



Facing the Realities of Water Limitations in Western US for Forage Crops



Dan Keppen, P.E.
Executive Director

Overview of Today's Presentation

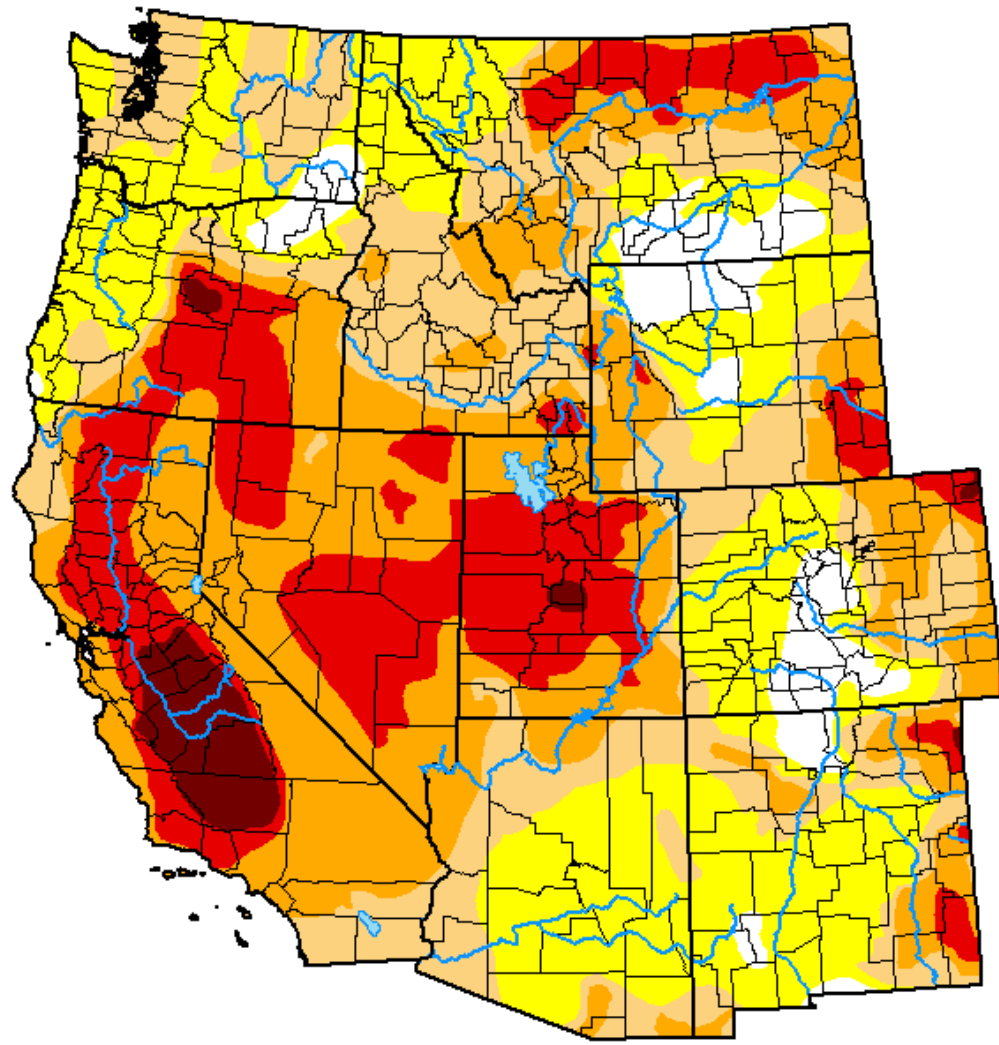


- The Western Drought Impacts on Western Irrigated Agriculture
- Demonization of Irrigated Agriculture and Forage Production in the West
- Why Protecting Western Agriculture Now is More Important than Ever.







2022 Western Drought

U.S. Drought Monitor West

November 8, 2022
(Released Thursday, Nov. 10, 2022)
Valid 7 a.m. EST



Intensity:

-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <http://droughtmonitor.unl.edu/About.aspx>

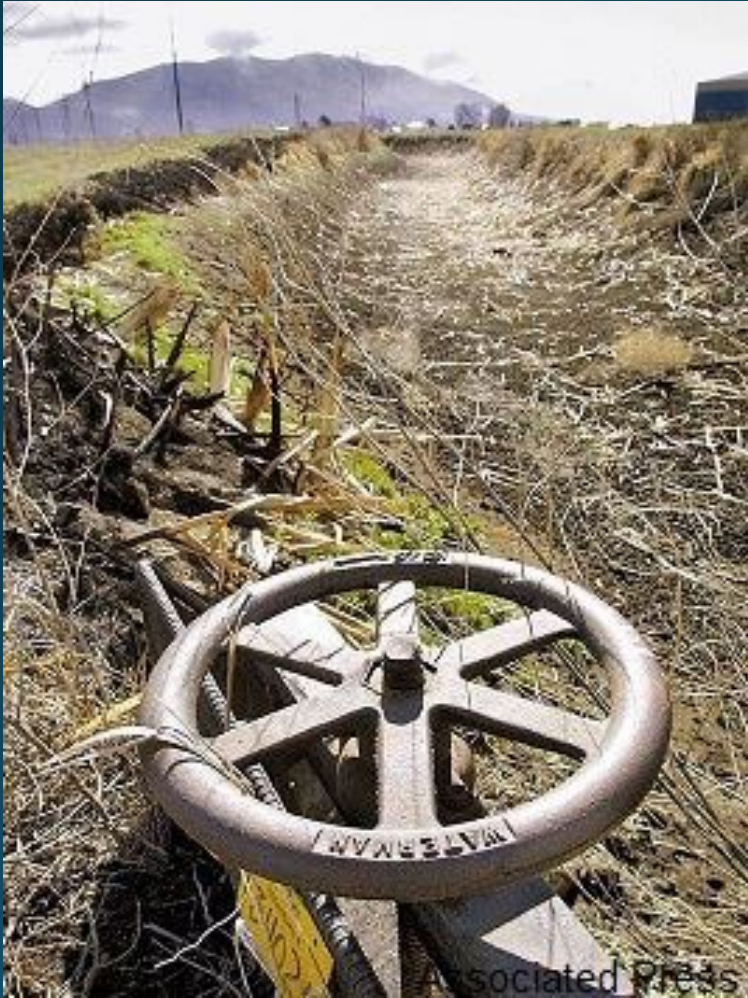
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droughtmonitor.unl.edu

Scary Times for Western Irrigated Agriculture



- 695,000 acres fallowed in Central Valley
- 15% Klamath Project allocation
- Irrigators in AZ summer fallowed due to increased power rates

Scary Times for Western Irrigated Agriculture



- CAP irrigators - due to operating guidelines on the Colorado River - expect that about 100,000 acres of farmland will be fallowed in 2023.
- Colorado River Speculation: 1 million acres of farmland fallowed to meet targeted 2-4million AF of cuts.

Regulations Exacerbating Natural Drought

- Central Oregon
- Klamath Project
- Central Valley Project



Regulatory Pressures Further Make Farming Difficult in California

- Clean Water Act
- Endangered Species Act(s)
- Central Valley Project Improvement Act
- Sustainable Groundwater Management Act (SGMA)
- Pesticide Regulations
- Minimum Wage Increase
- 40-hour Work Week/Overtime Pay

The Demonization of Western Irrigated Agriculture & Alfalfa Production

Water scarcity and fish imperilment driven by beef production

Brian D. Richter^{1,2,✉}, Dominique Bartak³, Peter Caldwell⁴, Kyle Frankel Davis^{5,6,7}, Peter Debaere⁸, Arjen Y. Hoekstra^{9,10}, Tianshu Li¹¹, Landon Marston¹², Ryan McManamay¹³, Mesfin M. Mekonnen¹⁴, Benjamin L. Ruddell¹⁵, Richard R. Rushforth¹⁵ and Tara J. Troy^{16,17}

Human consumption of freshwater is now approaching or surpassing the rate at which water sources are being naturally replenished in many regions, creating water shortage risks for people and ecosystems. Here we assess the impact of human water uses and their connection to water scarcity and ecological damage across the United States, identify primary causes of river dewatering and explore ways to ameliorate them. We find irrigation of cattle-feed crops to be the greatest consumer of river water in the western United States, implicating beef and dairy consumption as the leading driver of water shortages and fish imperilment in the region. We assess opportunities for alleviating water scarcity by reducing cattle-feed production, finding that temporary, rotational fallowing of irrigated feed crops can markedly reduce water shortage risks and improve ecological sustainability. Long-term water security and river ecosystem health will ultimately require Americans to consume less beef that depends on irrigated feed crops.

Water shortages have afflicted human societies for thousands of years¹. As population centres grow and farmlands expand, freshwater consumption typically increases until renewable water supplies are fully utilized (for example, in Fig. 1); at this point, water users and freshwater ecosystems become highly vulnerable to water shortages during drier periods². Historically, water shortages had local causes and consequences, involving only the communities that were directly dependent on an overused river or aquifer. Today, however, with trade networks encircling the globe, demand for asparagus in the United Kingdom can contribute to the depletion of an aquifer in the Peruvian desert^{3,4} and water shortages in the Central Valley of California can affect the availability and price of almonds and pistachios imported into the European Union⁵.

Climate change exacerbates water shortages by affecting both water supplies and water demands. Higher temperatures increase evapotranspiration, reducing aquifer recharge and watershed runoff⁶. For example, Udall and Overpeck attributed one-third of recent declines in Colorado River flows (19% below average during 2000–2014) to temperature increases⁷. The Intergovernmental Panel on Climate Change expressed high confidence that irrigation—the largest water-using sector globally—will increase in coming decades due to increased evapotranspiration⁸.

Human-induced depletion of river flows has deleteriously affected freshwater species and ecosystems across the globe^{9,10} and is a leading cause of fish imperilment in the US^{10–12}. Richter et al.¹³ documented that 62% of sub-watersheds in the western US contain at least one species endangered by flow depletion, with a total of 367 plant and animal species affected, including two-thirds of all native

fish species in the Colorado River basin. To protect species listed under the US Endangered Species Act, water regulators have been forced to curtail water use for irrigation in some watersheds, leading to severe political controversy and economic hardship^{13,14}. The annual cost of recovering Endangered Species Act-listed fish species (more than US\$800 million per year) now exceeds expenditures for all other animal and plant groups combined¹⁵.

Water shortages have increased in both frequency and geographic extent in the US and globally^{16,17}. However, some recent water shortages have begun to stimulate policy responses. A severe drought in California during 2012–2016 led to record levels of river and aquifer depletion across the state and US\$2.7 billion in agricultural losses in 2015 alone, provoking mandatory state-wide water use reductions and legislation requiring preparation of sustainable groundwater-management plans^{18,19}. In recent decades, water extractions from the Colorado River have exceeded total river flow, causing rapid depletion of water-storage reservoirs (Fig. 1). In response, state and federal water agencies are preparing demand-management plans to stabilize reservoir levels and avoid mandatory reductions in water deliveries to states sharing the basin's water^{20–22}.

For water-management plans and policies to succeed, they need sufficiently detailed and accurate information that can enrich understanding of the causes of water shortages and help guide decision making around potential solutions. Here we assess river flow depletion across the US, identify direct and indirect drivers of this depletion, and assess options to reduce vulnerability to water shortages.

Our findings led to closer examination of the water use and ecological impacts associated with irrigation of cattle-feed crops. We

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The Demonization of Western Irrigated Agriculture & Alfalfa Production

The Colorado River's alfalfa problem

**Growing less hay is the only way to keep the river's water system
from collapsing**



The West has an alfalfa problem

Key Criticisms of Alfalfa Production in the West

Argument

- Alfalfa production should be abandoned in favor of “higher value” crops, or ones that use less water.

The Other Side of the Story

- Farmers only grow crops that other people buy.
- The Western agricultural system was built on local supply of feed and food.
- Lower Colorado River states have highest alfalfa yield in the U.S.

“The definition of a low-value crop is one that’s grown with the water someone else wants.”

Key Criticisms of Alfalfa Production in the West

Argument

- Precious water is being “shipped overseas” through field crops grown in Arizona and California and sold to foreign countries.

The Other Side of the Story

- What about other export products?
- The focus on “exporting water” in crops sold abroad is fundamentally incomplete because it does not account for the multitude of imported products used by U.S. residents.

Colorado River: Alfalfa in the Crosshairs

- Short-term actions by districts and producers to reduce water use – 2-4 MAF in the coming years
- Pressure to further reduce ag water use; lots of talk about fallowing or retiring **ALFALFA**
- There is an important role for alfalfa to play in water demand management - without eliminating it.



2021-22 Western Drought: Silver Lining?

IMAGE of President
Biden and Senate Dem
Leaders at Press
Conference on IIJA

- Political and public attention paid to the needs of Western agriculture and rural communities

A Perfect Storm: Western Drought, Inflation, Ukraine and Global Food Insecurity



Global grain stocks are pushing towards a decade low

- Ukraine war - massive blow to food production
- Food shipments are too few
- Harvests from other major crop producers are smaller than initially expected.
- Poor weather in key agricultural regions: U.S., France, China

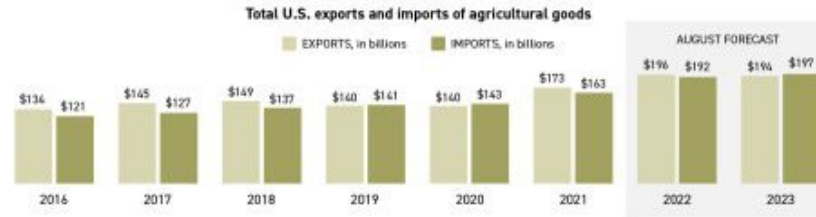


For the third time since 2018, the U.S. will run an agricultural trade deficit

Sept. 7, 2022

U.S. agricultural imports forecast to reach a record high in 2023

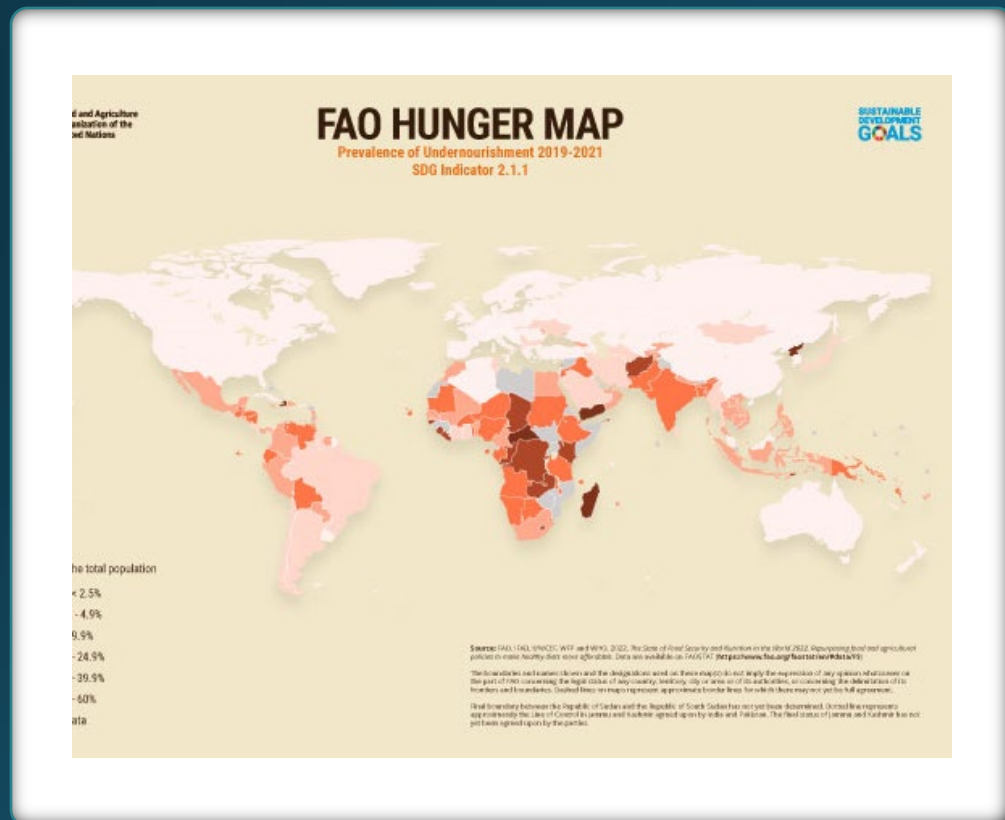
USDA's August 2022 Outlook for U.S. Agricultural Trade forecasts that U.S. imports of agricultural products will grow in fiscal 2023 to a record high of \$197 billion, creating a slight trade deficit in agricultural commodities. In some previous years, U.S. exports of agricultural goods outnumbered those brought into the states. The largest sources of agricultural imports are forecast to continue to be Mexico, Canada and the European Union.



Source: USDA

By Cristina Rivers, POLITICO Pro DataPoint

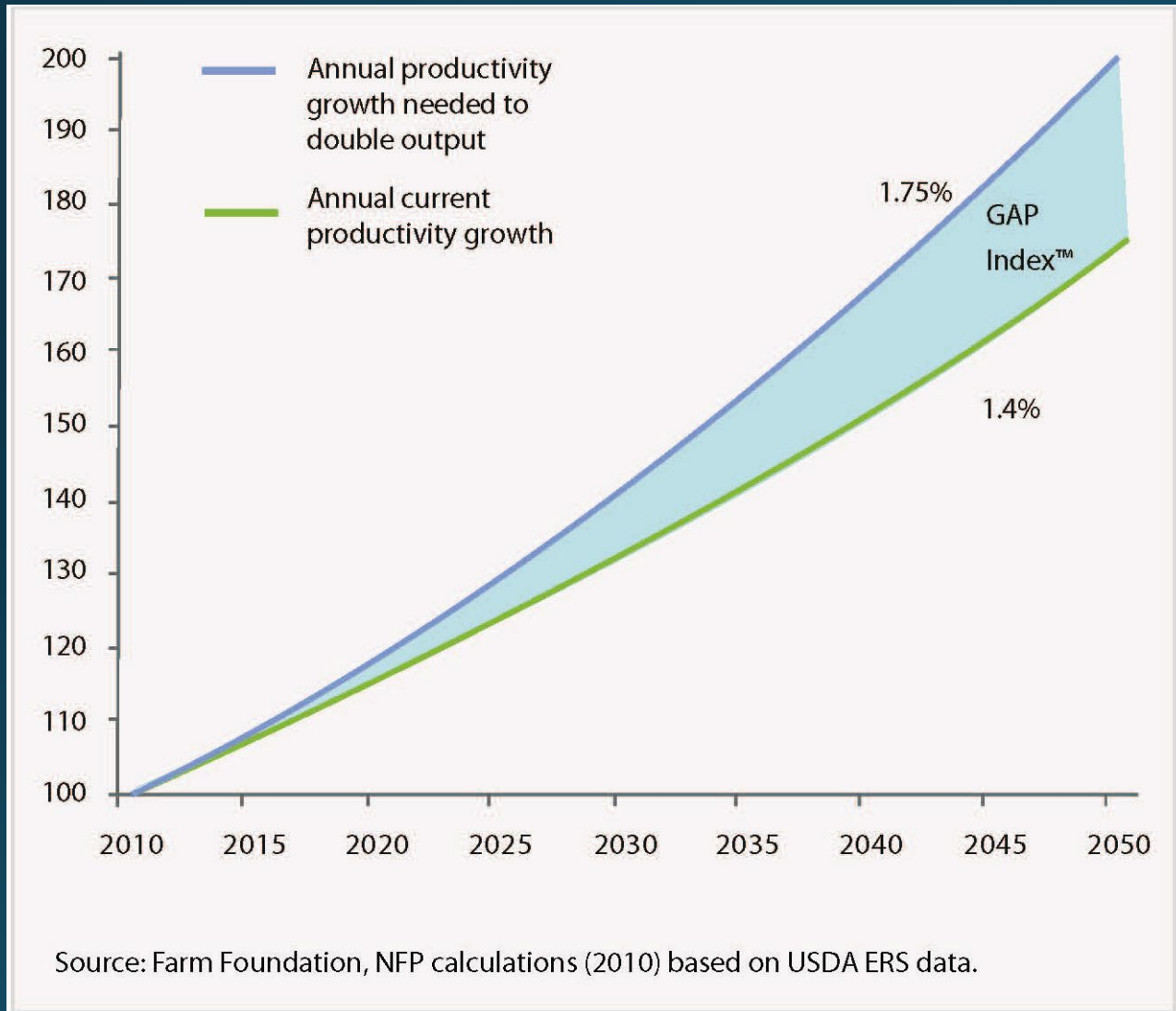
State of Food and Nutrition in the World 2022



World leaders fear global price spikes in food, fuel and fertilizers will lead to widespread famine, prompting:

- Global destabilization
- Starvation
- Mass migration on an unprecedented scale

The World Food Supply "GAP"



The 2022 GAP Report

shows “fragility of agricultural systems, global inability to sustainably feed a growing population”



Key messages:

- Global agriculture productivity growth is in steep decline;
- Extreme climate events disrupt productivity gains;
- Current efforts to accelerate productivity growth are inadequate.

If productivity remains unchanged, the gap will widen over time, making it increasingly difficult to close.

“Many Uncertainties”

- High Fertilizer Prices
- Bleak Global Economic Outlook

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of
Torero

These.... *“pose serious strains for global food security.”*

Maximo Torero, [FAO](#) Chief Economist
August 2022

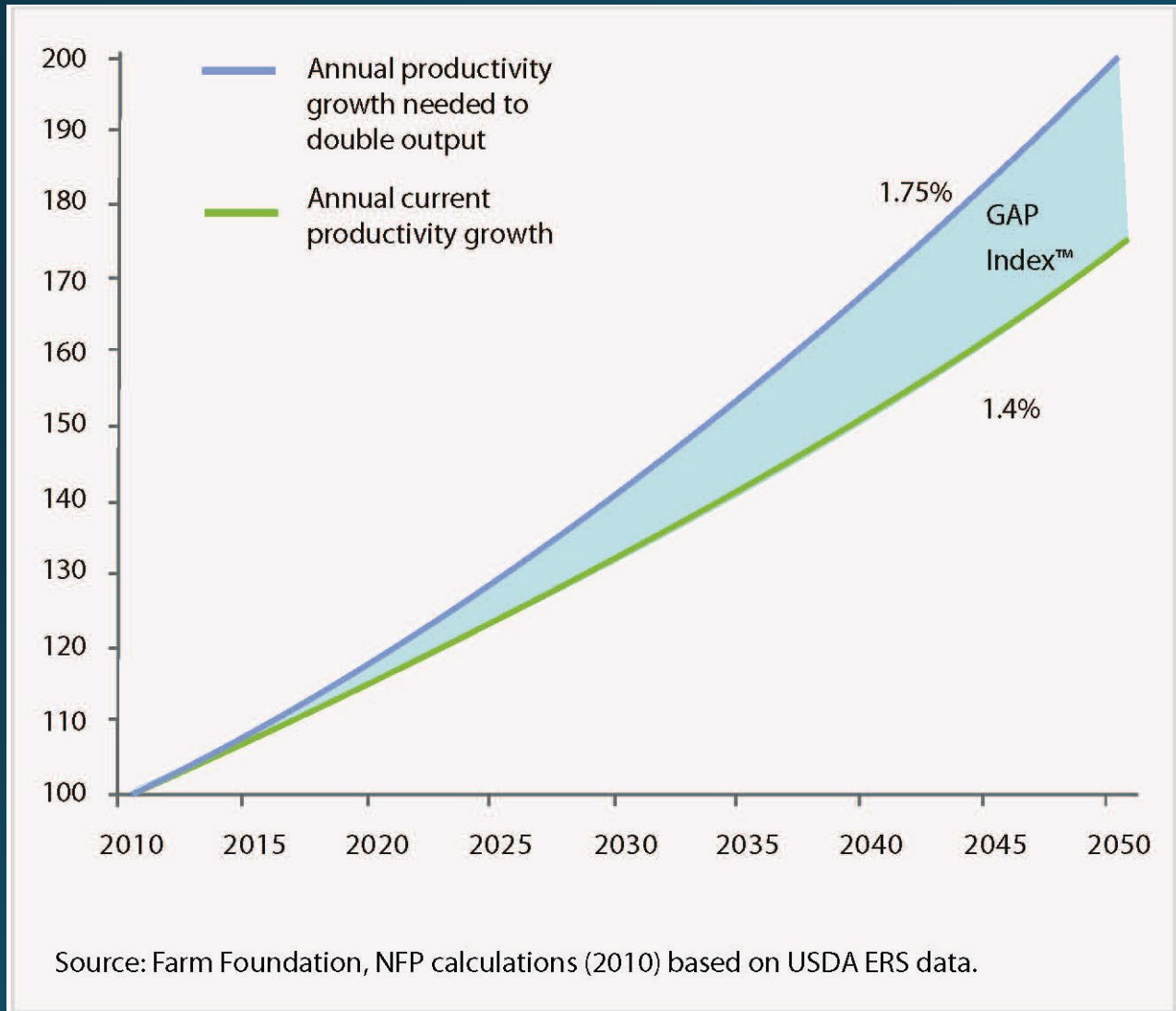
“Wake-up Call”

- Hunger-stricken African countries are struggling with reduced wheat imports due to war in Ukraine.
- One country - Zimbabwe - is looking to build a small strategic reserve for the first time in its history.
- **Russia's war in Ukraine is a "wake-up call"** for countries to grow their own food (*Associated Press*).

INSERT
photo
of
Mnangagwa

Emmerson Mnangagwa
President of Zimbabwe

The World Food Supply "GAP"



Inflation:

Highest Grocery Store Price Boosts since 1980

Putin's invasion of Ukraine has decreased and destabilized worldwide ag commodity production and availability.

Rising input costs:
Fuel, pesticides, fertilizer

Energy and supply chain
crises

Final Thoughts

- *"You've got to . . . keep listening to the farmers, because ultimately, you don't want to get to the point of creating a food crisis to solve a water crisis."*

Enrique Martinez
General Manager
Imperial Irrigation District
Palm Spring Desert Sun
August 4, 2022



Food Riots in Sri Lanka

INSERT photo of
Sri Lanka Food Riots

Dutch Farmers Protest Government Climate Policies

INSERT photo of
Dutch Protests in The Netherlands

Conclusion

Questions?

E-mail me at dan@familyfarmalliance.org

or, check out our website:

www.familyfarmalliance.org

