

Cooling options and business models in the developing world

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Presentation Overview

- ▶ GCCA/WFLO/PEF
- ▶ Cold Chain Innovations
 - ▶ On-Farm
 - ▶ Cold Storage
 - ▶ Transportation
 - ▶ Trends
- ▶ Case Study: Nigeria
- ▶ Common Challenges
- ▶ Conclusion



Global Cold Chain Alliance (GCCA) & The Postharvest Education Foundation (PEF)

GCCA

- ▶ International Association of Refrigerated Warehousing
- ▶ World Food Logistics Organization
- ▶ Controlled Environment Building Association
- ▶ International Association of Refrigerated Transportation

WFLO Mission: WFLO delivers education and research to the industry and empowers economic development by strengthening the global cold chain.

PEF Mission: To provide innovative educational programs and information to motivate and empower people to reduce postharvest losses and food waste



On-Farm Cooling Options

Low-Cost Options

- ▶ Use of Shade
- ▶ Evaporative Cooling

Use of Reusable Plastic Crates (not a cooling option, but important)

- ▶ PEF White Paper No. 13-01, April 2013



Use of Shade



Evaporative Cooling (ZECC)



Cold Storage Solutions

- ▶ Cool-Bot Equipped Rooms
- ▶ Solar-Powered Cold Rooms
- ▶ Modern Small-Scale Cold Storage



Cool Bot



Solar Powered Cold Storage

- ▶ Aldelano
- ▶ Dgrid
- ▶ Solercool
- ▶ ColdHubs



Solar Powered Cold Storage + Financing

InspiraFarms

- ▶ Affordable leasing options
- ▶ 3-year preferred payment terms



Small-Scale Traditional Cold Storage Facility



Refrigerated Transportation Options

Primary and Secondary Distribution

- ▶ Reefer Trucks/Vans
- ▶ Airflow and shade
- ▶ Solar powered boxes
- ▶ Electric Trailers



Nonrefrigerated Transport

Importance of
Shade and
Airflow



Solar Powered Trailers



Electric Trailers



Case Study: ColdHubs

- ▶ Capital cost: US\$20,000 to \$50,000 or more per unit (depends on capacity)
- ▶ Operating cost: labor
- ▶ Customers pay a fee per crate
- ▶ Low environmental impacts

Additional Support Services

- ▶ Packing into plastic crates
- ▶ Refrigerated transport
- ▶ Links to markets



Trends: The Future of Cold Chain Development in Emerging Economies

- ▶ Leapfrogging
- ▶ Automation
- ▶ Liquid Nitrogen
- ▶ Uberization of Transport



Leapfrogging



Automation



Liquid Air Technologies

Dearman Engine

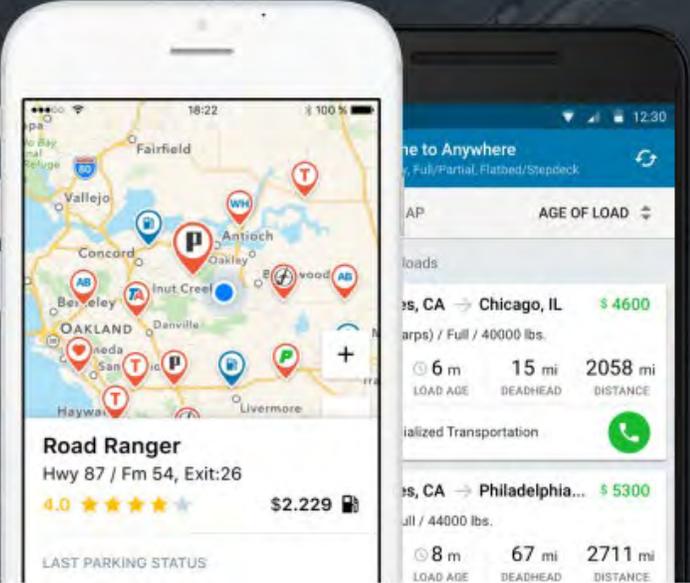


Uberization of Transport



The Future of Trucking is here

Trucker Path
Find truck stops,
parking, weigh stations
& more



Truckloads
The marketplace that
connects carriers with
quality freight



Common Cold Chain Development Challenges

- ▶ Focus on innovation; not paired with education
- ▶ Lack of understanding of the business case
- ▶ Focus on storage with little regard for the beginning of the chain
- ▶ Not enough outside opinions to ensure suitable investment
- ▶ Return on investment needs to be clearly calculated and understood
- ▶ Refrigeration systems: ammonia, Freon, and phase-out of R22



Clean Cooling Systems Development Requirements

- ▶ Appropriate cooling, cold storage and cold chain technologies
- ▶ Vetted business models for small, medium and large scale enterprises
- ▶ Access to reasonably priced equipment, tools, supplies
- ▶ Trained technicians for maintenance and repairs
- ▶ Enabling support - finance options, basic infrastructure
- ▶ Incentives such as duty free imports, low interest rates, corporate tax breaks
- ▶ Educational support - training opportunities and rural extension systems