





# SBAR OVERVIEW

(SUSTAINABLE BIO-ECONOMY FOR ARID REGIONS)

Alix Rogstad







United States  
Department of  
Agriculture

National Institute  
of Food and  
Agriculture

# USDA-NIFA Network

(CAP coordinated agriculture projects)



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# Project Mission

*Build a sustainable bio-economy for arid regions to improve quality of life in rural communities and Native Nations.*

We Achieve This by:

- Optimize production of guar and guayule as a viable source for biofuel and bioproducts in arid regions of the Southwest
- Engage growers, producers, and industry in new crop production within the region
- Training the next generation of scientists, producers, and researchers to accept and generate jobs in bioproduct and biofuel fields



Guayule flower



Guar flower



# Partners



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# Management Team

- **Kim Ogden** – Principal Investigator & Project Director
- **Alix Rogstad** – Project Director (Operations)
- **Colleen McMahan** – Associate Project Director
- **Dennis Ray** – Feedstock Development & Production
  - *Pete Waller*
- **Catie Brewer** – Post-Harvest Logistics & Co-products
- **Jason Quinn** – System Performance & Sustainability
- **Sara Chavarria** – Education
- **John Idowu** – Extension & Outreach (NM)
- **Blase Evancho** – Extension & Outreach (AZ)



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# External Advisory Board

- **Chris Cassidy** – USDA, Rural Development
- **Matt Chavez** – Independent Grower, New Mexico
- **Steve Csonka** – Commercial Aviation Alternative Fuels Initiative (CAAFI)
- **Mark DeDecker** – Bridgestone Americas, Inc.
- **Gary Deen** – Double D Farms, Arizona
- **William Goldner** – USDA, National Institute of Food and Agriculture
- **John Holladay** – Pacific Northwest National Laboratory
- **Chris Kuzdas** – Environmental Defense Fund
- **Homer Marks** – Southwest Indian Agriculture Association, Tohono O’odham Nation
- **Newt McCarty** – New Mexico State University, Extension Educator
- **Jaroy Moore** – Texas A&M Agrilife Research & Extension Center
- **Alex Muraviyov** – Guar Resources
- **Paco Ollerton** – Tierra Verde Farms, Arizona
- **Matt Payne** – West Water Research, Inc.
- **Bob White** – Bridgestone Americas, Inc.



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# Major Accomplishments

- Developed Reporting and Evaluation Plans
  - *First round of project evaluation occurred Aug 2018*
  - *Second round of project evaluation will occur this week (Sep 2019)*
- External Advisory Board – 15 people; initial board formed 2018; meets 3 times/year
- Initiated all aspects of research plan – 5 Components
- Successful Outreach
  - *Directly through workshops/presentations (1,461 ppl)*
  - *Tabling events (2,312 ppl)*
  - *Website visits since Jul 2018 - Jun 2019 (3,319)*
  - *Summer youth activities and internships (567 ppl)*



# Highlights: Feedstock Development & Production

- Guayule and guar field experiments established in 7 locations
- Irrigation field experiments established in 3 locations
- Highest rubber yield obtained with drip at 75% ET replacement (preliminary results)
- Aim and Poast herbicide studies are complete, pursuing 24c SLN labels; documented toxicity of Paraquat on guayule seedlings
- 2,074 transformations performed on LEAFY RNAi construct as a promising target for genetic modification
- 3 publications in process; 11 presentations provided; 3 student awards won



Guar field measurements



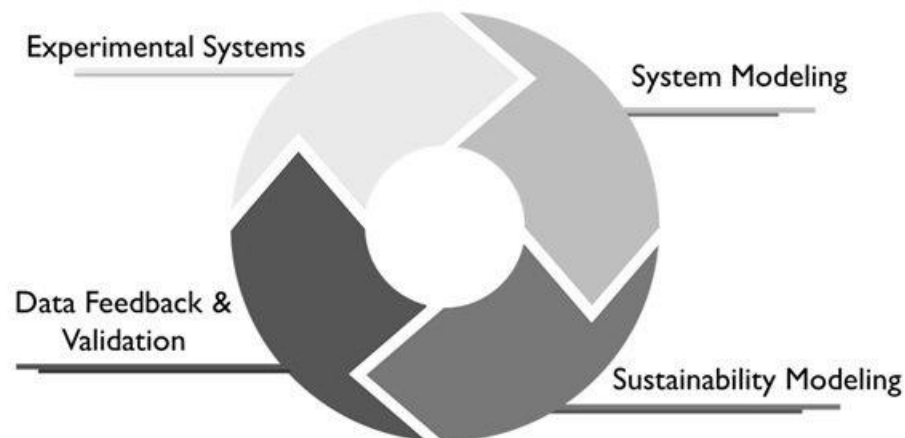
# Highlights: Post-Harvest Logistics & Co-Products

- Finalized hybrid optimization models for facility location and transportation
- Initiated decision framework for smart biomass supply chain for guayule and guar
- Identified 17 major terpenes in guayule resin and 3 minor metabolites (including 1 new natural product)
- Completed guar biochemical composition analysis
- 3 publications in process; 33 presentations



# Highlights: System Performance & Sustainability

- Generated integrated guayule and guar agriculture and processing models
- Quantified environmental impact of agriculture and processing of guayule to raw natural rubber and guar to guar gum
- Quantified costs/benefits for agriculture and processing of guayule and guar
- 3 publications in process; 11 presentations; 2 student awards won





# Highlights: Education

- Modified and expanded relevant biofuel lessons for application in arid regions
- Recruited 2<sup>nd</sup> cohort of SBAR Fellows and Teacher Mentors
- Train the Trainer event hosted at NMSU in July 2019; 32 participants
- Developed and hosted a summer professional development workshop for teachers and graduate fellows
- Curriculum and lessons are under development
- 11 presentations



# Highlights: Extension & Outreach

- SBAR was 1 of 2 projects selected by NMSU for a Research Exhibition and Reception in Washington DC
- Arizona Extension and Bridgestone hosted a guayule field day; over 30 participants
- 4-H Biofuel summer camp hosted in Tucson, AZ; 20 youth participants
- Second cohort of *Project Puente* interns completed summer session
- 38 presentations; 1 student award won



# Next Steps & Future Plans

- On-going Research
  - Year 2 field trial results anticipated this fall (AZ & NM)
  - New irrigation project initiated this fall and spring
  - Potential co-products identified within guayule resin
  - Sustainability models integrated; life-cycle analysis underway
- Education and Extension & Outreach
  - Phase 2 of Teacher Professional Development (Jun 2019)
  - 8-10 interns supported next summer (2020)
  - Ramping up 4-H workshops in AZ & NM in 2020
- Annual SBAR Retreat
  - Hosted in Tucson area, August 2020

