



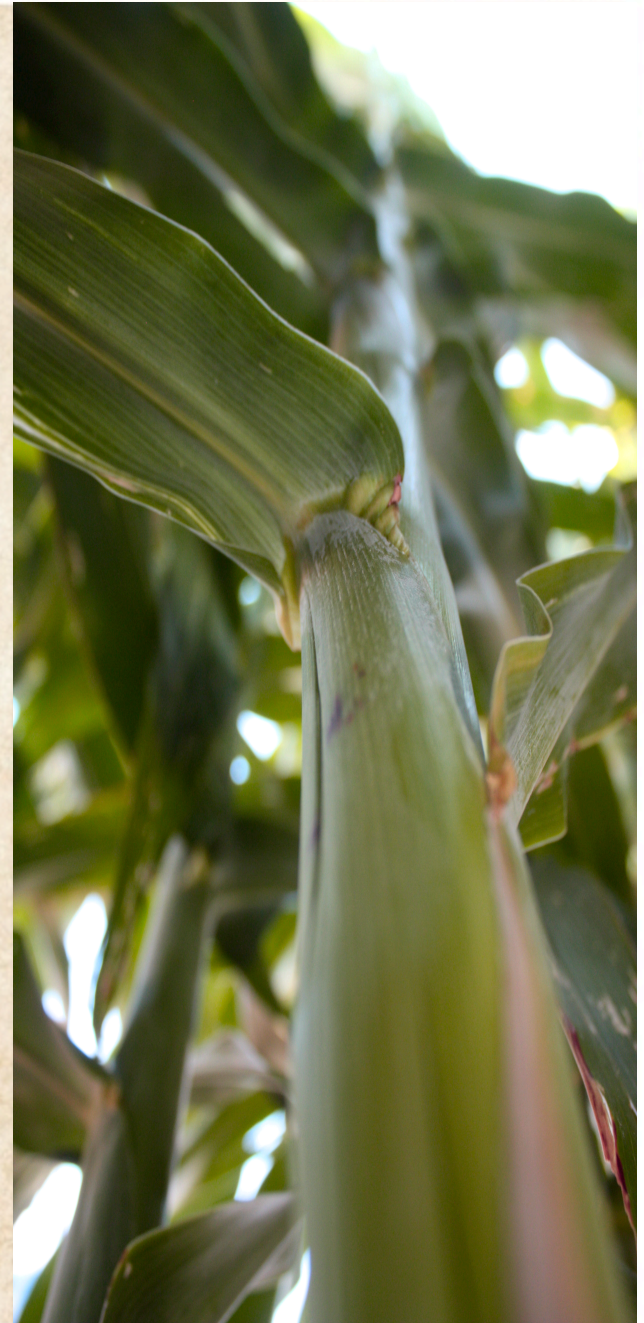
From seed to processor:
Sustainable customized feedstocks



Biomass feedstock demand

- 2020 projected demand
 - Cellulosic 80
 - US Heat & Power 170
 - EU Power 50
 - Chemicals 150
 - Animal feed 150+

600 million tons
- 2030 projected demand is > 1 B tons
~ 600 M tons purpose grown crops
- Agriculture expansion of > 70 million acres



Purpose grown biomass: Today's markets

Cellulosic / Power (US)

- \$50 - 70 / ton

Power (EU)

- \$150 - \$200 / ton

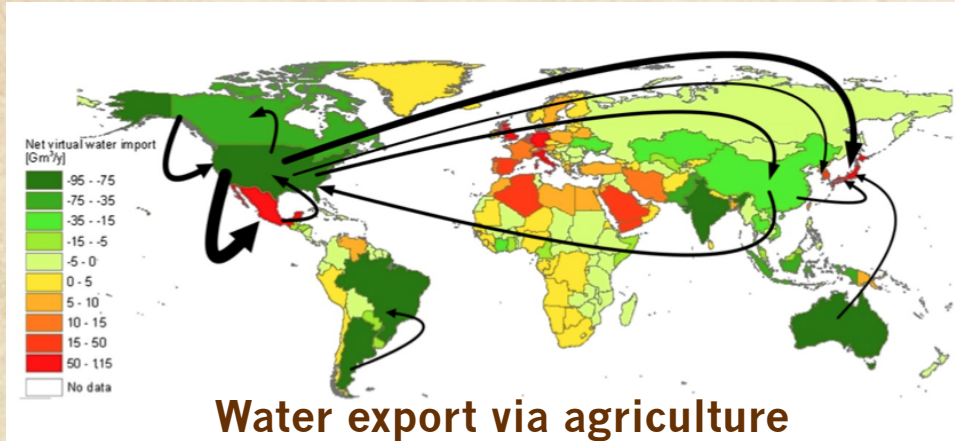
Animal feed

- Middle East / Asia, >\$200 / ton
- TX, \$110 - 220 / ton
- USDA Projected (2013-2020) \$150 / ton



Global markets are emerging

Economic driver: Water



Hoekstra A Y , Mekonnen M M PNAS 2012;109:3232-3237

- Agriculture accounts for > 90 % of fresh water consumption.

Manufactured Item	Water needed (L)
1 glass milk	200
Blue jeans	11,600
1 MWhr (coal)	200,000

Biomass crops that conserve water will be in high demand

Economic driver: Grower opportunity

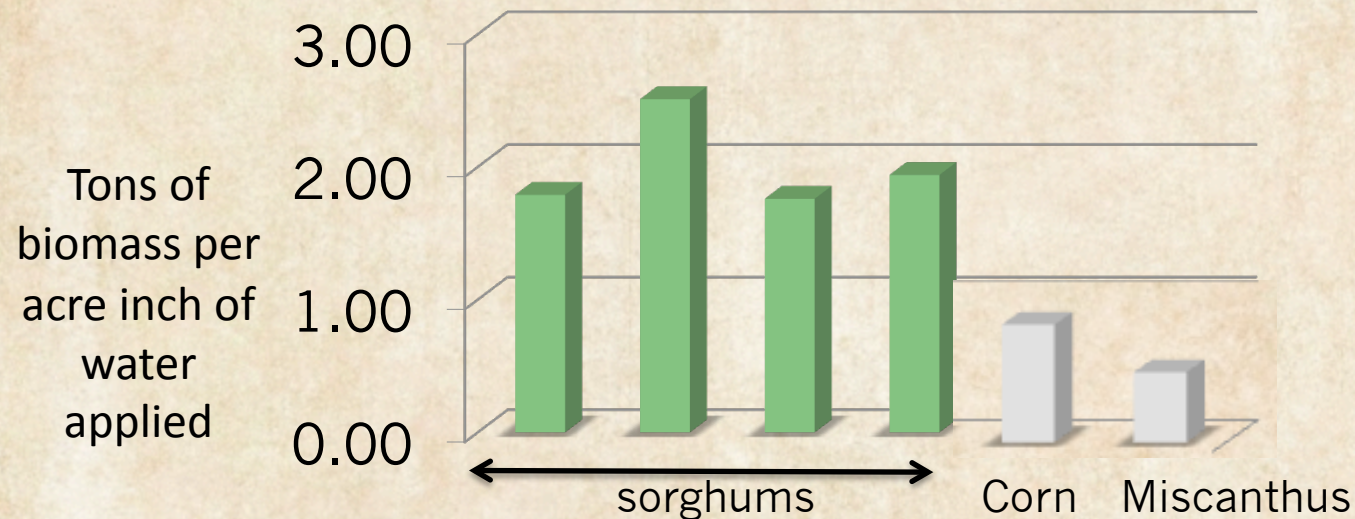


Growers balance:

- Market demand
- Costs of production
 - Land
 - Water
 - Fuel
- Risk

**Annual crops (not
perennials) have a
strong advantage**

Sorghum is a sustainable crop solution

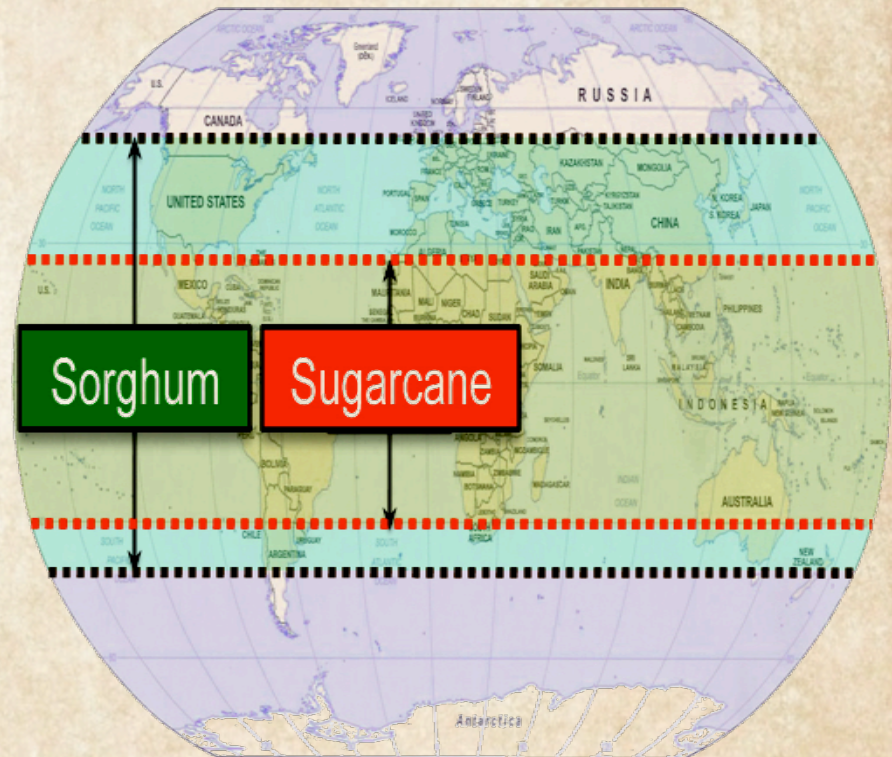


Water use for a 50,000 acre project:

Using sorghum, instead of irrigated sugarcane, saves enough water to meet the annual needs of a city of 1 – 2 million

Sorghum footprint

- Global, at scale today
 - > 500 million tons
 - > 100 million acres
- US
 - > 100 million tons
 - > 10 million acres



Chromatin Overview

- Vertically integrated feedstock provider:
 - Technology
 - Seed
 - Feedstock growth, harvest and delivery
- Seed supply chain today is delivering globally to > 3 million acres
- Participating in biogas, ethanol, biopower, lignocellulosic, and animal feed markets



Chromatin drives value by customizing proprietary sorghum

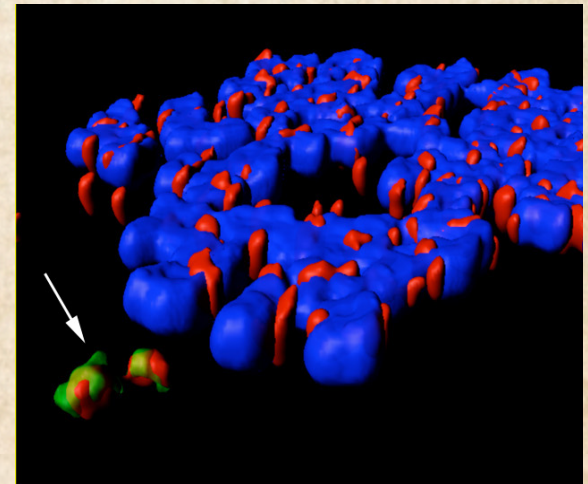
- Tremendous product diversity
- High yields
- Chromatin's R&D pipeline is rapidly customizing sorghum for specific processes



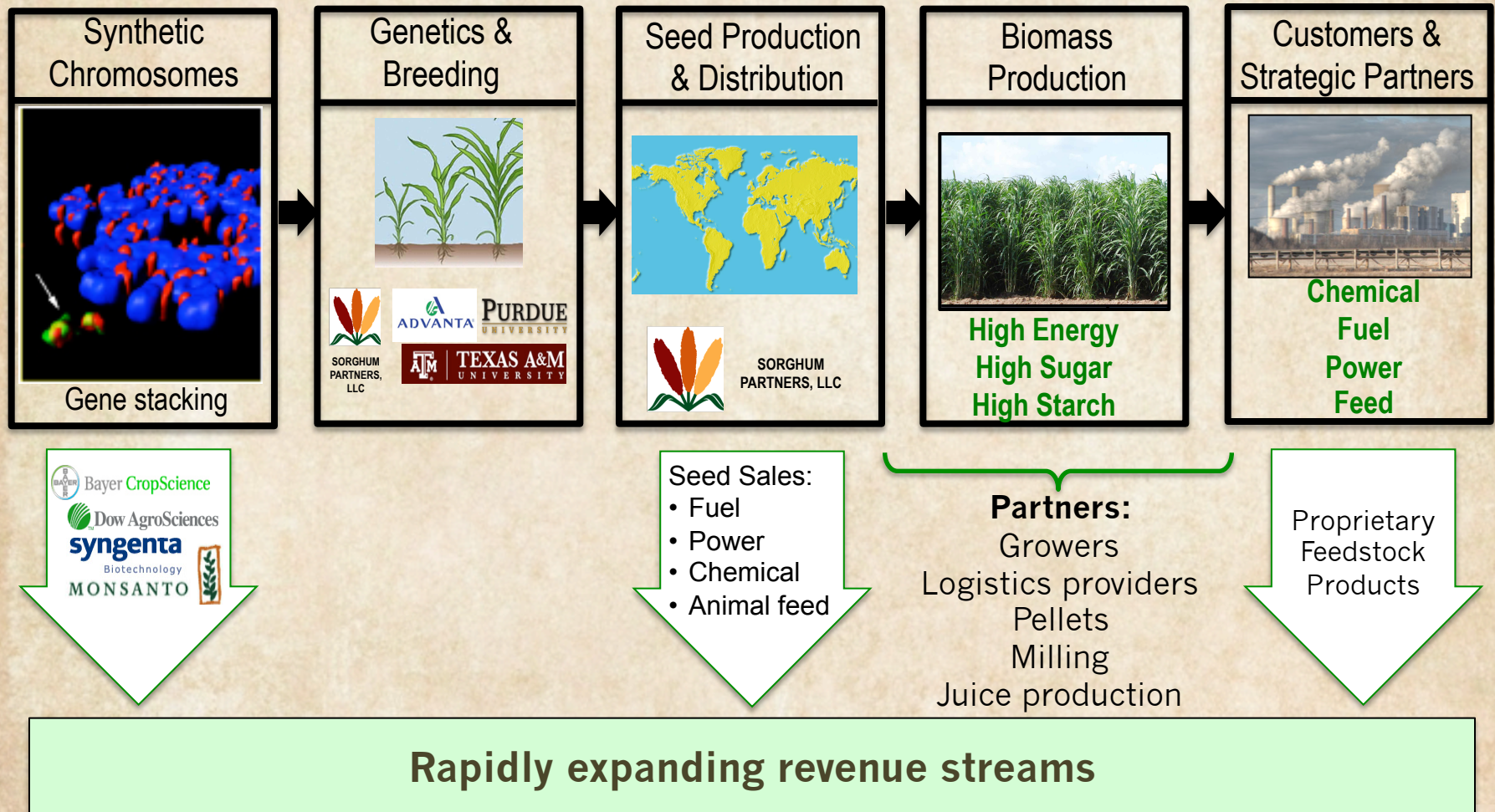
Chromatin is turning sugar to fuel – within sorghum

- Sweet sorghum + genes → farnesene
- Cost ~ \$1.60 per gallon
- Co-product: 11,000 BTU / lb bagasse

Synthetic chromosome with genes to produce farnesene



Chromatin's vertical integration pipeline





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