New Crops and City Farming: Disruptive Agro Food Innovations

Arjen van Tunen
CEO
KeyGene

Gus van der Feltz
&
Global Director City Farming
Philips Horticulture

The crop innovation company
Introduction

• Global trends & food: a different perspective
• Disruptive innovations in the Agro industry
• Crop phenotyping
• City farming
KeyGene: its strategy

The crop innovation company

Advanced Molecular Genetics for the future of Agriculture
About KeyGene

Founded in 1989

Advanced molecular genetics for the future of agriculture

Current shareholders

ENZA ZADEN
RIJK ZWAAN
Vilmorin & Cie
Takii

Staff

135

Wageningen NL

Rockville USA

Shanghai China

The crop innovation company
About KeyGene

Customers: wide range of breeding, agro and food companies

Focus: 6F crops
- Food
- Feed
- Fiber
- Fuel
- Flowers
- Fun

KeyGene’s passion: crop innovation

Integrated solutions: combining technology innovations with knowledge of plant traits and crops for crop improvement

- Innovative & unconventional problem solver
- Clear & focused
- Dedicated & smart employees
- Communicative & connective
Global trends
Another perspective

- The MORE revolution
- The MOBILITY revolution
- The MENTALITY revolution
- The TECHNOLOGY revolution

Inspired by mr Moisés Naím and mr Yuri van Geest
The MORE revolution
MORE of a lot

- more countries, people (9 billion in 2050), (mega) cities
- more middle class (2x), more political parties
- more world wide economic growth, income
- more agricultural products, food, diverse food
- more competitors, rules, patents, breeders rights & varieties

Despite (perceived) negative developments like terrorism, economic recessions in EU, Japan & USA, natural disasters, climate change
The MOBILITY revolution

MOBILITY & end of helpless waiting people

- (knowledge) migrants from Asia (China, India), Latin America and Africa to USA and EU, also migrants returning home to China & India, urbanization

- super easy, affordable transport of information via prepaid telephone & internet also in the Ag Sector

- easy transport of people, money, seeds, agro products

- power of social media

Despite visa, restrictions on money and data exchange, rising restrictions on exchange of seeds and genetic material
The MENTALITY revolution

Emancipated consumers

- all demand a better & longer life all want a better income
- all want better, personalized, good quality & tasty, healthy food
- all demand a better education & top career
- all demand personal, specific influence

and they all want it NOW and if they do not get it they will act and take it
The TECHNOLOGY revolution

Exponential and disruptive innovations

- ICT and Big Data

- (Ag) Biotechnology & Life Sciences

- Material Sciences

- Conversion of technologies resulting in super innovations
  - ICT plus AG Biotechnology = Ag Genomics
  - Phenotyping plus City farming

Despite questions asked about application of certain technologies (e.g. Genetic Modification)
Consequences & Opportunities

- Power & dominance of large organizations decline worldwide: also for the Agro world. Large Seed Companies have to adapt, opportunities for innovative SMEs.

- Rise of other agricultural (super) powers: opportunities in China, India, Brazil and also Vietnam, Poland, Costa Rica etc.

- Economy of scale remains important but dealing with the new global socio economic reality, rising interest of other parts of the world, fast disruptive innovations of SMEs have to be taken into account.
Disruptive & Exponential Innovations

Disruptive innovations are needed to sustainably produce sufficient and healthy food, satisfy the need of consumers.

Opportunity: Disruptive and Exponential innovations are occurring when boundaries are crossed causing traditional definitions to blend; for this we need unconventional partnerships.

At KeyGene:
1. Agro genomics and Big Data
2. Phenotyping and Advanced Agronomic methods
   e.g. City Farming
Traits for the future
Meeting the demands of consumers

• Yield & Yield Stability
• Abiotic Stress Tolerance
• Biotic Stress Resistances
• Quality
• Health

- e.g. drought, salinity, extreme temperatures
- e.g. insect pests, viruses
- e.g. taste, long shelf life
Crops for the Future

- Continue improvement of current cash crops (e.g. corn, canola, tomato, lettuce)
- Start improvement of Industrial crops (e.g. oil palm, banana)
- Start improvement of orphan crops (e.g. cassava, millet)
- Novel crops for super foods (e.g. quinoa)
- Others
Traits & crops for the future
Cross-sectoral collaboration

Digital Phenotyping & City Farming:

How could the food sector and consumer benefit from a partnership between two different worlds?
Digital Plant Phenotyping

- Crucial for the development of new varieties
- The breeders eye needs addition of large numbers of robust, automated & digital pictures
- High Throughput digital phenotyping measures traits by advanced techniques and image analysis
Digital phenotyping
Why?

• Great tool
  ◦ Better
  ◦ Faster
  ◦ Breeding difficult traits

• Opportunities
  ◦ Supports breeding future crops
  ◦ Allows cross sectional collaborations to grow crops everywhere

→ City farming
Philips GrowWise Center
Global Challenges

Growing Population

Urbanization

Availability of Water

Food safety

Food accessibility

Philips Horti Solutions

Extremely efficient farming, high yield

Efficient use of space

>90% reduction in water use

No Pesticides, No Pollution

Grown Locally
Philips Builds City Farms Today

• >30 years of Horti experience
  *Technology that Grows Better Plants*

• City Farming Engines
  *Lighting, Climate, Control, Calibration*

• From Seed to Supermarket
  *Cooperation across value chain*

• Engineering and Innovation
  *Creating the best solutions*

• Global presence
Thank You