Bringing the Digital Revolution to Circular Industries – Agriculture 4.0

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Industry 4.0

Industrial Revolutions

1st
Mechanization, water power, steam power

2nd
Mass production, assembly line, electricity

3rd
Computer and automation

4th
Cyber Physical Systems

Courtesy: Wikipedia, Industry 4.0
Industry 4.0

Industrial Cyber Physical System

- Permanent optimization processing
- Physical factory and cyberspace linked by sensor layer
Agriculture 4.0

A Stimulus

Merging farming and industrial processing in a strongly connected ECO system


2. World Government Summit & Oliver Wyman, Agriculture 4.0, The Future of Farming Technology
Agriculture 4.0

The Agricultural Cyber Physical System

Confused Farmer (Overwhelmed by data)

- Connected Ag Weather Stations
- Doppler Weather Forecast
- Plant Sensors (e.g., sap flow)
- UAV with Sensor Payload

PRESENT

FUTURE

DATA INSIGHT

NEW GROWTH POTENTIAL FOR FARMERS

{cyber space}

{sensor layer}

Courtesy: Accenture

5/19/19 Agriculture 4.0 share your talent. move the world.
ChemPort is an ecosystem in which companies that are committed to developing a greener chemical sector can flourish.

Companies, knowledge institutes and government together create the conditions for transformation and green growth of the chemical industry.

www.chemport.eu
ChemPort Europe

Ecosystem in North Netherland
Zernike Advanced Processing (ZAP) Facility

Scaling Laboratory Processes to Industrial “Proof-of-Concept”

BIOMASS PROCESSING & STORAGE

• Availability to rinse biomass material

GREEN TECHNOLOGY

• Super critical CO2 equipment (extraction, fractionation, spray drying)
• Biorefinery
• Bioconversion – fermentation
• Smart processing

CHEMICAL ANALYSES

• GC-MS, GC-FID/TCD (gas chromatography)
• LC-MS, LC-DAT/UV-VIS/Fluor (Liquid chromatography)
• IC (Ion chromatography)
• UV-VIS (spectrometry)
• Fluorometer
• AES and AAS (metals)
• IR (infrared)
• Density meter
• Polarimeter
• Determining the melting point
• Refractive index

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Smart (Sensor) Systems

Swarms of Adaptive Micro Sensors – ZAP & TU/e pilots

Pilot:
Process dynamics measured in situ operated reactor

Hanze, TU Eindhoven, ANTEA Group – Collaboration
TU Delft, Eindhoven, Twente, U Wageningen collaboration on:
sensing, communicating and energy generating cyber plants
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