Using Technology to Solve California's Agriculture and Natural Resource Challenges

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About Me

Gabriel Youtsey

- CIO of UC Division of Agriculture & Natural Resources
- Former Assistant CIO at UC Davis for 5 years
- Co-chair the Cloud Services Work Group for UC
- Member of the IT Leadership Council for the UC

- Work on national higher education IT initiatives
- Worked as an IT consultant for KPMG in Ag and many other industries

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WE ARE UC ANR

We are
- Problem Solvers
- Researchers
- Coordinators
- Advisors
- Collaborative Leaders
- Educators
- Stewards
- Community Builders

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WE ARE UC ANR

UC ANR is a network connecting the people of California and their University.

Our more than 300 campus-based specialists and county-based advisors work as teams to bring practical, unbiased, science-based answers to Californians

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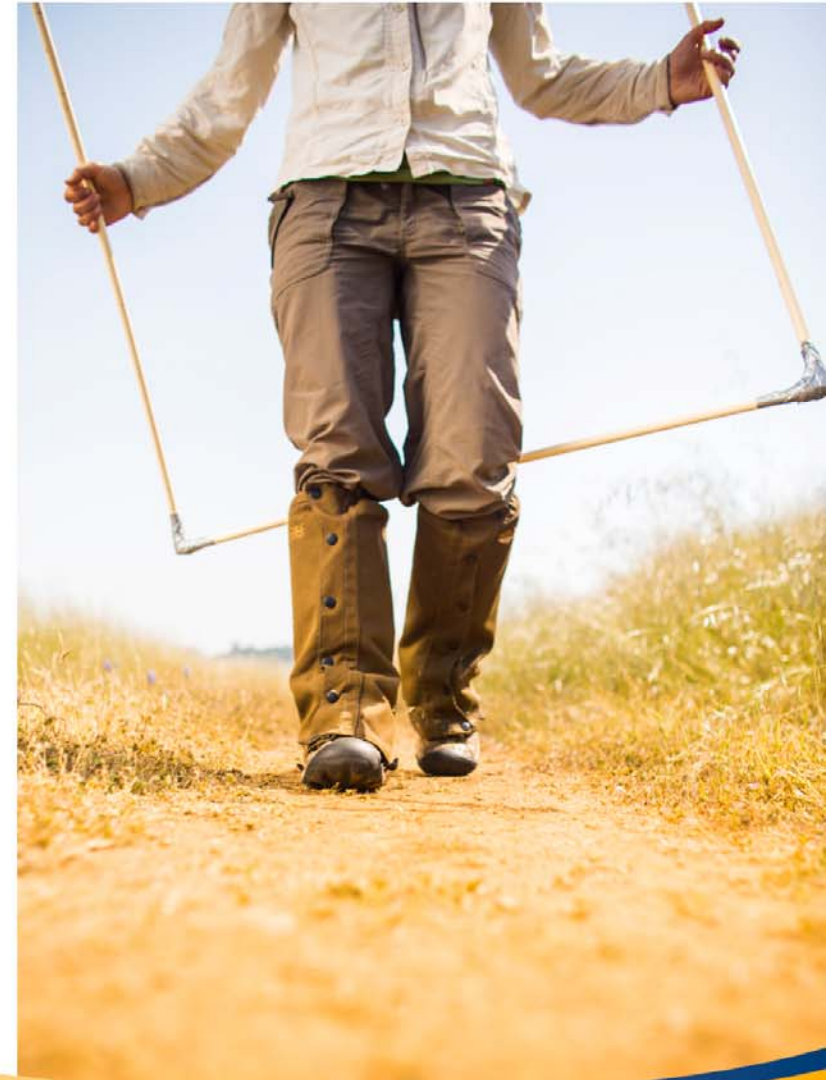
A VITAL PARTNER

We are a vital partner, working hand in hand with agriculture to

- enhance markets
- help the balance of trade
- address environmental concerns
- protect plant health
- provide growers with scientifically tested production techniques
- and Californians with increased food safety

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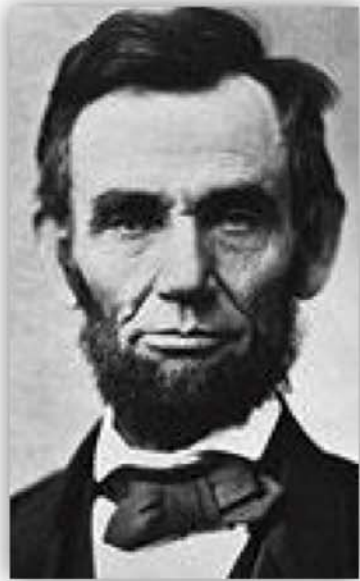
OUR ROOTS

We trace our roots to legislation signed by President Abraham Lincoln in 1862 - the Morrill Act that created the "land grant" state universities.

In 1914 the Smith-Lever Act enabled the creation of Cooperative Extension.

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California opened its first county Cooperative Extension office in Humboldt county in 1913.

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THE UC ANR NETWORK

Research and Extension Center
UC Cooperative Extension
UC Campuses

Agricultural Experiment Station

- Campus-based researchers

UC Cooperative Extension

- Local Advisors who live and work in the communities they serve and our campus-based Specialists

Research and Extension Centers

- 9 locations statewide

Statewide Programs and Institutes

- Specific focus on high-priority concerns

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THE UC ANR NETWORK

Locally based advisors work with campus-based specialists and AES faculty to solve local problems.

They work to tailor programs and solutions to fit local needs.

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# IT supports the mission of ANR

Vision

- Healthy Food Systems

- Healthy Environments

- Healthy Communities

- Healthy Californians

Initiatives

- Enhance Competitive, Sustainable Food Systems

- Enhance Sustainable Natural Ecosystems

- Provide for Healthy Families and Communities

- Manage Endemic and Invasive Pests and Diseases

- Improve Water Quality, Quantity, and Security

Technology does not exist for its own sake!
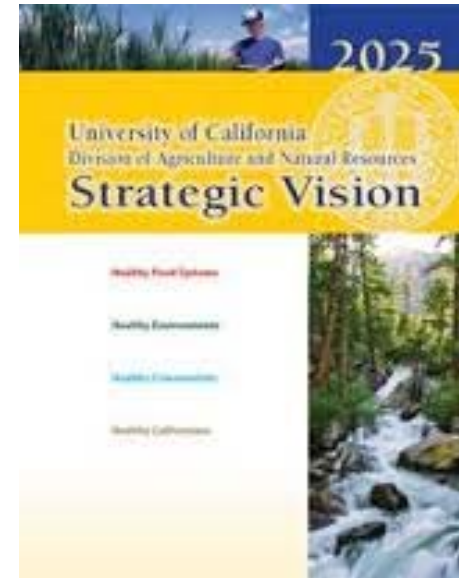
AGRICULTURAL EXPERIMENT STATION

650+ faculty members in 38 departments

- Conducting fundamental research that addresses "real-world" problems of Californians

In 3 colleges and 1 professional school on 3 campuses

- Berkeley – College of Natural Resources

- Davis – College of Agriculture and Environmental Sciences; School of Veterinary Medicine

- Riverside – College of Natural and Agricultural Sciences

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COOPERATIVE EXTENSION

- **Locally based experts**

- **~130 campus-based specialists**

- **~200 CE advisors**
    - Statewide network of local offices

- **Live and work in the communities they serve**

- **"The face of UC"**

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RESEARCH AND EXTENSION CENTERS

- **9 facilities statewide**

- **Variety of climate zones**

- **Variety of crop production areas**

- **Land, labor, technical, and management support for research**

  - **120 professional staff**

  - **12,000+ acres of land**

- **350+ research projects per year**
- **600+ educational events per year**

Intermountain REC

⭐ Research and Extension Center

Sierra Foothill REC

Hopland REC

Kearney REC

West Side REC ⭐   ⭐ Lindcove REC

Hansen REC

South Coast REC

Desert REC

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STATEWIDE PROGRAMS AND INSTITUTES

California Institute for Water Resources

- Integrating California's research, extension, and education programs to develop research-based solutions to water resource challenges.

- Facilitating collaborative research and outreach on water issues.

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STATEWIDE PROGRAMS AND INSTITUTES

Nutrition Policy Institute

Providing statewide leadership to improve nutrition and reduce obesity, hunger and chronic disease risk in children and their families in diverse settings.

Youth, Families, and Communities

Includes:
- Nutrition education for low income families, adults, and youth
  - Expanded Food and Nutrition Program (EFNEP)
  - In partnership with the UC CalFresh Program
- 4-H Youth Development Program

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4-H YOUTH DEVELOPMENT

"Growing youth who thrive"

- Serves youth throughout California in urban, suburban, and rural areas

- Over 14,000 adult volunteers are trained and certified to work alongside youth

- The 4-H SET Initiative provides innovative out-of-school models, curricula, activities, and professional development for effectively engaging youth in self-directed learning and discovery.

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MASTER GARDENER PROGRAM

"Advice to grow by . . . Ask us!"

- Research-based information on home horticulture and pest management

- 6048 UC trained volunteers in 50 counties

- Over 385,000 volunteer hours per year (FY 13-14)

- Estimated value of volunteer hours - $10.1 million annually

- Classes, workshops, telephone help lines, demonstration gardens, websites, fairs and plant clinics

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INTEGRATED PEST MANAGEMENT

Resources for researchers, growers, and gardeners

- Pest Management Guidelines

- Pest Notes

- IPM manuals

- Management of exotic and invasive pests

- Management of pests that threaten natural resources

- Decision-making tools

- IPM workshops

- Pesticide safety and training

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THE CHALLENGE AHEAD

"Meeting these challenges will require a renewed commitment to research, innovation, and technology development in agriculture. If we act strategically today, we will gain invaluable benefits tomorrow, including enhanced food security better nutrition, greener sources of energy, and healthier lives, while we grow the rural economy."

—Daniel Schrag, co-chair of the President's Council of Advisors on Science and Technology, Agriculture Preparedness Working Group

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Role of IT and the CIO

Engage ◆ Advocate ◆ Lead ◆ Partner ◆ Support

Principles of IT

- Fully engaged at every level
- Serve as technology partners
- Enterprise campus level services
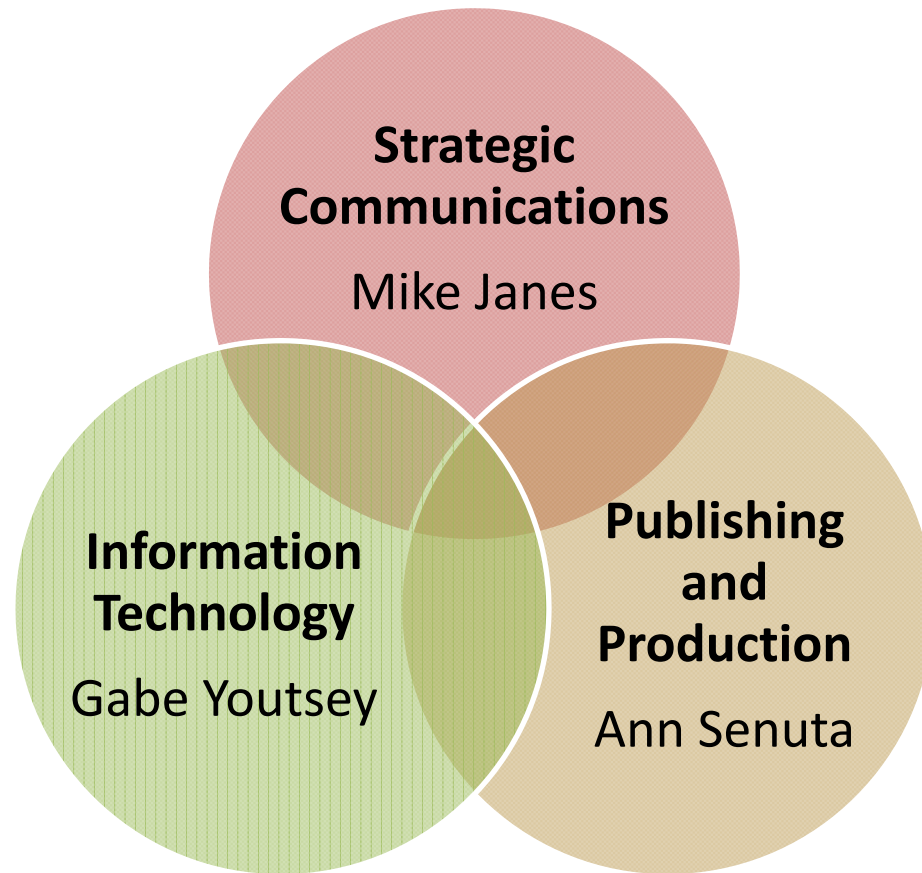- Professional division wide IT support

Areas of Focus

- Infrastructure & support
- Enterprise applications
- Web & social media
- Research technology
- Academic technology

Strategy, Service, Support, Coordination

Communications Services & Information Technology

Services
Strategy
Support
Coordination

Strategic Communications

Mike Janes

Information Technology

Gabe Youtsey

Publishing and Production

Ann Senuta

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My Visit to the RECs and UCCE offices

Key Challenge: Web and Social Media

508 sites
205 mobile friendly sites
Thousands and thousands of pages

- **Lots and lots of outstanding content**
- **Hard to get a sense of ANR**
- **Many pages are UC Davis branded**
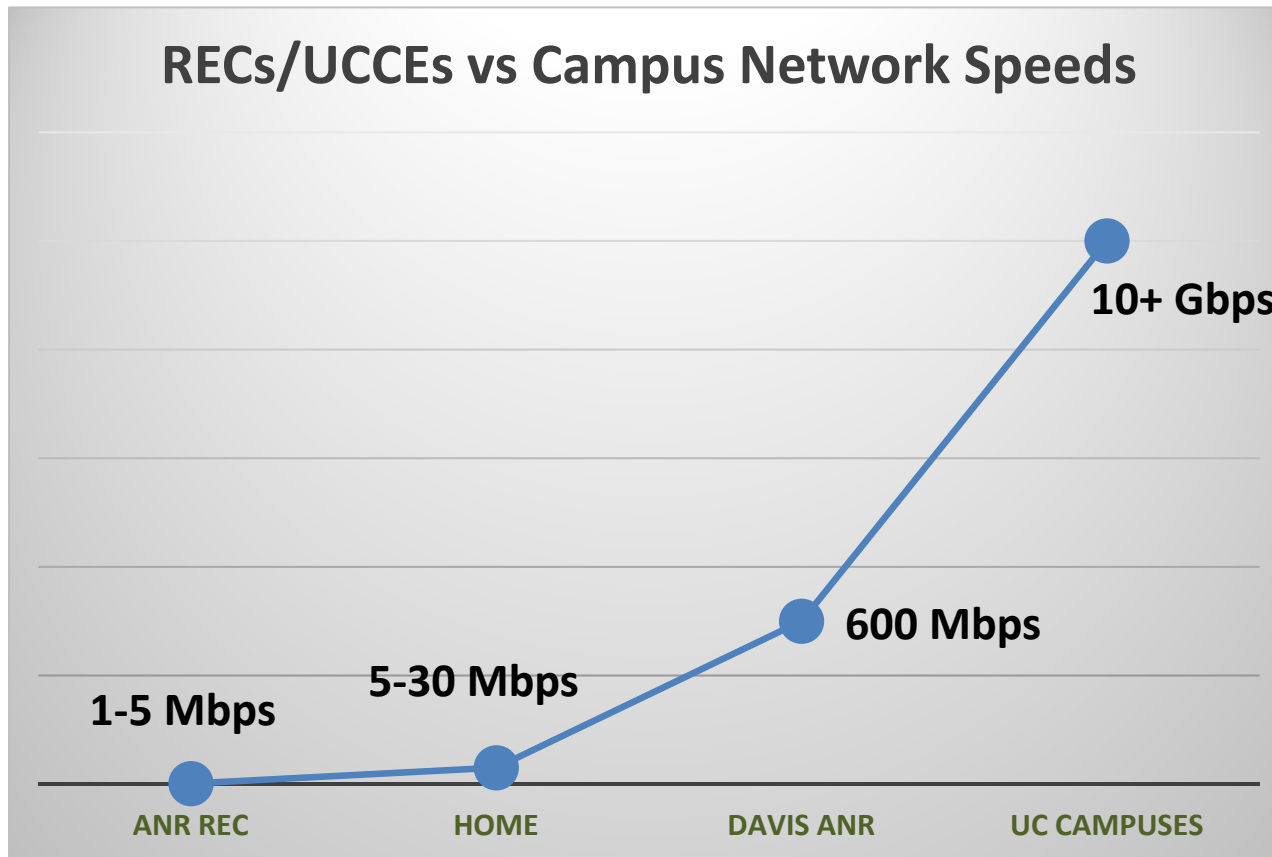- **Engagement strategies (e.g. social media) inconsistent**

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Website project

Redesign the ANR Website

- Understand ANR in one page
- Engage with the community
- Easier to find information
- Visually appealing

Approach

- Engage design, brand and front end specialists
- Partner between IT, Strategic Communications, Publishing and social media stars at ANR
- Conduct a needs assessment then design/build

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Key Challenge: Outdated Network

RECs/UCCEs vs Campus Network Speeds

10+ Gbps

600 Mbps

5-30 Mbps

1-5 Mbps

ANR REC — HOME — DAVIS ANR — UC CAMPUSES

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USDA's Vision for Rural Broadband

Rural Wireless Broadband		
New Agriculture Technology		
Production	Water	Energy
Environment	Food Safety	
Rural Tele-Health/Tele-Medicine		
Distance Learning	Public Libraries	
Transportation & Logistics		
Public Safety		
Rural Agro Tourism & Recreation		
University Research & Extension		

USDA

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Network upgrade project

Upgrade Network to Campus Level Speeds

- Campus-like connectivity
- Support research technology
- Supports video and web conferencing
- Allows cloud and remote management
- Provide services to agriculture and underserved communities
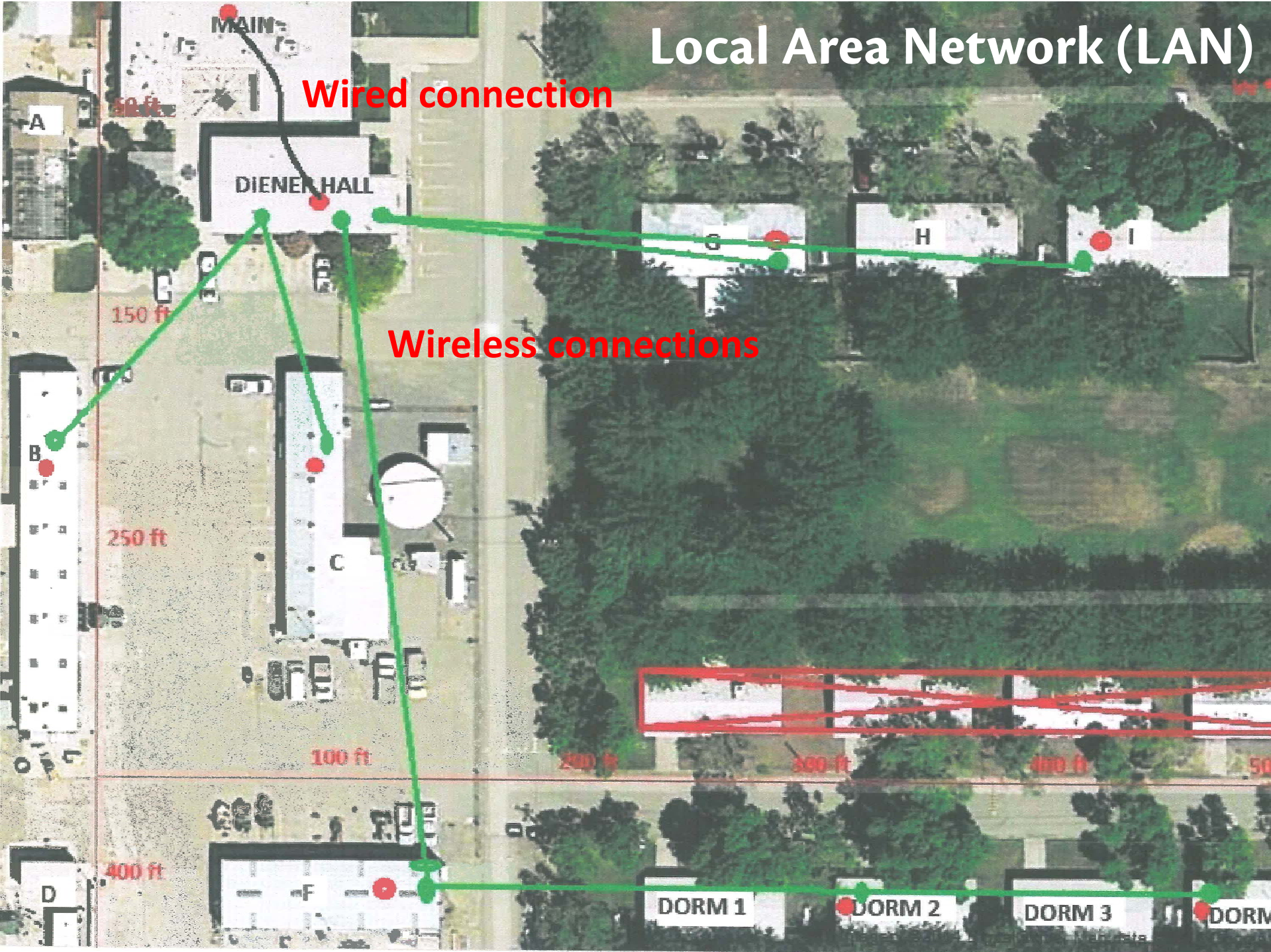

Approach

- Engaged CENIC to design WAN and provide service
- Seeking telecom vendor for internal LANs
- Will use LTE wireless backup approach
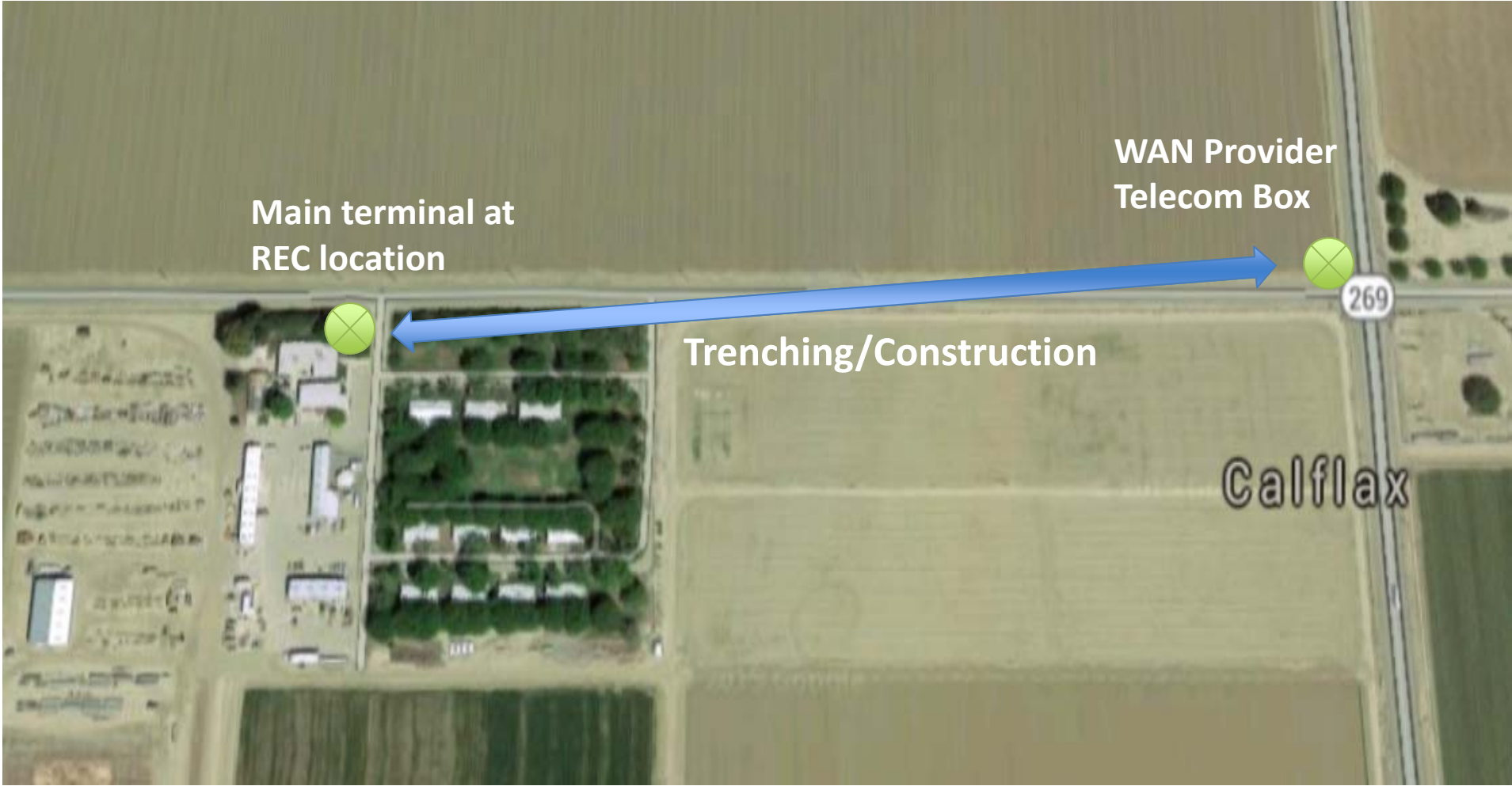- Upgrading network equipment for better support and central monitoring/management

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WIDE AREA NETWORK

CENIC

Connect

ANR

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Local Area Network (LAN)

Wired connection

Wireless connections

Connecting WAN to LAN

WAN Provider Telecom Box

Main terminal at REC location

Trenching/Construction

Calflax

269

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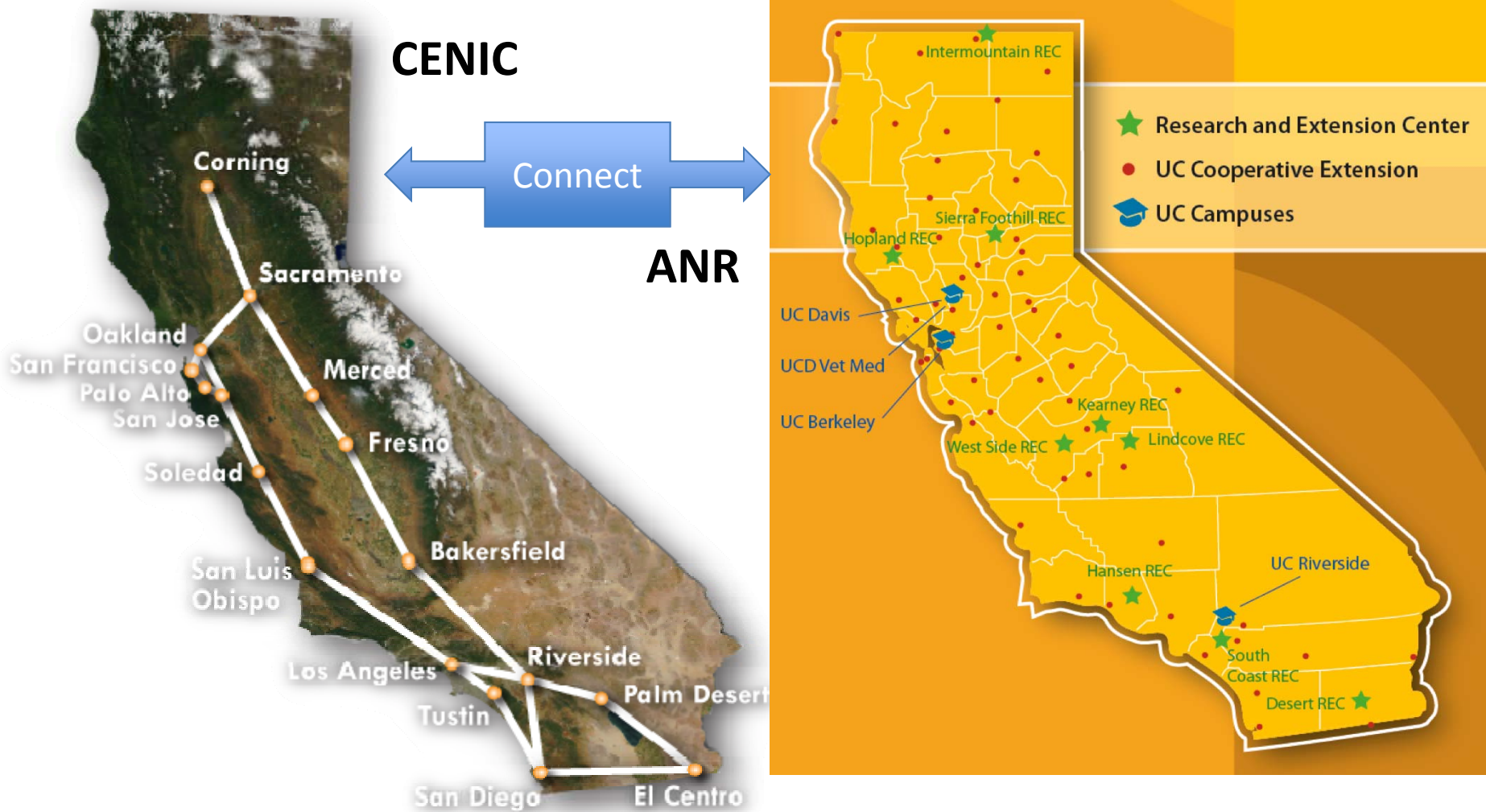
Longer term goal: community broadband

Lindcove Research and Extension Center

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Precision Ag or Data Driven Crop Science

The holy grail of **precision agriculture** research will be the ability to define a Decision Support System (DSS) for whole farm management with the goal of optimizing returns on inputs while preserving resources.

Research Technology Interest Areas

Create a Research Technology program

- UC leader in data-driven crop science
- Weather and climate technology
- Seed to harvest big data
- ANR institutional data
- Build applications for researchers

Approach

- Create an Ag research technology forum
- Explore research technology grants
- Continue to drive GIS expertise
- Pilot BI tools for big data

REC Manage Initiative

RECManage Platform

- User-friendly "PI Hub" for proposal creation, tracking and reporting
- Custom request forms tailored to specific center and project
- Standardized local and statewide reporting
- Research datasets deposited and connected to projects and researchers
- Modular construction allows for transmission of critical research and report data in real-time

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REC Manage Initiative

RECManage Platform
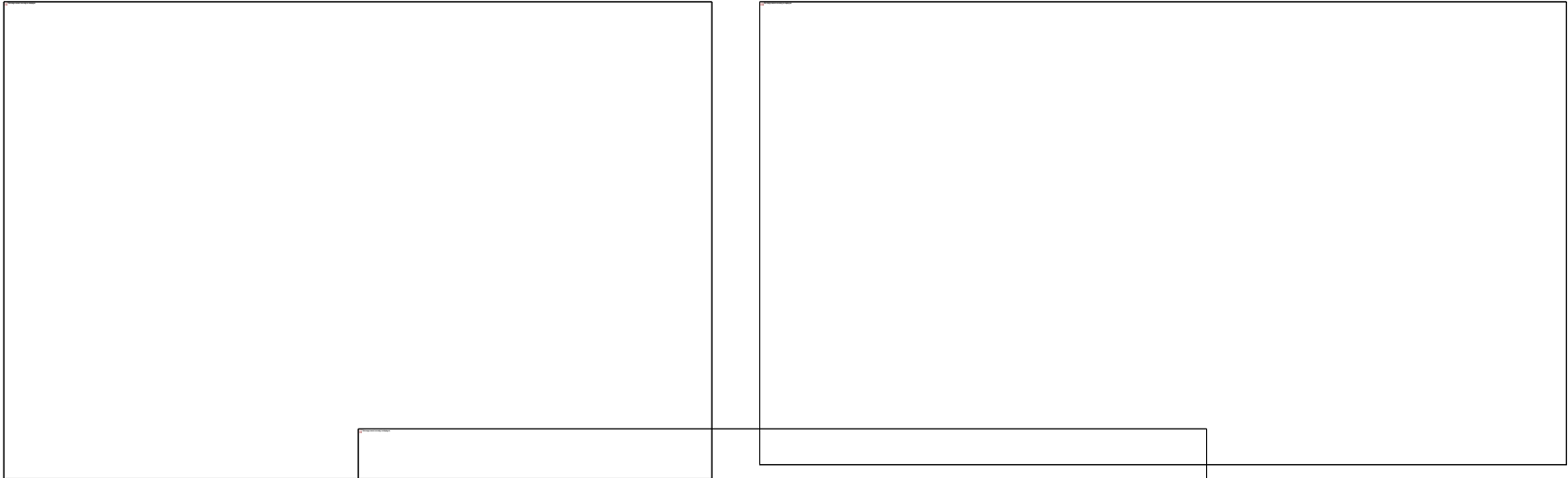
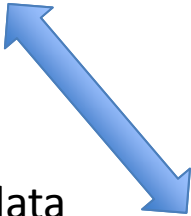# Collecting "seed to harvest data"

GIS data

Packing data

Tree data

Research data

Research software projects

Decision Support Systems

- **CropManage** – provides lettuce growers with decision support for irrigation and fertilization using weather stations, irrigation flow meter data, soil analysis and other datasets. Currently expanding to multiple commodities.
- **Tower Management System (TMS)** – provides real to near real-time data feeds to researchers from Flux towers and project-based weather stations.
- **Calculators and Models** – online harvest prediction applications for peaches, plums, nectarines, almonds, pistachios and other commodities.

Academic Technology Interest Areas

Create an Academic Technology program

- Creative multimedia support
- Creative tools and trainings
- Professional production support
- Enhance instructional design
- Enhance videography/photography
- Add lecture capture capabilities

Camtasia Studio®

Kaltura

mediasite

Approach

- Leverage ANR creative expertise
- Partner with campus experts
- Close CS&IT collaboration
- Contract outside expertise
- Purchase tools and hardware

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Organizing ANR IT to deliver

- **Create a Project Management Office**
  - ✓ Project intake and prioritization
  - ✓ Portfolio management and project dashboard
  - ✓ Best PM practices on projects
- **Implement an IT Governance process**
  - ✓ Advisory group made of academics and administrators
  - ✓ Decision-making group of executives
- **Reorganize IT for service delivery**
  - ✓ Create a sustainable IT "business model"
  - ✓ Deeper participation in mission-related activity
  - ✓ Unify IT and focus on service
- **Join UC-wide efforts to focus on strategic not commodity IT**
  - ✓ Use best of breed vendor or campus services
  - ✓ Participate in UC-wide shared service IT efforts

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Agile Project Management Approach

- **Iterative approach to projects / product development**
    - ✓ Deliver quality software early and often
    - ✓ Small, manageable pieces rather than delivering the entire product at once
- **Transparency and customer collaboration**
    - ✓ Product demonstrations provided every 1-4 weeks
    - ✓ Immediate feedback goes into product backlog
- **Quick response to change**
    - ✓ Product backlog of work items is constantly prioritized
    - ✓ Team works on the highest priority items first
- **Deliver the right product**
    - ✓ Ability to respond quickly to change ensures product aligns with vision (even as the vision evolves)

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Solutions for California
PRACTICAL | CONNECTED | TRUSTED

gdyoutsey@ucanr.edu
@gabe.toutsey

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UC Cooperative Extension

ANR Technology Program

Create a technology program for ANR

- Lower cost of technology and provide better support division-wide
- Immediate phone support, problems solved within 1 day
- Modern technology and tools

Approach

- Flexible standards for computers, software, printers, phones, networks
- Implement tiered central service desk
- ITSM tools, processes, training
- Regional companies provide local support

ANR Identity Mangement

Create an ANR identity

- Create a campus-like identity for ANR
- Ucanr.edu email address for all
- ANR login + campus login
- Will provide the foundation for UC Path
- Will replace portal login

Approach

- Engaged UCOP to consider UC-wide approach
- Fast, nimble, innovative solution in the cloud
- Connect cloud email, file storage
- Begin migrating services over

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