



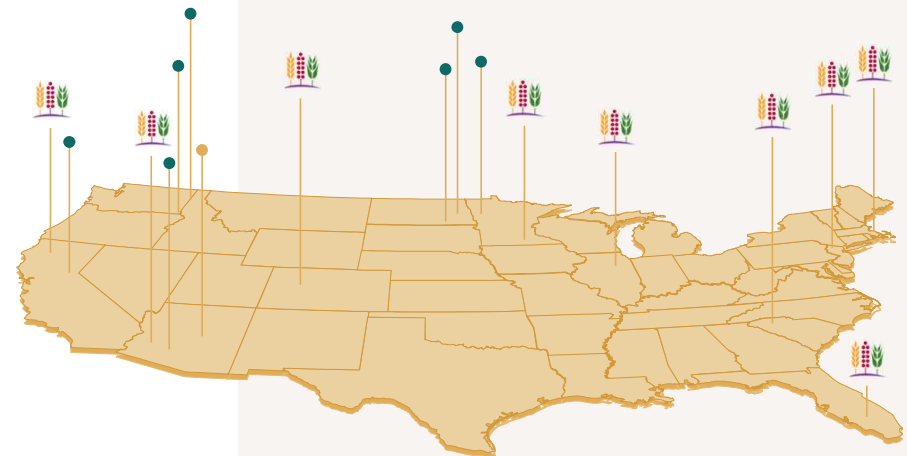
**Alternative Flours For the Tortilla Industry**  
**Nicholas Ahrens**  
Business Development Manager

*Bay State Milling*

# Company Overview: Bay State Milling

- Bay State Milling combines a 120-year family-owned heritage in wheat milling with the latest advancements in plant-based nutrition
- We exist to provide food ingredients that promote the growth of healthful and affordable food choices
- Today, BSM offers an unrivaled portfolio of traditional grains, global specialty supply chains, and unique varietal solutions that equip our customers to win

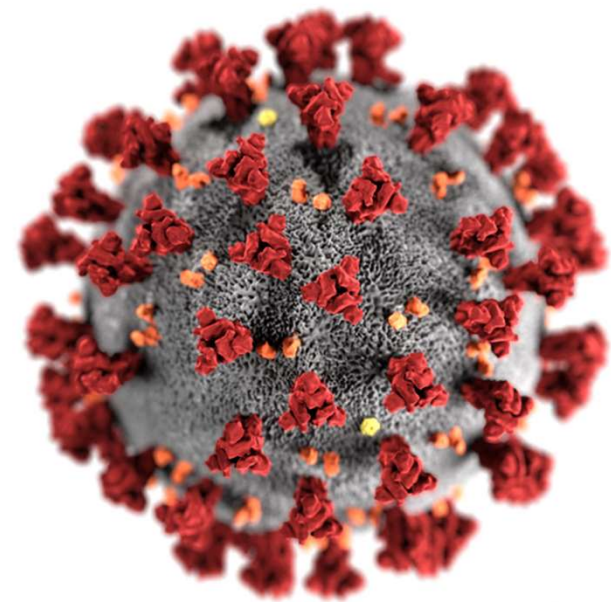
WITH HEADQUARTERS PROUDLY LOCATED  
IN BOSTON, BSM OPERATES A BROAD  
NETWORK OF ASSETS STRATEGICALLY  
LOCATED NEAR SOURCING REGIONS  
AND MARKET NEEDS



-  Bay State Facility
-  HealthSense Farming Location
-  HealthSense Milling Location

**The last 3 years have been dominated by the pandemic, supply chains and labor constraints**

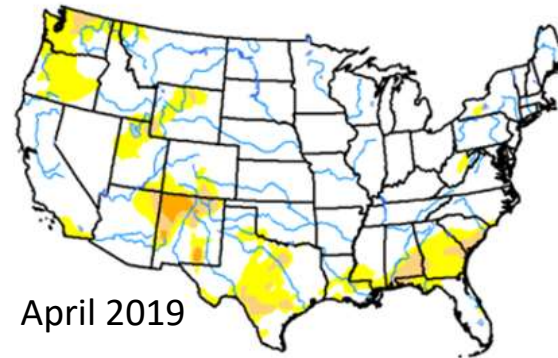
While the world focused on the pandemic. Markets turned upside-down.



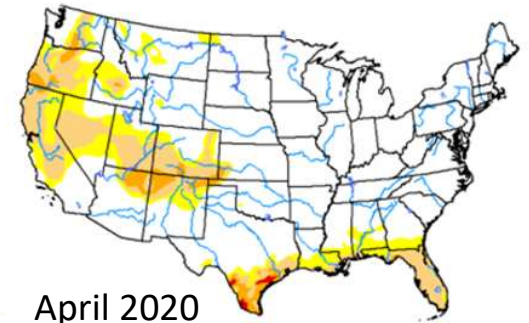
# Persistent Drought: Crop supply yield shock

Year over year Persistent Drought stresses agricultural land. Conventional Wheat Acres continue to be stressed reducing carry over stocks. USDA's March 31<sup>st</sup> Planting estimates indicate lower acres planted to wheat even at record high futures prices. For the first time Soybeans out pace corn for total acreage.

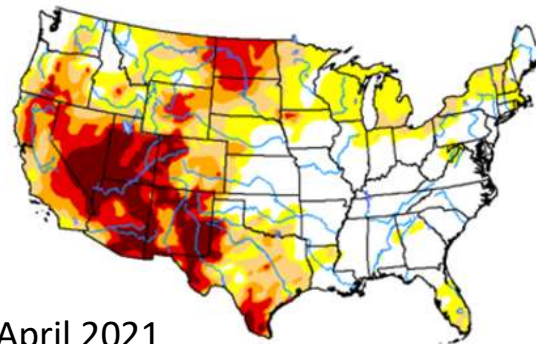
Rising Input costs to Farmers  
Fuel  
Fertilizer



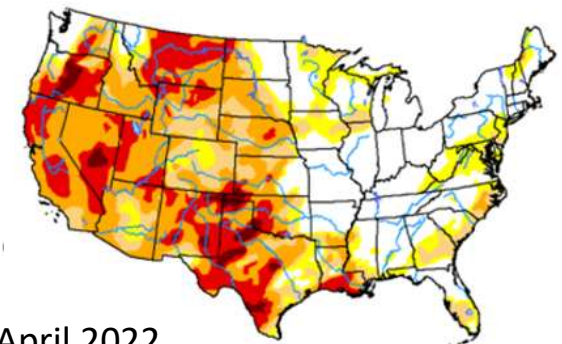
April 2019



April 2020



April 2021

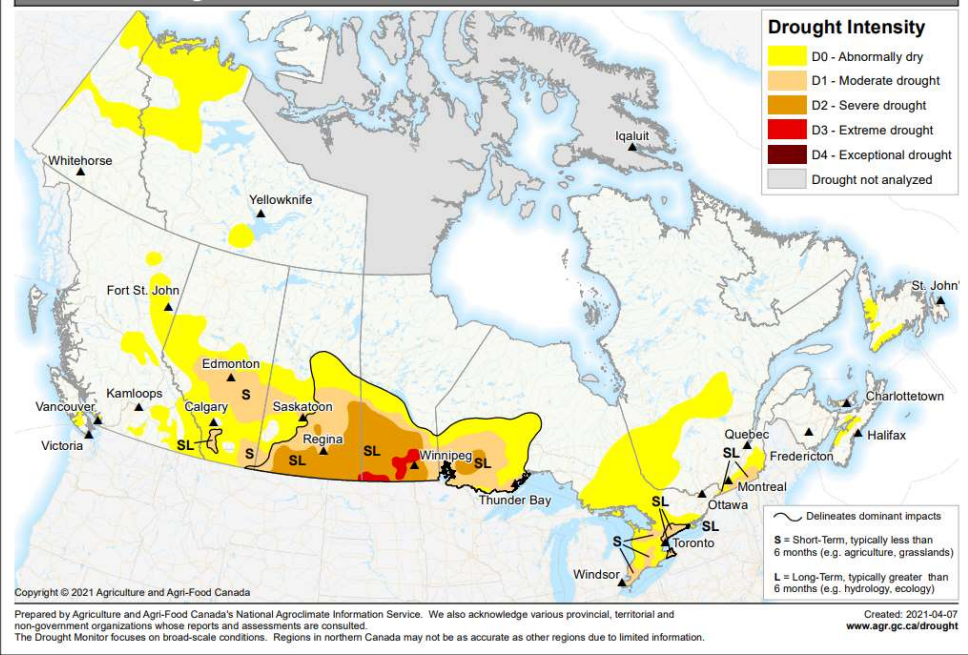


April 2022

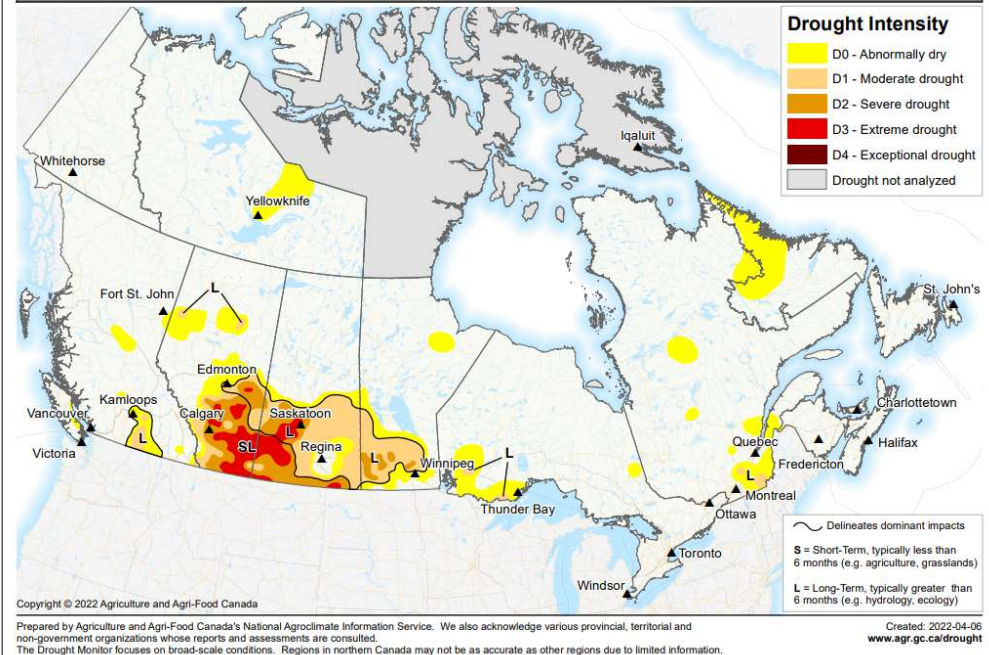
Sources: [1] \* US Drought Monitor the National Drought Mitigation Center, University of Nebraska-Lincoln

# Persistent Drought: Canadian Prairies

As of March 31st, 2021



As of March 31st, 2022



Sources: [1] " Agriculture and Agri-Food Canada <https://agriculture.canada.ca/> April 18,2022

# Wheat Futures: Geopolitical shocks

Geopolitical events (Russia's invasion of Ukraine) Both major Wheat Exporters (close to 30% of global supply)

- Inflation
- Climate change
- Rising Input costs
- UN FAO Food price Index up 12.6% February 2022



From Pakistan to Peru, soaring food and fuel prices are tipping countries over the edge

When people took to the streets in Egypt in 2011, protesters chanted about freedom and social ...

CNN · 2d

" US Drought Monitor the National Drought Mitigation Center, University of Nebraska-Lincoln

# Wheat Futures:

May Wheat Futures on CBOT reach highs not seen since the 2008 Financial Crisis. 20-year view



A person wearing a brown jacket is standing in a field of golden wheat. They are holding a stalk of wheat in their right hand and letting some seeds fall into their left hand. The background is a soft-focus field of wheat under a clear sky.

# Are we close to a Recession or are we already in one?

How Will consumers respond to rising inflation coming out of a Pandemic?

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Will we see Away-From-Home traffic returning and sustaining at pre-pandemic levels?

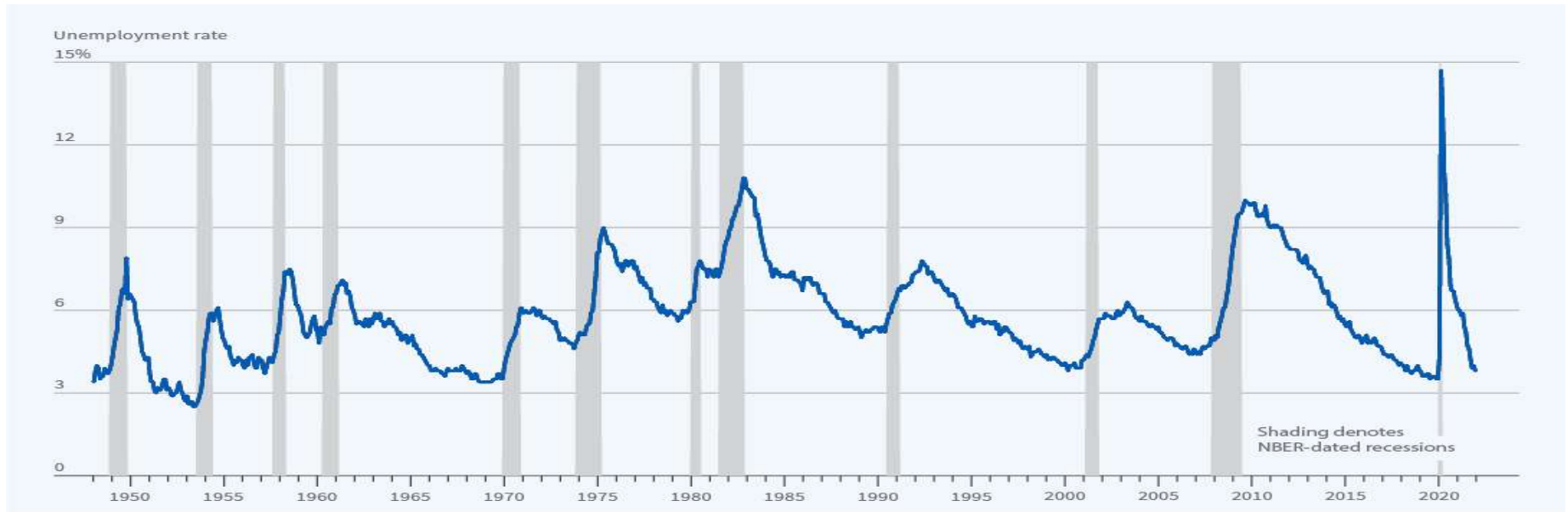
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What Can Tortilla Manufactures do to respond to rapidly changing markets?



# Recessions and Consumer diet trends:



1917

First Book released on counting Calories

1950's

"Cabbage soup" Mediterranean Diet

1960's

Jake Lalanne Juicing/ high protein "egg whites"

1970's

Low Fat Diet Slim Fast

1980's

Frozen Food Meals Jenny Craig

1990's

Low Carb Atkins Diet

2000's

Detox Diet South Beach Diet

2010's

Keto Diet Yogurt craze (Probiotics)

2020's and beyond

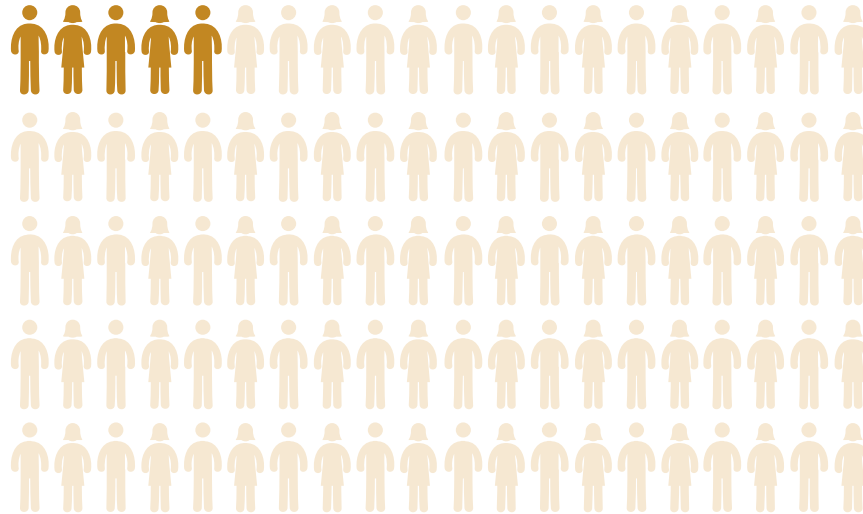
Prebiotics Immunity Gut-Health Microbiome

Common core: Fiber

# The Fiber Gap: 95% of People Fall Short!

## The Gap Defined:

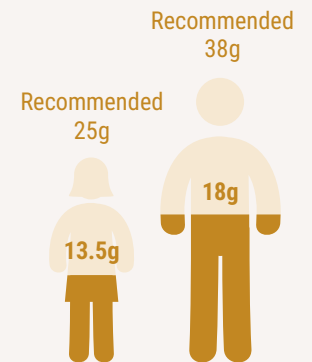
Only **5%** of the population gets enough fiber daily.



And among those who fall short, they miss the mark significantly - **only consuming on average half of the recommended daily intake amount**

(14g/1,000 kcal/day)

95% OF AMERICANS ARE ONLY GETTING 50% OF RECOMMENDED DAILY DOSE OF FIBER



WHY?

- ✗ Poor taste
- ✗ Few options
- ✗ Lack of education

# Rising Demand for Fiber: An Untapped Market

Early-adopting consumers recognize multitude of benefits derived from fiber and taking steps to find products that deliver them

## WHY IT MATTERS



Today's US population in midst of the Fiber Gap: **Only 5%** of people get the **recommended daily dose** of fiber <sup>1</sup>

## THE WAVE IS COMING



**60%** of consumers are actively **trying to consume** more fiber <sup>2</sup>

## HIGH PURCHASE INTENT



**9 in 10** consumers are **interested in buying** products made with High Fiber Flour and replacing flour typically used with a High Fiber version <sup>3</sup>

## EMERGING UNDERSTANDING OF FIBER'S HEALTH HALO

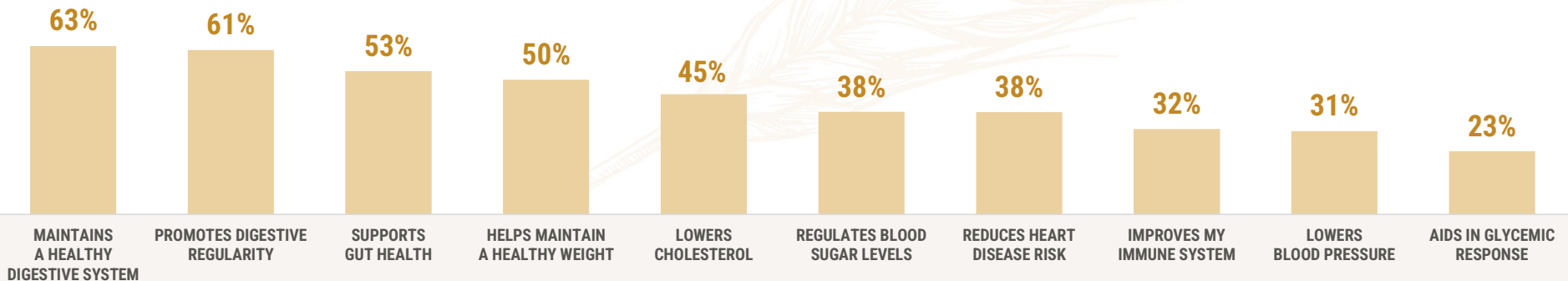


Fiber **ranked #1 in perceived healthfulness** (above plant-based protein, whole grain, probiotics, etc.) <sup>2</sup>

# Opportunity: Broaden Fiber's Benefits

## Health Benefits Associated with Dietary Fiber (N=1,500)

The majority of consumers associate fiber with digestive and gut health. There's an opportunity to communicate about its broader benefits that consumers are starting to associate with dietary fiber.



## WHICH OF THE FOLLOWING HEALTH BENEFITS, IF ANY, DO YOU ASSOCIATE WITH DIETARY FIBER?

# Breakthrough Fiber Source, Directly From the Farm!

## Non-Commodity Wheat

Stable Pricing not impacted  
by Geopolitical events

## HIGH FIBER WHEAT FLOUR

Delivers up to **10x the amount of fiber** in a finished product compared to traditional wheat flour

## PREBIOTIC POWER

Naturally occurring resistant starch fiber to **nourish gut health**

## CLEAN LABEL & WHOLE FOOD

Labels simply as wheat, allowing a reduction or replacement of fiber additives









## SENSORY & FUNCTIONALITY

Same **great taste, texture** and performance of white refined flour with nutritional profile of whole wheat flour



# Range of Benefits, Across a Range of Applications

## Nutritional Improvements Comparison Using High Amylose Wheat Flour (assumes an average 50% inclusion level)

Application (RACC/serving size)	CALORIES (cal/serving)			FIBER (gram/serving)			NET CARBS (gram/serving)		
	100% Traditional Flour	50% High Amylose Wheat™ Flour	% decrease vs. control	100% Traditional Flour	50% High Amylose Wheat™ Flour	% increase vs. control	100% Traditional Flour	50% High Amylose Wheat™ Flour	% decrease vs. control
 <b>Flour, as is</b> (30g)	110	100	-9%	<1	6	+600%	22	16	-28%
 <b>White Bread</b> (50g)	140	120	-14%	1	4	+300%	24	21	-13%
 <b>Tortillas</b> (55g)	160	140	-13%	1	4	+300%	26	23	-12%
 <b>Pasta</b> (55g)	200	180	-10%	2	7	+250%	39	34	-13%
 <b>Macaroni &amp; Cheese</b> (~70g dry mix, makes 1 cup)	250	220	-12%	2	10	+400%	45	37	-18%
 <b>Pizza crust</b> (55g)	140	130	-7%	1	4	+300%	24	21	-13%
 <b>Pancakes</b> (110g)	310	300	-3%	2	4	+100%	37	35	-5%
 <b>Crackers</b> (15g)	80	70	-13%	<1	3	+300%	11	8	-28%

# Sprouted Whole Wheat Excellent Source of Fiber

## Economics

Sprouted Wheat flour differentiates Whole wheat beyond commodities and provides premium value to consumers.

## Flavor/ Texture

The sprouting process increases overall sweetness, reduced bitterness and increased perception of Moistness leading to increased consumer acceptability

## Sprouted Wheat Flour

Increased Enzyme activity, Longer stabilities. Shorter proofing

## Protein/ Enzymes

40% increase in free amino acids  
Protease enzymes aid in digestion of protein. Increase amylase enzymes creating shorter carbohydrate chains and increase maltose

## Ease of use

Sprouted Whole Wheat flour can be utilized at 100% of the flour formulation in tortillas and breads.



24

36

48

30 μm

# Pulses & Chickpeas

## Excellent Source of Fiber & protein

### Economics

Chickpeas are a domestic crop and one of the most economical sources of plant-based protein a fiber. A true homerun.

### Sustainability

Excellent for crop rotations, Pulses are nitrogen Fixators. Can combat rising input costs on fertilizer

### Ease of use

Chickpea flour both whole and Decorticated are easy to incorporate into traditional tortilla formulas with minor adjustments. Or as the main structure in GF formulations.

### Chickpea Flour

Excellent Source of Fiber and crude Protein

### Complementary Protein

Chickpeas and Legumes are high in Lysine the limiting amino acid in cereal grains. Complexing of protein sources can lead to more complete protein





# Sorghum & Millet

## Adaptable to a changing climate

### Millet & Sorghum

High in crude protein amongst cereal grains. Ancient grain appeal to consumers

### Sustainability

Excellent for **crop rotations**, and **drought resistant**. Non-commodity grain. Good insect and disease resistant. Maintains Soil Health

### Economics

Sorghum and Millet are complimentary alternative grains that can succeed in arid environments and changing climates. (Southwest) Domestic **Supply chain**

### Ease of use

Millet and Sorghum are great **neutral flavor** GF flours that supplement wheat-based tortillas or the main component of Gluten free tortillas.

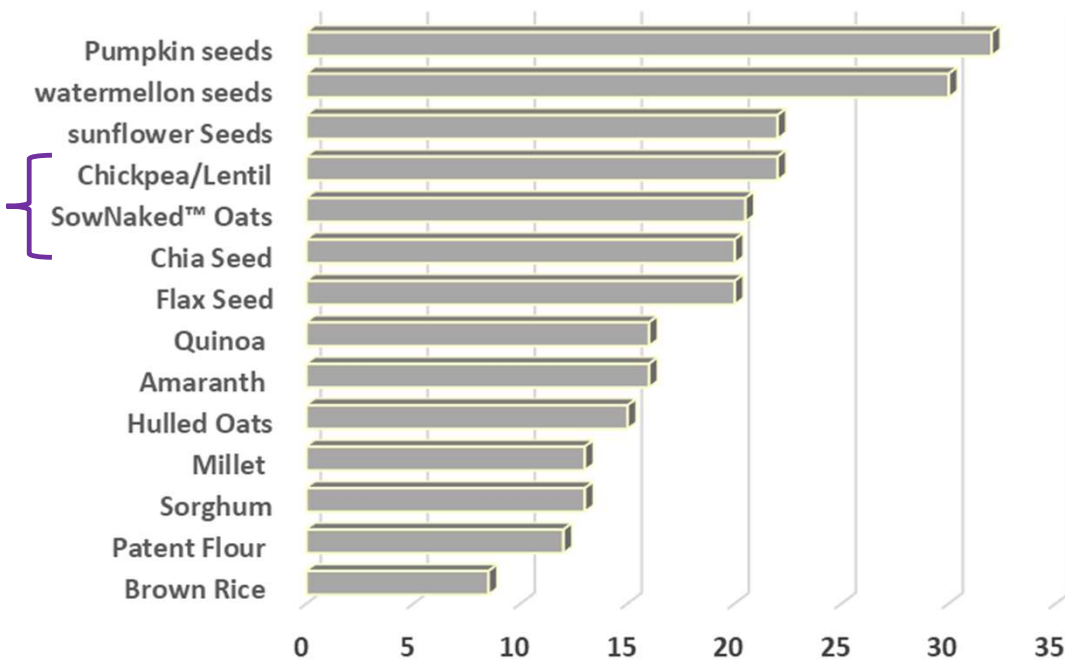
### 2023 Year of the Millet



# Plant Based protein:

## Plant-Based Protein Comparison

Grams per 100g (dwb)



- Pumpkin, Watermelon and Sunflower top the list on fiber concentration
- With up to twice the protein concentration in Hulless SowNaked™ oats and Chickpea flour compared to patent flour and even more so when compared to rice flours in Gluten free tortillas. Formulating in protein is much more easily obtained with functional flours.
  - Protein as nature intended

# Bay State Milling at Center of Various Consumer Trends & Supply Chains resiliency.



Digestive Wellness

Keto-Friendly  
& Low Net Carb



Fiber Enhancement

Clean Label

Immunity



Bay State Milling

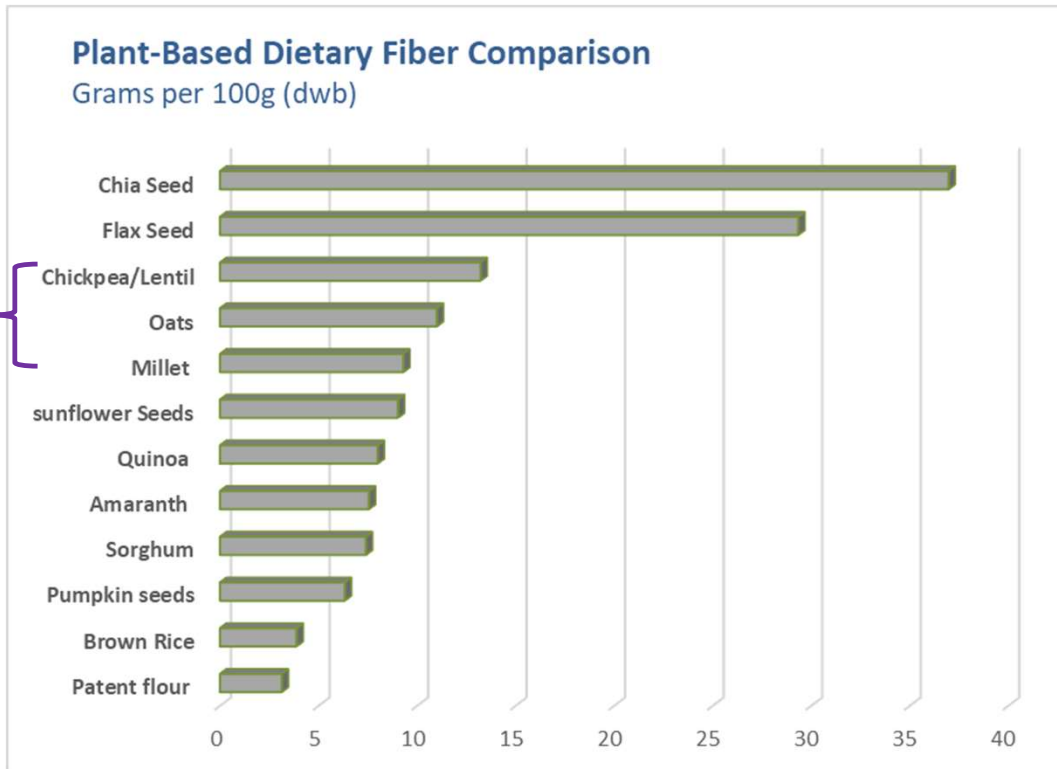




HEALTHSENSE™

# Appendix

# Plant Based Fiber sources:



- 
- Chia and Flax Seeds top the list on fiber concentration
  - Structure building flours sourced from Chickpeas, oats and millet can functionally displace traditional patent flour bringing more than twice the fiber contribution



CHICKPEA

Washington, USA

OATS & FLAX

Canada

SOWNAKED™ OATS

Minnesota, USA

BUCKWHEAT

Poland

CARAWAY

France

SUNFLOWER SEED

Belgium

RICE & SORGHUM

California, USA

MILLET

California, USA

POPPY

Spain

PUMPKIN SEED

China

TEFF

Ethiopia, USA

AMARANTH & SESAME

India

CINNAMON

Madagascar

QUINOA

Bolivia

RICE & CHIA

Argentina

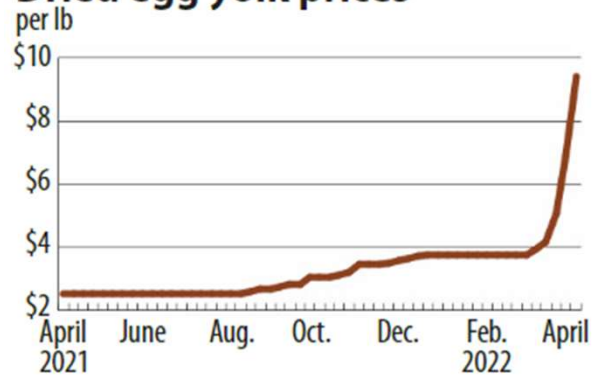


# A GLOBAL SUPPLY OF SPECIALTY INGREDIENTS

*Bay State Milling partners directly with suppliers and growers across five continents to source the highest quality specialty grains and seeds.*

# Industry shocks to agriculture continued

## Dried egg yolk prices



Source: Food Business News

- HPAI (Highly Pathogenic Avian Influenza)