

Agroecology as a tool to improve science capacity in agriculture through participatory research, education, and extension

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AGRICULTURE and FOOD SYSTEMS



Biodiversity loss

“Science capacity in the food, agriculture, natural resources and related sciences is at risk at a time of critical need”

(Association for Public and Land-grant Universities, 2009)

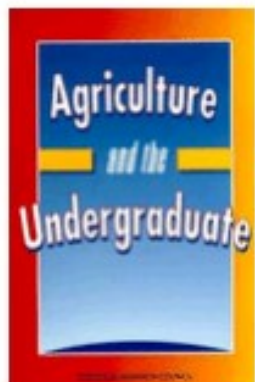
Transforming Agricultural Education for a Changing World

- *Agricultural education not keeping up with the changing nature of agriculture;*
 - often isolated from other disciplines
 - Academic institutions often isolated from other sectors and employers;
 - Employers are looking for skills, competences, and abilities not always found in agriculture graduates

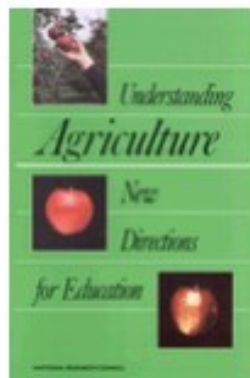
Transforming Agricultural Education for a Changing World

- *Changing student demographics*
 - disconnect between student body and agriculture
 - Students are not aware of the opportunities in food and agriculture careers;

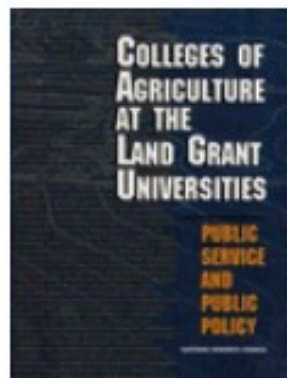
Follow up to previous National Academies reports on agricultural education



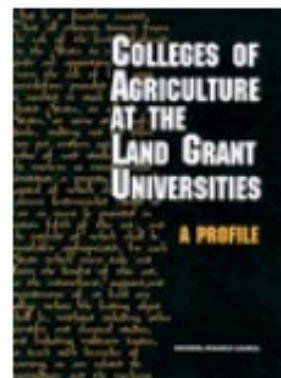
1992



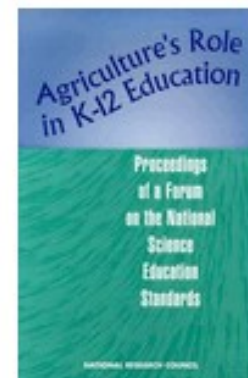
1988



1996

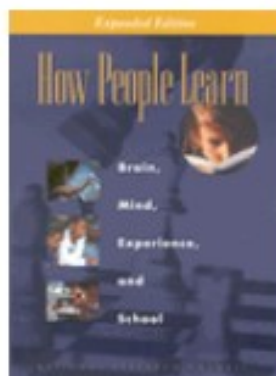


1995



1998

and on undergraduate education



2000



2003



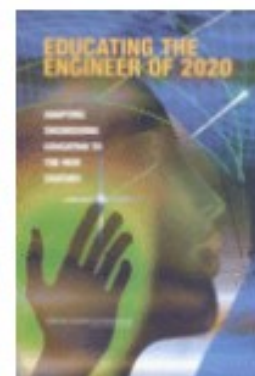
1999



2003



2003



2005

Build capacity through training programs in agroecology:

the application of ecological concepts and principles to the design and management of agricultural systems

- Promotes a **systems approach** that supports the resilience and ecological, socio-economic and cultural sustainability of farming systems
- a scientific discipline that Acknowledges that agricultural systems are inescapably **linked social-ecological systems**
- a social movement seeking a new way of considering agriculture and its relationship with society (IIED, 2014)

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*High potential for immediate, **multi-dimensional outcomes**, through integrated research, education, extension*



- Regional history embedded in agriculture

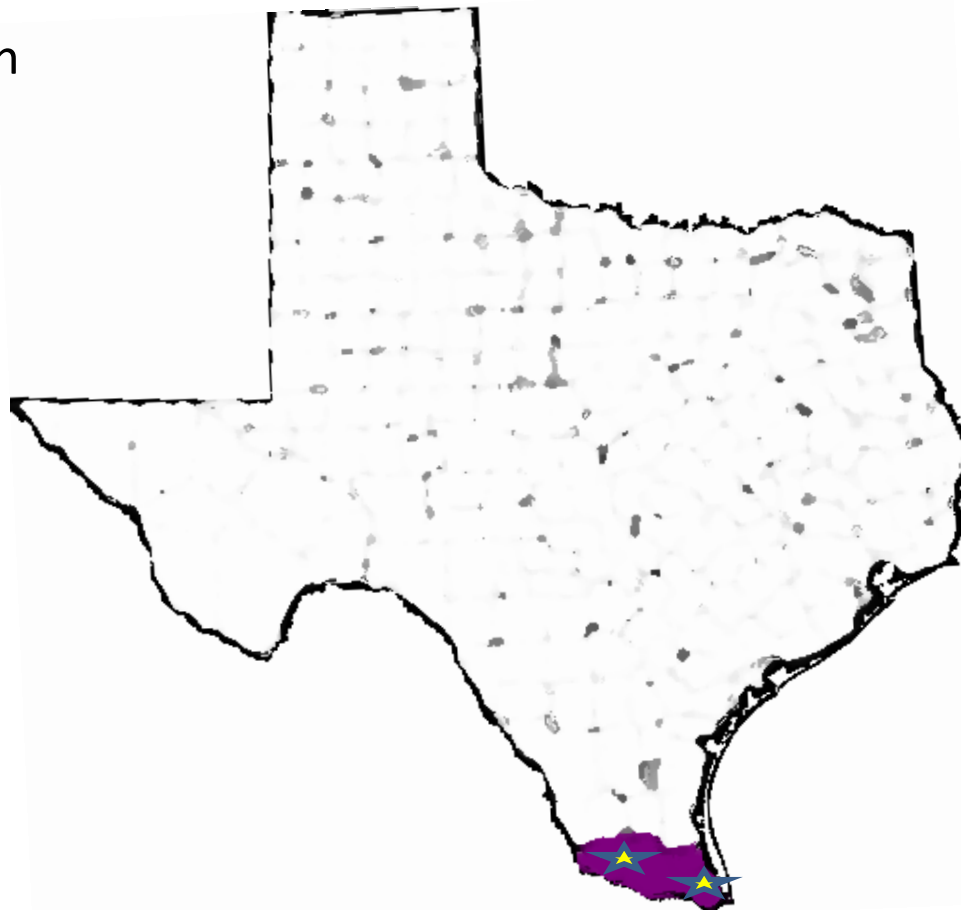
- Statewide leader in the production of specialty crops

- Winter vegetables

- 350+ day growing season

- \$732 million annually – economic impact of \$1.6 B

Lower Rio Grande Valley



- National leader in food related diseases

- Largest coverage of urban food deserts

- 4 of 10 top poorest counties in the US

- Lowest percent of people who eat vegetables regularly

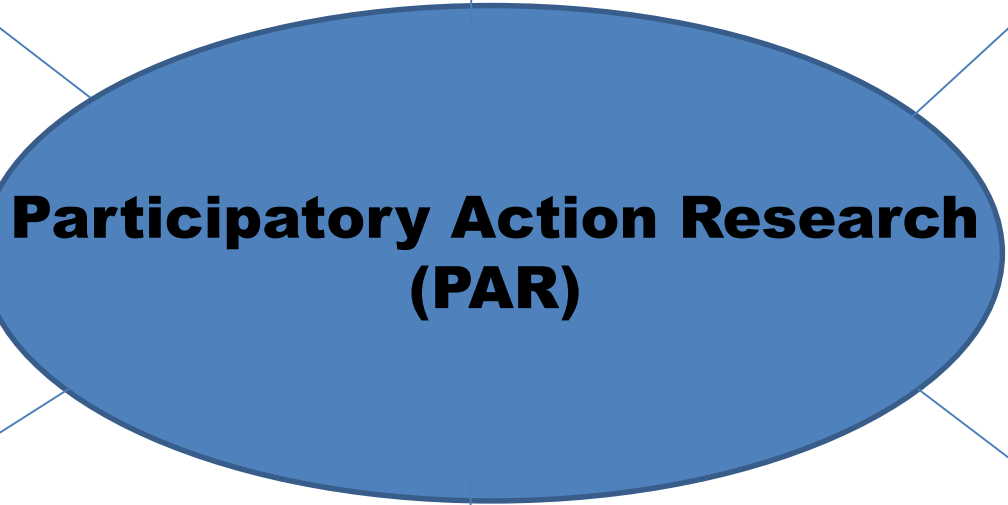
Participatory Action Research in Agroecology at UTRGV

CULTURALLY APPROPRIATE PEDAGOGY



OUTCOME ORIENTED
PARTICIPATORY ACTION

SERVICE LEARNING
and ENGAGED
SCHOLARSHIP



Collaborative inquiry and experimentation

Community engagement

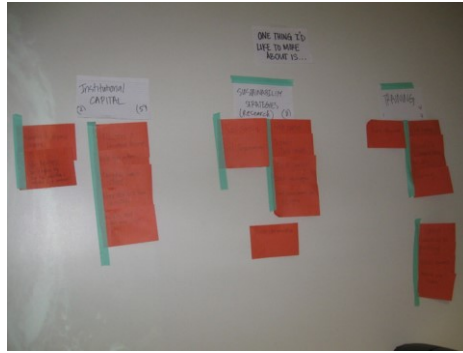
Stakeholder empowerment

Local knowledge/experiences

Self-reflective process

Endogenous science

Participatory assessment and planning

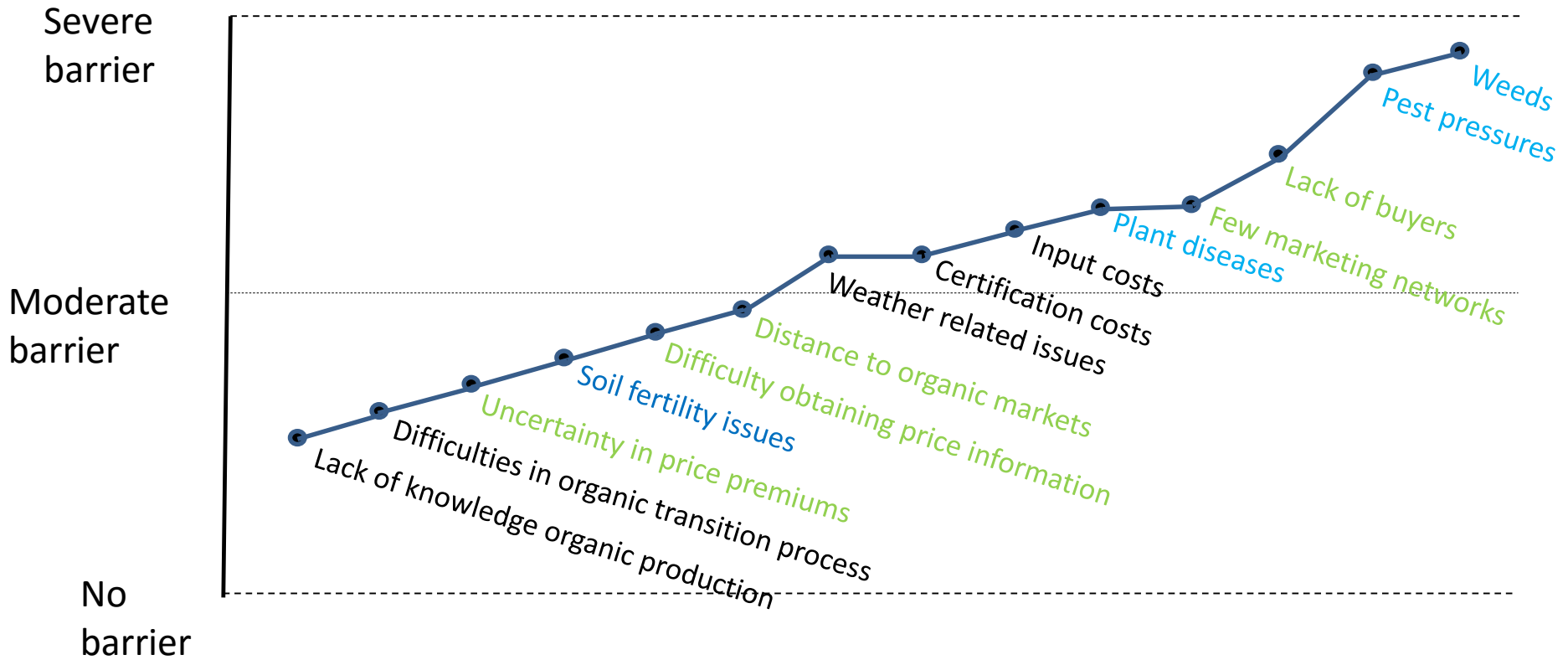


Partners



- Abundant Grace Farm
- Green Retros
- Freedom Harvest Farms
- Aurelia Consuelo Balthrop

What are the barriers to sustainable agriculture in south Texas?



Pest pressures

Weeds

Plant diseases

Weeds

1. Assess economically viable organic weeding methods
2. Investigate strategies that reduce weed build up and improve soil fertility

Pest pressures

1. Identify major pest and beneficial insects in organic vegetable systems in South Texas
2. Test agroecological practices that can prevent/reduce pest buildup

Pests pressures in cruciferous crops in south Texas

Identify major pest and beneficial insects in organic vegetable systems in South Texas

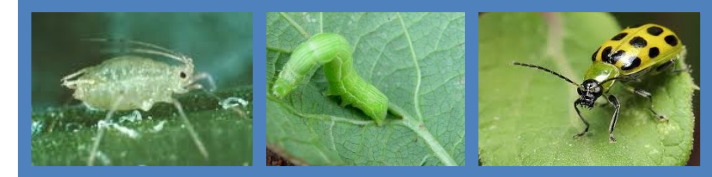
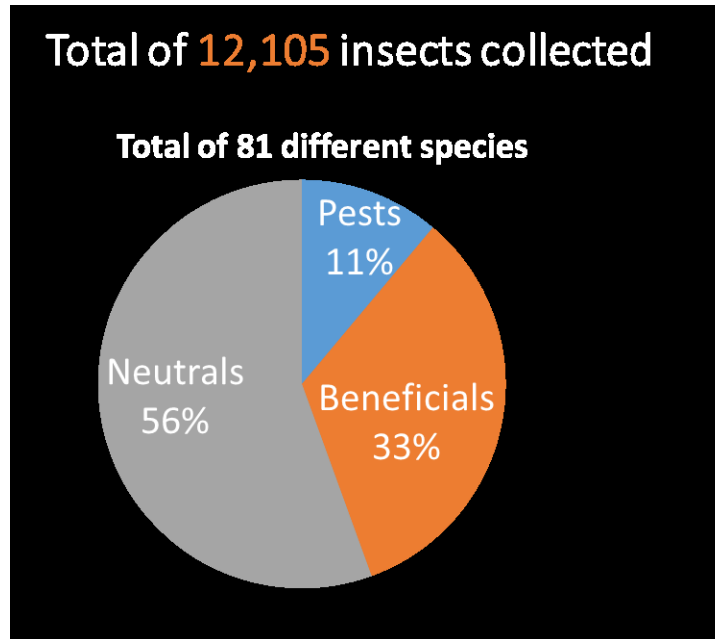
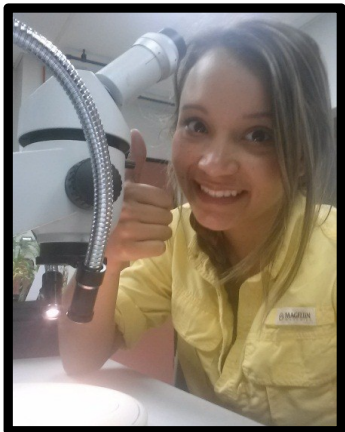


In a 2 acre plot of kale, we monitored:

1. Foliar arthropod pests and beneficials
2. Ground-dwelling pests and beneficials
3. Aerial pests and beneficials

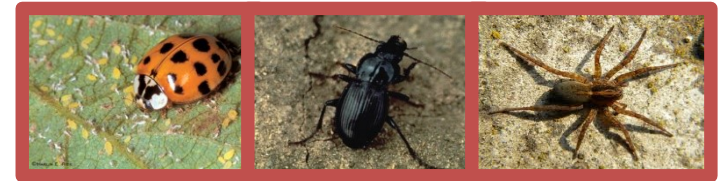
Pests pressures in cruciferous crops in south Texas

Identify major pest and beneficial insects in organic vegetable systems in South Texas



Most abundant pests (foliar)

1. Green Peach Aphid
2. Cabbage Looper
3. Spotted Cucumber Beetle



Most abundant predators

1. Convergent ladybeetle
2. *Pterostichus* ground beetle
3. *Pardosa* wolf spider

Pests pressures in cruciferous crops in south Texas

Identify major pest and beneficial insects in organic vegetable systems in South Texas



BRASSICA PESTS &
THEIR NATURAL ENEMIES

A FIELD GUIDE FOR
TEXAS ORGANIC FARMERS



Pests pressures in cruciferous crops in south Texas

Test agroecological practices that can prevent/reduce pest buildup

Approach:

- Example potential of push-pull systems in brassica crops
- Compare Green peach aphid, beneficial arthropod abundance on neighboring kale



Green peach aphid



Lyford, Texas

Dill and Fennel



Indian mustard



Buckwheat





Subtropical Organic Agriculture Research (SOAR) Partnership Videos

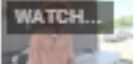
by NCATATTRA • 8 videos • 63 views • Last updated on Sep 16, 2015


The SOAR Partnership is led by the University of Texas-Río Grande Valley (UTRGV) and National Center for Appropriate Technology (NCAT). Funding to create these videos was provided by the Organic Transitions Program of USDA's National Institute... more


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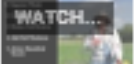
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1  Farm to Hospital in the Rio Grande Valley: Getting Ready
by NCATATTRA


2  Organic Weed Removal Technique
by NCATATTRA


3  Small Hoop House Construction Trick
by NCATATTRA

4  Four Warm Season Cover Crops
by NCATATTRA

5  Five Benefits of Cover Crops
by NCATATTRA

6  Resultados Maravillosos Manteniendo Humedad con Mantillo de Paja
by NCATATTRA

7  Amazing Water Holding Result from Straw Mulch
by NCATATTRA

8  Construcción de Invernadero Pequeño
by NCATATTRA

- *Texas Organic Chronicles (1400+ members)*
- *SOAR Newsletter*
- *Advisory Board*
- *Electronic Listserv*
- *Website*
(www.utrgv.edu/agroecology)
- *Annual Meeting*

Basic Heuristics for Participatory Agroecology Research and Training

PRELUDE: building social capital; preliminary situation analysis; know your strengths

1. Backward Design (Wiggins and McTighe 1998): What are the desired outcomes?

Do students as well as farmers/community benefit from collaboration and acquire skills, knowledge and abilities to handle new concerns, challenges, and opportunities?

Basic Heuristics for Participatory Agroecology Research and Training

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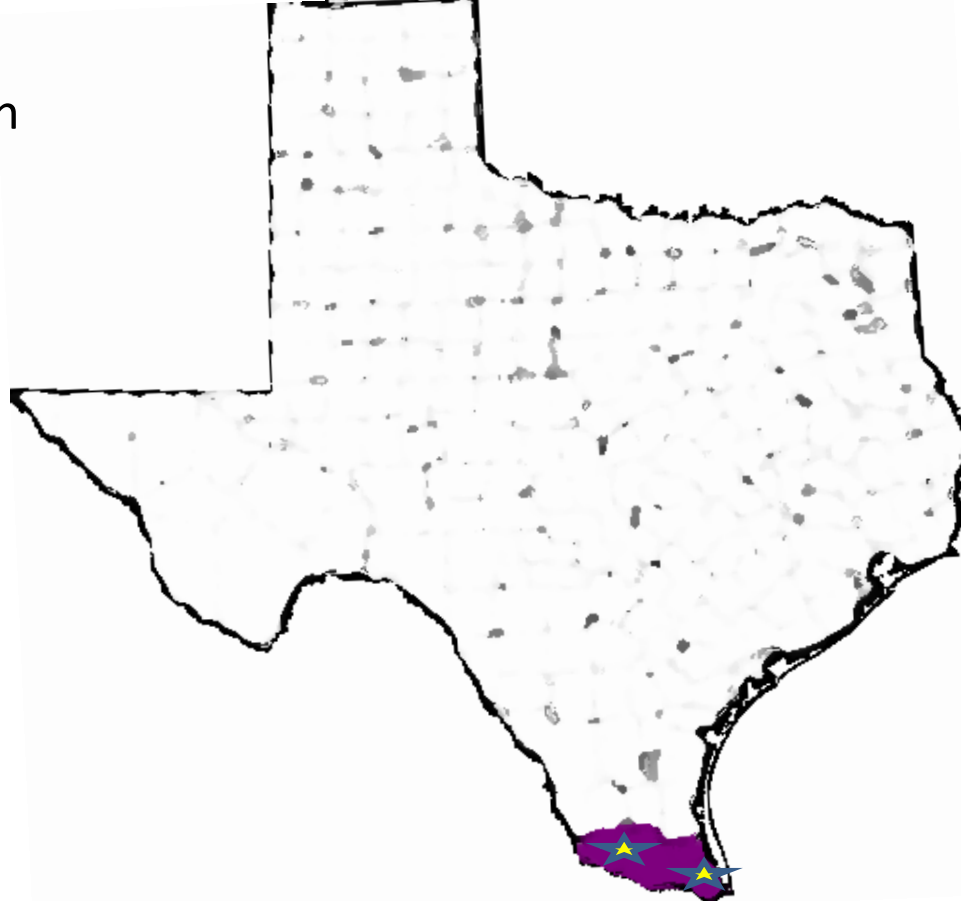
1. Backward Design (Wiggins and McTighe 1998):
2. Look for things to try: identifying priorities; identifying 'best-bet' options from indigenous knowledge and scientific sources;
3. Design/implement experiments, monitoring and evaluation should all be participatory and collaborative
4. Share results through culturally and socially appropriate media— Student to farmer, farmer-to-farmer, farmer friendly social media



- Hidalgo County:
Highest concentration
of organic farms in
Texas

- Statewide leader in
the production
organic certified
winter vegetables

Lower Rio Grande Valley

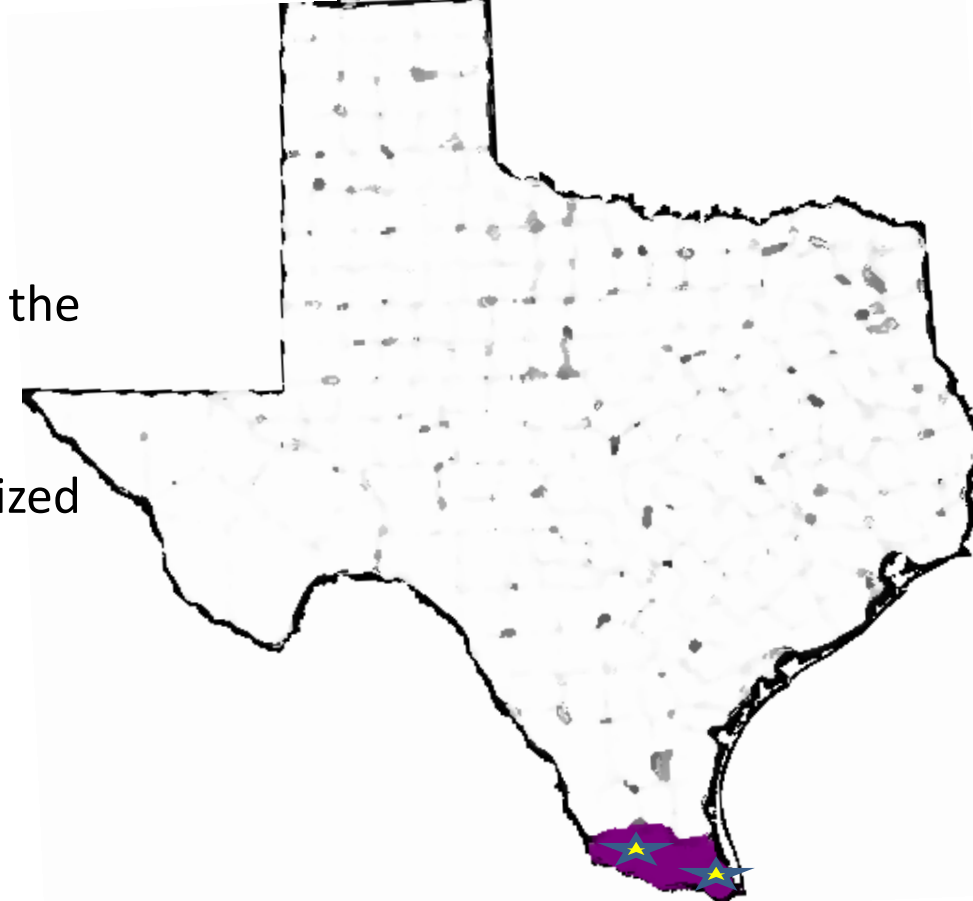


- On-campus
conversation
about food
systems
sustainability
- Development of a
degree program
and research in
sustainable food
systems
- Systems approach
to sustainable food
systems with
network of
different actors



- Development of a degree program and research in sustainable food systems
- Masters in Agriculture, Sustainability and the Environment
- Nationally recognized program in Agroecology and Resilient Food Systems

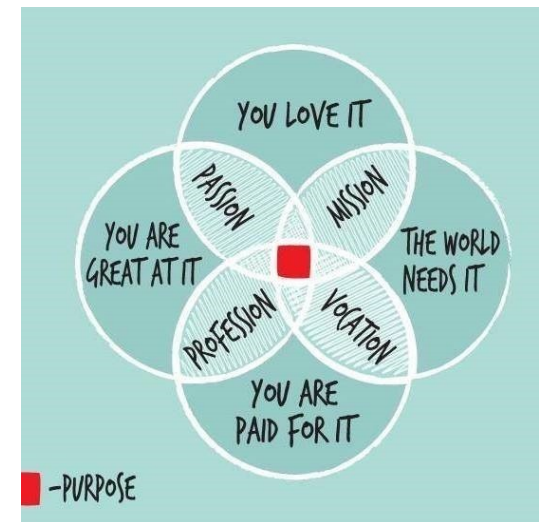
UT Rio Grande Valley



- First certified organic research garden on University Campus in the state
- Provided fellowships or internships to 7 graduates and 38 undergraduates (89%) identified as Hispanic/Latino
- 60% of undergraduates reported ag-related jobs

LESSONS LEARNED

- Implement Strategic Planning
- Build Stronger Connections and Strategic Partnerships with Farms, schools, administrators, etc;
- Broaden Treatment of Agriculture in the Overall Curriculum, use locally relevant examples
- Broaden the Student Experience through innovative curricula, engaged scholarship, service learning
- Start Early—K-12 Outreach



UTRGV



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- USDA-NIFA-ORG
- USDA-NIFA-HSI
- Southern SARE
- UTRGV COS
- UTRGV FM



- Collaborators at USDA-ARS/APHIS
- Subtropical Organic Agriculture Research Partner farms
- NCAT-San Antonio



United States
Department of
Agriculture

National Institute
of Food and
Agriculture