Developing Sustainable Markets for Hemp

Professor Jay S. Noller, PhD
Agricultural Hemp Research Lead and
Head of the Department of Crop and Soil Science
Oregon State University

Key Points

1. Hemp is a diverse agricultural commodity
2. Macroeconomic “Big Bang” of US hemp markets
3. Research → Sustainability of production models
4. Politics vs biology: Legalization and coexistence issues

Key Points

1. Hemp is a diverse agricultural commodity
2. Macroeconomic “Big Bang” of US hemp markets
3. Research → Sustainability of production models
4. Politics vs biology: Legalization and coexistence issues

History as guide to our hemp future

Sugar Cane

Industrial Hemp

Both images: Franz Eugen Köhler, Public Domain

History as guide to our hemp future

Sugar

- Cultivation of sugarcane
- Acclimatization of cultivars
- New uses/markets developed
- Efficiencies achieved
- Substitutes enter market

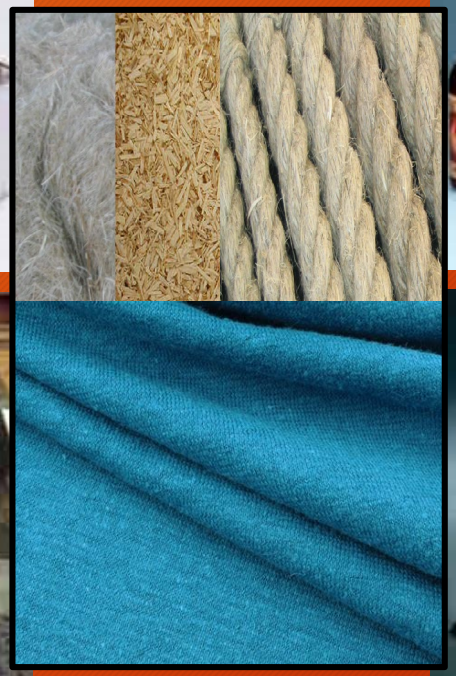
TAKES 2000+ YEARS

Hemp

- Legalization of hemp
- Acclimatization of cultivars
- New uses/markets developed
- Efficiencies achieved
- Substitutes enter market

TAKES 20+ YEARS

Diversity in market classes and entries



Goal in future,
for producers,
3+ contracts

Market classes for hemp production

- Fiber
- Grain and seed
- Oils and extracts (cannabinoids, cannaturpenes)
- Useable and medicinal hemp
- Forage

In future, 3 or more contracts is goal

Can be produced over large extents

Genetic and environmental variability

- “Wild west” Closet breeding → Lab breeding
- Criminalization drove breeders to basements and closets
  - ! Light deprivation is an important tool for hemp breeding
- Transition from *seed saving* to *plant variety protection*
- Need open, scientific breeding
- Off-types are innumerable in US germplasm
- Open-field production is a frontier

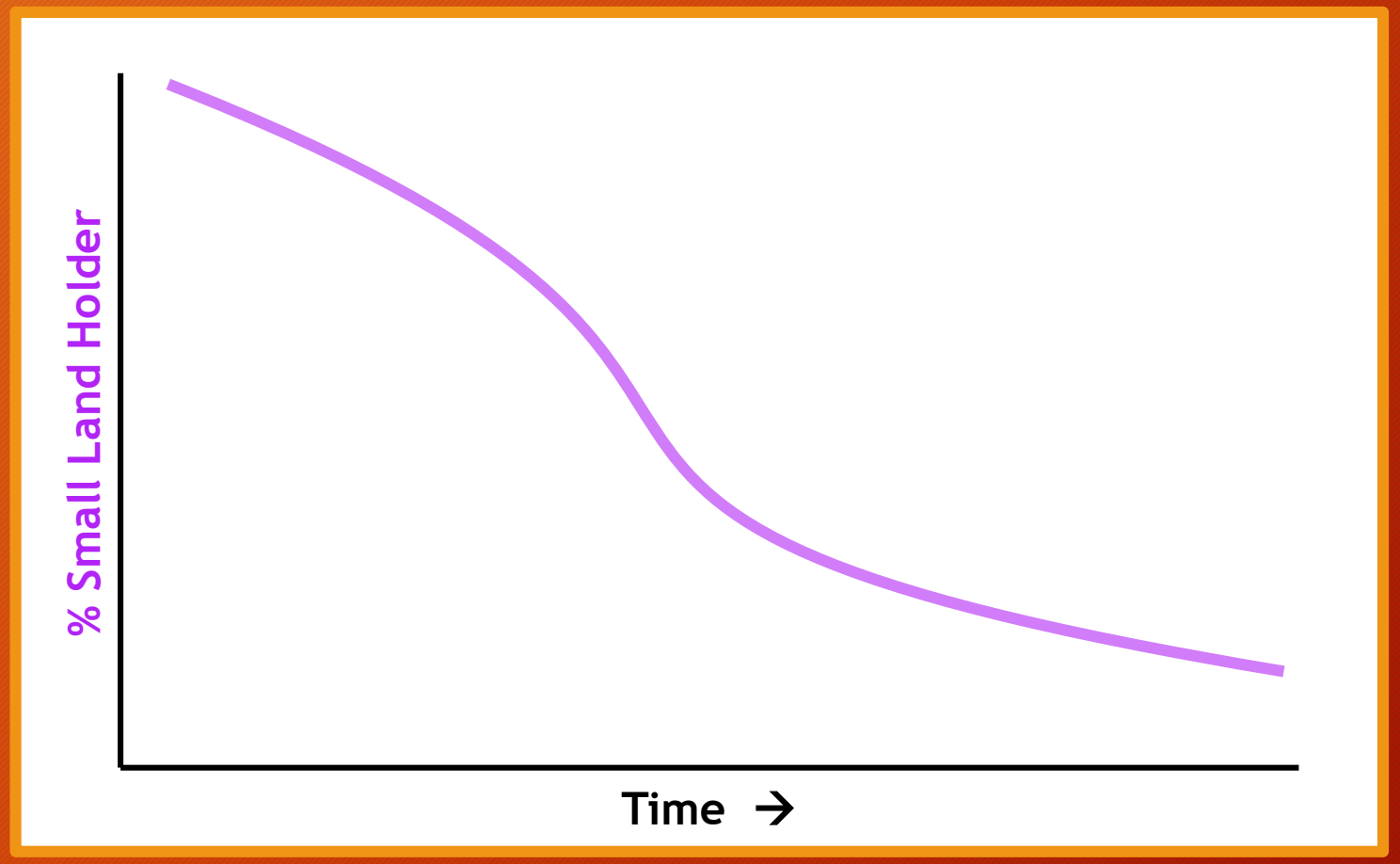
Key Points

1. Hemp is a diverse agricultural commodity
2. Macroeconomic “Big Bang” of US hemp markets
3. Research → Sustainability of production models
4. Politics vs biology: Legalization and coexistence issues

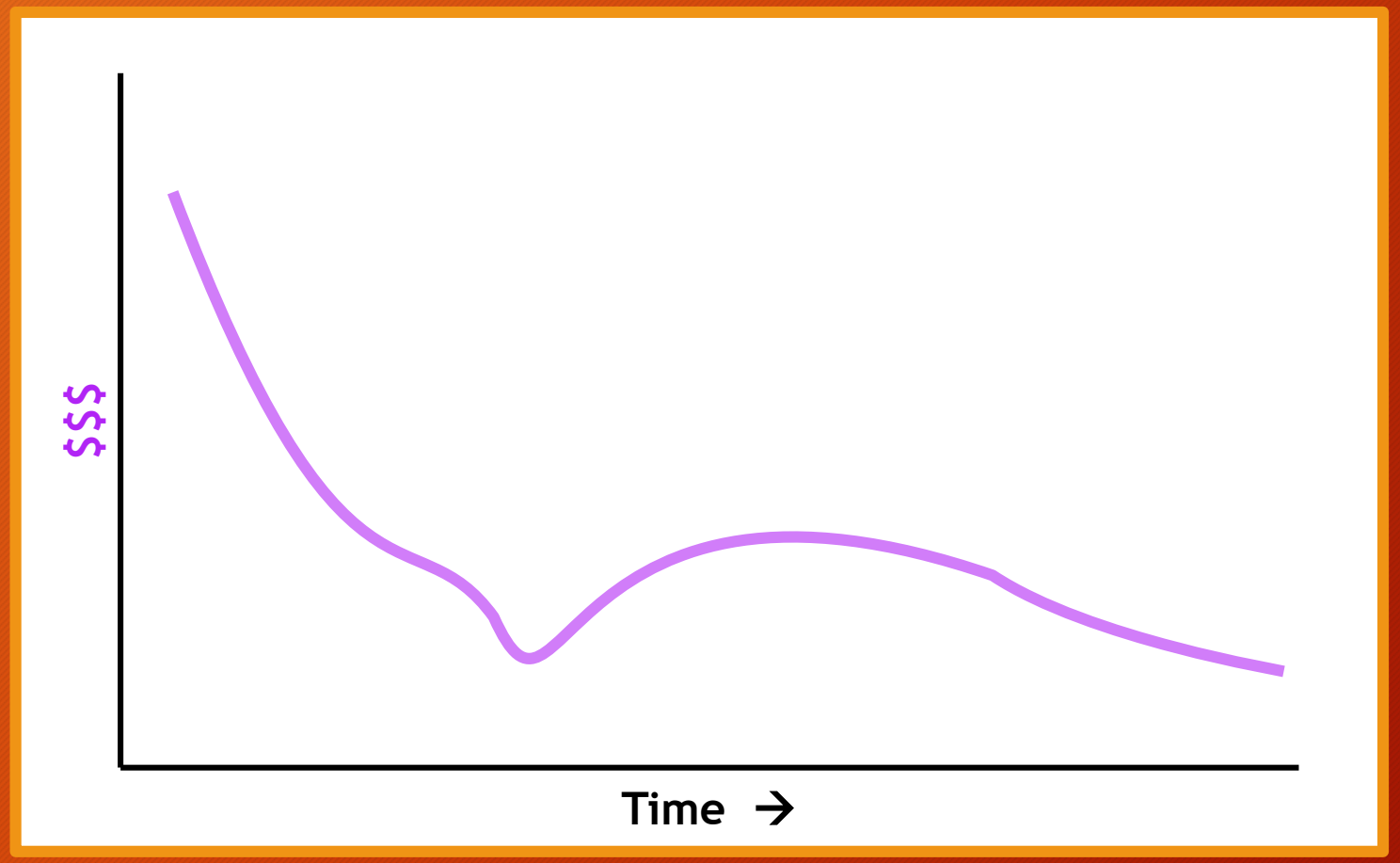
Evolution in Hemp Production (2014-18)

- Hemp industry is rapidly evolving
  - Exponential growth in production (mass and area)
  - Three years, three different extraction practices
- Hemp has broad support now among small land holders
  - Initially requires hand labor, yet still profitable
  - Dropping price and processing capacity limit supply growth
- Mainstreaming of production onto large farms
  - Efficient growers grow more efficiently

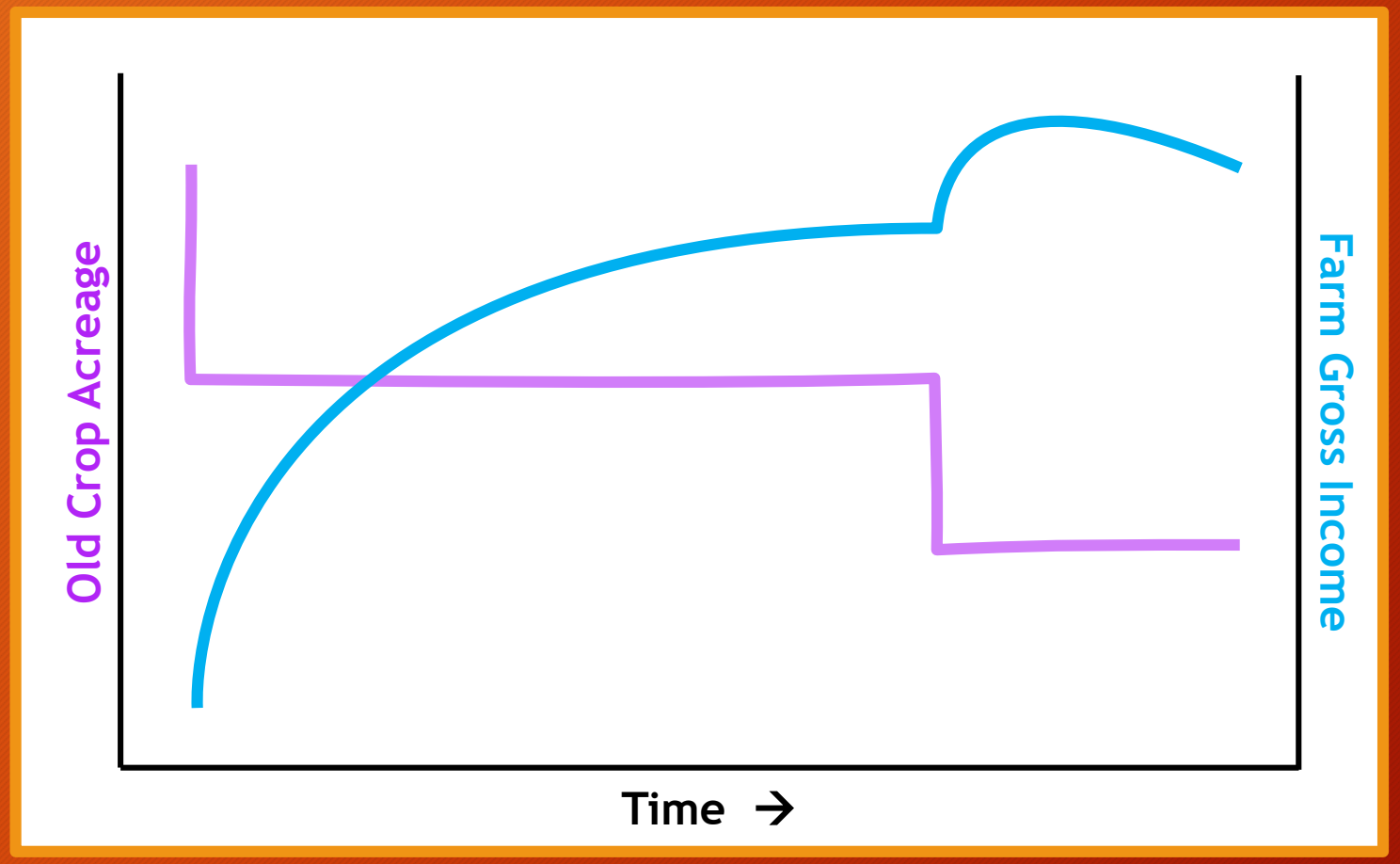
Commodification effect on land holdings



Macroeconomics of hemp markets



Introduction of hemp in crop rotation



Value chains for hemp

- Highly organized value chains
  - strong buyers - processors, distributors, commodity traders
  - secure lending to those farmers supplying to these buyers
- Initial beneficiaries = early to market; vertically integrated
- Long-term beneficiaries = larger producers or co-ops
  - capable of delivering high volumes at precise intervals
  - while meeting stringent quality standards
  - reduces transaction costs for high-volume buyer

Key Points

1. Hemp is a diverse agricultural commodity
2. Macroeconomic “Big Bang” of US hemp markets
3. Research → Sustainability of production
4. Politics vs biology: Legalization and coexistence issues

Engage the research enterprise model

- Expansion and coordination of research
  - (g x e) - Multiple locations and multiple disciplines
- Public and industry support funds
  - No better time to gift funds to university than today
- Land grant universities (LGUs)
  - Ag experiment stations
  - Extension services
  - Teaching and research
- Private industry research and development

LGU research enterprise model

- Breeding and genetics
- Agronomy, horticulture, integrated pest management
- Precision ag and technologies
- Post-harvest processing
- Food science and technology
- Public and animal health
- Social and environmental sciences

Research Plots

Management

Harvesting

Processing

No registered chemicals in US (today)

- Commercial production today is organic in practice
- But not for long
  - IR-4 chemical registration is underway
- Hemp-on-hemp monoculture will foster pest issues
- This is a large-area experiment with few parallels

Key Points

1. Hemp is a diverse agricultural commodity
2. Macroeconomic “Big Bang” of US hemp markets
3. Research → Sustainability of production models
4. Politics vs biology:
   Legalization and coexistence issues

2018 Farm Bill with American Hemp Act

- Decriminalizes hemp
- Adds prospect of national and international trade
- Sets Federal uncertainty through 2021
- Need for additional clarity
  - Funds
  - CBD and other compounds
  - Other expected federal and state interactions with commodity

S. 420 – Marijuana Legalization

Washington, D.C. – FRIDAY FEBRUARY 8, 2019

WYDEN INTRODUCES S. 420 TO LEGALIZE CANNABIS

S. 420 included in legislative package introduced by Oregon Se. Wyden and Rep. Blumenauer to lay foundation for responsible, comprehensive federal regulation of marijuana.

Legislative package also empowers states to implement own marijuana laws

Senate Finance Committee Ranking Member Ron Wyden, D-Ore., today (2/8/19) announced introduction of S. 420, the Marijuana Revenue and Regulation Act, legislation that would responsibly legalize, tax and regulate marijuana at the federal level.

Cannabis, Marihuana, Hemp

- Problems with a politically divided biology
- Four tiers of the US
  - 1 – Full Cannabis legal
  - 2 – Hemp + Medicinal marihuana legal
  - 3 – Hemp legal
  - 4 – No Cannabis legal
- Delta-9 THC, Total THC
- Timing and mode of sampling to meet law

Gene flow – Corruption of harvests

- Cannabinoid output by type
  - Male = 1X
  - Pollinated female = 3-5X
  - Virgin female = 17-20X
- “Hot” hemp and crop-destroy mandate
- Feminization – all or most
- Need coordination in space and or time
  - grower communication >> regulations

Key Points

1. Hemp is a diverse agricultural commodity
2. Macroeconomic “Big Bang” of US hemp markets
3. Research → Sustainability of production models
4. Politics vs biology: Legalization and coexistence issues