Big Data: Changing the paradigm for small farms
My background

- Working with social entrepreneurs with innovative financing
- Investing in farms and technology start-ups (land + water)
- Head of AgriTech incubator and innovation space Farm491
Since 2018 developed the incubation support

**Strategic support**
Leveraging the team’s experience/knowledge
Agricultural, business model, financial, market, investment

**AgriTech knowledge network**
Farmers, academics, students

**Events**
Driving thought leadership through speaking engagements
Showcases companies at trade shows, farmer-led workshops and investor days

**AgriTech Community of entrepreneurs**
Unique community of AgriTech companies
We believe the strongest scalable companies will marry best practice with commercial viability.

- **Best practice**
  - Animal welfare
  - Pesticide alternatives
  - Farmer-led innovation
  - Bio-diversity
  - Bio-alternatives
  - Strong core of research

- **Commercial viability**
  - Productization
  - Scalable business models
  - Investible propositions & different funding models

Farm491
“A large farm is one that’s a farm twice the size of mine”
WHAT IS A SMALL FARM?

- Smaller Acreage
- Value Driven
- Generational
- Low Income
WHY DO WE CARE?

- Low profits due to disenfranchised within the food supply chain
- Environmental fragility as small farms either consolidate or focus on unsustainable practices
- Ultimately the inability to be agile and react to uncertain challenges

In the UK, total income from farms declined...

£7bn in 1970

£2.7bn in 2006

(% increase in treated area (ha) from 1990 to 2016)

+63%

(Oglethorpe, 2005; DEFRA, 2007b; OECD, 2008)
UK food sales through major retailers has increased:

- 22% in 1950s
- 44% in 1971
- 75+% in 2009 (Top 4 major retailers)

In their position of market dominance, retailers have effectively become gatekeepers to the consumer, controlling shelf space as well as consumer perceptions of quality and acceptable product standards.

(Cooper, 2003; Dobson et al., 2003; Wrigley, 1987; Morelli, 1999; Clark, 2000; IGD, 2005; IGD, 2009)
U.S. IS DRIVING UK AGRITECH DEVELOPMENT

UK Farms
130 Acres
(Defra 2009)

U.S. Farms
423 Acres
(USDA 2009)
Farmers are categorized into stereotypes. Businesses are then structured around these stereotypes. Farmers are forced into these pigeonholes. Doesn’t give them room to grow in other directions.

E.g. If the tech only works for big farmers then we lose small farms and the heritage that comes with it.
Giving farmers more influence in the supply chain

Better represent consumer preferences

Allows farmers to build resilience

Empowers small/medium farms (maintains heritage) and leads to shorter food chains

Agility is needed to balance complex challenges: environment, profits, equity
Roughly 2 billion people (26.7% of the world population) derive their livelihoods from agriculture.

75% of agriculture is small family farms.
Most Activity: Focus on advanced IoT
## Infrastructure challenges

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<tr>
<th>Type of Intervention</th>
<th>Second-order enablers</th>
<th>Tertiary enablers</th>
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| Direct interventions  | 4. high-nutrient animal fodder  
3. Lifescaff vaccines for key diseases/pathogens, and cold-chain-enabled artificial insemination for improved breeding  
2. Steady supply of fertilizer (conventional or via alternative mechanisms e.g. small-scale Haber-Bosch process or efficient composting)  
1. Affordable on-farm implements for irrigation and weed removal | 9. Post-harvest loss reduction including dry storage and refrigeration  
8. Processing equipment for key cash crops | 11. Granular data for improved policy-making  
10. Training content (customized generation and dissemination) on optimal agronomic practices |
|                      | 7. Market information; pricing and match-making between sellers and buyers  
6. Crop [micro]-insurance  
5. Funds for financing for smallholder farmers, agricultural processors and other SMEs in the agricultural sector | 12. Improved seeds for drought and heat, with induced market for understanding impacts on ecosystems |

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<th>Limited dependence on data-driven analytics</th>
<th>Conventional analytics and decision-making tools</th>
<th>AI and big data</th>
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### Dependence on big data/Al
Using existing data sets to drive decision management platforms
HOW BIG DATA PLAYS A ROLE

TRAIN

Remote Data
Upstream Tech’s ensemble of satellites and meteorological data

Ground Data
Gauges and measurements made at the subject’s location

AI
Machine learning models learn from combined sets of remote and ground data

ESTIMATE

Remote Data + AI → Estimated Quantity
AI makes predictions from remote data sources and trained machine learning models

Upstream Tech website
A CALL FOR INNOVATION

• Big data cloud based processing to minimize need for hardware on small farms

• Near-real time solutions for low connectivity regions

• Using unorthodox data points to drive better performance within farms or access to finance

• Enabling shorter supply chains between small farms and big food service providers
Any questions?

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