



***"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?

Edible Nuts, Spices and Vegetable Ingredients

#1 global dehydrated onion and garlic supplier

#1 global cashew supplier

#1 global almond grower

Confectionery and Beverage Ingredients

#1 focused supplier of cocoa beans and cocoa products

#2 global coffee supplier

Food Staples and Packaged Foods

#2 largest wheat miller in Nigeria and Ghana

#2 global rice merchant

Industrial Raw Materials

#1 global FSC® certified* contiguous tropical forestry concessions

#2 global cotton merchant



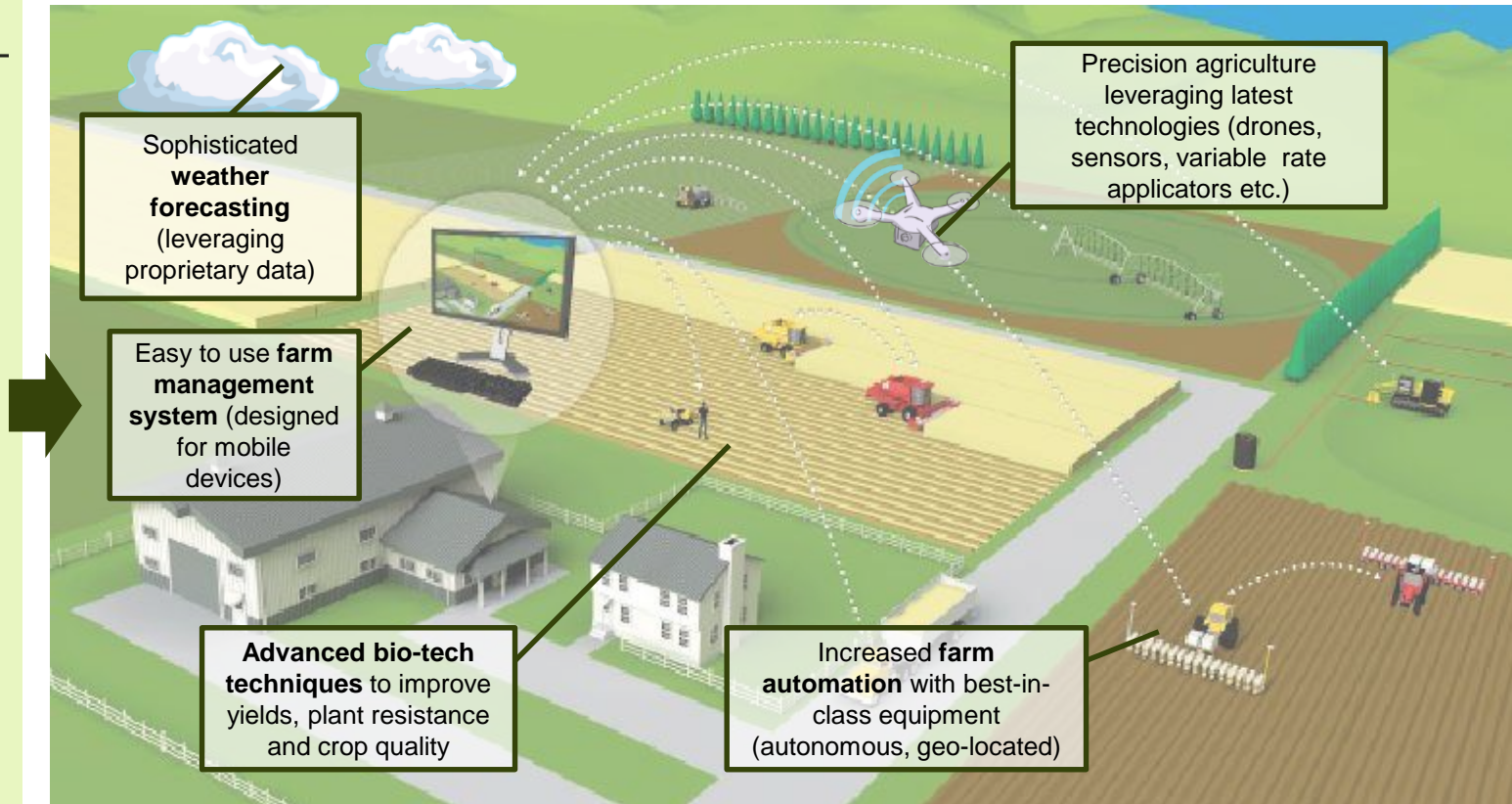
What is our vision?

FARM-OF-THE-FUTURE

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

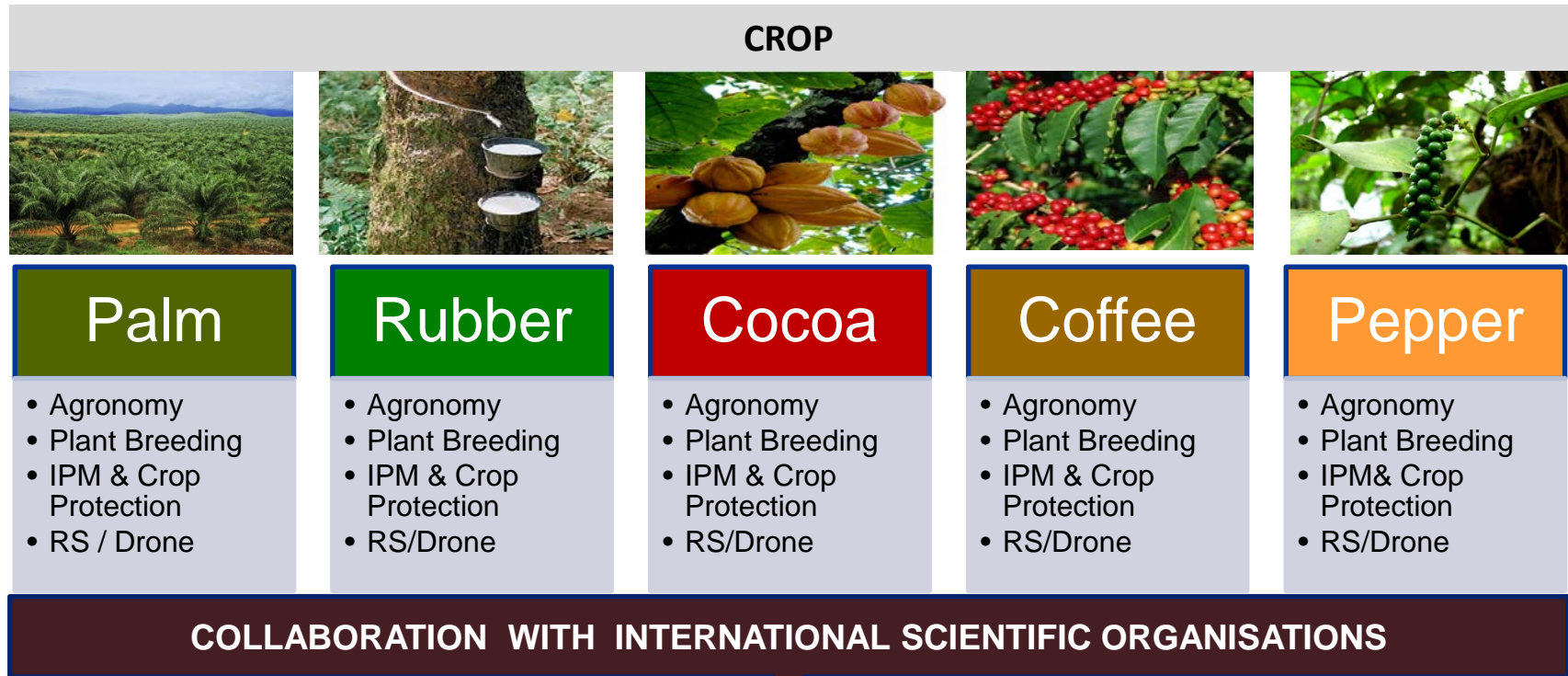
CURRENT SITUATION

- **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



Long Term Roadmap for 'Farm-of-the-Future'
Upstream CoP to drive work on 'Farm of the Future' with DTF.

RESEARCH & DEVELOPMENT



RESEARCH & DEVELOPMENT



CLOUD SEEDING

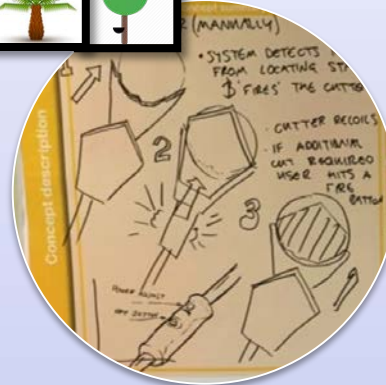
For enhanced rainfall distribution

ModClima
Modificações conscientes no clima e meio ambiente



ELEPHANT DETECTION AND DETERRENT SYSTEM

Sustainable elephant control



WHITE GOLD

Rubber tapping and oil palm harvesting mechanized device



RYNCHOPHORU S WEEVILS

reduce damage on palms, less/no impact on palms



RESEARCH & DEVELOPMENT...cont:



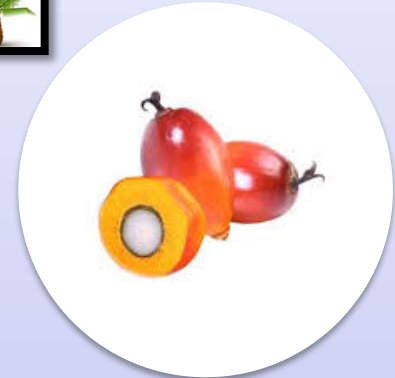
UAV DRONE/ AERIAL IMAGING

For plantation monitoring



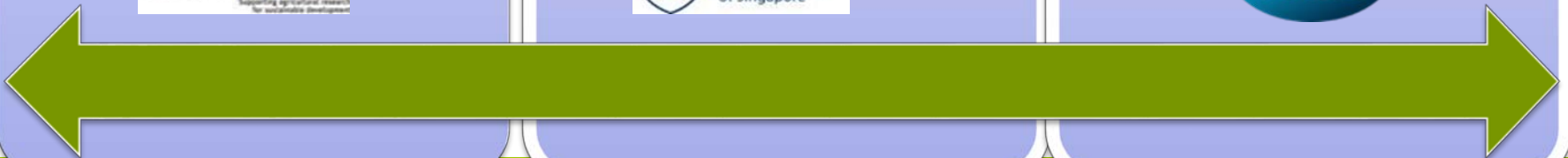
OIL PALM BREEDING

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

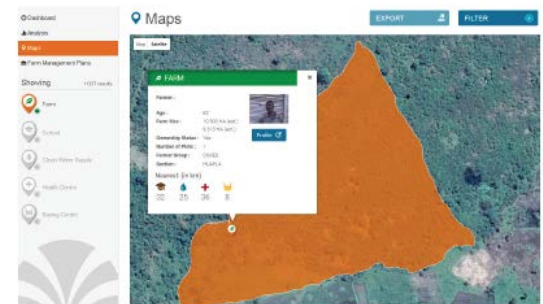
Sensors with Infra-red
technology to spray trees
only



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.

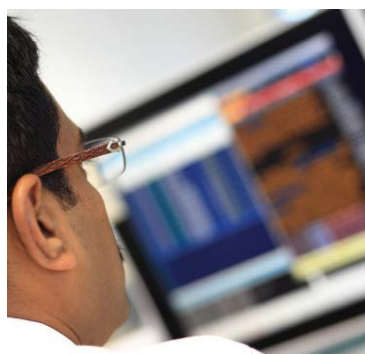




Are agriculture value chain prone to disruption?



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**



Nestlé

Good Food, Good Life

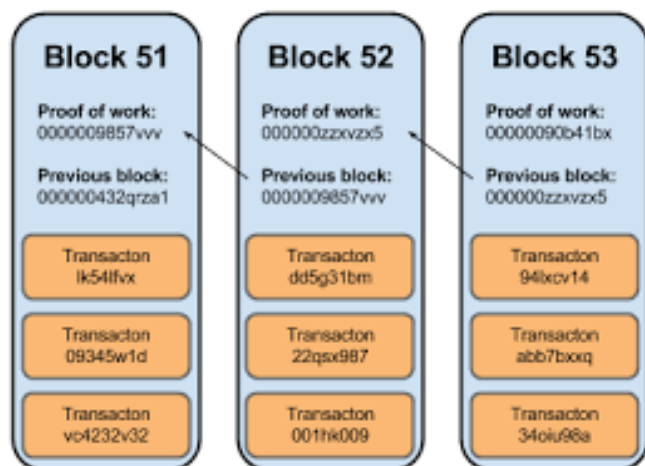


Unilever



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.

Banks Invested In The Blockchain 2016



FarmShare



sku chain



FILAMENT

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.**



IFAMA Global Network on LinkedIn

Thank You !