

Thinking beyond Production

-value chains, interactions
and complexities in food
systems

Ian Roberts
October 15, 2014

Agenda

- Introduction and background
- Technology access and wealth creation
- Food Safety and process efficiency
- Collaborations
- Final thoughts

‘When people have both physical and economic access to sufficient food to meet their daily needs for a productive and healthy life’

Prof. Patricia Holm, University Basel
Prof. Wilhelm Gruitens, ETH Zurich
Co-Presidents

Food security requires a sustainable value chain

Agriculture



Logistics



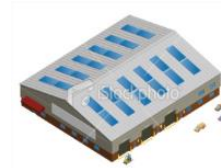
Processing



Manufacturing



Distribution



Retail



Consumption



- supply should be safe (operator and consumption)
- healthy (nutritionally valuable)
- efficient (energy, losses, waste, payments, scale, logistics)
- demand driven (relevant to culture and supply-demand balanced)
- wealth creation and distribution (robust in absence of subsidies)
- requires entrepreneurs and job creation
- viable business environment

We need to bring new thinking and new approaches to sustainably solve old problems

Agriculture

Logistics

Processing

Manufacturing

Distribution

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Consumption



1.3 billion ton of losses and waste

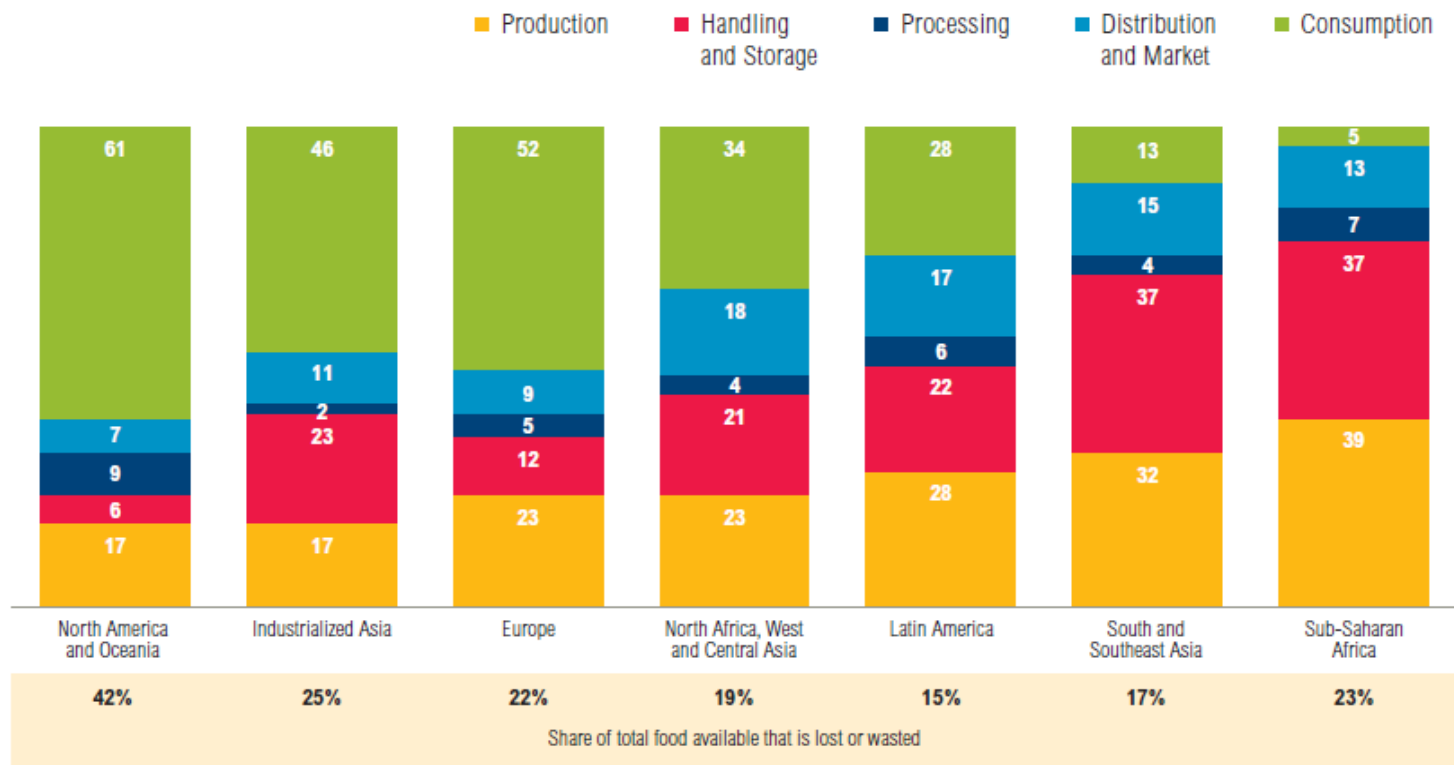
(1 300 000 000 000 kg)



FAO

Food loss is primarily in handling and storage and production in developing markets

Figure 6 | Food Lost or Wasted By Region and Stage in Value Chain, 2009
(Percent of kcal lost and wasted)



Note: Number may not sum to 100 due to rounding.

Source: WRI analysis based on FAO. 2011. *Global food losses and food waste—extent, causes and prevention*. Rome: UN FAO.

World Resource Institute, UNEP,
Reducing Food Lost & Waste, 2013

What guides us.

Vision.

Innovations for a better world.

Mission.

Ensure a sustainable and independent development of Bühler Group with products, processes and services which contribute to a substantial improvement of quality of life.

Promise.

Engineering customer success.



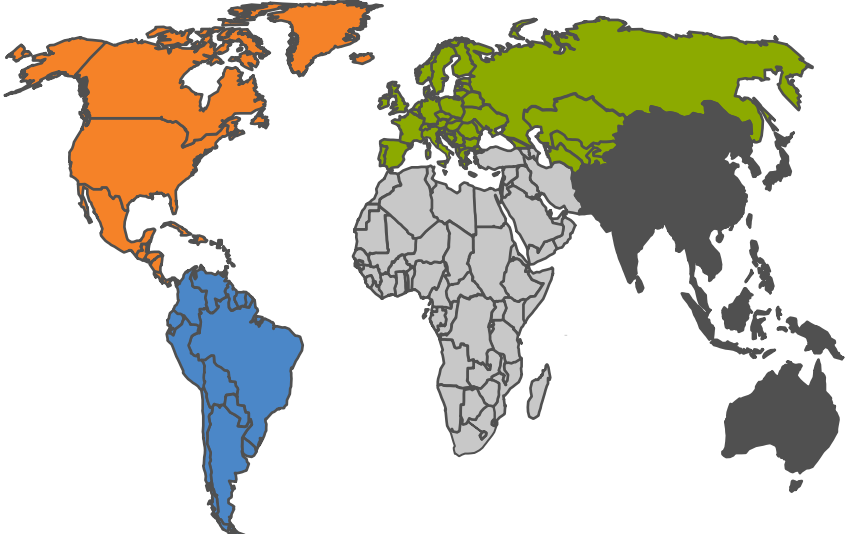
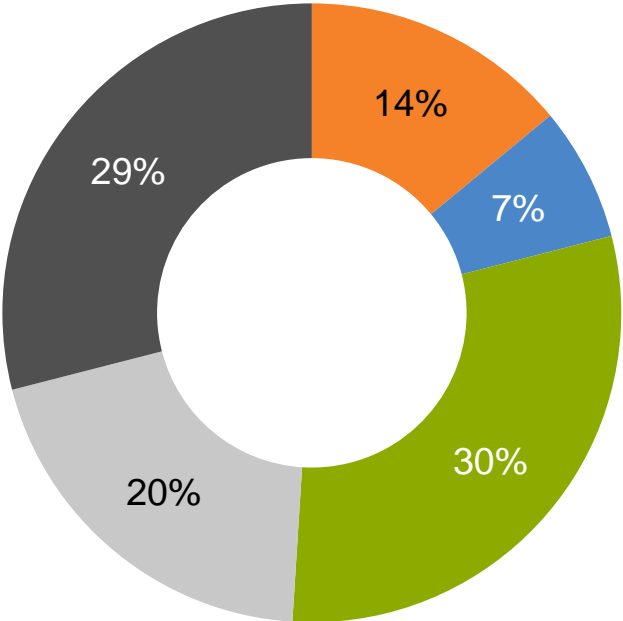
Bühler at a glance.

Global market leader with strong roots in local markets.

- Group turnover (sales) 2013: CHF 2.3 bn.
- Over 10,000 employees and 550 apprentices worldwide.
- Operating in 140 countries, producing across the world.
- More than 90 own local sales and service stations.
- Production all regions.
- Investing in the future (4.7% of sales for R&D).
- Touching billions of peoples lives every day.
- 100% family-owned.

Successful all over the world.

Sales by region 2013.



- North America
- South America
- Europe
- Middle East & Africa
- Asia

Bühler has a broad coverage of the food value chain

Agriculture



Logistics



Processing



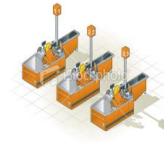
Manufacturing



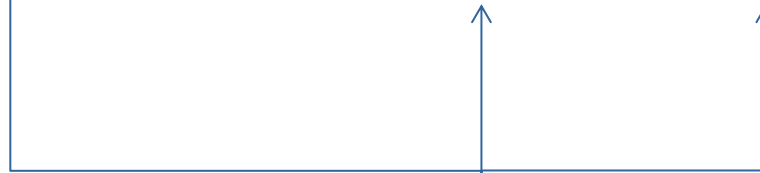
Distribution



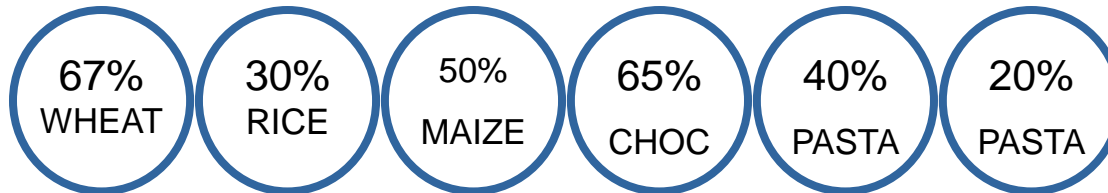
Retail



Consumption



Bühler role



Focus on sustainable value chains drives our Innovation

Agriculture

Logistics

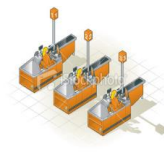
Processing

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Halve losses and waste

Reduce energy usage by 25% per ton of product for our customers

Bring a step change in food safety

Bring a step change in nutritional or functional value

Technology access

Access to affordable, low scale, technology can unlock value chains

Buhler compact maize mill for Africa.



AgDevCo supports smallholder farmers to create industrial quality maize flour and enable wealth creation

AgDevCo

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ECA smallholder commercialisation

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About

Empresa de Comercialização Agrícola Ltd ("ECA") is a market-oriented extension programme which aims to boost the incomes of up to 50,000 farmers in central Mozambique while introducing sustainable farming practices, organizational safeguards and providing access to markets.

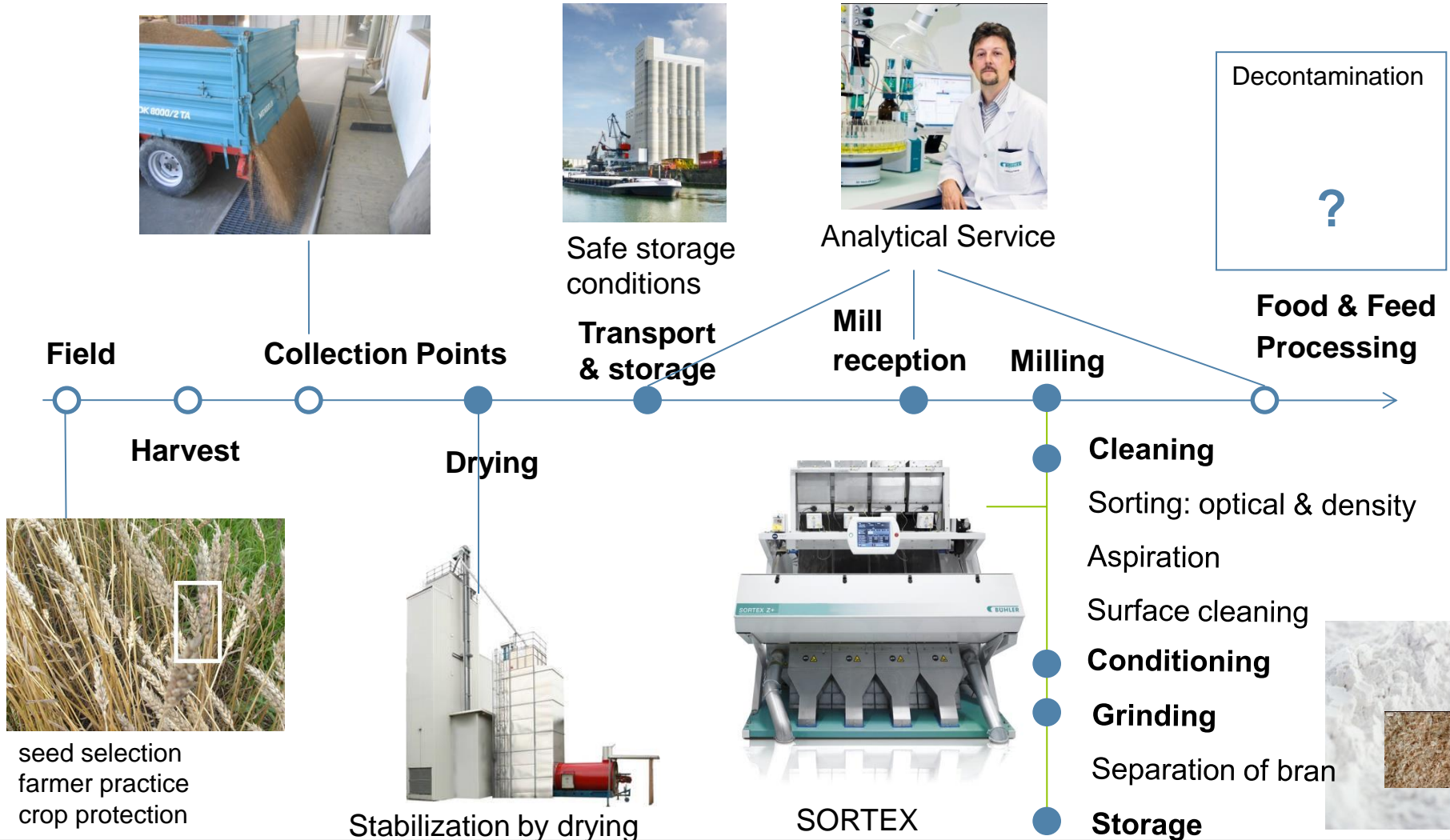
The initial focus will be on maize and higher value crops such as sesame, sorghum, soya, cow peas, and sugar beans. ECA supplies inputs (seed, fertilisers, etc.) on credit, on time and at lower prices than local alternatives, and provides extension advice and will engage with farmer clubs, each of 10 to 15 farmers, all pre-screened, with individual land holdings of 0.5 to 2 ha.

Aflatoxins

The Aflatoxin

- FAO estimates that **25% of the world food crops** are affected by mycotoxins.
- Aflatoxins are **carcinogenic substances** produced by *Aspergillus* fungi and have been linked to **liver cancer, stunting in children, reduced immunity,** and acute aflatoxicosis
- In Kenya, **265 people have died** from acute aflatoxicosis between 2000 – 2008 (Source: Kenyan Ministry of Agriculture)
- The European RASFF database lists 60 notifications of aflatoxins in maize and maize products since 2011 (22 alerts, 6 border rejections)
- Maximum levels in place in most countries, depending on intended use (food/feed) and further processing
- Customers in Africa **report 20% losses** of raw materials and **prefer to import raw materials**

Mycotoxin reduction requires a broad value chain approach



Post-harvest Aflatoxin Reduction: some signs of progress.



- Partnership with the Institute of Sciences of Food Production (ISPA-CNR), Bari, Italy, to demonstrate the effectiveness of Aflatoxin reduction in maize.
- Examples from case study in July 2013
 - Reduction of total aflatoxin levels from **64.3 ppb** to **14.3 ppb** at an overall reject level of **6.2%** of the input material.
 - Reduction of total aflatoxin levels from **30.2 ppb** to **4.7 ppb** at an overall reject level of **6.6%** of the input material.
- Sampling was done according to EC Commission Regulation No 401/2006, the aflatoxin analysis according to AOAC Official Method 2005.008.



Collaborations

We aim to be a preferred innovation partner

Innovation challenge: leveraging our global knowledge base.

In 2012 ,3000 people registered, 2000 voted, 50 people trained, 3 products in development

- 2014 running, 4000 registered, 220 ideas
- 2014 EPFL/ETHZ 90 ideas, 5 rewarded

Innovating with suppliers and customers.



Customers

Innovating with our global academic network.



- Pulse Taskforce
- EHEDG, WEF, CFTRI, Campden BRI, ZHAW



Bringing knowledge to small and growing food businesses in Africa



Connecting Expertise with Opportunity



Vision
A healthy world through sustainable food systems.

Mission
To be a leader in scientific research, education and outreach that contributes to sustainable food security for local and global stakeholders. We do this through collaborative partnerships oriented along the four pillars required for food security (availability, access, use, stability) within the context of the world food system.



34 Members – ETHZ and Eawag





Partnership Council


Preparing for the protein challenge



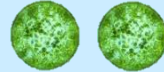
Plant protein structuring

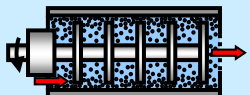
different raw materials  → pulse task force


adaptable processes 

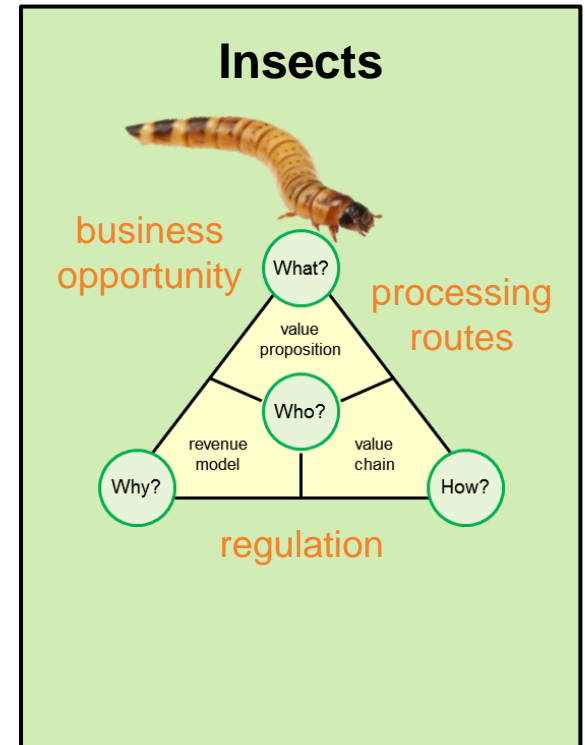
differentiating end products 

Algae

raw materials  microalgae

cell disruption  bead mill sold to TNO

separation, drying  wet extraction



Final Thoughts

We need to bring new thinking and new approaches to sustainably solve old problems

Agriculture

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Consumption



Access to technologies & practices

Scale with process intelligence

Access to applicable knowledge

Access to education

Leapfrog technology phases IoT, Smart Data, MOOCs

New business models and entrepreneurship

Systems thinking

Collaboration

The challenges we face today in
‘leading for future generations’
will not be solved by any single entity
but require multiple players, skills and interests to
collaborate to create sustainable value chains.



CREATE OUR FUTURE TOGETHER

BÜHLER INNOVATION
CHALLENGE 2014

buhlerchallenge.com

**BÜHLER**