



**UNIT 3:
FOOD AND POWER**

L.29

THE GREEN REVOLUTION AND MODELS OF INVESTMENT

Note to Teachers

This lesson is designed to introduce students to a fundamental issue: how to feed the world's population. If we survey discussions on our current and future ability to feed the world, scholars propose different methods. Some emphasize our need to improve our agricultural productivity and to invest in areas of the world that have greater agricultural potential. Others, as future lessons explore, focus on empowering ordinary people to feed themselves and their communities.

This lesson introduces the question of how to feed the world by considering the first systematic answer to this question: the Green Revolution. It then illustrates current models of investment/development that we might support around the world.

This reading is fairly long, but it offers a good focus for homework and comes from an accessible and insightful pair of articles from the *National Geographic Magazine*.

Goals *In this lesson, students will*

- begin a conversation about how to feed the world's population that frames all future lesson plans.
- understand the history of the Green Revolution and its limitations.
- understand, clearly articulate, and evaluate the models of development at work in attempting to bring greater productivity to land characterized by scientists as "underutilized."

Objectives

- Students will use some simple statistics on malnutrition in small children to explain the motivation of scientists, development agencies, and companies to increase agricultural productivity in developing countries.
- Students will use a reading to describe the Green Revolution and its export of industrial farming practices to the Global South.

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THE GREEN REVOLUTION AND MODELS OF INVESTMENT

Please use this margin to notate how to best adapt this curriculum to your students.

Objectives CONT.

- Students will study the models of development currently applied in Africa to increase the productivity of land that is well suited to agriculture.
- Students will present their findings to each other, to create a forum for peer teaching and the framing of good questions.

Materials

- Reading

Instructions

Part I: Introduction

1. **FFW:** Has any of your students ever encouraged to eat their dinner, being reminded that there are “starving children in Africa” or a similar comment? Have they ever been reminded in any other way that children elsewhere may be malnourished or starving, and how?

(What do you know? And where does their knowledge come from?)

Ask selective students to read (word for word) their FFWs, or ask all students to read one or two sentences

Open the floor for discussion. What did you hear? Do students have other sources of information about malnutrition or famine?

2. UNICEF has significant amounts of data online if you would like to introduce it. See the following brochure on malnutrition and its effects at https://data.unicef.org/wp-content/uploads/2017/06/JME-2017_brochure_June-25.pdf. Online, you will also find datasets and an interactive dashboard.

Here are some very simple statistics from the World Health Organization, if you want to get straight to the heart of the matter:

- In 2016, globally there were 155 million children under five years of age whose growth was stunted from a lack of proper nutrition (23% of the population of children under five)
- In 2016, 52 million were wasted (i.e., showing signs of starvation)
- In 2016, 41 million were overweight (most in industrialized countries)

As a result the need to “feed the world” is real. The question is, how?

Part II: Models of Development and Investment

Given projections for world populations and the diminished agricultural capacity in many parts of the world due to soil degradation, one focus of scientists, non-governmental organizations, governments, and private investors is to enhance the productivity of land that is deemed “underutilized.” The following handout discusses how—in the past and present—we have sought to do so.

1. Distribute the attached handout. It probably warrants more than one tactic. Consider, for example, reading the first page aloud and then assigning one of the remaining sections to small groups. Alternatively, ask students to read the excerpts from Bourne’s article silently.



THE GREEN REVOLUTION AND MODELS OF INVESTMENT

2. Ask your students to identify and do their best to distinguish the models of agricultural development that the text addresses, as well as the consequences that each will have on local societies. The section titles will give students a name for the system they describe.

Bring students back together and facilitate a discussion that allows students to share their understanding of each of these models.

Encourage members of the class to pose questions that will enrich the discussion.

3. Once students have a good working knowledge of each system, ask them to assess them. What are strengths and weaknesses of each model?

It is not necessary to arrive at a decisive conclusion about which system seems best or worst. The goal is to engage the students systematically in thinking about the assets and liabilities of each.

Part III: Cooking Lab

The cooking lab for lesson 29 is inspired by the model established in the reading by Bananalandia, a big company with a demonstrated interest in improving the quality of life for its employees. Students will use bananas for this lab. While bananas are a commonly eaten food (the most commonly eaten fruit after the apple in the United States) and available year around due to their cultivation in tropical climates, bananas also illustrate much of the history of food crops more generally. Over the course of the last century, most of the bananas we eat are from the Cavendish cultivar.

Students of Latin American and Caribbean descent often have a great affection for dishes using plantains and bananas. While plantain dishes can be sweet or savory, Americans have developed a particular love of bananas in desserts: banana splits, banana pudding, bananas foster, banana bread, etc. This lab brings bananas into a perhaps less-familiar presentation: a curry. Banana curry offers a sweet and hot accompaniment to rice.



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THE GREEN REVOLUTION AND MODELS OF INVESTMENT

Today's Models of Investment

So, how do we feed the world? What models of agriculture are wealthy investors and non-governmental organizations supporting? And will traditional peasant farming—one family growing its own food, with a little left over to sell, on a small plot of land—survive? Steven Stoll, in an analysis of Haiti following its catastrophic 2010 earthquake, warned that anything short of peasant farming leads to exploitation of both land and people.² Independent farmers, he argued, are motivated to steward their land, preserve local cultures, and form the basis of a healthier economy and civil society.

A recent series of articles on food in the *National Geographic Magazine* gives us a glimpse of what forms agricultural development takes today in one continent experiencing intensive investment: Africa.



This land outside Maputo provides a snapshot of Africa's agricultural choices: Will its food be produced on giant, leveled plantations like Bananalandia (at left) or on small farms, called machambas? "It must be a mix of big ag and small," says Dries Gouws, the sprawling banana farm's founder.

JOEL K. BOURNE JR
from
THE NEXT BREADBASKET
National Geographic, August 2014

Since 2007 the near-record prices of corn, soybeans, wheat, and rice have set off a global land rush by corporate investors eager to lease or buy land in countries where acreage is cheap, governments are amenable, and property rights often ignored. Most land deals have occurred in Africa, one of the few regions on the planet that still have millions of acres of fallow land and plentiful water available for irrigation. It also has the largest "yield gap" on Earth: Although corn, wheat, and rice farmers in the U.S., China, and Eurozone countries produce about three tons of grain per acre, farmers in sub-Saharan Africa average half a ton—roughly the same yield Roman farmers achieved on their wheat fields in a good year during the rule of Caesar. Despite several attempts, the green revolution's mix of fertilizers, irrigation, and high-yield seeds—which more than doubled global

² "Toward a Second Haitian Revolution." *Harper's Magazine* (April 2010).



THE GREEN REVOLUTION AND MODELS OF INVESTMENT

grain production between 1960 and 2000—never blossomed in Africa, thanks to the poor infrastructure, limited markets, weak governance, and fratricidal civil wars that wracked the postcolonial continent. . .

[As greater peace and economic stability reshape many part of Africa,] the continent is emerging as a laboratory for testing new approaches to boosting food production. If sub-Saharan African farmers can raise their yields to even two tons of grain per acre using existing technology—a fourfold increase and still a tall order—some experts believe they could not only better feed themselves but actually export food, earning much needed cash and helping to feed the world as well. . .

But the thorniest question is, Who will do the farming in Africa’s future? Will it be poor farmers like Chirime working one-acre plots, who make up roughly 70 percent of the continent’s labor force? Or will it be giant corporations like Wanbao, operating industrial farms modeled on those of the American Midwest?

Humanitarian groups that deal with global hunger and peasants’ rights call corporate land deals neocolonialism and agri-imperialism. Yet veterans of agricultural development say the massive infusion of private cash, infrastructure, and technology that such deals may bring to poor rural areas could be a catalyst for desperately needed development—if big projects and small farmers can work together. The key, says USAID’s Gregory Myers, is protecting the land rights of the people. “This could significantly reduce global poverty, and that could be the story of the century” . . .

Big Ag or Peasant Farmers

In 2009 the government signed an agreement with Brazil and Japan to develop an agricultural megaproject dubbed ProSavana, which would make almost 35 million acres of northern Mozambique available for industrial-scale soybean production, possibly the largest such land deal ever reported. The plan is inspired by a Japanese-Brazilian project that transformed Brazil’s cerrado grasslands into one of the largest soy-exporting regions in the world, with the bulk of its yield going to feed Europe’s and China’s livestock. The North Carolina-size corridor would be dotted here and there with modern, 25,000-acre farms run by Brazilian agribusinesses and with technical centers to educate local farmers on how to boost yields of cassava, beans, vegetables, as well as soy—or so the initial vision went. But when a group of Brazilian farmers toured the region in 2013, they had a rude awakening.

“They saw good lands, but everywhere was a community,” says Anacleto Saint Mart, who works with farmers in the region for the U.S. nonprofit TechnoServe. “They were seeing a reality very different from what they were told in Brazil.” Development experts who’ve pored over maps of the area say most of it is already leased for mining or logging, is protected as wildlife reserves, or is already being cultivated by local farmers. Only about 2.2 million acres are currently unutilized, and those are the worst lands for farming.

“When you look at ProSavana, who is winning?” asks Devlin Kuyek of GRAIN, the nonprofit that first focused the world’s attention on corporate investments in farmland. “The land is currently worked by small farmers, and [yet] the government is placing it in the hands of corporations. I’m sure there are some companies with good intentions. But they’re still profiting from low wages and low land prices. Industrial agriculture will just lead to more exploitation.”



THE GREEN REVOLUTION AND MODELS OF INVESTMENT

With the right policies, small farmers can be extremely productive, Kuyek says, pointing to the rice farmers of Vietnam or the small dairy farmers in Kenya, who supply more than 70 percent of the nation's milk. Simply providing women—who make up the majority of African farmers—the same access to land, credit, and fertilizer as men could boost food production by as much as 30 percent. The government of Mozambique doesn't see it that way. Though food production by small farmers has improved over the past few years, 37 percent of the population is undernourished, and the country's southern region is plagued by droughts and floods. Despite its mineral wealth, Mozambique remains one of the hungriest nations in the world. The government thinks bigger farms are the answer.

"I look at ProSavana along with the Zambezi Valley region as the food store of the country," says Raimundo Matule, the national director of economics at the Ministry of Agriculture. "I don't envision huge farms like in Brazil, but more medium-size producers of three to ten hectares [7 to 25 acres]. The Brazilians have knowledge, technology, and equipment that we can adapt and transfer to medium-size farms. If ProSavana doesn't contribute to better food security, then it will not have government support."

Outgrowing

A few miles down a washboard dirt road from Hoyo Hoyo, a soybean farm run by a retired schoolteacher is an example of a productive middle path. Armando Afonso Catxava began growing vegetables in his spare time on a small plot of land and over the years has cobbled together about 64 acres. He now grows soybeans as an "outgrower" under contract with a new company called African Century Agriculture, which provides him with seeds and mechanical weeding. In return he sells his soybeans to the company at an agreed-on price, minus the cost of the services provided. So far both have profited from the arrangement.

"I think middle-size farms are the secret," Catxava says. "Big farms take too much area, and there is nowhere for people to live. If everybody had five hectares [12 acres] of soy, they would make money and not lose their land." Outgrower arrangements have been successful with poultry and high-value crops like tobacco and even organic baby corn grown for export to Europe. Now Mozambique's farmers are starting to raise soybeans for feed to supply the booming chicken industry.

Rachel Grobbelaar is a tall, tough Zimbabwean who left a good job in London's financial district to run African Century, which works with more than 900 outgrowers—a mix of smallholders and medium-size growers—on nearly 2,500 acres. Farmers each get seven visits a season from the company's extension agents, who teach them the basics of conservation agriculture and the use of inexpensive seed treatments, instead of expensive fertilizer, to boost yields.

"I was visiting one of our small farmers up on the mountain yesterday, and he grew 2.4 tons per hectare [one ton per acre]," Grobbelaar says, referring to last year's harvest—more than double the average yield. "He couldn't believe it. He made 37,000 meticais [about \$1,200] profit. That's a lot. I'm very supportive of the outgrower model in Africa. Commercial farms may give them a job, but it takes away their land and typically pays them bare-minimum salaries. I honestly believe we can increase production this way."



