw funds to stabilize the market. Siamwalla compared that to the situation in Kenya where the stabilization agency can buy up to a certain point and all of the market participants know that when they're done with that, they're done. Then the instability can recommence. So the leverage of public institutions in Asia and in Africa to affect stabilization is vastly different because of fiscal resources.

#### *Timmer*

It took more than a decade to build that institutional capacity in Indonesia. It didn't just happen because it was in Asia. They really invested in the institution.

#### *Carter*

We're saying, is it happening? Or is it not happening? And we're looking at macroeconomic and microeconomic explanations. Coming from Latin America, I feel unhappy with understanding in an unconditional way what "it" is. I think we have on our minds maybe a little two dimensional Hayami-Ruttan picture of what the agricultural transformation is. But we're missing dimensions if we just think of that output-per-worker sort of space as defining the agricultural transformation, because certainly looking at Latin America, we can

see that it can happen in ways that are sometimes very socially destructive.

I was reading a little Argentinean economic history recently on the great democratizing force of grain production in the 19th century and how all the sorts of good things that we associate with agricultural transformation happened. It's written by an economic historian. Then at the end of the article he sort of looks over the Andes Mountains, in a metaphorical sense, and says, my gosh, look what was happening in Chile at the same time. You had a grain expansion. You had an agricultural transformation in this sort of two dimensional Hayami-Ruttan space, yet the form that agricultural transformation took was incredibly destructive socially. So it's not just growth, but it's the social sustainability of that growth. I think we need to be quite careful.

### *Antoine*

Peter's remark that economies are not connected in Africa explains why it is so important to pay attention to the environment. If you look at the map of Africa and studies made on land potential by FAO, you find that countries like Sudan, Zaire, and Uganda combined could provide enough food for the continent. You can also read that with increasing input, Africa could feed six or seven times its present population. But the fact that Uganda cannot feed central Africa, that Côte d'Ivoire doesn't necessarily have an impact on northern Mali, and so on says that we have to look at the environment on a very localized basis. Often there is overuse of land in one place, there is land degradation, there is environmental degradation, while in other places in fact, there is luxury. We cannot average those data.

I remain convinced that a lot has been done in agricultural research and that the big stumbling block now is not agricultural research itself, but the linkage between agricultural research and the farm. You can call it transfer of technology. You can call it education. You can call it extension if you want. But at that level there is a big gap and it's due to a variety of things. Some of them being the fact that there is no demand because there are no markets. But the linkage to me is becoming the key.



*Timmer*

I want to reinforce what Pierre says. All countries are diverse, but what happens with functioning markets is that people leave the poor resource areas and migrate to the high-resource areas where the jobs are, where productivity can be higher. You can't solve the productivity problems by forcing people to stay on low-productivity soils, in low-productivity environments, and not provide them either with new technology or whatever it's going to take to break out of there. If you force them simply to deal with their environment, you are going to keep them poor. The only way to break out of that is mobility. That's fundamental. All societies have had to do that.

Second, incompatibility between the microeconomic and macroeconomic view is an important question because it goes right to the heart of how we know what's going on. Do we get our information to monitor implementation policy from microeconomic field surveys? Or do we get it out of our macroeconomic data? When the two are telling us the same thing, it's easy. When it's optimistic, that's great. When it's pessimistic, it's bad, but at least it's consistent. The problem comes when you're getting different stories from the macro and the micro. It doesn't necessarily mean that one is right and the other is wrong. It really can be the case that the macroeconomic story looks different than the microeconomic story because the microeconomic data just doesn't add up yet to what the macroeconomic picture is telling us.

You don't want me to compare Africa with Southeast Asia. You keep telling me that I shouldn't do that because it's harder in Africa. But why then was per capita income in Africa double per capita income in Southeast Asia just 20 years ago? If it's so much harder in Africa and you had this enormous advantage and starting point, why can't I say Southeast Asia did something right, Africa did something

**"You can't solve the productivity problems by forcing people to stay on low-productivity soils, in low-productivity environments, and not provide them either with new technology or whatever it's going to take to break out of there. If you force them simply to deal with their environment, you're going to keep them poor."**

wrong? I'm making it more stark than I believe, obviously, but my point is that there are important lessons out of the rapid growth in Southeast Asia, precisely because they started from such a low base.

### *Ackello-Ogutu*

I would like to emphasize the preoccupation of Africa with food production, which arises naturally from the high population growth rate and poverty in the rural areas. It is important to come to grips with that in the policy reforms that we expect governments to undertake. The food problem is affecting the adoption of innovations. I think we agree that the technologies are on the shelf, but adoption remains as a major stumbling block. The extension services are generally capital- and labor-intensive. Kenya, for example, experimented with various types of extension services: integrated, training and visit, and farming systems. Funding continues to be inadequate and success, particularly in food crop production, is still elusive. I feel that more effort should go toward devising extension services that can deliver viable technologies to the farmers within the limited budgets available.

The development of markets affects the adoption of technologies, but due to Africa's preoccupation with food crops, the benefits arising from improved markets may only be modest. More emphasis must in future be placed on cash enterprises rather than subsistence production.

My contention is that the African farmer is currently receiving recommendations and technologies that are too capital-intensive. Fertilizer, for example, is quite expensive especially when applied to subsistence crops. Many improved husbandry methods requiring minimal nonfarm inputs are yet to be appreciated by the African farmer. Practices such as use of clean seeds, timeliness in planting, and post-harvest hygiene are still taken for granted by farmers and only accorded lip service by policy makers even after their potential financial rewards have been amply demonstrated by researchers.

With regard to land-to-man ratios, we hope that the high population densities may eventually have some positive effects in terms of conservation and in terms of investment in productivity-enhancing innovations. For example, in dairy production in Kenya, zero grazing is

being adopted in densely populated areas, thus economizing on the major constraining resource, grazing land.

The final point concerns the government's role in creating an enabling environment. In the face of democratization processes now going on in Africa, I think we may be asking too much. Governments have their hands full right now. They are going to have their hands full with the rigorous domestic political demands as well as with demands from donor agencies. This phase may take 10 or 20 years, but one hopes that the calls for accountability, especially in the use of public funds, will eventually yield fruits and that governments will ensure that markets function freely and efficiently. If this happens, agriculture will most likely benefit.

## Notes

1. *Assessment of Animal Agriculture in Sub-Saharan Africa* (Morrilton, Arkansas: Winrock International, 1992) 125 p.
2. *Accelerated Development in Sub-Saharan Africa: An Agenda for Action* (Washington, D.C.: World Bank, 1981) 198 p.
3. S. Haggblade, P. Hazell, and J. Brown, "Farm-Nonfarm Linkages in Rural Sub-Saharan Africa," *World Development* 17(1989): 1173-1201.
4. David Seckler, Doug Gollin, and Pierre Antoine, *Agricultural Technology in Sub-Saharan Africa* (Washington, D.C.: World Bank, 1991).
5. *Accelerated Development in Sub-Saharan Africa*.