CAN HUNGER BE ERADICATED IN OUR LIFETIME?
Hunger is the leading cause of death in the world.

Source: World Health Organization
HUNGER AND CONFLICT ...

The vast majority of armed conflicts are domestic. Of the 118 conflicts worldwide in the 1990s, 100 were primarily or exclusively civil strife. More than 80 percent of these armed conflicts took place in countries in the bottom half of the UN Human Development Index in 1999. And more than half of the countries where undernourishment is most prevalent experienced conflict.

Undernourishment and conflict
% of population undernourished

- <5
- 5-19
- 20-34
- ≥35

% of countries that experienced conflict during the 1990s

- Countries ranked in the top half of the HDI
- Countries ranked in the bottom half of the HDI
- Not ranked in the HDI
- Countries that experienced conflict between 1990 and 1999

Source: FAO
WE CAN TRY TO PREVENT HUNGER BY ADDRESSING CONFLICT...
AN EXAMPLE OF HUNGER AND CONFLICT...
AN EXAMPLE OF HUNGER AND CONFLICT...
AN EXAMPLE OF HUNGER AND CONFLICT...
Dr. Norman Borlaug said it best...

“Peace cannot be built on empty stomachs, or on human misery”
PROGRESS MADE SO FAR...
IT’S A VERY COMPLEX SYSTEM...

• The “landscape” has become more complex, requiring interventions at multiple points, executed simultaneously.
Progress has been affected by external factors, some beyond our control:

- Growing populations
- Climate extremes
- Limited fossil fuels
- Limited water
- Limited land

LARGE PROBLEMS HAVE BECOME GRAND CHALLENGES!
GROWING POPULATIONS...

Human Population Growth

- World Total
- Less Developed Countries
- More Developed Countries

We Are Here

Billions

1750 1800 1850 1900 1950 2000 2050 2100
CLIMATE EXTREMES...

- Changing Rain and Snow Patterns
- Changes in Animal Migration and Life Cycles
- Higher Temperatures and More Heat Waves
- More Droughts and Wildfires
- Less Snow and Ice
- Thawing Permafrost
- Damaged Corals
- Rising Sea Level
- Warmer Oceans
- Changes in Plant Life Cycles
Projected impact of climate change on agricultural yields

* A key culprit in climate change — carbon emissions — can also help agriculture by enhancing photosynthesis in many important (...) crops such as wheat, rice, and soybeans. The science, however, is far from certain on the benefits of carbon fertilisation.*

This map represents the case of beneficial carbon fertilisation processes.

Change in agricultural productivity between 2003 and the 2080s

+25  +10  +5  0  -5  -15  -25%  No data

Source: Cline W., 2007, Global Warming and Agriculture.
THE GREAT WALL OF INDIA...
LIMITED FOSSIL FUELS...
LIMITED WATER...

Today: A Look at the World’s Water Stressed Areas

Water Stress Level:
% of Total Renewable Water Withdrawn

- < 20%
- 20% - 30%
- 30% - 40%
- 40% - 50%
- > 50%
- No Data
WAR OVER WATER?

Water conflict spots in Africa

The availability of fresh water in Africa is growing less and less every year while the overall population continues to explode. Experts are already worried about the current water stress on the continent, which is projected to get worse if the effects of climate change are not tackled. While Africa has contributed the least to climate change (low green-house gas emissions), experts say it is the most vulnerable to climate change. According to Global Water Futures, Agriculture is the largest consumer of fresh water resources globally.

Volta Basin on border of Burkina Faso and Ghana
Lake Chad on the border of Nigeria and Cameroon
River Nile (Ethiopia & Egypt)
River Omo - Ethiopia
Migingo Island on Kenya - Uganda border
Lake Turkana
Zambesi basin covering SADC countries
Lake Nyasa on Tanzania - Malawi border
Rwizi basin covering Tanzania - Malawi - Mozambique border
River Cuito on Angola - Namibia border
Sedudu/Kasiki Island on Namibia - Botswana border

"Brilliantly researched, ably argued... Resource Wars shows that a new geography of conflict based on looming scarcities is already being mapped out. Klare's analysis is indisputable." —David Rieff, Los Angeles Times Book Review

RESOURCE WARS
THE NEW LANDSCAPE OF GLOBAL CONFLICT

Michael T. Klare
AUTHOR OF ROGUE STATES AND NUCLEAR OUTLAWS

THE BORLAUGH INSTITUTE
for International Agriculture

TEXAS A&M AGRILIFE
AGRICULTURE & LIFE SCIENCES
LIMITED LAND...

Clusterstock  Chart of the Day

Arable Land Per Capita Is Decreasing
(Hectares Per Thousand People)

Source: FAO, World Bank

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-20% 
-25% 
-17% 
-32% 
-16% 
-45%

Texas A&M AgriLife
BORLAUG INSTITUTE for International Agriculture
THE GLOBAL LAND GRAB...
HOW ARE WE GOING TO FEED 9 BILLION BY 2050?

- Need to engage in “smart agriculture”: produce more food while optimizing the use of natural resources in a way that is sustainable.

![Graph showing population and dietary energy supply from 1970 to 2050.](chart.png)
Farming Hits the Wall, But Not the Ceiling

Humankind now farms 38 percent of the earth's ice-free land. Crops cover one-third of that area; pastures and ranges for livestock cover the rest. Little room exists for expansion because most of the remaining land is deserts, mountains, tundra or urban. Still, farms in many existing areas could be more productive (insets).

**Better Breadbaskets**

The world could grow much more food if the productivity of the poorest farms were raised toward the maximum possible, given climate and soil conditions. For example, the yield for maize (shown), could rise significantly across parts of Mexico, West Africa and Eastern Europe if seeds, irrigation, fertilizer and markets were improved.
SMART AGRICULTURE IS THE PEBBLE THAT STARTS THE RIPPLE EFFECT RESULTING IN AN END TO POVERTY AND HUNGER AND A SUSTAINABLE PLANET!
WHAT WE’RE DOING AT TEXAS A&M...

- Developing climate-adapted food crops, cash crops, and food animals
- Developing energy-efficient, water-efficient, and input-efficient farming systems
- Developing water reclamation technologies
- Developing strategies to enhance nutrition and food safety
- Developing modeling systems to predict outcomes
A REAL LIFE EXAMPLE...

- Intervention through Value Chain Development – the Rwanda coffee project
  - A country in shambles after 1994 genocide (800,000 people killed in 100 days)
  - Gemmima Mukashyaka, 16 yr old, taken from village, raped, parents and six siblings tortured and killed
  - Tried to restart her family’s coffee plantation, making $30 in 1996
Rwanda Coffee project

- Funded by USAID and led by Borlaug Institute in partnership with MSU, National University of Rwanda, Kigali Institute of Science & Technology, ACDI/VOCA
- 2000 to 2012, focused first in Butare district
- Consisted of training in agronomy, quality control to improve cupping quality
A REAL LIFE EXAMPLE...

- Rwanda Coffee project
  - Established Maraba Coffee Cooperative
  - Built washing stations, brought in mineral water from the mountains
  - Community Coffee in Louisiana was first buyer (40,000 lb)
  - First ever direct contact between American roaster and African coffee cooperative!
Rwanda Coffee project

- $0.20/kg of ordinary coffee in 2000
- $3.50/kg in 2011
- Maraba Cooperative first ever to receive Fair Trade status
- 70% of profit was split among the farmers, tripling their income, 30% was reinvested into the cooperative
A REAL LIFE EXAMPLE...

- Rwanda Coffee project
  - Gemmima now owns two houses and has put her sisters through school
WHAT CAN ONE PERSON DO...
1.4 billion people live on less than $1.50 per day...

Can you live on $1.50 per day for 5 days?

https://www.youtube.com/watch?v=iytUPfQRzps