

***Food and Culture:  
How Americans are Rethinking What they Eat***<sup>1</sup>

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This event is made possible by the **US State Department’s renewed focus on agricultural development and food security** as a foundation for global economic and political stability. After decades of relative neglect, food and agriculture are back on the agenda for U.S. policy. The many challenges posed by this sector -- and the actions needed to overcome obstacles to success – are extremely location-specific. **An improved food system can come only from local actions.** This is true in the United States, in the story I will share with you today, and it is also true in this region, to address the challenges you face in this part of Nigeria. So I am grateful for the opportunity to talk with you today, to share experiences and to learn from each other.

I am an academic economist. **My job is to use survey data and other observations about households and countries around the world, to describe the world’s many diverse food and agricultural systems, and to test hypotheses about what factors have contributed most to meeting the various food needs of people around the world.** This lecture today aims to tell the story of the U.S. food system, and how Americans are rethinking their food culture, in a way that I hope might offer useful lessons for you to address the particular challenges faced here.

I believe that the history of the US food system can best be told through a version of **the familiar story of the golden geese.** There is probably a Nigerian story of this type, which is well known to all Americans. In this version of the story, a farm family has a few chickens, and one day they are given bigger chickens – actually, geese -- that lay wonderful golden eggs. The family takes good care of these golden geese, and enjoys the valuable eggs which they use and also sell to others. The family gets rich and invests in lots of other businesses, as a result of which they no longer need those golden geese – instead their values change and they want other things, including more opportunities to experience their own history and traditional culture: they want their old chickens back.

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<sup>1</sup> These notes were used for a series of public lectures in Nigeria funded by the US State Department, and organized by the US Embassy in Abuja and the US Consulate in Lagos. Each talk was hosted by a local program partner and involved food system leaders associated with that organization in their local area. In sequence, these events were hosted by: (1) the University of Agriculture Abeokuta (UNAAB) in Abeokuta; (2) the International Institute of Tropical Agriculture (IITA) in Ibadan; (3) the UAC group of food companies in Lagos; (4) the Kaduna Agricultural Development Program (KADP) in Kaduna; (5) Ahmadu Bello University (ABU) in Zaria; and (6) the Federal Ministry of Agriculture in Abuja. Many thanks are due to the US State Department’s Bureau of International Information Programs (IIP), the US Embassy’s Public Affairs Section in Nigeria, as well as each of the program partners and the many participants in these events for their support and interest in this topic. The actual lectures and these underlying notes represent Dr. Masters’ views alone, and were not reviewed or approved by the US State Department.

For me, this story captures the essence of how Americans are rethinking their food system – following similar trends in Europe, Asia and indeed all wealthy societies -- changing what they eat, and how their food is grown and sold. **America, like other rich countries, has long enjoyed the fruits of a hugely productive food system, laying golden eggs that liberated us from hunger and rural poverty**— allowing us to devote more and more time and resources to other things. Now, in addition to the golden eggs we have already eaten, we are rethinking agriculture and many Americans want some aspects of their old agriculture back —**an increasing number of Americans, like many Europeans and others, want to experience more of the traditional agriculture that was lost through industrialization.**

**In this talk I'll describe the golden geese that liberated America from dependence on agriculture, and describe how American food systems are changing in pursuit of cultural goals.** We might call this rethinking the new agri-culture, with a hyphen to emphasize the cultural objectives of our new food and farming systems. Pursuing these goals involves setting aside many of the tools that were developed earlier to help us escape from hunger and poverty. Killing these golden geese reduces our 'productivity', but only when measured in terms of how much food we can produce. Now many Americans want more cultural values associated with food, and can afford to pay for them, because, for Americans, food is no longer scarce and agriculture is no longer a burden. **What Americans need now is a food system that helps us to appreciate and enjoy smaller quantities of culturally more significant foods**, if only to help us stay healthy and avoid obesity, **and to live closer to traditional agriculture**, so as to enjoy the cultural significance of farming in close contact with nature.

The rethinking of the food system that I will describe is not unique to America, but shared with all wealthy societies. Indeed, **in this dimension America is following Europe and Japan**, rather than leading them. These other societies rejected the golden geese of a modern food system much earlier than America, in part because their geese were not quite so golden. America has had a uniquely productive modern agriculture, and the bulk of the American food system continues to cultivate those golden geese to produce low cost 'conventional' products, even as more and more Americans want and can afford to rethink their food preferences in pursuit of the new agri-culture.

The new agri-culture: less food, more culture

**You are probably familiar with the new agri-culture in America, Europe and Japan**, even if you've never visited those places, because what is sold to you from there – and what they want to buy from you as imports – is clearly visible.

I have brought a sample of America's rethinking, **in the form of this document entitled *Rebuilding America with Farm-Centered Food Systems***, produced by friends of mine at an organization called Farm Aid in Boston, the city where I live. I brought this because I think it embodies America's new agri-culture, in a way that is very light and easy for me to carry—and that you can easily find for yourselves on the internet at **[www.farmaid.org](http://www.farmaid.org)**.

This brochure comes from an advocacy group with a specific point of view. Farm Aid is led by four famous musicians who do an annual concert, which raises funds to pay for various services aimed at reshaping agriculture in ways that are described in this document. Many other

advocacy groups would emphasize different things, but I think Farm Aid is particularly adept at capturing the broad mainstream of popular concerns about agriculture.

I may be a bit biased in favor of Farm Aid, because I like the group and what they do, and because the two main authors of this report are graduates of the program where I now teach. But you can look at this document online and judge for yourself, and I believe you would see that **this document communicates clearly a widely-held set of arguments about how agriculture in the US should change, and that these views are quite similar to arguments you will have heard coming from Europe, Japan and elsewhere**, not only from advocacy groups and governments but also private food companies in their packaging and advertising materials.

So, from what you know or could read in a document like this, **what are the main elements of the new agri-culture?**

- Organic** methods, so food is produced in more natural ways;
- Traditional** genetics, including traditional tastes and nutrient composition of foods;
- Local** production, from identifiable producers through fair trade and farmers markets;

In addition to these goals, **advocates often also describe the new food culture** as pursuing:

-- **'slow food'**, implying that consumers want to spend more time and other resources, rather than less; and as pursuing:

-- **'food sovereignty'**, implying control by consumers as opposed to producers, government or agribusiness, with consumers wanting to control their food systems just as they control other aspects of local culture.

Clearly, the goals of having food be organic, traditional and local – and for it to be slow food, controlled by consumers rather than by producers or agribusiness -- is about *avoiding* the opposite attributes of what are now called 'conventional' foods. **The goal is to move away from:**

- Inorganic** fertilizers and crop protection chemicals;
- New genetics**, including conventional breeding and hybridization as well as GMOs;
- Commodity trade** and regional specialization through large-scale agribusinesses.

These attributes of **what are now 'conventional' foods in America were developed to reduce the costs and increase quantities of the basic foods that Americans were demanding in the past, when Americans had much lower incomes than we do today**. The development and spread of new techniques has enabled a small number of farmers and food producers to supply conventional foods at extremely low cost. About 2% of Americans are now farmers, and Americans spend less than 10% of their resources on food. Much of U.S. food production is exported, but Americans are tempted by low cost and abundance to consume all too much of it. Our fastest-growing health problems by far are caused by over-consumption, leading to obesity and diabetes, cardiovascular disease and other threats which are now very well known.

**The new food culture is about putting back into food some of the tastes, feelings and experiences that were lost** in our efforts to reduce cost and increase quantities, so as to help us meet our nutrient needs with less total consumption. As a result, it is clear that America's **new food culture might help Americans achieve their goals – but could also reduce our ability to sell less expensive conventional foods around the world**. To the extent that Nigeria and others are still keen to obtain larger quantities of lower-cost conventional foods and basic nutrients,

then they face all the more urgency to do what they can to reduce their own production costs and increase quantities produced.

As we watch America rethink its food system, it is essential to keep in mind that America's choices, like Europe's, are not necessarily in other peoples' best interest. Europe has been particularly opposed to one kind of innovation, namely GMO seeds. That may be a fine policy for Europeans, whose crop yields and farm productivity are already among the world's highest, but it could be a huge missed opportunity for Africans whose yields are among the lowest, and who face many pest and weed-control problems that GMO seeds are capable of solving.

#### The world with too little food: hunger and rural poverty

In contrast to Americans, most people in Africa and South Asia **have no choice but to spend most of their time and resources in agriculture**— where their productivity is so low that undernutrition remains widespread, even as the continent buys a huge volume of food imports in addition to its own production.

**Africa is a continent with very of the innovations and opportunities that allowed Americans to leave agriculture, and to feed themselves so abundantly.** The African landscape offers mainly traditional crops and livestock rather than new genetics, mainly organic production and few crop chemicals. Due to low productivity, a lot of time and resources are needed to produce relatively little food, and despite their focus on agriculture many rural families often fail to acquire enough food to avoid undernutrition, or to limit the need for food imports at the national level.

Food shortages now occur quite regularly across rural Africa and Asia, and are still so widespread that **undernutrition is still the world's leading cause of premature death and disability.** The disease burden due to undernutrition is hidden in part because the victims are mostly preschool children in rural areas. Their physical growth is permanently stunted, and their muscles and internal organs are wasted from insufficient calories, protein and fat intake. Many others consume enough food to fulfill their physical growth potential, but their health and longevity is impaired by insufficient vitamins and minerals.

It is an astonishing fact that undernutrition occurs primarily among farmers – **hunger is closely linked to rural poverty.** Undernutrition is much less prevalent among the urban poor. Another astonishing fact about hunger and rural poverty is that it used to be much more widespread than it is today, and occurred in different regions.

For those of us in this room, severe undernutrition is almost certainly no longer a daily threat, but **hunger did affect our families in the past.** It may be a living memory for you personally, or for your parents and grandparents, but for many of us the most recent periods of sustained hunger would go back much further – in my own case, to my great-great-grandparents who came to America from Eastern Europe, where seasonal hunger was a frequent occurrence.

When my ancestors came to America over the 100 years ago, they started by selling vegetables from a pushcart in the small city of Salem, Massachusetts. (This town is famous for its witchcraft trials that had occurred 200 years before that.) They made enough money to move into the bigger city of Boston, and eventually when I was a child my parents moved out of the city to a

rural area, where we kept a big garden and a dozen chickens. But we were not really farmers. We kept the garden and chickens by choice, so that my parents could teach me and my brother more about life than could be learned in town. Our hobby farm supplied only a tiny fraction of our nutritional needs, and used only a few of the modern techniques needed for a productive agriculture. As you might guess, we used my parents' paychecks to buy food for the family, and food for the chickens too.

How rich people escaped from hunger and rural poverty: golden geese laying golden eggs

**What generated America's super-productive food system** which my own family came to enjoy in America, after a life of relative poverty in Eastern Europe? Many things changed in America during the development process, and a central task for academic economists is to separate causes from effects – to trace the flow of goods back to their source. What were the golden geese of American agriculture, and what were their golden eggs that have allowed a few producers to sell increasingly large quantities of food at increasingly low cost?

The story is difficult to tell in part because Americans tried so many different experiments during our development process. **Traces of almost every imaginable effort are visible in U.S. history.** Some of these efforts were clearly failures, while others were actually made possible by other things – they are results of economic development, rather than its causes.

To begin, **one of the most surprising failures in agriculture has been recurring attempts at large scale "factory" farming.** Almost all field crop production is still done by independent family farmers. Attempts at investor-owned farming staffed by hired workers have succeeded only in animal and horticultural production, where labor supervision is easier so workers do not have to be self-motivated. On the other hand, an important success has been the combination of flexibility and security in land tenure, so that these family operations can subdivide their land and change farm boundaries, buying and selling or renting land to adjust areas planted to the family's changing circumstances.

As American farms are almost all owner-operated, variation in land area covered is made possible by mechanization. **The spread of harvesters, tractors and farm equipment of all kinds has been key to helping farmers cultivate all available land, but it very rarely increases yields per acre, or per year.** Farm machinery is definitely not the golden goose of our story – it is a result of how the golden eggs are used, a way to promote flexibility in land use but generally not a source of higher total productivity for the sector as a whole. Almost all of America's farm machinery has been developed by local innovators, working privately to produce items that they hope to sell under patent protection from imitators, just like other kinds of machinery.

Not all farm tasks are mechanical in nature – indeed much of agriculture involves biochemical processes around photosynthesis, plant growth and protection from pests and diseases. Here, **the golden goose of industrial chemistry yielded the golden eggs of low-cost fertilizer, pesticides and herbicides.** Many of these innovations have had undesirable side effects, in runoff and residues and operator poisonings, without these crop chemicals a much larger area of land would be needed to produce the output we have.

Tracing back the chain of causality, what makes farmers' efforts worthwhile is crop genetics tailored to local conditions and market needs. **The single most important golden goose has**

**been scientific breeding for improved seeds, making use of natural biodiversity by drawing in traits from other places to make new crosses with the most desirable mix of features. The resulting golden geese are extremely location-specific and often quite unexpected.** Observers often think of America's corn, soybeans and other areas as genetically uniform monocrops, but in fact there are literally hundreds of distinct hybrids and varieties tailored to each location, with surprising traits that traditional breeding could not have delivered.

Of these three major kinds of innovation, both **mechanical and chemical technologies resulted mainly from private investment**, just like the mechanical and chemical technologies developed for the nonfarm sector. **In contrast, genetic innovations were initially developed by the public sector** and remain heavily supported by government funding, through the US Department of Agriculture and the Land Grant universities in each state. These golden eggs generate large benefits through higher yields and lower production costs, by competition among producers and the private companies that multiply and distribute seeds quickly shifts those gains to consumers in the form of lower food prices.

As a result, government funding for crop breeding plays a causal role not just in a physical sense, changing the 'blueprints' by which crops transform resources into products, but also in political and historical terms, since this is a service that private firms cannot provide for themselves. **A successful effort to meet consumer needs through modern plant breeding must be funded by the government, or it will not be provided at all**; the benefits are real and measurable, but cannot be captured by the breeders themselves.

#### The example of hybrid maize

**The single most important of all agricultural innovations in US history is probably hybridization of maize** – the American food writer Michael Pollan has made much of the fact that most of the organic material in our bodies was originally photosynthesized by maize plants. Some of that comes into our bodies by eating maize itself, for example as corn flakes, corn chips, tortillas, popcorn, corn oil and so forth, but most of it enters through maize-fed animals, as milk or eggs or meat of all kinds. Michael Pollan attributes the dominance of maize to agricultural policy, but in fact maize is so cheap mainly because hybridization made it among the most efficient photosynthesis machines of all time, a most efficient way to convert solar energy into human food.

The origins of hybridization embody the story of agricultural innovation, through its key elements:

- public-sector research** that discovered the process itself, at the Connecticut Agricultural Experiment Station just after World War I;
- public-sector technology development** that found where the process could best be deployed, for example by Iowa State University in the Midwestern corn belt of the United States just before World War II;
- **education and extension to transfer that technology to the private sector**, in this case helping seed houses multiply the new hybrids, and explaining their use to farmers during and after the war;
- private-sector market response** to the new technology, in the form of other input suppliers and product marketers who took advantage of what the new seeds could do.

The technological advantages of hybrid maize are also characteristic of many kinds of new technology:

--hybridization allows for **more precise breeding**, to obtain a final cross whose parents (the inbred lines) provide specific traits

--successful breeding often offers **unexpectedly desirable traits**, that respond to other changes in how crops are grown. For example, a key feature of hybrid maize is not more yield per plant, but more plants per acre.

--successful breeding can target **higher productivity with less inputs** if that is what's wanted, instead of higher productivity using more inputs. A prime example of input-saving genetics is the spread of herbicide-tolerant corn and soybeans, which sharply reduce the need for mechanical tillage.

#### Why isn't everyone rich? Geography and demography

Although economists find that **appropriate institutions and policies as well as appropriate technologies are essential for successful development**, this finding begs the question of what causes those societal factors to succeed in some locations rather than others. Africa, Asia and other places where extreme rural poverty is still widespread have inefficient institutions and government policies, to be sure, but so did Europe and America at the start of their economic development.

**Some important causal factors behind the societal outcomes involve these regions' geophysical environment:** most importantly, **high transport costs as well as high disease transmission** and other factors limited the payoff from good institutions in the distant past, and exposed these regions to colonial conquest from Europe and Japan.

**Another set of important causal factors involve history** itself, particularly **as embodied in demography**, as death rates and birth rates interact to change population growth and age structure very slowly over time. In Asia and Africa, there is actually quite a lot of specialization and innovation in agriculture – we see new technologies spreading rapidly in many areas -- but in recent decades that process has been heavily constrained by rural population growth, and its associated reduction in land area and other natural resources available per rural person. New technologies to farm more productively are spreading, but not fast enough to keep up with rural population growth and food demand.

**Rural population growth is not the same as total population growth – the difference is urbanization.** Innovation and specialization is all about serving *other people*, and depends for its success on access to a large population. This is the reason why people crowd into cities. Why else would people crowd together, if not to benefit from each other's presence? Our cities grow at breakneck speed, with people streaming out of rural areas so as to participate in the specialization and innovation of urban life.

The flow of people from rural into urban areas is a consistent feature of economic development, characteristic of American history as well as Africa today. **Once people are living in cities, development can proceed quickly on a platform of man-made capital – while Malthusian land constraints continue to limit income growth for the rural people left behind.**

Having observed centuries of economic development in all regions of the world, demographers have a pretty clear picture of how populations change during the development process.

Whatever the initial source of improvements might be, a first consequence of successful development is a decline in the death rate – mainly among infants and young children, the age where survival is most precarious. That **increase in child survival associated with economic development triggers population growth**; population growth does not come from an increase in birth rates, as one might think, but from the survival of young infants. Birth rates then decline only slowly in response to the fall in death rates. Population growth is a result of that time lag.

**Urbanization can absorb a lot of population growth, but if the drop in death rates happens suddenly enough, at a time when cities are initially quite small, even the world's fastest growing cities cannot absorb all of the increase in rural population.** We know this because it is Africa's story, as the end of colonialism brought a rapid decline in child death rates and a burst of rural population growth despite having the world's fastest-growing urban population. Similar experiences occurred across Asia, but with an earlier and more gradual fall in child death rates, so their period of rural population growth is already behind them.

**During the period of rapid rural population growth, a rising farm population brings an inevitable decline in the available land area per farm.** Specialization and innovation may raise crop and livestock yields during this period, but it is nearly impossible to raise productivity faster than the drop in land resources per person -- so this is a period of almost inevitable decline in the income of farmers, often in absolute terms and certainly relative to non-farmers.

**In America, the period of rising farm population ended almost 100 years ago, around 1914.** The continued growth of cities led to a rapid fall in the number of farmers, particularly during the 1940-1960s. The decline ended in the mid-1990s, when per-capita income among farmers had risen to be about the same or higher than the national average, thereby cutting off that motivation for rural-urban migration.

**So America had a brief, 50-year period, from about 1945 to about 1995, in which the number of farmers plummeted and the land area per farm rose sharply.** This was the era of farm consolidation and large-scale mechanization. **Farms remained almost entirely family-owned and operated**, with only a few hired workers in most kinds of farms – the exceptions being confined livestock operations and fruit/vegetable farms, where it labor can be more easily supervised so it is less important for workers to be self-motivated owner-operators.

During this period, and continuing today, **farmers became a small part of an increasingly specialized agro-industrial complex.** They are still family farms, remember, and the **total land area under cultivation remained roughly constant**, but each farm was and continues to be offered an ever-increasing range of technological and institutional innovations.

More rethinking is still needed: What the new agri-culture promises but doesn't provide  
Now that Americans have much less need for the ever-higher productivity offered by hybrid maize, GMOs and the like, Americans are following the Europeans and Japanese in seeking a different kind of food system. **What Americans want is to consume more culturally significant foods, albeit at higher cost, and to live closer to nature and to traditional agriculture.**

**I personally share these cultural values, and I believe that even people who don't share these values can see them as entirely understandable**, in an industrial society where high-productivity agriculture has already delivered a superabundance of inexpensive, easily-



affordable food, while leaving people living far from their own historical connection with traditional agriculture. **But not all of our re-thinking of conventional agriculture is completely thought through.** In particular, many advertisements for new food products, and much of the modern food journalism, activism and lobbying that is promoting the new food culture, make claims about food sovereignty for which there is little or no actual evidence. These unsupported claim could be a problem for many reasons, as we will see.

What common claims about the new agri-culture might be not actually be supported by empirical evidence? **Arguments in favor of this new food system often claim that it provides healthier food, with benefits for the environment and for local economies.** What do you think? How far true are these claims?

**--is organic, traditional food actually healthier?** The answer is clearly yes, to the extent that focusing on limited quantities of high-quality food helps to deliver healthy nutrients with less total calorie intake. This focus is extremely important in more industrialized settings to help combat obesity and other food-related diseases. But repeated studies of nutrient content and health effects have found very few significant differences between “organic” and “non-organic” food as such. It appears that the much more important food and health issues involve micronutrients (such as vitamin D or iron) and food-borne illnesses (such as from e. coli, salmonella and aflatoxins) which the new agri-culture does not address.

**--is organic, traditional food better for the environment?** The answer is also yes, but only in the very narrow sense of the immediate environment of the farm in question, in terms of the specific environmental traits that organic, traditional food production aims to provide. Many studies have found that, if this kind of agriculture were to expand, it could be worse for the environment elsewhere because other peoples’ demand for large quantities of conventional food would bring more acres into production, at the expense of forests and wildlife of all kinds. In any case, there are severe environmental problems associated with producing conventional food, requiring careful control of nutrient runoff into rivers, aquifer depletion from irrigation, and antibiotic resistance in livestock and other interventions that are not addressed by bringing more acres into organic production.

**--is organic, traditional food better for local economies?** Again yes, but only in terms of the specific activities that are being promoted. Any resources that go into the local food sector must come from somewhere else, where their productivity might have been higher. The net effect depends on relative values. In terms of quantities produced at conventional prices, the new agri-culture is clearly less productive, but its purpose is to produce certain culturally valuable foods, not larger quantities of conventional foods.

In summary, the new agri-culture offers a lot of things that people want – but in general it may not be **generally healthier** (except in offering smaller portions of tasty, nutrient-dense foods), **generally environmentally better** (except in bringing consumers closer to nature and to traditional agriculture), or **generally economically better** (except in producing those specific qualities, which come at the expense of other things). The new agri-culture does little for the major problems in food health, the environmental impacts of conventional agriculture, or the economic issues of rural areas. **What it delivers is a set of specific food qualities that many consumers in industrialized countries want for powerful cultural reasons,** and can easily afford after more than a century of agricultural technology development and productivity growth.

The golden geese that made American agriculture productive in the first place can be summarized as the following sequence of inter-related steps: (a) government funded science-based research and technology development; which (b) is directed at and quickly transferred to competing private companies who sell inputs to farmers and buy products from them; with (c) increasing specialization and trade. None of these steps can succeed in isolation, and their magic works only slowly over a period of years, but taken together they have provided America and the world an ever higher level of farm productivity selling low-cost food to alleviate poverty and undernutrition.

The challenge ahead: Can old and new food systems coexist?

I believe that a central challenge for 21<sup>st</sup> century agriculture is **how to sustain the golden geese of productivity growth for places that still need them** -- and thereby eradicate the remaining pockets of hunger and rural poverty -- **even as the industrialized world moves on to other objectives**. To be clear, the rethinking I have described is hardly universal in America. It's not even very widespread, in the sense that the vast majority of American food is still produced by conventional means, but does dominate food culture and has a rapidly growing influence.

And so I end with an open question: has Nigeria maintained an appropriate balance between its own priorities and those of other regions? Has Nigeria gotten enough of the golden eggs from science-based, highly specialized agriculture, to justify moving on to the new agri-culture that is increasingly demanded in the Europe, America and other industrialized regions? **What are the real lessons for Nigeria from America's experience?**