

# Cover crop cocktails for Hawai'i



O'AHU RESOURCE CONSERVATION  
& DEVELOPMENT COUNCIL



United States  
Department of  
Agriculture

National Institute  
of Food and  
Agriculture





Source: CRAMP



Source: USGS

A green tractor is parked in a field of cover crops. A man in a grey hoodie and blue jeans is walking through the cover crops in the foreground. The background shows a flat landscape under a cloudy sky.

# 2017 SARE Survey

- Cover crop acreage in the US has doubled over the last five years
- Farmers report increased cash crop yields when using cover crops
- Reduced inputs

# Cover Crops WORK!

- Reduce soil erosion and nutrient leaching
- Fix nitrogen (green manures)
- Build organic matter in soil
- Weed suppression / smothering
- Scavenge nutrients
- Increase water infiltration & improve soil tilth

# Who's cover cropping in Hawai'i?

- Specialty vegetable growers investing in long-term soil health
  - Limited equipment for terminating for broadcasting cover crops
  - Summer fallows
  - Limited availability of inputs
- Seed Corn Growers
- Orchard systems
  - Successional plantings during establishment
  - Perennial cover

A person stands in a field of lush green cover crops, with their arms raised in a gesture of triumph or joy. The background features rolling hills and mountains under a blue sky with scattered white clouds. The overall scene is bright and vibrant, suggesting a healthy and productive agricultural environment.

# Cover Crops Cocktails WORK BETTER

- Diversified plant growth (above and below ground )
- Grow your cover crop like a cash crop
- Grass
- Legume
- Broadleaf

A close-up photograph of a cover crop cocktail. The image shows a dense growth of green plants, including tall sorghum stalks and clusters of small white flowers, likely buckwheat. The plants are healthy and vibrant, illustrating the 'diversified plant growth' mentioned in the text above.

Sorghum-Sudan + Buckwheat

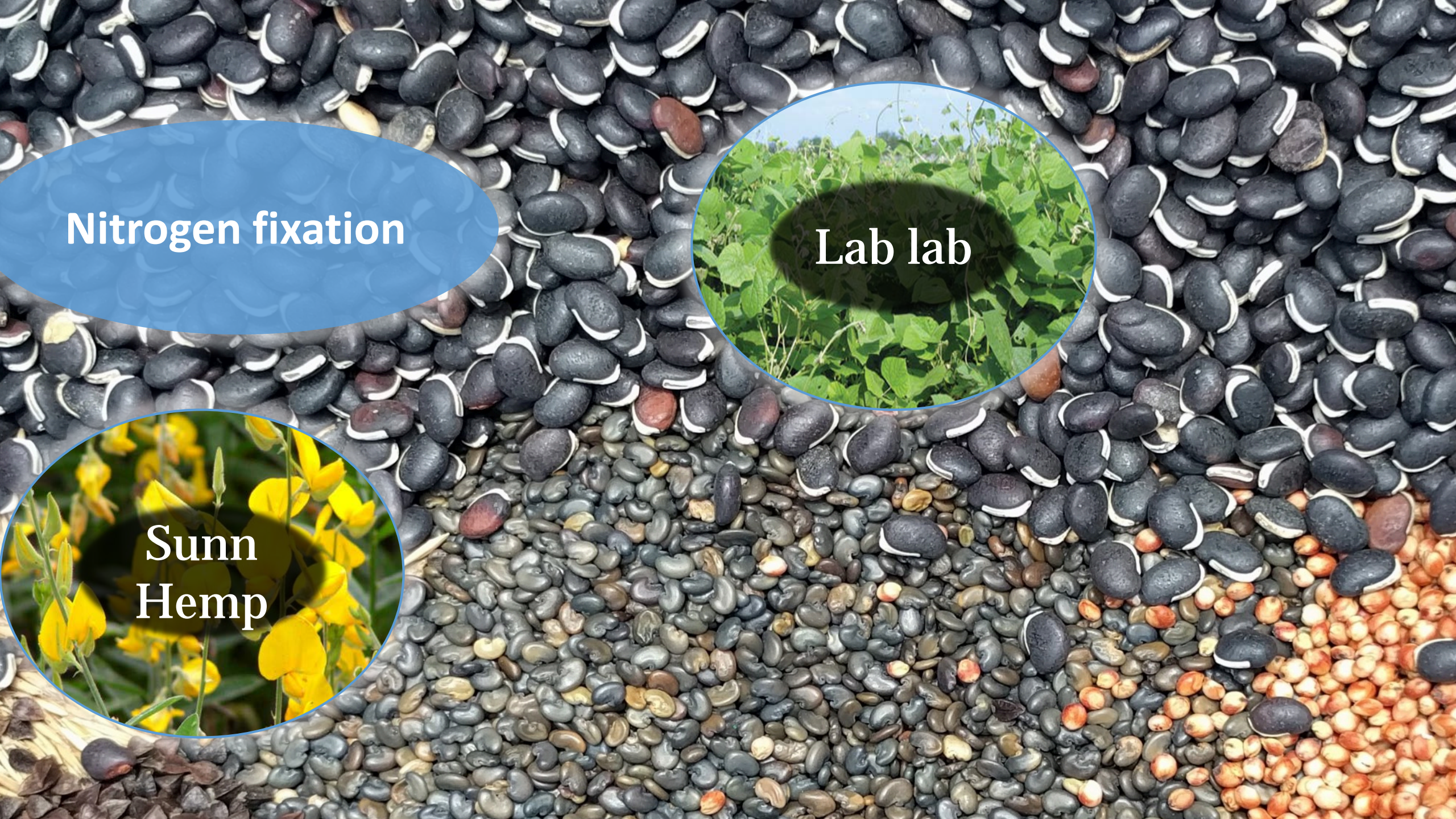
# Are cocktails worth it? Farmers will decide!

- Five farmer-researchers in different regions of O‘ahu conducting side-by-side trials of:
  - Single-species sunn hemp
  - standardized cocktail: sunn hemp, black oats & buckwheat
  - “tailor-made” cocktail customized by farmer for growing conditions
- Gain insights for Hawaii’s farmers:
  - Obstacles for cover crop cocktail adoption
  - Document costs and benefits
  - Recommendations for seeding rates, field practices and equipment.

Nitrogen fixation

Lab lab

Sunn  
Hemp







**Buckwheat**

**Nutrient scavenging +  
Weed smothering**

A large pile of black beans and yellow corn kernels. The black beans are in the upper left and middle sections, while the yellow corn kernels are in the lower right and middle sections.

Organic matter

A circular inset image showing a field of green sorghum plants. The plants are tall and have long, narrow leaves. The field is densely packed with these plants.

Sorghum  
Sudan



CRATE

# Cover Crop Chart for Hawaii

Koon-Hui Wang and Archana Pant, CTAHR, University of Hawaii



	Broadleaf						
	Legume						
A Black Oat 75 lb/acre						A Sesame 4 lb/acre	
A Barley 90 lb/acre					(CA Blackeye 5', Purple knuckle, TS Brown, MS Silver) Cowpea <sup>R</sup> 40-60 lb/acre	A Buckwheat 20-30 lb/acre	A Pearl Millet 15 lb/acre
A Cereal Rye 90 lb/acre	A Canola 7-10 lb/acre	A Hairy vetch 30-50 lb/acre	A Woolly pod Vetch 40-60 lb/acre	P Jack bean 50-60 lb/acre		A Mustard 7-10 lb/acre	A Oat 90 lb/acre
A Oat 90 lb/acre	A Mustard 7-10 lb/acre	A Bell Bean 150 lb/acre	B Yellow Sweetclover 10-15 lb/acre	SP Velvet Bean <sup>R*</sup> 40 lb/acre	A Soybean 50-75 lb/acre	A Rape Seed <sup>S</sup> 7-10 lb/acre	A Black Oat 75 lb/acre
A Winter Wheat 120 lb/acre	A Rape Seed <sup>S</sup> 7-10 lb/acre	SP Red Clover 20 lb/acre	P White Clover 20 lb/acre	P Pigeon Pea 40-60 lb/acre	A Lablab 11-18 lb/acre	A Oil Radish <sup>S</sup> 10 lb/acre	A Grain Sorghum 25-30 lb/acre
A Annual Ryegrass 100 lb/acre	A Oil Radish <sup>S</sup> 10 lb/acre	A Austrian Winter pea <sup>R</sup> 100 lb/acre	P (Moapa 69) <sup>R</sup> Alfalfa 15 lb/acre	R Perennial Peanut 40 lb/acre	A Sunn Hemp <sup>R*</sup> 30-60 lb/acre	A Marigold <sup>R</sup> 3 lb/acre	A Sorghum-Sudangrass <sup>R</sup> 35-60 lb/acre

\* = seedling rate

A = annual; B= Biennial; P = Perennial; SP = Short-term perennial.

R = resistant to root-knot but not reniform nematode; (note: only certain cultivars are resistant to root-knot nematodes for alfalfa and cowpea; cowpea is very susceptible to reniform nematode).

S = suppressive to plant-parasitic nematodes

R\*= sunn hemp and velvetbean are resistant to root-knot and reniform nematodes; marigold, *Tagetes patula*, is resistant to root-knot and reniform, *T. erecta* is only resistant to root-knot; sesame is resistant to southern and peanut root-knot nematode (*Meloidogyne incognita* and *M. arenaria*) but not Javanica root-knot (*M. javanica*).

**Cover Crop  
SYNERGY**

**Lab lab**

**Oats**

**Sunn  
Hemp**

**Sorghum  
Sudan**

**Buckwheat**

**Radish**

# Grow Soil!

- Reduce soil erosion and nutrient leaching
- Fix nitrogen (green manures)
- Build organic matter in soil
- Weed suppression / smothering
- Scavenge nutrients
- Increase water infiltration & improve soil tilth



# Not Problems...

- Poor establishment = weeds & wasted field time
- Know how to effectively terminate your cover crop!
- Find a cover crop mentor
- Treat your cover crop like a cash crop

# BUT things work a little different in Hawaii

- Higher soil temperatures = faster microbial breakdown of organic matter
- No hard freezes, no winter kill of cover crops (EXTREME weeds, pests and disease)
- Diversity of growing conditions
  - Soils
  - Altitude
  - Cropping systems

# Cover Crop Resources

- [www.oahurcd.org/cover-crops](http://www.oahurcd.org/cover-crops) - sunn hemp seed & cover crop manual (update coming in 2018)
- [www.ctahr.hawaii.edu/sustainag](http://www.ctahr.hawaii.edu/sustainag) - UH (Dr. Koon-Hui Wang):

## **Get good seed!**

- Local: Ko'olau Seed, Fukuda Seed & Moloka'i Seed
- Organic: Johnny's, High Mowing & Grow Organic
- Online: GreenCoverSeeds.com



# Want to Learn More?

Cover Crop Cocktail Field Demo:  
**5pm Tomorrow at Kahumana Organic Farm:**  
**Oahu RC&D Table: Free cover crop samples**

- Other upcoming Oahu RC&D events & programs:
  - Get paid to cover crop! Cost-share programs for farmers in Waiahole, Kaalaea and Mailiili watersheds.
  - Women Farmers Workshop Series (one on each island in October)