Data gaps for evaluating the CAP – current developments and future possibilities

Good practise workshop; 8 – 9th of June

Dr. H.C.J. Vrolijk

Wageningen Economic Research

EU CAP NETWORK




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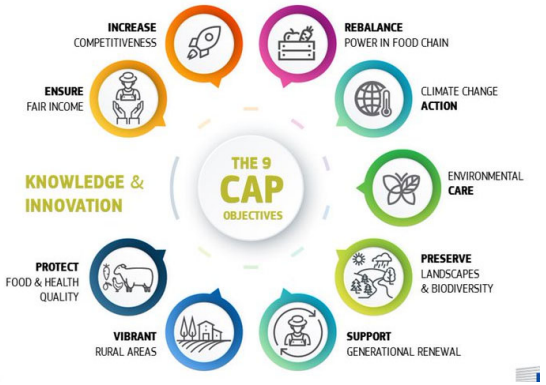
Who is Hans Vrolijk

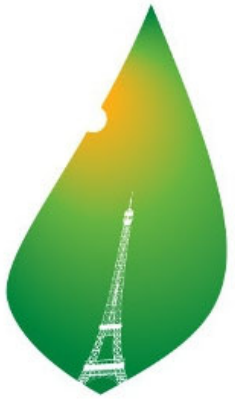
- Economist
- Head of Centre for Economic Information (statutory tasks on behalf of Dutch Ministry) at Wageningen Economic Research
- Head of Dutch FADN / Member EU FADN committee
- Member OECD Farm Level Analysis Network
- Chairman of the Pacioli network (informal community on farm level data collection for monitoring and evaluation)
- EU projects FLINT and MEF4CAP on monitoring and evaluation

Overview

- Changing societal and policy priorities
- New indicators for policy evaluation
- Expanding availability of data on agriculture
- Bridging the data gaps for indicators – some examples
- Long term perspectives using new technologies
- Concluding remarks

New policy objectives ask for new data





PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

- European policies are (being) adapted:
- Policy evaluation has a need for data on these topics
- Broader need for sustainability information from retail, sector initiatives, farming sector, governments, NGO’s.

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Addressing future data needs for evaluation

EU Research Projects

MEF 4CAP

FLINT

MIND STEP

And others

EU Regulations


6.12.2021 EN Official Journal of the European Union L 435/1

I

(Legislative acts)

REGULATIONS

REGULATION (EU) 2021/2115 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 2 December 2021

establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No 1305/2013 and (EU) No 1307/2013


7.12.2022 EN Official Journal of the European Union L 315/1

I

(Legislative acts)

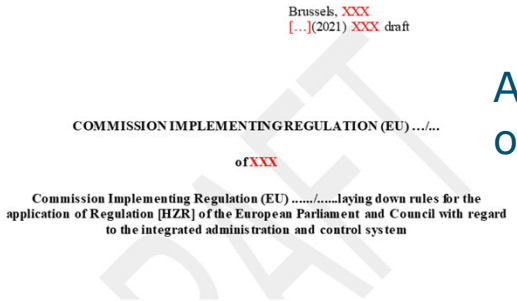
REGULATIONS

REGULATION (EU) 2022/2379 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 23 November 2022

on statistics on agricultural input and output, amending Commission Regulation (EC) No 617/2008 and repealing Regulations (EC) No 1165/2008, (EC) No 543/2009 and (EC) No 1185/2009 of the European Parliament and of the Council and Council Directive 96/16/EC

(Text with EEA relevance)


Brussels, XXX
[…](2021) XXX draft

COMMISSION IMPLEMENTING REGULATION (EU) …/...

of XXX

Commission Implementing Regulation (EU) ...../.....laying down rules for the application of Regulation [HZR] of the European Parliament and Council with regard to the integrated administration and control system

And others

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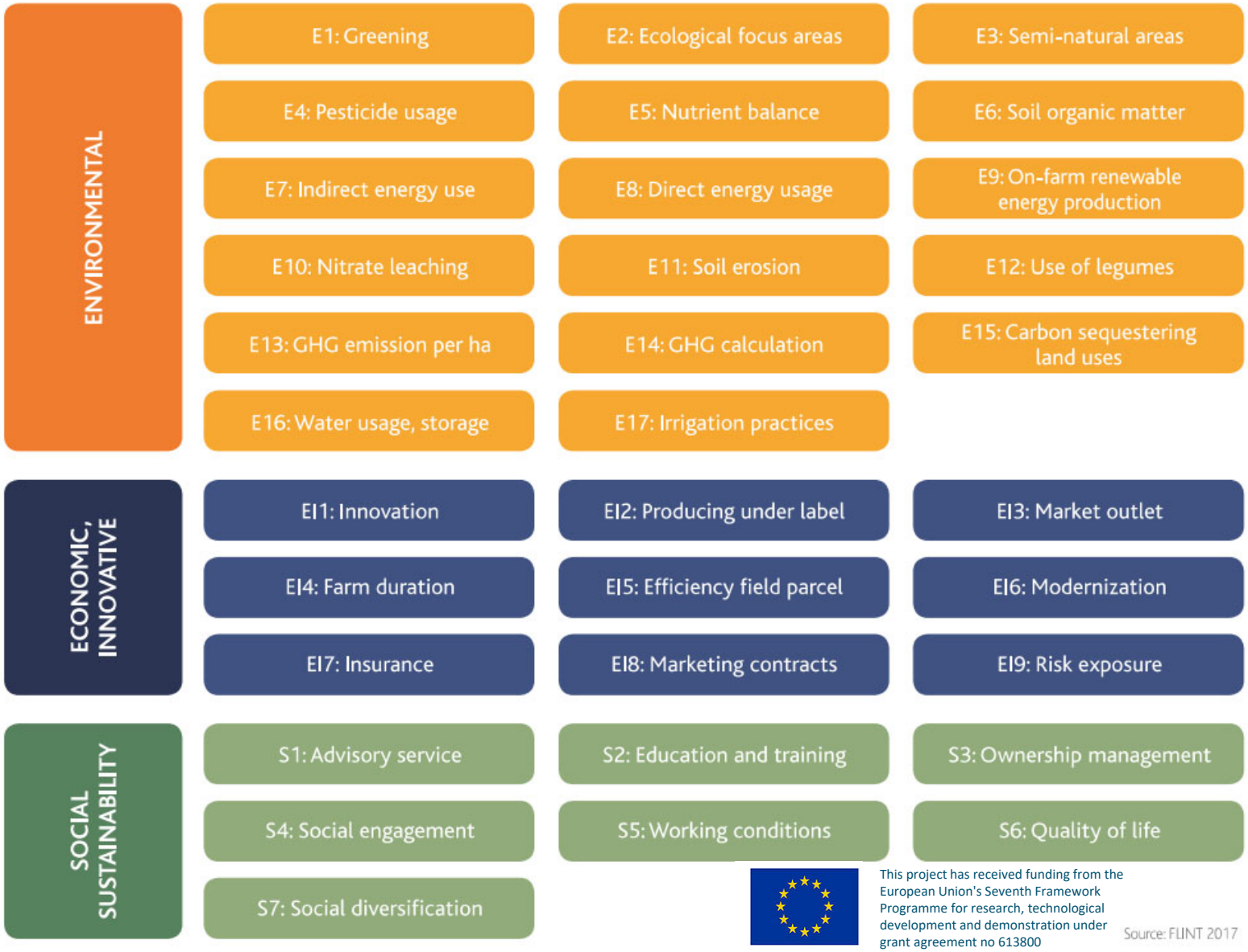
EU Initiatives versus National Initiatives

FLINT



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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613800

Source: FLINT 2017

Implications for monitoring & evaluation

- Shift from **compliance to performance**
  - Compliance with actions or regulations (original approach)
  - Performance, or achievement of specific objectives (new delivery model)
- MS CAP **Strategic Plans -** greater autonomy at MS level
  - **But commonality with overarching EU indicator set**
- Existing indicators - considerable, but…
  - Not always fit for purpose – in need of update (also granularity)
- **Additional environmental and social data a particular priority**
  - GHGs, biodiversity, water quality, pesticides, fertiliser usage etc.
  - Quality of life, gender issues and animal welfare etc.
- **Economic data** – some gaps remain
  - e.g. little information on innovation, use of risk management tools

Changes in Availability of Data

- Changes in Eurostat data collection – i.e. SAIO
- Development of FADN into FSDN
- Changes in IACS legislation

But also:

- Partnership agriculture for data
- Agri data spaces
- (Private) sector sustainability schemes
- Availability of Data at farm level

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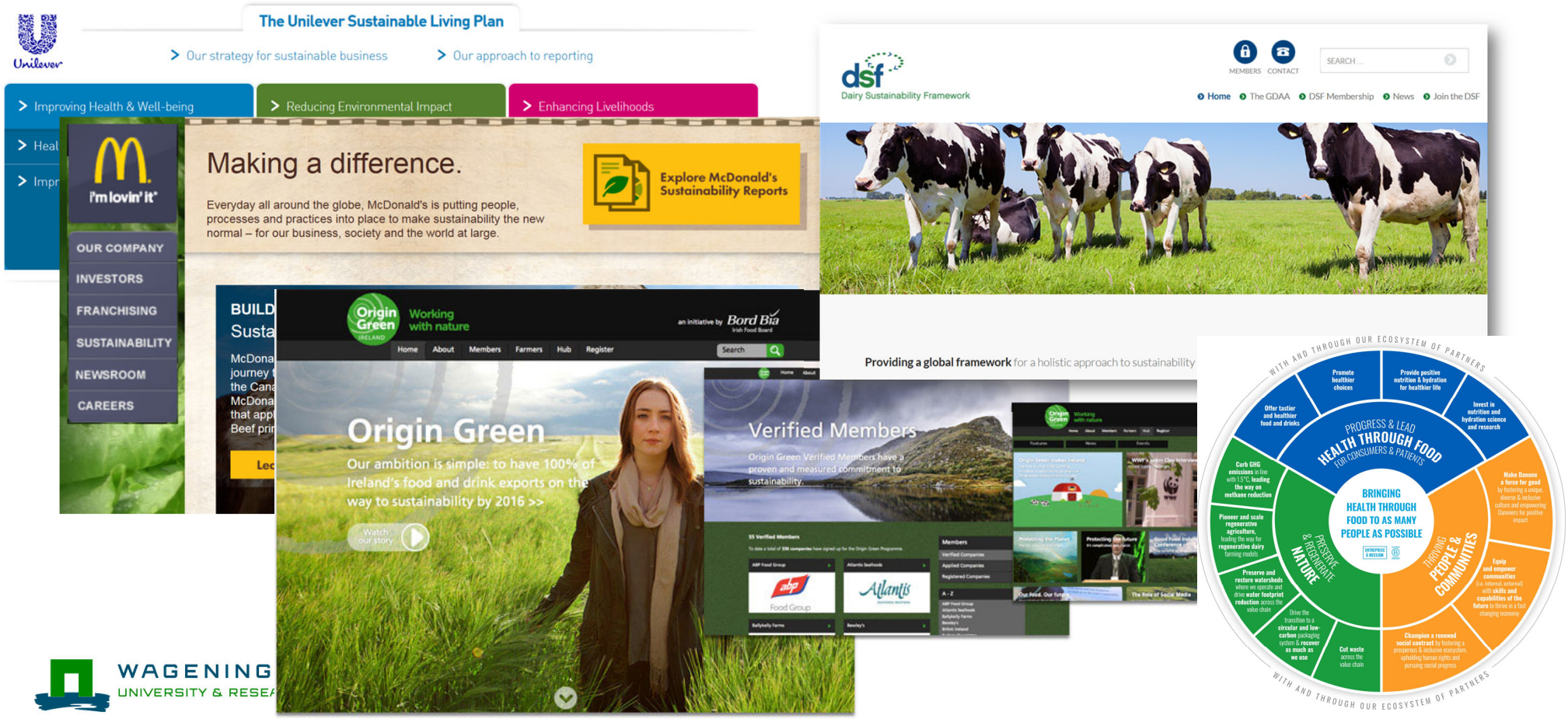
(Private) sector sustainability schemes



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Availability of Data at Farm Level

- Two important elements in the management of farm data:
  - Farm Financial Accounting (FFA)
    - uses financial transactions to calculate financial statements (for income taxes and financial management).
  - Farm Management Information System (FMIS)
    - developed out of field records / animal records and register inputs and outputs to guide operational and tactical management decisions.
- FFA focus on monetary flows (euros) and assets, FMIS on volumes and product flows within the farm.

Bridging the data gaps – general remarks

- Output, result, impact and context indicators, level of ambition varies, already taking into account data availability
- Administrative data important for number of output indicators
- Overview of potential datasources and open issues of future developments
- Besides EU initiatives many national initiatives that provide relevant information
- Not intended to be complete but start the discussion

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Bridging the data gaps - Pesticides

- Definition of indicator

  To foster sustainable development and efficient management of natural resources such as water, soil and air, including by reducing chemical dependency

  I.18 Sustainable and reduced use of pesticides: Risks, use and impacts of pesticides

  R.24 Sustainable and reduced use of pesticides: share of UAA

- Remarks on indicator

  USE versus Sales

  Product, active substances, environmental impact

- Potential sources of information

  Pesticide sales
  Pesticide use in agriculture
  Harmonised risk indicator for active substances
  FADN costs of Pesticides, some quantities in National FADN's
  FMIS, field books

- Developments/ Open issues

  FSDN will collect data on Pesticides
  SAIO will collect yearly data on use of Pesticides
  Recording of pesticide related to IACS
  Precision farming and farm accounting will generat data

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Bridging the data gaps - Innovation

- Definition of indicator

  I.1 Sharing knowledge and innovation: Share of CAP budget for knowledge sharing and innovation
  R.1 Enhancing performance through knowledge and innovation: Number of persons benefitting from advice, training, knowledge exchange or participation..

- Remarks on indicator

  - Impact on productivity and sustainability
  - Specific production methods vs innovation at the farm
  - Increasing interest in digital innovation

- Potential sources of information

  Administrative data

  IFS questions on digital innovation

  Innovation monitor in line with OSLO manual

  National innovation monitors in agriculture

- Developments/ Open issues

  FSDN might collect data on innovations

  Measure the impact of innovation?

Bridging the data gaps – Import / export

- Definition of indicator

  I.7 Harnessing agri-food trade: Agri-food imports and exports
  C.31 Agricultural imports and exports

- Remarks on indicator

  Local produced agri-food product versus further processing and re-export

- Potential sources of information

  Trade data
  - National statistical office
  - Eurostat Comext
  - UN Comtrade
    - https://comtradeplus.un.org/
  - Other Interfaces to previous data

- Developments/ Open issues

  Definition of agricultural products

Bridging the data gaps – Nutrient balances

- Definition of indicator

  C39 Gross nutrient balance – Nitrogen

  I.15 Improving water quality: Gross nutrient balance on agricultural land

- Remarks on indicator

  Farm gate vs soil level
  National values hide regional differences
  Similar to phosphorus balance

- Potential sources of information
  - Eurostat: Gross nutrient balance
  - National monitoring programs in relation to nitrate directive – LMM, Novana
  - National FADN
  - Farm sustainability tool for Nutrients - FASt

- Developments/ Open issues

  Possible future inclusion in FSDN
  Opportunities of precision farming and farm accounting
  Link to water quality

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Bridging the data gaps – Antibiotics use

- Definition of indicator

  I.28 Limiting antimicrobial use in farmed animals: Sales/use of antimicrobials for food-producing animals
  R.43 Limiting antimicrobial use: Share of livestock units (LU) concerned by supported actions to limit the use of antimicrobials (prevention/reduction)
  C.48 Sales/use of antimicrobials for food-producing animals

- Remarks on indicator

  Total vs use intensity

- Potential sources of information

  European Surveillance of Veterinary Antimicrobial Consumption (ESVAC)

  Registration by farmers

  Sector databases on antibiotics use

- Developments/ Open issues

  Possible inclusion in FSDN

  Opportunities of farm accounting

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Bridging the data gaps – Total factor productivity

- Definition of indicator

  C.29 Total factor productivity in agriculture

  I.6 Total factor productivity in agriculture

- Remarks on indicator

  Total outputs relative to the total inputs used in production

  More complicated econometric estimation

  Micro or macro level

- Potential sources of information
  - EAA with additional sources
  - FADN with some additional data
  - OECD case studies (i.e. France, Italy, Czech Republic, Demark)
  - National studies

- Developments/ Open issues

  Methodological improvements
  Environmentally adjusted TFP

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Bridging the data gaps – GHG emissions

- Definition of indicator

  C.44 Greenhouse gas emissions from agriculture
  I.10 Contributing to climate change mitigation: Greenhouse gas emissions from agriculture
  R.13PR Reducing emissions in the livestock sector: Share of livestock units (LU) under supported commitments to reduce emissions of greenhouse gases and/or ammonia, including manure management

- Remarks on indicator

  Emission at the farm vs life cycle assessment, product environmental footprint

- Potential sources of information

  European environmental agency

  National greenhouse gas inventories based on IPCC guidelines

  Initiatives like CoolFarmTool / sustainable dairy chain / dairy carbon navigator

- Developments/ Open issues

  Inclusion in FSDN?

  Satellite information on vegetation and hot spots

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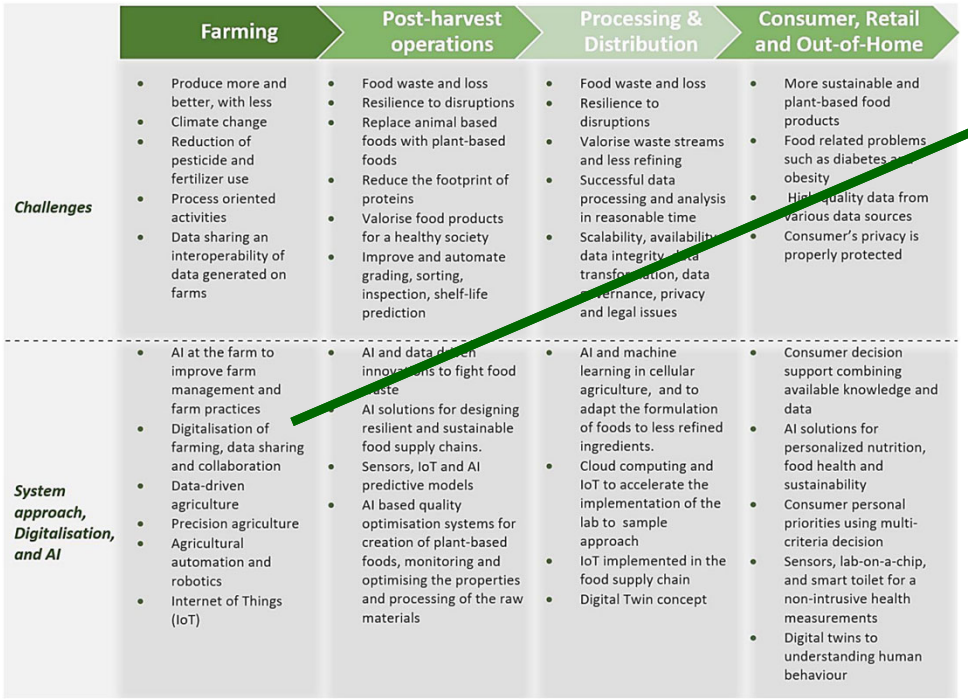
Long term perspectives using new technologies

Role of digitalization and Artificial Intelligence (AI) in food systems: including monitoring and evaluation



	Farming	Post-harvest operations	Processing & Distribution	Consumer, Retail and Out-of-Home
Challenges	• Produce more and better, with less • Climate change • Reduction of pesticide and fertilizer use • Process oriented activities • Data sharing an interoperability of data generated on farms	• Food waste and loss • Resilience to disruptions • Replace animal based foods with plant-based foods • Reduce the footprint of proteins • Valorise food products for a healthy society • Improve and automate grading, sorting, inspection, shelf-life prediction	• Food waste and loss • Resilience to disruptions • Valorise waste streams and less refining • Successful data processing and analysis in reasonable time • Scalability, availability, data integrity, data transformation, data governance, privacy and legal issues	• More sustainable and plant-based food products • Food related problems such as diabetes and obesity • High quality data from various data sources • Consumer's privacy is properly protected
System approach, Digitalisation, and AI	• AI at the farm to improve farm management and farm practices • Digitalisation of farming, data sharing and collaboration • Data-driven agriculture • Precision agriculture • Agricultural automation and robotics • Internet of Things (IoT)	• AI and data driven innovations to fight food waste • AI solutions for designing resilient and sustainable food supply chains. • Sensors, IoT and AI predictive models • AI based quality optimisation systems for creation of plant-based foods, monitoring and optimising the properties and processing of the raw materials	• AI and machine learning in cellular agriculture, and to adapt the formulation of foods to less refined ingredients. • Cloud computing and IoT to accelerate the implementation of the lab to sample approach • IoT implemented in the food supply chain • Digital Twin concept	• Consumer decision support combining available knowledge and data • AI solutions for personalized nutrition, food health and sustainability • Consumer personal priorities using multi-criteria decision • Sensors, lab-on-a-chip, and smart toilet for a non-intrusive health measurements • Digital twins to understanding human behaviour

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- Use of data for accountability whereby the farm submits digital information to governments, chain partners and institutions
- Increasing data needs make it necessary to use digitalization to collect these data in more efficient ways.
- AI techniques and robotic accounting will help to integrate, process and analyze data in more efficient and new ways.

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Contents lists available at ScienceDirect

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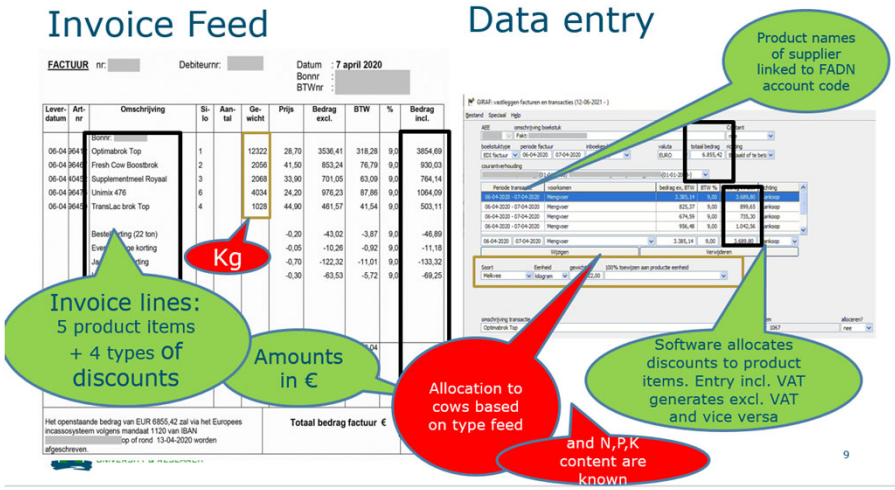
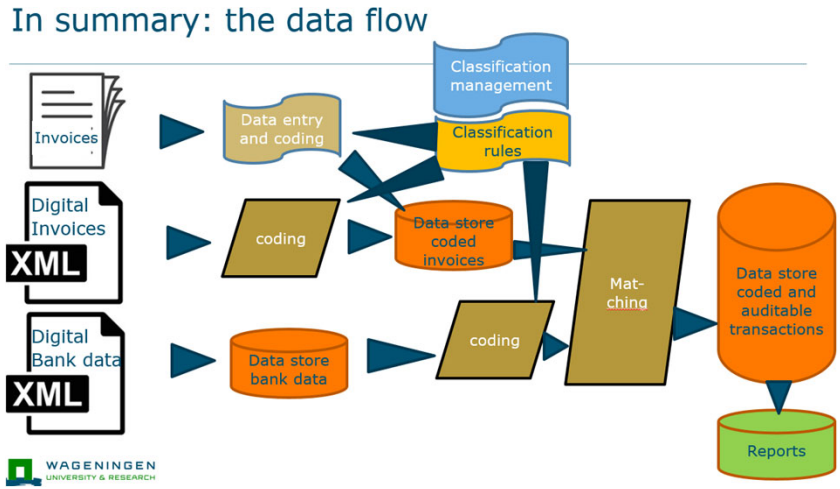
Digitalisation and Artificial Intelligence for sustainable food systems

Hans J.P. Marvin *, Yamine Bouzembrak, H.J. van der Fels-Klerx, Corné Kempenaar, Roel Veerkamp, Aneesh Chauhan, Sanne Stroosnijder, Jan Top, Görkem Simsek-Senel, Hans Vrolijk, Willem Jan Knibbe, Lu Zhang, Remko Boom, Bedir Tekinerdogan

Robotic accounting

- Typical **data needed in evaluations**: indicators on pesticide use, mass balances, material balances of N and P, energy use (and production) etc.
- **Invoices** provide a large amount of data needed.
  - Invoices provide a lot of the **financial and volume data** that both Farm Accounts and Farm MIS need to create information value.
  - Invoices on inputs and outputs (!) are typically created by trade partners of the farmer.
- **They can be digitised -** using digital standards like UBL, XML, UNCEFACT etc.
- **Robotic accounting** to generate indicators





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Concluding remarks

- Demand for data for monitoring and evaluation is increasing
- Data availability and demand in agricultural sector shows an exponential growth
- Indicators vary from well defined till more under development
- Differences in scale and granularity
- Search process to link needs and availability data
- New technologies will provide relevant information on the ‘long run’
- Important to share experiences between countries

Further information

EU Projects:

www.mef4cap.eu

www.flint-fp7.eu

www.mind-step.eu/

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researchgate.net/profile/Hans-Vrolijk

sustainability

MDPI

Article

Sustainability Monitoring with Robotic Accounting—Integration of Financial and Environmental Farm Data

Krijn Poppe [1], Hans Vrolijk [1,*], Nicole de Graaf [2], Roeland van Dijk [2], Emma Dillon [3] and Trevor Donnellan [3]

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electronics

MDPI

Article

Integration of Farm Financial Accounting and Farm Management Information Systems for Better Sustainability Reporting

Krijn Poppe [1], Hans Vrolijk [1,*] and Ivor Bosloper [2]

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