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# **New Possibilities for Hemp in Animal Feed**







## Hemp's legal status + eager farmers = feeding frenzy

- BUT hemp products for animal feed in the U.S. currently are not approved by the AAFCO or the FDA Center of Veterinary Medicine.
- A 2017 Colorado study cited a lack of domestic economic data, and the state called for research resulting in the Hemp Feed Coalition.

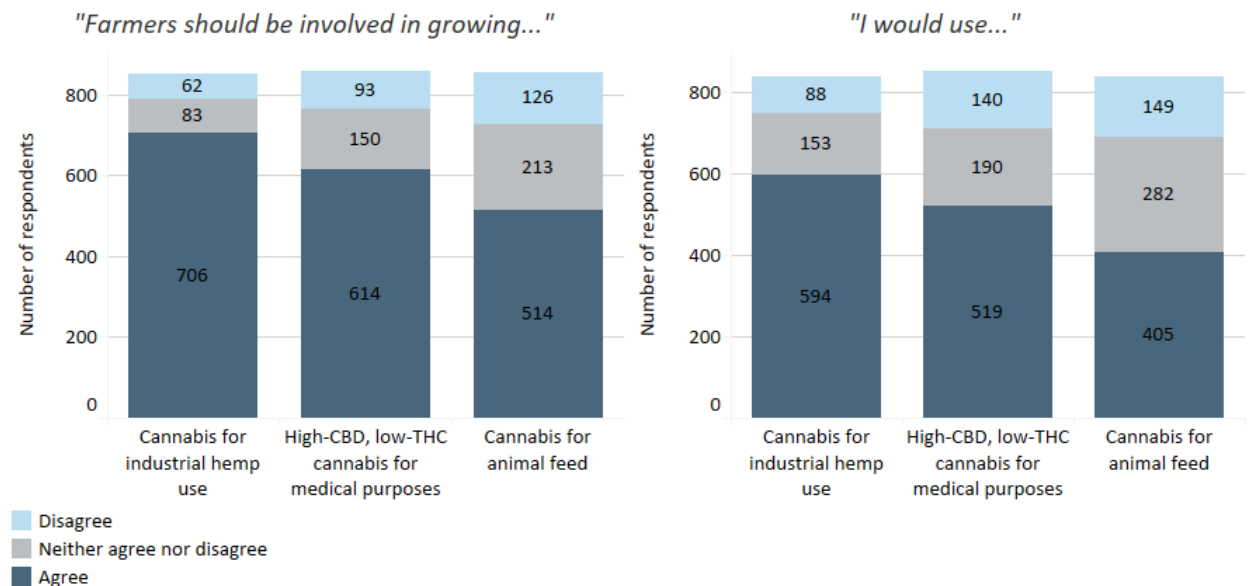




In a 2019 survey of farmers and ranchers looking at the interest of traditional agricultural producers in growing and using cannabis, 60% said they should grow it and 48% said they'd use it for animal feed.

Not an overly lucrative market but farmers aren't going to grow hemp for animal feed alone – potential is in providing a good ancillary market for byproducts.

## Farmer & Rancher Interest in Growing and Using Hemp



Note: Not all respondents provided an answer to each question.

Source: 2019 Farm Journal Cannabis in U.S. Agriculture Study

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A group of goats of various colors (white, brown, black and white) are gathered in a fenced enclosure. In the foreground, two large white buckets are visible. The background shows a chain-link fence and some trees.

## Economic indicators for hemp's potential in animal feed market

- Demand for products higher in amino acids.
- Hempseed cake and meal inexpensive byproduct of oil – nutritious and surplus exists
- Hemp grain & fiber can be grown as a dual crop.



## Why hemp for animals? According to research, hemp is:

- High in omega-3 fatty acids, protein and fiber.
- Good source of minerals including copper, iron, boron, zinc, manganese and nitrogen.
- More research needed – comparing nutrition and digestibility to other grains.

### Beneficial for:

- Providing general nutrition.
- Finishing for meat production.
- Egg-laying hens transfer omega fatty acids to eggs.
- Some animals, like horses, can't produce their own fatty acids, so they need feed to get them.

## **Current law – farmers cannot market or sell animals for human consumption.**

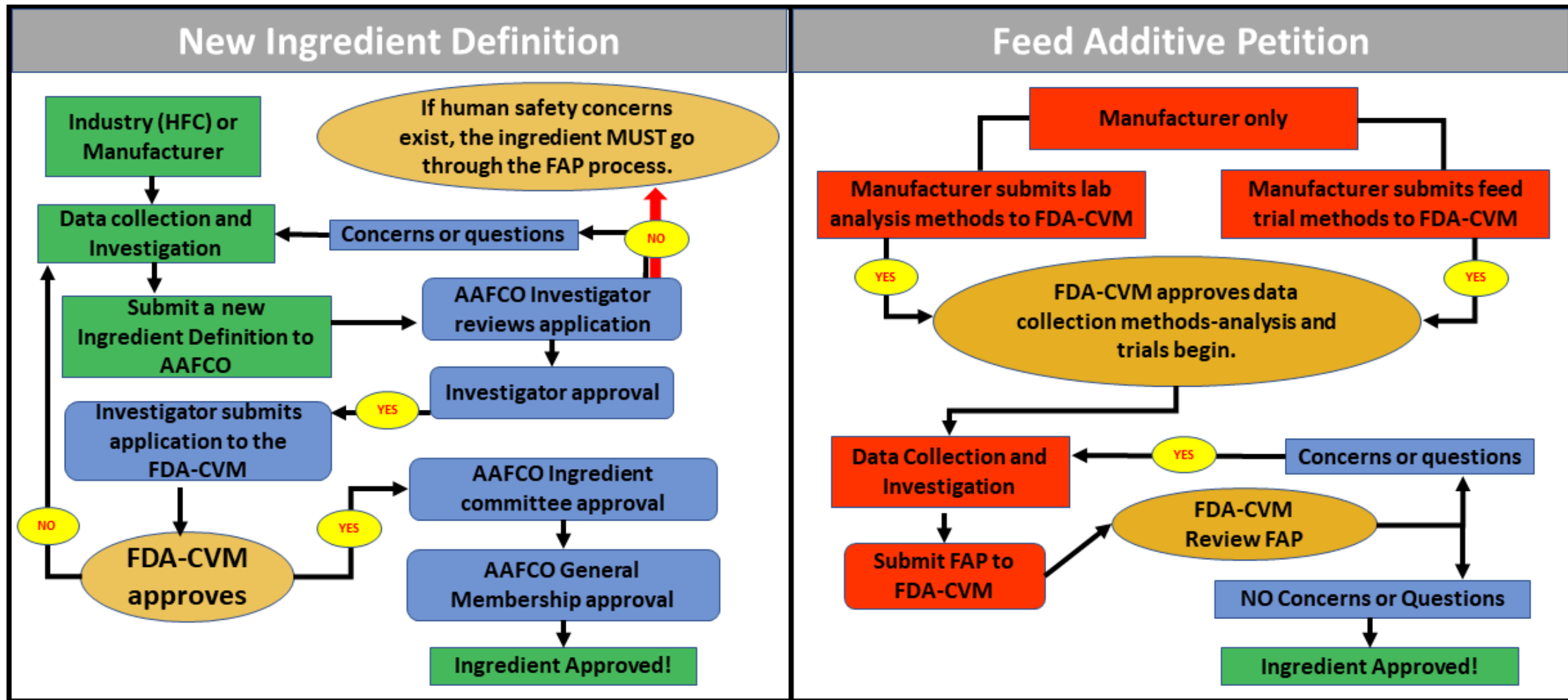


American Veterinary Medical Association:

Potential for residues of hemp or derivatives in meat, poultry, eggs, milk products and other animal products intended for human food must be considered via ingredient approval.

## Hemp Feed Coalition, non-profit organization

- Completed first submission for hemp to become approved animal-feed ingredient with
  - AAFCO
  - FDA Center for Veterinary Medicine
- Estimated 4-year process unless fast-tracked to 18 months-2 years.
- Data from American producers – COAs demonstrating hempseed cake and meal consistently grown and processed.
- Understand ingredient profile to answer questions.
- Conduct clinical feed trials – safety & efficacy.





# Potential opportunity for hemp in animal feed market:

- Animal feed market expected to top \$415 billion by 2023, up from \$336 billion in 2017 (Grand View Research).
- Seed and grain hemp segment expected to expand by 20% by 2027.
- USDA: 190 million tons of animal feed produced in U.S. annually.
- Ancillary market for farmers – answers need for non-GMO feed.





## Some farmers aren't waiting for approval, marketing hemp eggs across the Eastern seaboard



Kreider Farms in central Pennsylvania says its chickens fed with 20% hempseed meal produce eggs with more:

- Omega-3s
- Lutein
- Vitamins B12, B2, B5, E
- Biotin
- Choline
- Selenium

...than conventionally produced eggs.



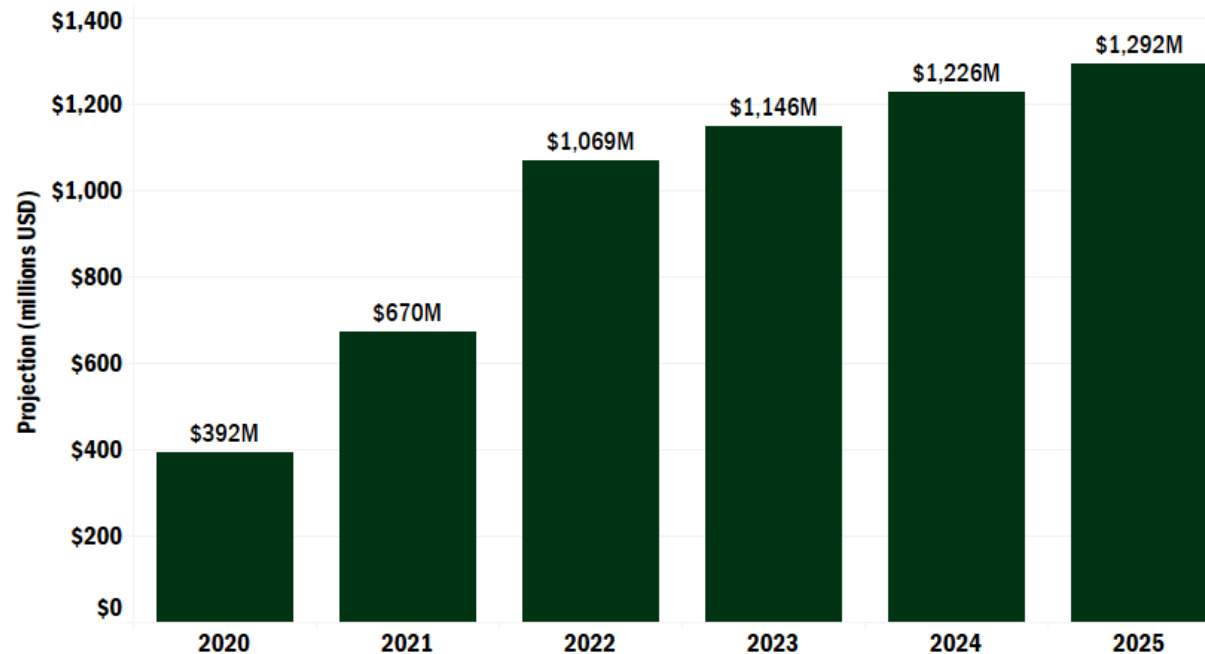
## Challenges for hemp:

- Competition with other established crops – corn and soy.
- Not yet an established crop – enter as niche segment.
- Time to develop the market and supply chain while waiting for AAFCO & FDA approval.



For U.S. hemp producers, total sales are estimated to be \$392 million in 2020 and \$670 million in 2021. A larger increase is expected in 2022, when total producer sales are projected to top \$1 billion.

### Estimated Annual Hemp Producer Sales: 2020-25



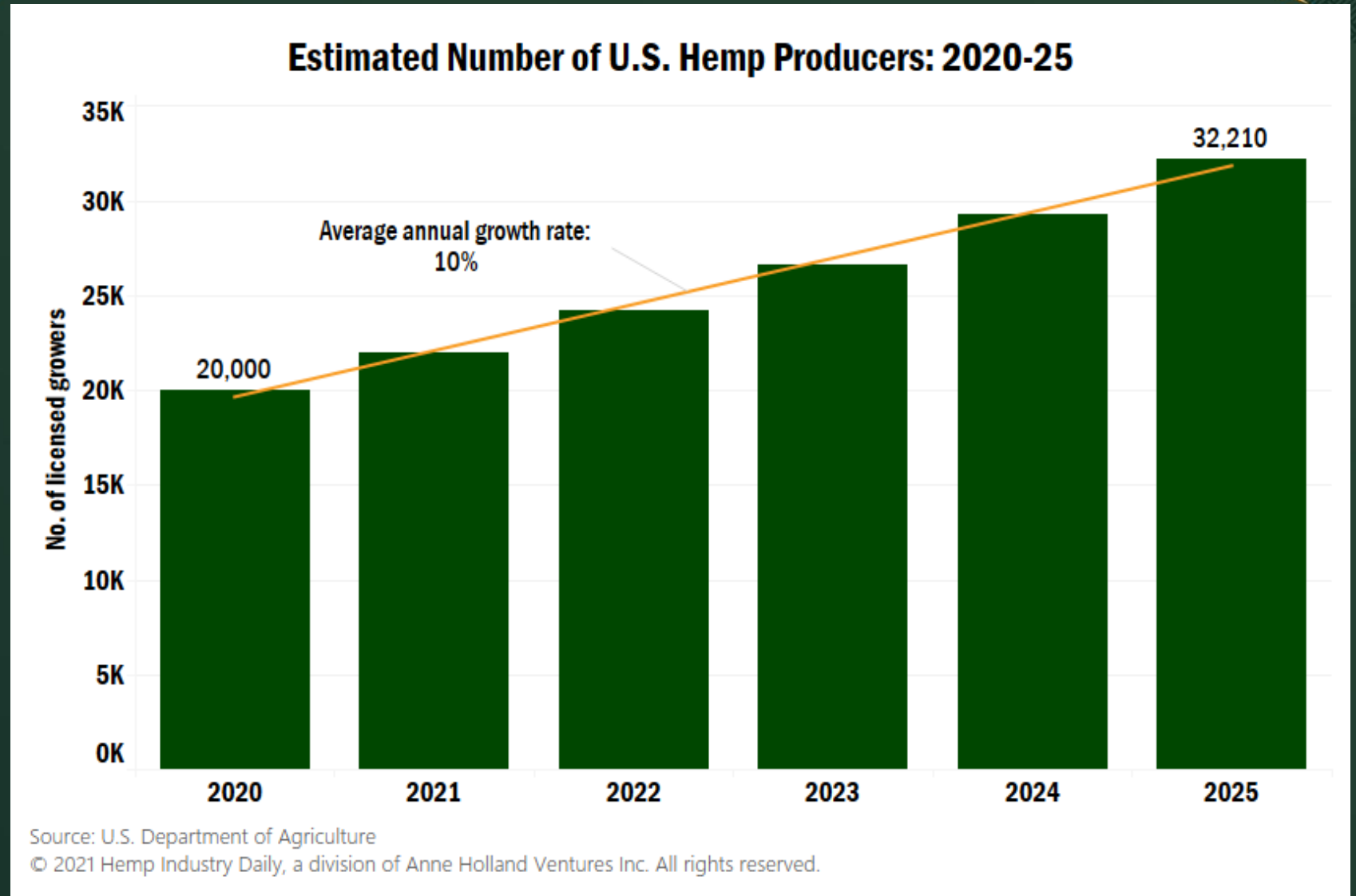
Source: Nielsen, U.S. Department of Agriculture and Hemp Industry Daily  
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Interest in producing hemp is expected to keep growing by 10% per year through 2025, according to the USDA.

Interest in hemp increasing because of:

- Novelty of hemp as a commercial agricultural commodity.
- Resolutions of uncertainty surrounding regulations.
- Growth in demand for existing and new hemp products.



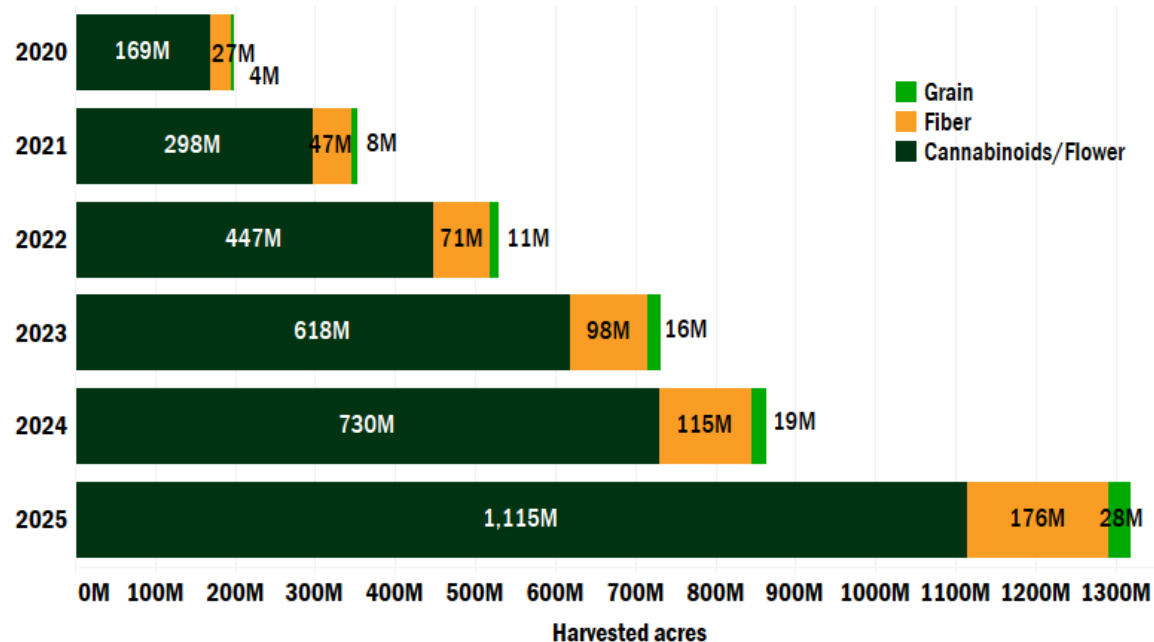
USDA projects that the nation's total harvest of hemp flower will jump nearly seven times from 2020 through 2025.

The USDA anticipates similar growth in hemp grain and fiber harvests between 2020 and 2025.

The USDA projects:

- Hemp-fiber production to go from 26.7 million pounds in 2020 to 176.3 million pounds in 2025, an increase of 561%.
- Hemp-grain production to increase from 4.3 million pounds in 2020 to 28.6 million pounds in 2025, growth of 567%.
- Projections assumed same yield per acre through 2025 and consistency in proportions of planted acreage harvested annually.

Estimated Harvested Acreage by Purpose: 2020-25



Source: U.S. Department of Agriculture  
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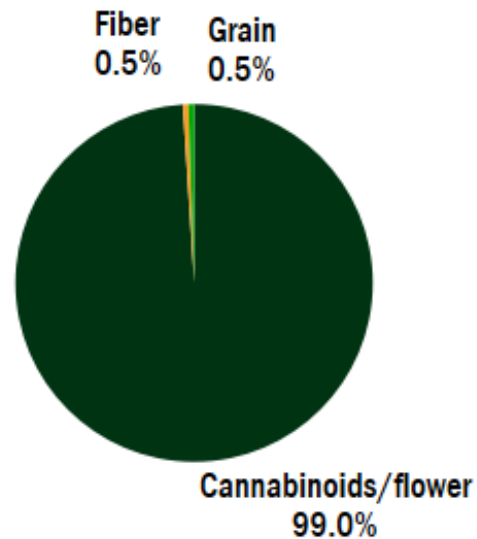
Updated yield estimates from USDA's final hemp production rule:

- Flower varieties yield 1,500 pounds per acre, up from 1,000-2,000 estimated in 2019.
- Fiber varieties are estimated to yield 8,000 pounds per acre.
- Grain varieties yield an estimated 1,200 pounds per acre.

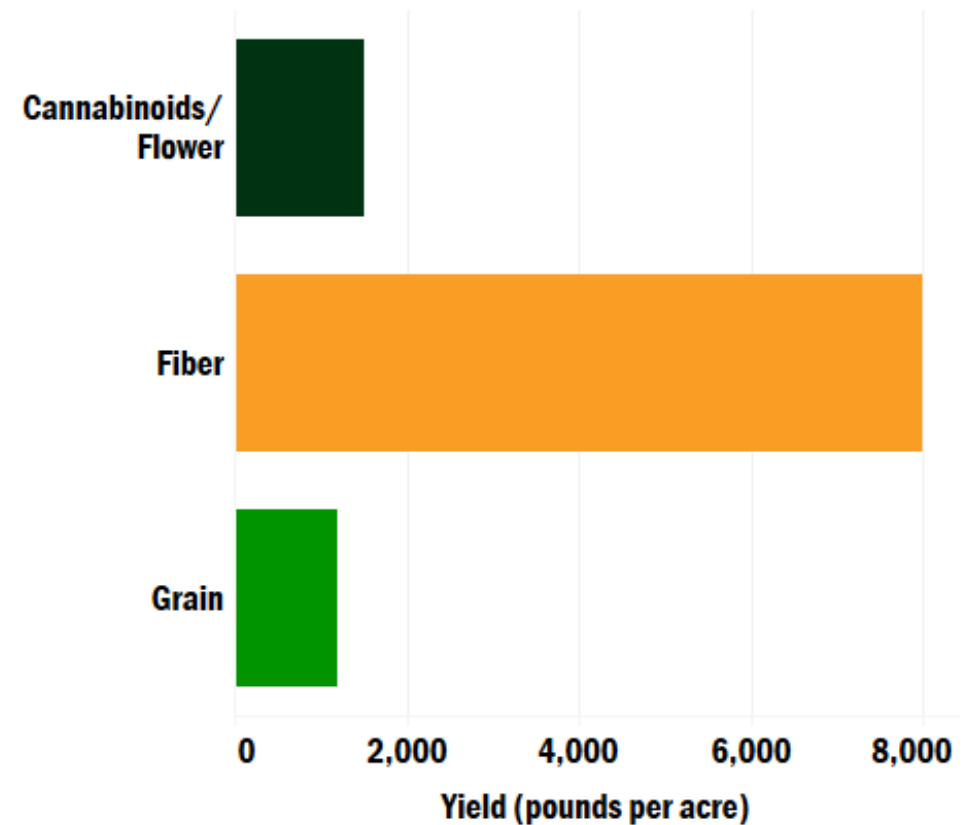
The USDA said it believes its updated analysis represents “the state of the hemp industry to the greatest extent practicable.”

## Hemp Production by Intended Use

Intended Uses for Harvested Hemp



Estimated Hemp Yield per Acre by Intended Use



Source: U.S. Department of Agriculture

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## Hemp yield small compared to corn and soy

Corn and soy production up in 2020:

Corn – 14.2 billion bushels, up 4% from 2019. Area harvested for grain, at 82.5 million acres, is up 1% from 2019.

Soy – Soybean production for 2020 totaled 4.14 billion bushels, up 16% from 2019.

According to USDA-NASS Crop Protection Annual Summary, Jan. 12, 2021.





## Next steps for hemp approval

### Hemp Feed Coalition

- Clinical trials to add ruminants to the submitted AAFCO and FDA-CVM application for hempseed meal (but more expensive).
- Pivoting to research on other hemp byproducts – oil, sediment, hulls, pulp and screenings, as potential feed ingredients.



## Most recent USDA and state research grants:

- Oregon State University: \$300k for safe use of hemp byproducts in livestock diets to maximize potential nutritional properties.
- OSU received USDA grant last fall to study feeding hemp biomass to sheep to see whether it affects meat tenderness and shelf life
- USDA granted researchers at Kansas State University \$200k to study whether hemp feed can be used without THC intoxication for the animals.
- State of Pennsylvania granted University of Pennsylvania School of Veterinary Medicine \$14,432 to analyze cannabinoids in bovine serum and hemp seed samples.



## More research via Hemp Feed Coalition:

- Colorado State University conducting FDA-CVM pre-approved lamb study on hemp seed meal.
- Tarleton University – working with HFC to get pre-approval for rabbit trial using hemp seed meal.
- Wenger Group – FDA-CVM pre-approved for private study on feeding hemp seed meal to egg layers.
- North Carolina State University – looking for pre-approval for hemp seed oil for horses.
- North Dakota State University proposing pilot trial using hemp seed meal for multiple classifications of beef cattle, with cattle and meal donated.
- Kansas State University – characterization of cannabinoids in feed and transference in animals fed hemp and hemp byproducts.
- Oregon State University – conducting clinical feed trials using post-extracted pulp material for multiple species: lambs, swine, poultry, dairy cattle and horses, to show how higher cannabinoid concentrations can be fed safely.





Industry can get involved through:

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- Study sponsorships.
- Hemp Feed Coalition membership, donations, and volunteering.



## Any questions or comments?



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