

A few perspectives and outlook on hemp



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Key points, and so I have heard it said...



- Hemp as a legislated crop
- World's newly invigorated commodity
- Status of the industry, Oregon as an example
- Research needs
- OSU Global Hemp Innovation Center

Hemp and regulatory stability



≤ 0.3% delta 9-THC



> 0.3% delta-9 THC

Hemp

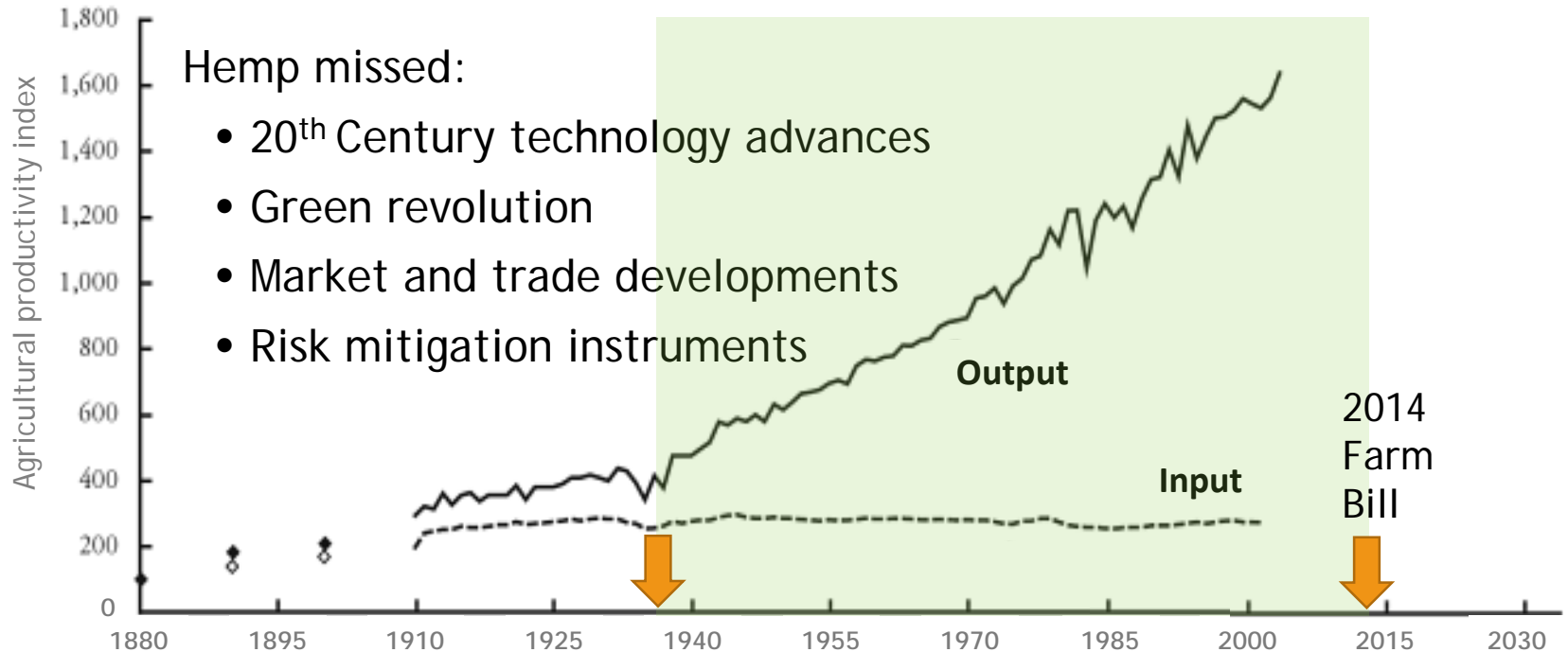
U.S. Domestic Hemp Production Program

The [2018 Farm Bill \(pdf\)](#) directed USDA to establish a national regulatory framework for hemp production in the United States. USDA established the U.S. Domestic Hemp Production Program through an interim final rule. This rule outlines provisions for the USDA to approve plans submitted by States and Indian Tribes for the domestic production of hemp. It also establishes a Federal plan for producers in States or territories of Indian tribes that do not have their own USDA-approved plan.

NOTE: This document is a draft version of the interim final rule provided as a courtesy. The official publication of the interim final rule in the Federal Register may include changes from this version. The effective date of the interim final rule is, and the comment period will not begin until, the date of publication in the Federal Register.

- [Interim Final Rule \(pdf\)](#)

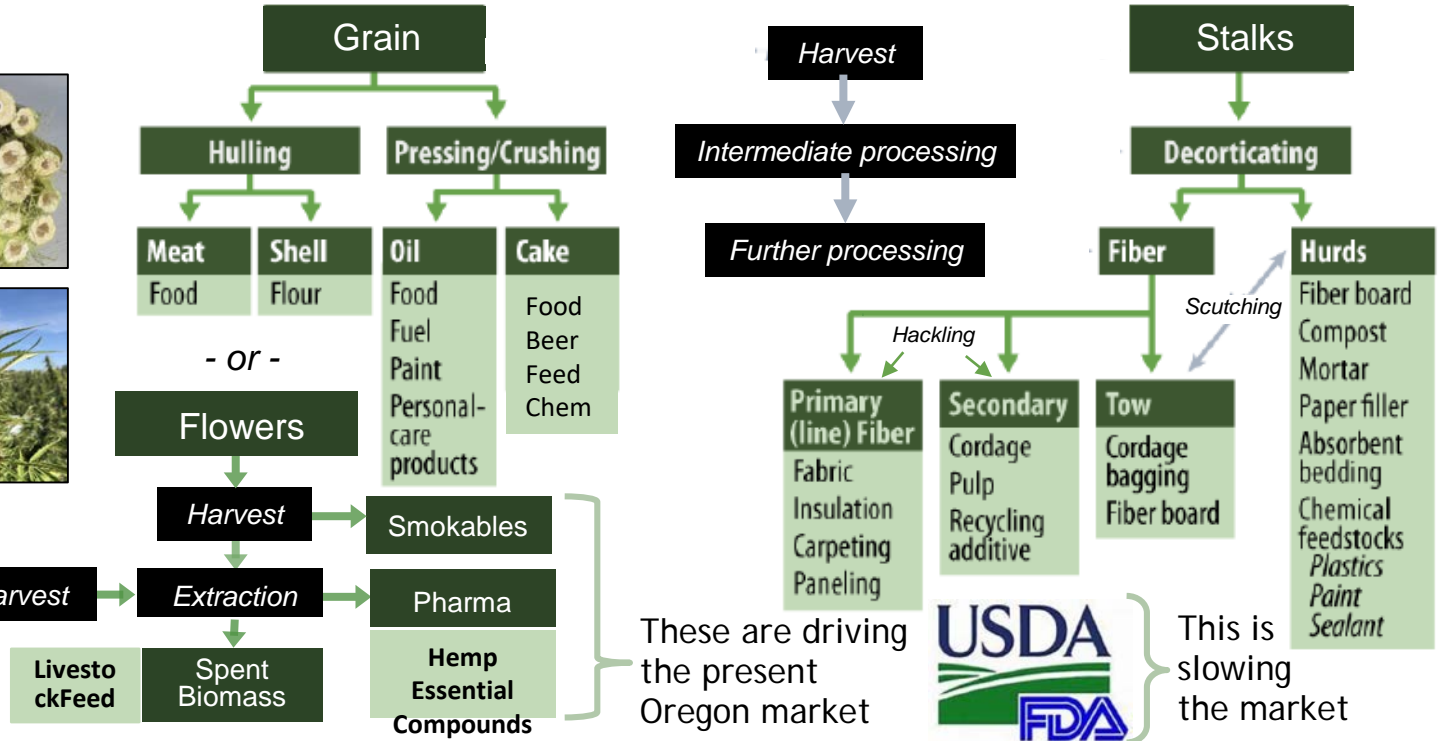
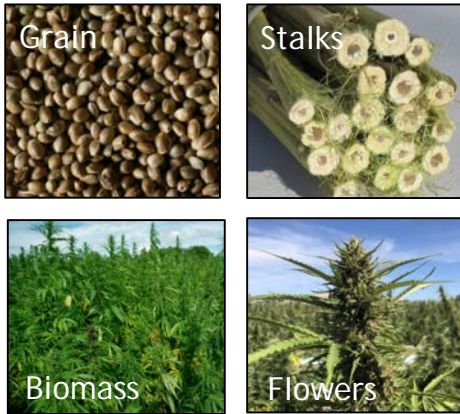
Hemp, in a time capsule since 1936



Kinds of hemp crops and products



Hemp Crops

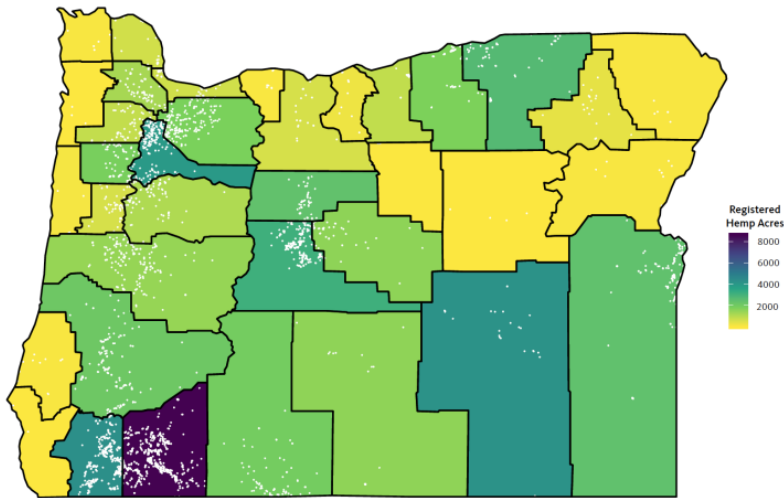


These are driving the present Oregon market



This is slowing the market

Growing pains, a diverse industry by all measures



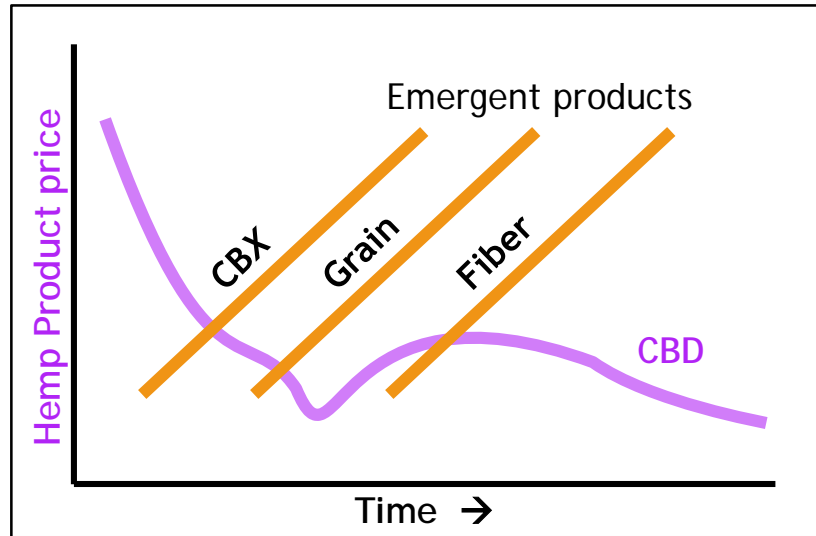
- Growers and rest of sector participants from all walks of life
- 63,000 registered acres in 2019, and 1,940 registered growers in the state
- Crop is being grown for hemp essential oils using feminized seeds
- Need for dependable, functional, connected value chain components

Look for competitive advantages



- Low state legal barriers
- Robust genetics are available
- Natural products experience
- Naturally productive environment
- High-value agriculture experience
- Existing infrastructure to leverage
- Entrepreneurial business attitude

Hemp is a commodity in need of...



- Prices set by efficient markets
- Established market standards
- Tracking of production, costs, and returns
- Investments in supply chain infrastructure and innovation
- Science-based decision-making

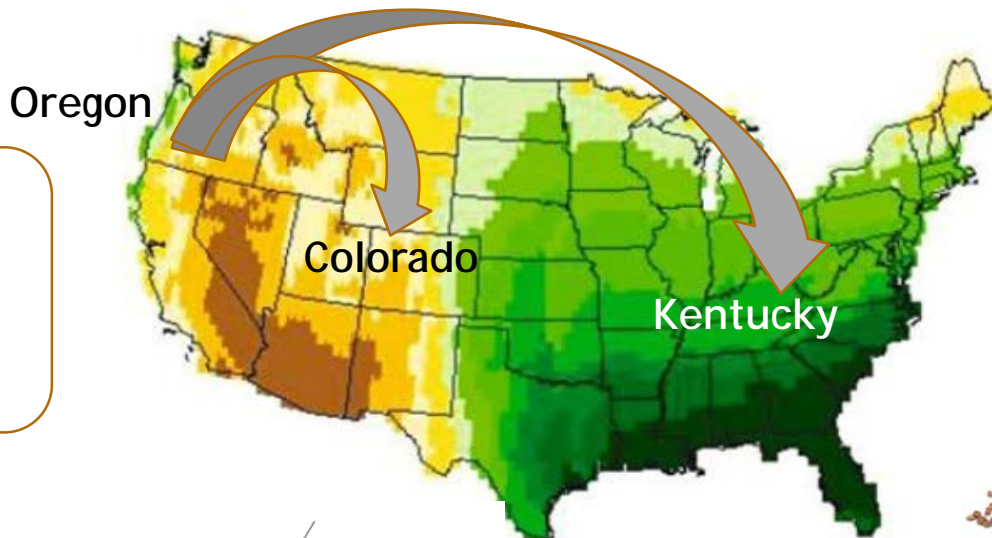
Discovering the optimal place for hemp



Oregon hemp essential
oil yields:

2.2 x Colorado

1.9 x Kentucky

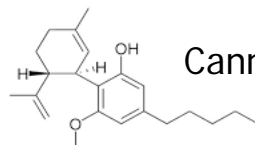


Fibers



Grain and Oil

Environment x Genetic x
Management effects



Present system scaled from marijuana production



Seeds



Transplant



Vegetable transplanter



Established field

Research new systems and mechanization



Hemp Crops



Grain



Stalks



Flowers



Biomass



Flowers + Stalks

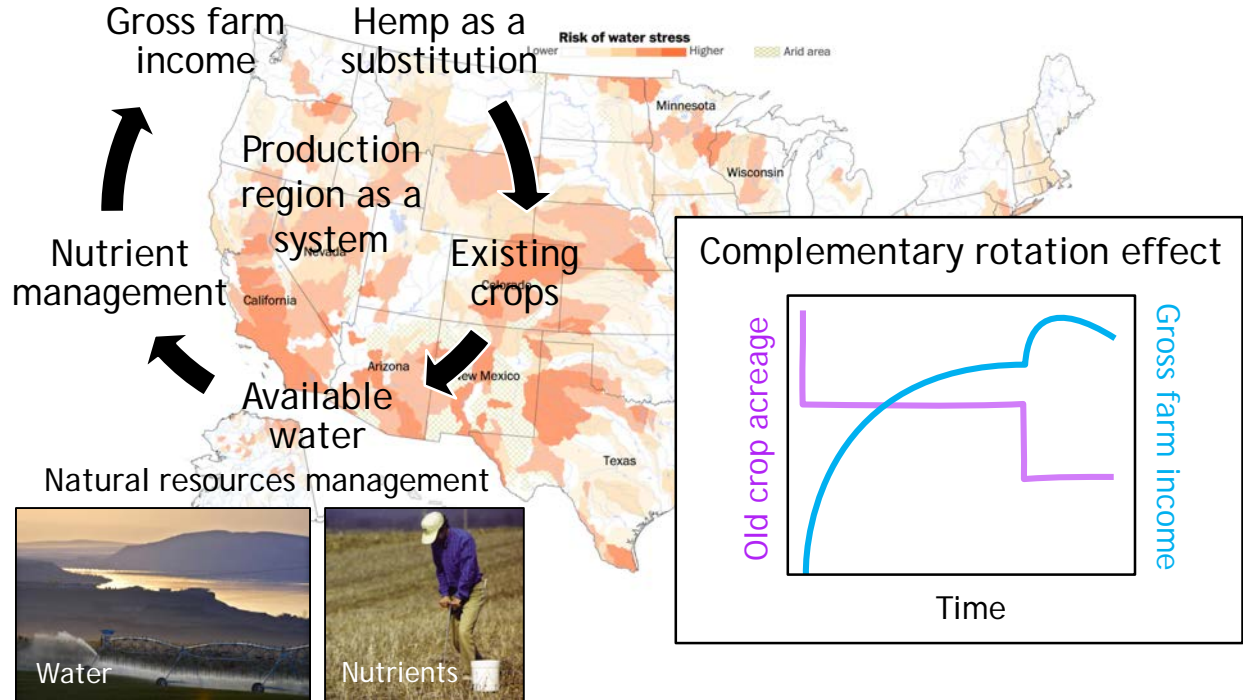
Systems to solve larger sustainability challenges



Existing crops



Hemp as a substitution crop



Global Hemp Innovation Center



Research at OSU 1880-1936, 1994-1998, 2012

Formalized university-wide center in June 2019

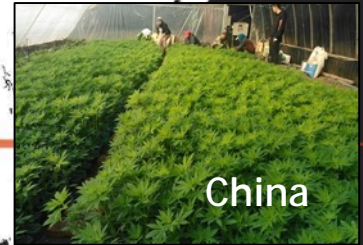
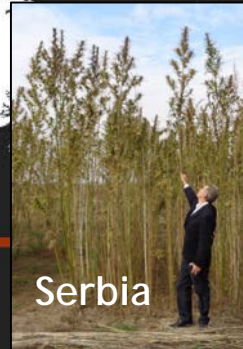
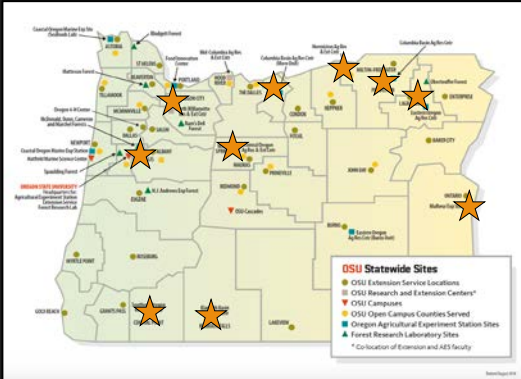
All OSU colleges involved

- 50+ faculty; 25+ disciplines

Industry-focus, implementing a *Research Consortium Model*



Global Hemp Innovation Center



World-wide reach: more than 40 agreements world-wide

Research Consortium Model



- Organized by industry sectors
- Guides R&D by scholars
- Private-public shared goal setting
- Access to GHIC global partner network
- Tiered membership, research sponsorship, and access to discoveries



Industry sector organization



Agricultural production

Plant genetics and breeding

Harvest and post-harvest processes and
manufacture

Animal health and nutrition

Human health

Human health and nutrition

Engineering

Chemistry, Chemical engineering

Fiber and Textiles

Digital architecture and construction

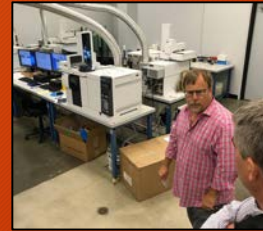
Business and marketing

Cannabis lab standards, Certification

New opportunities for international trade



- Establish international hemp testing protocols - B2B compliance with standard measures
- Set up international trade protocols - for import-export markets
- Develop hemp commodity and product exchanges





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