2nd Calestous Juma Legacy Seminar on Steering Science, Technology and Innovation to Achieve Sustainable Development Goals

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Entrepreneurism in Aquaculture

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Busia County

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Aquaculture & SDGs by 2030

Sustainable Development Goals (SDGs)

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Food and agriculture are key to achieving the entire set of SDGs, and many are directly relevant to fisheries and aquaculture.
Trends in Aquaculture in Kenya

• Growing fish demand globally, Kenya deficit of 500,000 Tons annually, increased cross border conflicts

• Decline in Capture fishery/ export supplies

In Kenya Per Capita Fish Consumption is at 4.6 to 5Kgs as of 2020 against global rates of 20Kgs, compared to Japan at 70Kg

Entrepreneurs aim to Solve That Problem/Pain Point in Aquaculture through Innovation, new ideas, supply goods/services, procedures.
Top 10 Aquaculture Business Opportunities

1) Fish fry production or Fry Nursing to fingerlings
2) Fish Feed production, mixing or aggregation
3) Fish ornamental production & Aquarium set up
4) Fish cage fabrication
5) Fish feeder eg. in cages
6) Fish cooling & Ice flake making
7) Fish Transportation
8) Fishing gear suppliers and repairs
9) Fish Extension services and capacity building
10) Fish traders and value addition
Challenges in Aquaculture

1. Knowledge & Innovations

- Every challenge calls for Innovations
- Take time to evolve when in Business
2: Inclusive Aquaculture in Future Food Systems

Source: WCDI, Wasafiri Consulting and IKEA
3: Location: Hydro Victoria Fish Farm

- **Location**: Hydro Victoria Fish Farm
- **Dimensions**: 10m Circular Dia = 18 Ton
- **Number of Fish**: 33,000 Tilapia Fish in 6-8 months
- **Area**: Most Suitable 191.3Km² = 47,271.3 Acres

Mainly in Busia, Port Victoria (KMFRI)

**HISTORY → TODAY → FUTURE**
Hydro Victoria’s Social Entrepreneurship

- Active since Nov 2018
- Located at Port Victoria, adjacent to L.Victoria
- 40 Tons of Tilapia Fish Annually
- 68 Fish Cages in L.Victoria (Busia/Siaya) Counties
- 12 Employees (9M, 3F)
- 48 Contracted BSF Farmers in Self Help Groups (Women led)
- 2 Fish hatcheries-Busia
- 150Kg -Wet BSF Larvae or 75Kg of Dry BSF Larvae PM
- 1.5M fingerlings Annually
- 2300 Farmers in Western Kenya
Current Innovations & Systems at Hydro Victoria Fish Farm
Uses of solar powered CCTV -4G Internet access and Solar Flood Lighting, IoT-Temperature Sensor Technologies in fish cages Monitoring & Surveillance
In Pipeline: First Organic Fish Feed Plant in Kenya

- 2Ton/Hr Capacity Feed Plant
- Located: Port Victoria
- Value chains: Fish/Poultry Feeds
- Main inputs: BSF Insect Larvae - Food Waste to protein, others Rice/Maize
- BSF farmers out grower scheme for targeting 1500 producers within 10 food markets in Busia County.
- Feed Plant Budget: 300K USD
- KCSAP/World Bank/Busia County 100,000 USD - Inclusive Grant)
- 100,000 USD - Hydro Victoria
- 100,000 USD - Looking for partners, donors, Researchers, Experts
- Impact: Over 3500 farmers (fish/Poultry)

**Busia Fish market alone - produces 2Tons of fish offal's waste daily and this is dumped**
DESIGN: Automated 2Ton/Hr Feed Processing

No.1 - screw conveyor
No.2 - hammer mill
No.3 - screw conveyor
No.4 - feed mixer
No.5 - screw conveyor
No.6 - pellet machine
No.7 - bucket elevator
No.8 - cooler & screen
No.9 - No.10 - packing machine
No.11 - electric control cabinet

Photo of automated feed processing system with various feed materials.
ECOSYSTEM APPROACH

- Strategy: Closing the Loop of consumption

Food losses or by-products at VC level

Unavoidable losses and by-products

- **Harvesting**
  - Example: Maize stalks or leaves from cassava plants

- **Treatment**
  - Example: Coconut fibres, peels from cassava or potatoes

- **Quality control**
  - Example: Whey from cheese making, rice bran or oil from rice milling

Avoidable (?) losses

- **Processing**
- **Sales**

Transport & storage

- **Retail & consumers**

Example:
- Damaged produce during transport or spoils due to incorrect storage
- Rejected (lower grade) fresh produce like tomatoes
- Fresh produce that spoils before reaching the market due to (long) lead times
Product Design Principles

We live in a World with Finite Materials, Rethink/Transform from Take → Make → Waste

Waste

Eliminate waste and pollution

By changing our mindset and harnessing new materials and technology on food, to ensure waste and pollution is not created in the first place.

Resource

Circulate products and materials

Food Products cannot last for ever, but we can keep them in circulation, so they don’t end up in landfill.

Nature

Regenerate nature

Everything is food for something else. By returning nutrients to the soil and other systems, we can enhance natural resources.

Tackle Climate change, biodiversity loss, social needs

→ decoupling profits, & grow prosperity, jobs, and resilience
→ cut production cost, greenhouse gas emissions, waste & pollution
→ recover nutrients in soils, energy
TURN WASTE TO VALUE USING BSF

“Solving our problem in organic waste disposal, reduce Food Waste, GHG emissions & protein source for Animal Feed with one insect- Black Soldier Fly”

10 Tons of Organic Waste → 3 Tons of Wet BSF → 1.5 Ton Dry BSF → 3-4 Tons of Organic Fertilizer

Food and nutritional security
Economic and Social Well-being

SUSTAINABLE AGROPOLICY

AGRICULTURE, SOCIAL SUSTAINABILITY, etc. As
Why Insect Based Feed in Our Food systems

*Post-COVID & related Soymeal Import shocks in Kenya

June-July 2021
30 Companies relying on Soymeal imports in Kenya closed shops affecting thousand of farmers

Economic empowerment to reduce HH level tensions and achieve SDG 16 on Peace
THANK YOU