"The Role of Technology in Shaping the Future of the Food Supply Chain".
Raj Vardhan     Miami 2017
Who we are?

• In 27 years, we have expanded into 70 countries in 18 platforms, comprising of 47 agri-commodities
• Sourcing from 4.3 million farmers, supplying 22,900 customers worldwide
• Managing 2.4 million hectares of land
• Operating 204 processing facilities globally
• Headquartered in Singapore and listed on the Singapore Exchange (SGX)
Where do we participate?

1. Selective upstream
   - Perennial tree crops
   - Broadacre row crops
   - Forest concessions
   - Dairy farming

2. Supply chain
   - Global origination and sourcing
   - Primary processing
   - Inland and marine logistics
   - Merchandising
   - Trading
   - Value-added solutions and services
   - Risk Management

3. & 4. Selective mid/downstream
   - Value-added/manufacturing
   - Branding and distribution (Africa)
What has been our outcome?

<table>
<thead>
<tr>
<th>Edible Nuts, Spices and Vegetable Ingredients</th>
<th>Confectionery and Beverage Ingredients</th>
<th>Food Staples and Packaged Foods</th>
<th>Industrial Raw Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 global dehydrated onion and garlic supplier</td>
<td>#1 focused supplier of cocoa beans and cocoa products</td>
<td>#2 largest wheat miller in Nigeria and Ghana</td>
<td>#1 global FSC® certified* contiguous tropical forestry concessions</td>
</tr>
<tr>
<td>#1 global cashew supplier</td>
<td>#2 global coffee supplier</td>
<td>#2 global rice merchant</td>
<td>#2 global cotton merchant</td>
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<tr>
<td>#1 global almond grower</td>
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</tbody>
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* CIB Kabo - FSC-C128941; CIB Pokola - FSC-C014998; CIB Loundoungo - FSC-C104637
What is our vision?
FARM-OF-THE-FUTURE

Objective: To dramatically increase Olam’s farm yields using the latest bio-tech and digital tools

CURRENT SITUATION

- High labor costs, low skilled labor
- Scattered use of latest precision farming technologies and equipment
- Lack of integrated real-time farm data for precision farming
- Limited expertise in new bio-tech techniques to improve yields
- Limited insights on high impact factors such as weather

Sophisticated weather forecasting (leveraging proprietary data)

Easy to use farm management system (designed for mobile devices)

Advanced bio-tech techniques to improve yields, plant resistance and crop quality

Increased farm automation with best-in-class equipment (autonomous, geo-located)

Precision agriculture leveraging latest technologies (drones, sensors, variable rate applicators etc.)

Long Term Roadmap for ‘Farm-of-the-Future’
Upstream CoP to drive work on ‘Farm of the Future’ with DTF.
RESEARCH & DEVELOPMENT

CROP

Palm
- Agronomy
- Plant Breeding
- IPM & Crop Protection
- RS / Drone

Rubber
- Agronomy
- Plant Breeding
- IPM & Crop Protection
- RS/Drone

Cocoa
- Agronomy
- Plant Breeding
- IPM & Crop Protection
- RS/Drone

Coffee
- Agronomy
- Plant Breeding
- IPM & Crop Protection
- RS/Drone

Pepper
- Agronomy
- Plant Breeding
- IPM & Crop Protection
- RS/Drone

COLLABORATION WITH INTERNATIONAL SCIENTIFIC ORGANISATIONS
CLOUD SEEDING
For enhanced rainfall distribution

ELEPHANT DETECTION AND DETERRENT SYSTEM
Sustainable elephant control

WHITE GOLD
Rubber tapping and oil palm harvesting mechanized device

RYNCHOPHORUS WEEVILS
Reduce damage on palms, less/no impact on palms
RESEARCH & DEVELOPMENT…cont:

UAV DRONE/AERIAL IMAGING
For plantation monitoring

OIL PALM BREEDING
Planting material improvement

FRUIT RIPENING
Reduce variation in oil palm fruitlet maturation
ELECTROHERB
Manage weed by electro physical power without chemical residue

WEED SEEKER TECHNOLOGY
Infra-red cameras to identify weed plants

TWO-ROW-TREE SPRAYER
Sensors with Infra-red technology to spray trees only
Olam Farmer Information System (OFIS)

OFIS - Olam Farmer Information System is an innovative and advantageous agri-business data solution unlike any other.

- **Collect:** Farmgate level data of 65,000 farmers registered so far across 4 products in 10 countries.

- **Analyse:** Information is visualised via an online Google Maps interface, a proprietary Analysis Graphing Tool, and Farmer Group statement and transaction screens.

- **Apply:** View project activities versus targets on training and input deliveries, as well as tracking impact over time. Create individualised Farm Management Plans that can be tracked and updated and which help develop new sustainability projects and initiatives. In addition use OFIS to support a functional Internal Management System, and track financial and commercial records.
“Can the Ag Industry be Uberized”
Are agriculture value chain prone to disruption?

SUPPLY CHAIN
WALMART
MULTIPLE ROLES
Can the role of a supply chain company be compressed?

- **Trade Financer**
  - Pre-finance Trade
  - Buyer’s credit
  - Trade guarantor for Banks
  - Risk manager

- **Processing**
  - Primary
  - Secondary

- **Aggregator**
  - Collection of produce
  - Coordinator of services, Quality inspection, banks, etc

- **Carry Provider**
  - Long string offers
  - Warehousing
  - Supply assurances

- **Execution & Logistics**
  - Packaging
  - Primary, secondary & Tertiary logistics.
  - Road, Rail & Marine logistics
  - JIT
What are the existing needs?

What are the needs of the food Industry?

• **LOWER COST** of sourcing
• **TRANSPERANCY**
• **TRUSTWORTHY MULTIPLE source.**

What do **BLOCKCHAINS** provide?

• **PRICING TRANSPERANCY**
• History of **CHAIN OF CUSTODY**
• **TRACEABILITY**
What is Blockchain or Distributed Ledger Technology?

- **Peer to Peer network** of distributed database **across multiple users** – Oct 2008.
- **Permanent record** of each transaction.
- **No single entity can control** operations – Open source.
- Provides **authenticity basis digital signature**
- Enables **differential data access**.
Who is using blockchain technology?

- Private Blockchain experiments in financial sector.
- Provenance.org – Traceability & transparency in Agriculture.
- Filament- Tracking of agricultural assets
- Skuchain - Track containers & trucks
- Farm Share – Decentralized community support for agriculture.

What is Bitcoin?

- Cryptocurrency to support blockchain transaction.
- Digital Bearer instrument.
- Verifiable bitcoin transfer based on transfer between two entities.
- 1 bitcoin = $2675.81
- Multiple currency – Ethereum, Bitfury, Kolion
Conclusions…

• Blockchain a foundation technology & not disruptive technology.

• Conversion slow initially & will face hindrance basis prevailing practices & mindset.

• Differential access to Blockchain transaction will allow hubs as provider of aggregated services. HUBS MAY DISRUPT TRADITIONAL SUPPLY CHAINS…BASIS SCALE.
Conclusions…

- Lower sourcing cost for food companies & higher realization for farmers. Fee quality income for supply chain aggregators.
- BITCOIN acceptability with scaled farmers & agriculturally developed nations with established exchange.
- In sub scale farms, last mile reach will require traditional cash transaction.
Thank You!

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