

2019 ISLAND AGROLOGY WORKSHOP

August 18-20th, 2019

Stanley Bridge Resort, Stanley Bridge, PEI

Theme:

Building Resiliency in Maritime Agriculture

*Exploring the effect of a changing climate on
agriculture and how to respond to those changes today.*



CROP DIVERSIFICATION & NEW CROP OPPORTUNITIES

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A few questions first.....

Student Course Evaluation

- Dr. Caldwell, thank you for not telling me how to grow cereals.

Student Course Evaluation

- Dr. Caldwell, thank you for not telling me how to grow cereals.

One of the greatest compliments I have ever received as a teacher

Guidelines for
making
decisions on
new crop
opportunities

- **#1: Consider the sweet spot triangle**
- **#2: Develop value chains that are win-win-win-win**
- **#3: Embrace (critically) technology**

Health

#1

"Sweet
Spot"

Economics

Environment





What does climate change
look like?

?

What does climate change
in the Maritimes look like?



Welcome to the Climate Atlas

The Climate Atlas of Canada combines climate science, mapping and storytelling to bring the global issue of climate change closer to home for Canadians. It is designed to inspire local, regional, and national action that will let us move from risk to resilience.

Start Exploring ▾

Find & Display Local Data

MAP > CAMPBELLTON

⊕ Location

CAMPBELLTON

⊖ Variable

VERY HOT DAYS (+30°C)

⊕ Type of display

TIME SERIES



Hot Weather



Cold Weather



Temperature



Precipitation



Agriculture

☒ Very Hot Days (+30°C)

- ☐ Tropical Nights
- ☐ Warmest Maximum Temperature
- ☐ Summer Days
- ☐ Cooling Degree Days

- ☐ Very Cold Days (-30°C)
- ☐ Freeze-Thaw Cycles
- ☐ Frost Days
- ☐ Icing Days
- ☐ Coldest Minimum Temperature
- ☐ Heating Degree Days
- ☐ Freezing Degree Days
- ☐ Mild Winter Days (-5 °C)
- ☐ Winter Days (-15 °C)

- ☐ Mean Temperature
- ☐ Maximum Temperature
- ☐ Minimum Temperature

- ☐ Precipitation
- ☐ Heavy Precipitation Days (10 mm)
- ☐ Heavy Precipitation Days (20 mm)
- ☐ Wet Days
- ☐ Dry Days
- ☐ Max 1-Day Precipitation
- ☐ Max 3-Day Precipitation
- ☐ Max 5-Day Precipitation

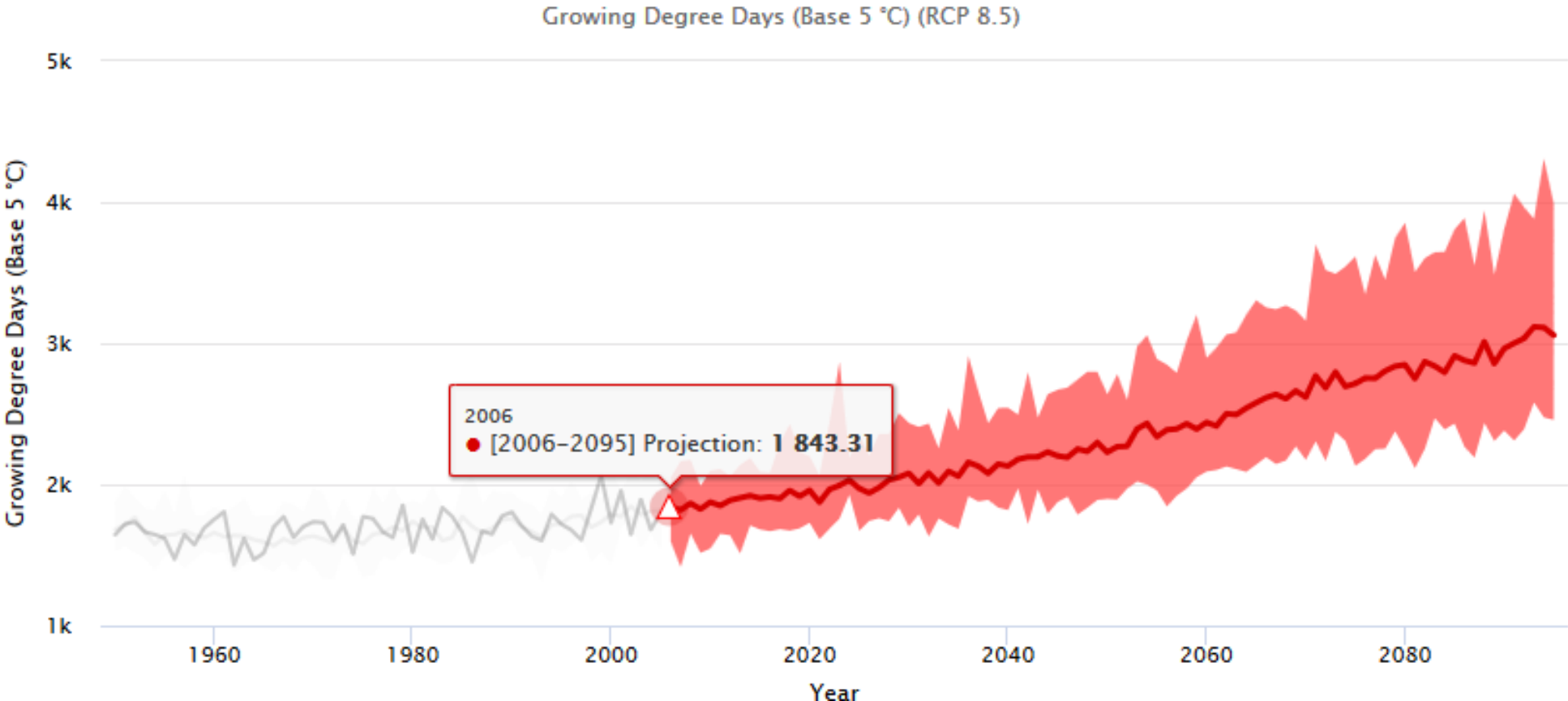
- ☐ Frost-Free Season
- ☐ Date of First Fall Frost
- ☐ Date of Last Spring Frost
- ☐ Corn Heat Units
- ☐ Growing Degree Days (Base 5 °C)
- ☐ Growing Degree Days (Base 10 °C)
- ☐ Growing Degree Days (Base 15 °C)
- ☐ Growing Degree Days (Base 4 °C)

Growing Degree Days (Base 5 °C) (RCP 8.5)

Mean value



Municipality: Charlottetown

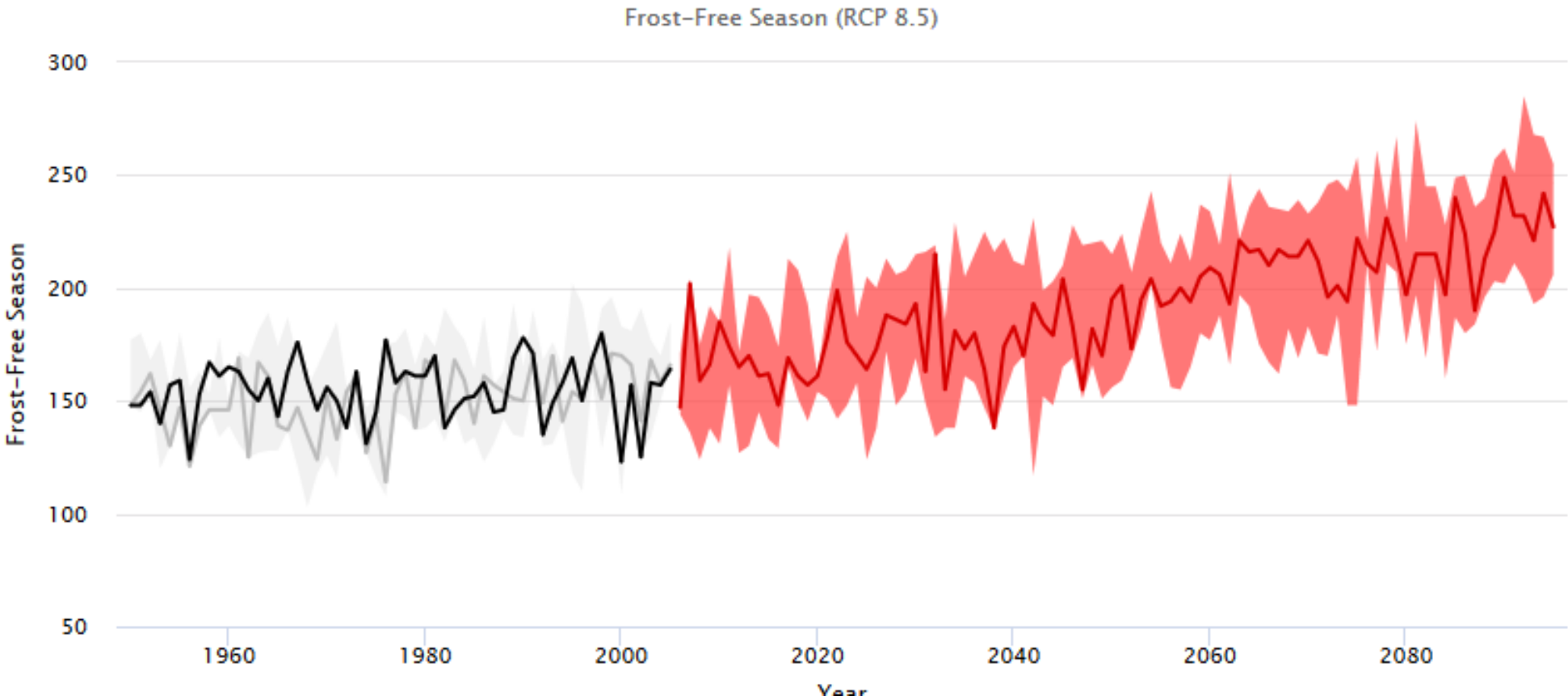


Frost-Free Season (RCP 8.5)

Mean value



Municipality: Charlottetown



What are the agronomic/horticultural opportunities and Hazards climate wise?

- Winter cereals, including Winter barley (malt and feed)
 - Erosion control and potentially increased income
- Higher-yielding grain corn
- Longer season cultivars of traditional crops
- Overwintering of disease and insects
- More severe rainfall events
- Overall variability/unpredictability



Economics:
making
money

**Senate committee concludes
Canada should expand the
value-added food sector,
expanding trade, investing in
innovation and reducing
barriers inside our borders**

Made in Canada:
Growing Canada's Value-Added Food Sector

The value-added sector is key

Canada currently processes only half of its agricultural output

The processing industry cultivates primary products in order to meet emerging consumer trends

Outcome is more transparency and sustainability

#2: Develop value chains that are win-win-win-win

- The **value chain** is the network of stakeholders involved in growing, processing, and selling the product that consumers buy— from farm to use :
 - (1) the **producers**
 - (2) the **processors**
 - (3) the **distributors,**
 - (4) the **consumers**
 - (5) **governments, non-governmental organizations (NGOs), and regulators**

#2: Collaboration is essential

- Collaboration among the various stakeholders along the value chain is more important than ever. :
- Food safety
- Efficiency, especially energy
- Reduce losses
- Waste management
- Prices



Examples of Successful research with failed value chains in my research

Canola/winter canola

Winter triticales

Sweet white lupins

Hemp in 1990's

Flax/solin

Sunflowers/sunola

Crambe? Camelina?

A photograph of a healthy meal. On the left is a white bowl filled with a salad. The salad includes green leafy vegetables, several halved red cherry tomatoes, cubed pieces of cooked chicken, and shredded yellow cheese. To the right of the bowl is a single slice of rustic, artisanal bread with a thick crust and large air holes. A semi-transparent circular graphic is overlaid on the left side of the image, containing text.

Health

- **Food people and society need**

Many
people
have
become
afraid of
their food



Health?(consumer decisions right/wrong)

- **Anti-GMO**
- **Anti-gluten**
- **Pro plant protein**
- **Greenhouse gases and meat/milk**

Opportunity: Plant-based protein



Health

So how does this help?

"Sweet
Spot"

Economics

Environment



How do we get a sweet spot crop?

- **Consider the balance of:**
 - **Environment**
 - **Health**
 - **Economics**
- **Value chain development**
- **Use technology**

Triangle test : Non-GM high oleic, low linolenic and low palmitic soybeans



- **Health:**
 - increased heat stability; no trans fats
 - a better taste and longer shelf life
- **Economics**
 - more uses in food processing
 - open new markets in EU, Japan and other parts of the world (premium price)
- **Environment**
 - Lower use of nitrogen fertilizer due to nitrogen fixation

Hemp and CBD's



- **Health**
 - A strongly perceived but not completely verified portfolio of health effects
- **Economics**
 - Wild West at the moment; Returns over investment per acre range from \$30,000 to \$3000 for the full value chain
- **Environment**
 - Hemp roots aerate soils; build organic matter.
 - hemp biomass assists carbon sequestration

Hemp Farm level economics 2018

- **Grain and Fibre**

- **Input costs**

- \$484/acre grain
- \$545/acre fibre

- **Crop value**

- \$1100/acre (1000 lb x \$1.10)
- \$800/acre (8000 lb x \$.10)

- **Returns**

- \$625/acre grain
- \$255/acre fibre

- **CBD Dry Flower**

- **Input costs**

- \$20,000/acre (seed/clones; mulch; irrigation; **LABOUR**)

- **Crop value**

- \$4 per % CBD x 10% CBD = \$40/lb
- 1 lb/plant x 1400 plants/acre = 14,000/acre
- \$40 X 1400 = \$56,000/acre

- **Returns**

- ~\$36,000 per acre?

Which brings us back to value chain

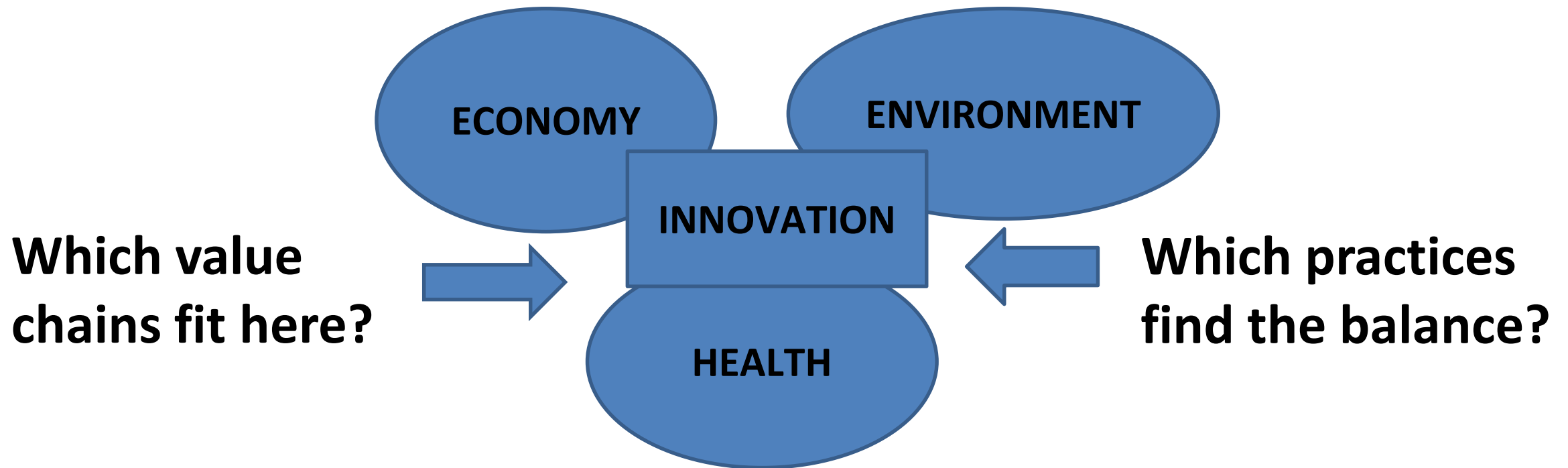
- Who makes the \$30,000 per acre (or \$3000 per acre)?
- How are profits earned and distributed within the value chain?
- How do we develop value chains within the Maritime provinces?



What facilitates a sustainable value chain?

- **Good communication**
- **Realizing that value chains are not zero-sum**
 - **Good value chains benefit all members**
- **Forward-looking regulations**
- **Good communication**

We need to examine each of our ideas for sustainable development



General warning for any new crop:

- **Without any safety net for this crop and the infancy of the industry, producers need to understand and be willing to lose their investment in the crop if it fails, the processor goes out of business, or the policy environment changes. If these are not risks the producer is willing to accept or does not have the financial ability to absorb, then hemp may not be the right crop for their operation until these conditions are ameliorated or become more stable (University of Kentucky Re: hemp)**

As always, whatever we choose, there will also be agronomic challenges.





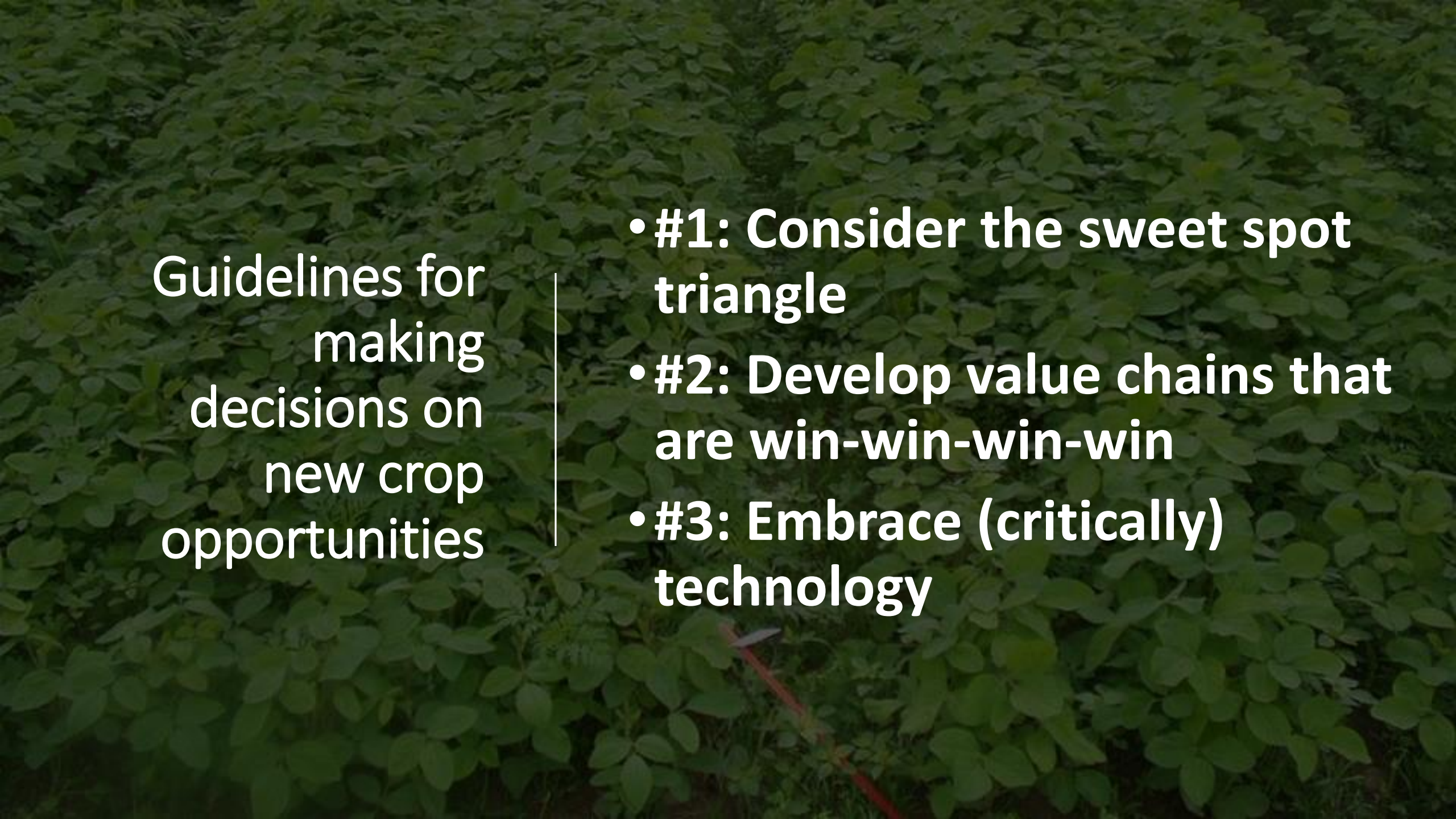
"This really is an innovative approach, but I'm afraid we can't consider it. It's never been done before."

The most dangerous phrase in the language is, "We've always done it this way."

- Admiral Grace Hopper

What does the future hold?

- **Change and opportunity**
- **Hold to the principles of good agronomy/economics/environment**
- **Build sustainable, well-defined and fair value chains**



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The science, art, politics and sociology of changing sunlight
into healthy, happy people.



AGRICULTURE

QUESTIONS?



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