Colorado State University
SPUR Innovation Center

Ram Venture Accelerator:

AGRICULTURE BUILD-A-THON

SEVEN AG-CHALLENGES TO HACK

Efficient Farm Water

Rescue Cattle Keratin

Solo Cattle Feeding

Vineyard UV Tech

Restoration Grazing

Automated
Manure Composting

Upcycling Potatoes

CHALLENGE BRIEFS

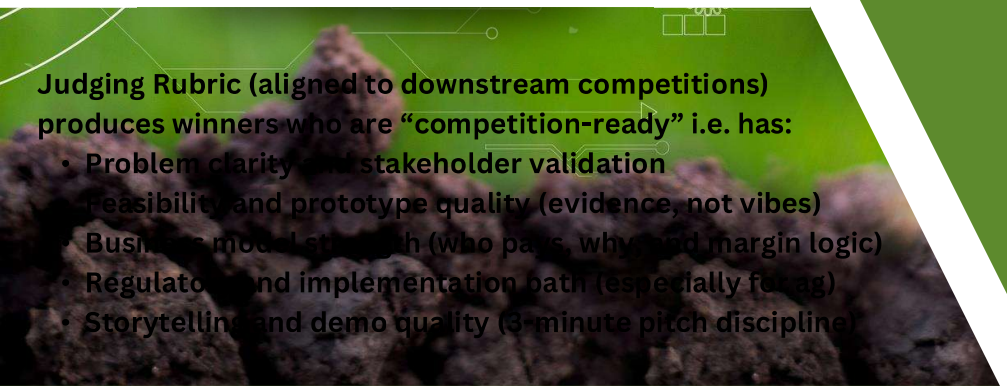
Create “real scenarios” *without re-inventing the wheel*

The Challenge Brief is a 1 page solicitation for innovation that defines the challenge, and should lead into a full scenario packet that is provided during the kick off, modeled like UConn’s for clarity, but sourced from:

- SPUR sponsor-interested problem sets referenced (our local backlog).
- A small number of “global-aligned” frames (food, climate, water) so winners can translate the story outward (TFF and Grow-NY style).
- Market-demanded prototype deliverables:

Challenge Brief Template (one page each)

- Problem title (plain language)
- Stakeholder and user (who hurts, where, when)
- System boundary (inputs, outputs, constraints)
- Why now (market or regulatory or climate driver)
- What “prototype” means for this problem (acceptable formats)
- SPUR SME contacts (office hours during the weekend)
- Data or assets provided (if any)
- Success metrics (technical + adoption + economic) & Judging Rubric criteria



Judging Rubric (aligned to downstream competitions) produces winners who are “competition-ready” i.e. has:

- **Problem clarity and stakeholder validation**
- **Feasibility and prototype quality (evidence, not vibes)**
- **Business model strength (who pays, why good margin logic)**
- **Regulatory and implementation path (especially for ag)**
- **Storytelling and demo quality (3-minute pitch discipline)**

CHALLENGE BRIEF: KEEP RANCHERS SAFE WHILE FEEDING CATTLE

Ranchers often have to feed their animals alone, so they put their truck in low gear, exit the cab, and climb onto the truck-bed as the truck is moving along the fence. They then throw hay into the feed bunks for the cows to eat as the truck is moving along the fence line, hoping they won't fall or run into the fence. This activity has to be done every morning and night, often in weather conditions like snow and rain. If the rancher falls, he may not have access to his phone to get help, and hospitals can be hours away. Many ranchers have been seriously injured from this activity.

STAKEHOLDER

Solo ranchers feeding daily

PAIN

Daily injury risk + labor inefficiency + remote emergency response

48 HOUR BUILD TARGETS

- Retrofit assist device
- Autonomous crawl mode
- Hay dispensing attachment
- Safety monitoring wearable
- Other ideas

CONSTRAINTS

- Works on old trucks/tractors
- <$10k solution
- Operates in snow/mud/dust
- No complex training
- Works off-the-shelf and out-of-the-box
- Compliant with retrofitting and safety constrains

SUCCESS METRICS

- 0 riders on moving truck
- Feeding time ↓ 30–50%
- Injuries eliminated
- <$X per ranch per year

INVESTMENT SIGNALS

- Huge installed vehicle base
- Retrofit = easier adoption
- Clear ROI (labor + insurance)
- Hardware + service/maintenance revenue

CHALLENGE BRIEF: MAKE COMPOSTING EASIER FOR DAIRY/FEEDLOTS

Colorado is home to some of the nation's most productive beef feedlots and dairy operations. Unfortunately, many producers cannot compost because they can't find workers (or can't afford to pay them) to drive a tractor in a straight line all day to turn the compost pile The cows that live on these operations produce anywhere from 30-120 lbs of manure a day. This manure is rich in nitrogen, phosphorous, and potassium that can be applied on fields to help crops grow, but too much in the wrong place can harm water quality. Composted manure is preferable to raw manure because it:

- Releases nutrients to crops in a longer-lasting way
- It has less water and so costs less to ship
- Improves soil structure and water holding capacity
- Reduces odor

STAKEHOLDER

Feedlots, dairies

PAIN

Manual tractor driving is repetitive, costly, and hard to staff

48 HOUR BUILD TARGETS

- Autonomous turning path planner
- Retrofit drive assist
- Compost monitoring sensors + alerts
- Or service workflow blueprint
- Modular on-site manure to compost packaging plant

CONSTRAINTS

- Harsh environment
- Low margins
- Must integrate with existing tractors
- Reliable daily use

SUCCESS METRICS

- Labor hours ↓ 50%+
- Compost cycle time ↓
- Nutrient retention ↑
- Cost/ton ↓

INVESTMENT SIGNALS

- Large manure volumes nationwide
- Automation replacing scarce labor
- Hardware + software subscription
- Environmental/regulatory tailwinds

CHALLENGE BRIEF: HELP COWS RESTORE FORESTS

Cattle play an important role in mitigating wildfire by grazing underbrush that can become fuel for fire, but cattle grazing in Colorado National Forest and Bureau of Land Management territory are often stopped by downed trees that prevent them from accessing areas with underbrush. Ranchers struggle to know where these downed trees are and the forestry service struggles to remove these trees.

STAKEHOLDER

Ranchers + forestry service

PAIN

Unknown blockages prevent grazing that reduces wildfire fuel

48 HOUR BUILD TARGETS

- Drone mapping demo
- Downed-tree detection model
- Routing/clearing priority dashboard
- Mobile reporting tool

CONSTRAINTS

- Remote terrain
- Limited connectivity
- Multi-agency coordination
- Must be low-cost

SUCCESS METRICS

- Acres accessible ↑
- Clearing time ↓
- Fuel load reduction
- Grazing coverage ↑

INVESTMENT SIGNALS

- Climate/wildfire funding
- Gov + private customers
- Data platform model
- Strong public benefit story

CHALLENGE BRIEF: SAVE WINE GRAPE FROM DISEASE

Grape producers on the Western Slope of Colorado would like to use new UV light-dosing technology to suppress grapevine diseases and arthropod pests, but companies who manufacture this equipment in California focus on vine-growing architectures that are common in California, not Colorado.

STAKEHOLDER

Western Slope grape growers

PAIN

Cannot adopt proven UV disease suppression tech due to architecture

48 HOUR BUILD TARGETS

- Adjustable mount prototype
- Modular attachment
- Vineyard workflow simulation
- Cost comparison model

CONSTRAINTS

- Works with Colorado trellis spacing
- Gentle on vines
- Night or low-light operation
- Affordable for small vineyards

SUCCESS METRICS

- Fungicide sprays ↓
- Disease rate ↓
- Labor/time per acre ↓
- Cost/acre competitive

INVESTMENT SIGNALS

- Specialty crop robotics niche
- High-margin wine market
- Clear chemical-reduction value
- Scalable to other crops

CHALLENGE BRIEF: RESCUE KERATIN FROM TANNERIES

Keratin is a natural biopolymer with valuable characteristics, such as mechanical strength, thermal insulation, hydrophobicity, and biodegradability that can be engineered into films, gels, nanoparticles, and scaffolds. Tanneries that convert cow hide to leather for couches, car seats, and apparel must de-hair the hides to create leather. This process leaves these tanneries with tens of thousands of tons of bovine hair waste - a rich source of keratin- that they pay to dispose of in landfills around the world.

STAKEHOLDER

Tanneries + materials buyers

PAIN

Paying to dispose of valuable biomaterial

48 HOUR BUILD TARGETS

- Small-scale extraction demo
- Material prototype sample
- On-site processing workflow
- Unit economics model

CONSTRAINTS

- Wet/contaminated feedstock
- Must be cheap
- Large volumes
- Industrial environment

SUCCESS METRICS

- $/ton recovered
- Disposal cost ↓
- Material performance benchmarks
- Offtake interest

INVESTMENT SIGNALS

- Waste → revenue
- Strong sustainability pull
- Defensible IP
- B2B contracts

CHALLENGE BRIEF: VALORIZE WASTE POTATOES

Farmers in the San Luis Valley of Colorado produce over 2 billion pounds of potatoes every year. Because not every potato can meet the exceptionally high quality standards of retailers for fresh potatoes, and because the local potato starch factory burned down last year, 1.2-3.8 million pounds of these potatoes must be destroyed annually.

STAKEHOLDER

Potato growers/processors

PAIN

Retail rejects + no starch plant → product destruction

48 HOUR BUILD TARGETS

- Upcycled product prototype (food/material/energy)
- Mobile processing concept
- Cost + margin model
- Buyer validation

CONSTRAINTS

- Massive bulk
- Low value per lb
- Must be simple/cheap
- Food safety

SUCCESS METRICS

- % waste diverted
- New $/lb revenue
- Processing cost ↓
- Shelf life ↑

INVESTMENT SIGNALS

- Circular economy
- Ingredient markets
- Stable supply
- Regional processing hubs

CHALLENGE BRIEF: HACK UP-HILL WATER DELIVERY

Many Colorado ranchers must move water **uphill** to reach livestock grazing areas. Existing engineering solutions (pumps, tanks, power infrastructure) are technically feasible but **prohibitively expensive**, often costing more than the operation can justify. This challenge is about **physically moving water uphill** in a way that is: affordable, reliable, maintainable by a small operation, realistic for rural conditions. Producers have already received quotes from professional engineering firms. The problem is not a lack of ideas.
The problem is cost, complexity, and practicality.

STAKEHOLDER

Irrigated crop producers

PAIN

Limited water rights + rising costs + inefficient irrigation → yield risk

48 HOUR BUILD TARGETS

- Soil moisture sensing network demo
- Irrigation scheduling tool
- Leak detection system
- Low-cost retrofit controller
- Or service blueprint

CONSTRAINTS

- Rural connectivity
- Low margins
- Must retrofit existing pivots/drip
- Simple to operate

SUCCESS METRICS

- Water use ↓ 20–40%
- Yield maintained or ↑
- Energy cost ↓
- Payback < 2 seasons

INVESTMENT SIGNALS

- Massive TAM
- Climate/drought urgency
- Recurring SaaS/data revenue
- Incentives/subsidies available