The Asia-Europe Environment Forum
“SMEs Going Circular: Decarbonization of Food Supply Systems”

SMEs and Start-ups:
Hidden Champions Driving Circular Food Economy

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• The Global Green Growth Institute (GGGI) is a treaty-based intergovernmental organization.

• Support developing countries to achieve their own Nationally Determined Contributions (NDCs) and Sustainable Development Goals.
Global food market is severely hit by the external shocks

COVID-19, war, export ban... food price is expected to soar by 22.9% in 2022, 40% only in wheat price

**Global Food Prices Surge Amid Russia-Ukraine War**

FAO global food price index*

*100 = average price level during the base period 2014-2016

Source: Food and Agriculture Organization of the United Nations

Note: Graph modified by GGGI 2022
Food is associated with poverty, hunger, and waste

SDG1 (poverty), SDG2 (hunger) SDG12 (circularity), SDG13 (climate action) are still far from the targets and all related to food system.
Broken compass – multifaceted risk management

Food and.....GHGs emissions, affordability, security, waste, among others.

- **44 million famine** (FAO 2022), 2 billion people malnutrition, while **growing obese population** and **1/3 of food produced** globally – worth US$ 1 trillion – **is thrown away** each year. *(Ellen MacArthur Foundation, 2021)*

- **18.4% of global GHG emissions** result from economic activities related to agriculture *(Our World in Data, 2020)*

- Global population to exceed 10 billion by 2050 – need to increase food production by at least 70% with less resources *(FAO, 2009)*

- Global crop loss due to pest & crop disease estimated at 20-40% which is equivalent to an annual loss of $220 Billion *(FAO, 2019)*

- **Small-scale food producers** (40%-85% of all food producers in developing countries) are **hit hard** by the pandemic, climate crisis, and other shocks.
Ag tech innovation changing the industry landscape

All the external shocks including the pandemic, supply chain disruption, fertilizer cost, climate crisis, etc. are the catalysts pushing for industrial transformation, led by SMEs and start-ups.

- Globally, agriculture technologies had a strong year for a nascent sector, raising $14.9 billion.
- In 2021 in the US, nearly US$5 billion invested in 440 funding deals to VC-backed ag start-ups.
Plant-based meat: new ways of protein intake

Plant-based meat market valued at $24.8 billion by 2030 – projected to expand at a CAGR of 19.3% from 2022-2030*; growing interest in “no-kill” meat (“cultured” or “lab-grown” meat)

The Global Plant-based Meat Revolution
Firms should invest strategically as soon as possible to be a part of our plant-based meat future.

Europe
- THIS™ (UK) developing plant-based meat alternatives, has raised £4.7 million in a seed plus round from Backed, along with other VCs and partners. www.this.co

USA
- Impossible Foods develops plant-based substitutes for meat products. Their signature product, the Impossible Burger is being sold to fast-food chains. www.impossiblefoods.com
- Beyond Meat is an LA–based producer of plant-based meat substitutes in the beef, pork and poultry categories. They are available in retail and foodservice outlets in over 80 countries worldwide. www.beyondmeat.com

Asia
- Zikooin Company (Korea) country’s leading plant-based meat company, raised $24.8million, its flagship product, UNLIMEAT has entered global markets. www.unlimeat.com
- WTH Foods (Philippines) country’s first homegrown plant-based startup, has closed its seed funding round with $1.2million. www.wthfoods.ph
- Eat Just (US/Singapore) received $3.1bn investment to produce alternative protein, not plant-based, but containing real meat grown from cells derived from living animals (cultured / lab grown meat). www.ju.st


*Source: Plant-based Meat Market Analysis Report. Report Linker (2022); insider.fitt.co
Vertical farming reduces land use and secures natural state

Vertical produce is grown on levels – one above each other – conserving both land and water while cutting down on pesticides and other chemicals.

**Asia/Europe**
- YesHealth Group (Taiwan) and Nordic Harvest (Denmark) completed first phase of construction on Europe’s largest vertical farm, 14-stories high in a 7000 sq. meter facility at Copenhagen Markets. [www.yeshealthgroup.com; www.nordicharvest.com](http://www.yeshealthgroup.com; www.nordicharvest.com)
- Infarm (Netherlands) is the world’s fastest-growing vertical farming unicorn valued at over $1 billion, capable of growing more than 500,000 plants annually on just 40m² of floor space. [www.infarm.com](http://www.infarm.com)

**USA**
- Plenty (US), an operator of indoor vertical farms and an indoor plant science research facility, secured US$140M series D financing by Softbank Vision Fund. [www.plenty.ag](http://www.plenty.ag)
- Kalera (US) is a vertical farming company that uses technology to ensure access to the freshest, most nutritious, and cleanest products available. [www.kalera.com](http://www.kalera.com)

**Middle East**
- iFarm is an ag-tech company based in Finland, now expanding into Qatar through a tie-up with Agrico Organic Farm to manage a commercial-scale indoor farm. [www.ifarm.fi](http://www.ifarm.fi)
Food waste can be upcycled, adding value to byproducts

1/3 of all food produced globally, worth $1 trillion, is thrown away each year. Reducing food waste and loss along the food supply chain could generate annual cost savings of $365 billion by 2030*

- **Europe**
  - Deligate (Sweden) is an application that simplifies controls of best-before dates in the food trade. They ensure reduced amount of waste and no bad goods in the store. [www.deligate.app](http://www.deligate.app)
  - Upprinting Food (Netherlands) develops food using residual food flows; creates customized recipes with 3D-food printing using purees from the residual food. [www.upprintingfood.com](http://www.upprintingfood.com)

- **America**
  - Flashfood (Canada) develops the Flashfood smartphone app to connect customers with surplus food at grocery stores. [www.flashfood.com](http://www.flashfood.com)

- **Asia / Oceania**
  - RE:harvest Co. Ltd. (Korea) is the very first food-upcycling company in Korea, currently upcycling by-products from beer and shikhye (Korean traditional drink). [www.reharvestshop.com](http://www.reharvestshop.com)
  - Wasteless (Israel) reduces food waste and increase perishable food profit by dynamically pricing items with a shorter expiration date at their optimal price point. [www.wasteless.com](http://www.wasteless.com)
  - CRUST Group (Singapore) upcycles surplus ingredients like bread and fruit peels into beers and sparkling water. [www.crust-group.com; www.carapac.com.au](http://www.crust-group.com; www.carapac.com.au)
  - Carapac (Australia) makes sustainable soft plastic alternatives from crustacean shell waste.

Digitizing agricultural data to drive resource efficiency

Precision Agriculture: Almost 20% increase in income possible from smart farming*; Internet of Things (IoT) has the potential to help increase agri productivity by 70% by 2050. (FAO)

**Europe**
- **myAgro** offers an integrated package of improved seeds, fertilizer and training to smallholder farmers, enabling them to increase their incomes. [www.myagro.org](http://www.myagro.org)
- **Farmforce (Norway)** is a mobile service that links smallholder farmers to other actors in the agro-value chain. [www.farmforce.com](http://www.farmforce.com)
- **Gamaya (Switzerland)** provides solutions for large-scale monitoring and diagnostics of crops. [www.gamaya.com](http://www.gamaya.com)

**USA**
- **Farmobile** specializes in collecting second-by-second agronomic and machine data from a mixed fleet. [www.farmobile.com](http://www.farmobile.com)

**Asia**
- **CropX (Israel)** has developed the world’s most advanced adaptive irrigation service that will provide farmers and industry experts with the data and information they need to improve farming sustainability by conserving resources and improving crop yields. [www.cropx.com](http://www.cropx.com)
- **Greenlabs (South Korea)** develops a digital agricultural platform for farm management. They were able to close a $140 million Series C funding. [www.greenlabs.co.kr](http://www.greenlabs.co.kr)
- **Agro-Digital PH (Philippines)** is a digital platform that helps minimize the layers in the value chain by providing value chain solutions for cooperatives & small farmer organizations. [www.agro-digitalph.com](http://www.agro-digitalph.com)

Blockchain drive innovation in the food supply chain

Enabling safer food, longer product shelf lives, reduced waste, faster traceability, and better access to shared information*

- Global market of blockchain in agriculture and food supply chain is growing at a CAGR of 47%1
- Supply chain infrastructure and efficiency alone could reduce the amount of food waste by $270 billion (in value) of what the report estimates to be a $1.5 trillion problem by 20502

- **AgriChain (Australia)** – A blockchain company focusing on enabling peer-to-peer agricultural transactions and processing while cutting out the middlemen. [www.agrichain.com](http://www.agrichain.com)
- **AgriDigital (Australia)** – A blockchain-based and integrated commodity management solution for the global grains industry. The platform helps to process complex agricultural transactions through smart contracts. [www.agridigital.io](http://www.agridigital.io)
- **AgriLedger (UK)** tracing food origins, getting easier access to financing, and storing transactions data. [www.agriledger.io](http://www.agriledger.io)
- **Demeter (UK)** – A central hub to rent and farm micro fields anywhere in the world – with no middlemen, complexity or the overhead of a big organization. [www.demeterlife.herokuapp.com](http://www.demeterlife.herokuapp.com)

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**Sources:**
1 Blockchain In Agriculture And Food Supply Chain Global Market Report 2022;
*IBM Food Trust: A new era in the world’s food supply

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### Traceability
- Enable consumers to verify the journey of the product
- Help to reduce food waste and keep products fresh
- Provide data on when a product was harvested and processed, and who produced it
- Provide reliable information regarding the origins of food
- Show in which field grass-fed beef (etc.) was raised

### Optimization of Food Supply Chain
- Allow farmers to properly set their own prices and optimize the quantities of products
- Correct the pricing imbalance by recording transactions in real-time
- Make it easier for parties to due diligence each other
- Provide up-to-date supply and demand information to stakeholders

### Crop Insurance
- Communicate loads, geo-waypoints and basic compliance information with carriers
- Provide more visibility across the supply chain
- Register the parties involved, price, date, location, quality, and state of the product
- Secure insurance documents, DOD numbers, and pickup documentation

### Transactions
- Help farmers to sell commodities, lowering transaction fees
- Prevent price coercion and retroactive payments
- Provide an opportunity to receive payments and micro-financing
- Provide lower cost and faster payment options to agro commerce participants
Entrepreneurs in dvg countries require more support

Over 90% are SMEs in the agri-food sectors in developing countries, and issues related to access to capital, technical assistance, etc. being exacerbated by the pandemic, climate crisis, supply chain crisis.

- **Greenpreneurs** is a global initiative / concept designed to support entrepreneurs in developing countries, from mentoring to seed funding provision and specific project intervention in our operating countries.

- During 2018 - 2021, several grassroot entrepreneurs committed to addressing local challenges related to agri-food sector were selected and incubated to offer business solutions. ([www.greenpreneurs.co](http://www.greenpreneurs.co))
Greenpreneurs – Case 1 (digital innovation)

Indonesia-based start-up providing AI-based services to island farmers to detect issues with crops and provide solutions to reduce harms

By 2050, We’ll need to increase food production by at least 70% with less resources. However...

Global Crop Loss
Due to pest & crop disease

20-40% annual lost.
$220 billion

Mr. Ace
Chili Farmer (Indonesia)

2017
200 kg → 2018
40 kg

Harvest decrease due to pest & crop disease

NEURAFARM

Source: NEURAFARM (Greenpreneurs Pitch 2020)
Mongolian-based start-up that uses micro solar and wind resources to deliver energy and provide cold chain (food delivery) services to off-grid areas, e.g. Ger (Mongolian traditional house in plain).

Source: Normadic Power Box (Greenpreneurs Pitch 2020)
Small holder farmers and their cooperatives in island regions require climate resilient farm-to-market infrastructure and business model innovation to improve economics and sustain their livelihoods.

**Greenpreneurs – Case 3 (climate adaptive in developing countries)**

Financing for
- Climate resilient facility renovations (green)
- Processing machinery

Technical assistance on
- Firm strategy
- Operations optimization

Mentoring by lead firms on market trends and industry know-how

**Agripreneurs benefit from:**
- Increased revenue
- Greater capacity
- Enhanced competitiveness

**Farmer-suppliers benefit from:**
- Increase in sale of raw materials
- Increase in dividends (if agripreneur is a cooperative)

A damaged facility in Barangay Mabuhay 2, Socorro, Oriental Mindoro at 6:29 AM as Typhoon Quinta made landfall in Pola Town, Oriental Mindoro on October 26, 2020.

Photo courtesy of Rezy Biscocho (ABS-CBN News)
Conclusion

• Food sector is at risk – price volatility, trade issue, production capacity, climate impact, waste, etc.

• Tech innovation led by SMEs and start-ups are changing the landscape – and ag-tech sector is growing rapidly.

• SMEs and start-ups play a significant role of reducing emissions, securing food security, promoting circularity, driving efficiency, among others.

• Grassroot SMEs and entrepreneurs in developing / least developed countries require more investment and tech transfer during this transition.
Thank You

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