

The past, present and future of sustainability indicators for farm management and monitoring

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Dr. Hans C.J. Vrolijk, Head of Statutory Task Unit

Wageningen Social & Economic Research



Hans Vrolijk

- Economist (PhD)
- Head of Centre for Economic Information (statutory tasks on behalf of Dutch Ministry) at Wageningen Social & Economic Research
- Member of EU FADN / FSDN committee
- Participant of OECD Farm level analysis network,
- Organiser and chairman Pacioli workshop (informal community on farm level data collection and policy use)
- Coordinator Research projects on sustainability monitoring (FLINT, MEF4CAP)

Statutory tasks



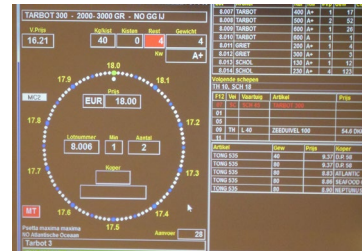
Agricultural and horticultural panel



Fisheries panel



Forestry panel



Agricultural input and output prices



Value tables animals



Foreign agricultural trade



Land and rent prices



Innovation monitor

Background sustainability monitoring in the Netherlands

- Societal concerns about agricultural production
- Private sector initiatives on sustainability
- Policy objectives broader than economic results
 - Minimum standards
 - Specific objectives
- National policies of Dutch Ministry: transition sustainable agriculture, policy sustainable livestock sector, vision on circular agriculture
- Integrated assessment of policy measures (environmental economic evaluations)



Farmer protests



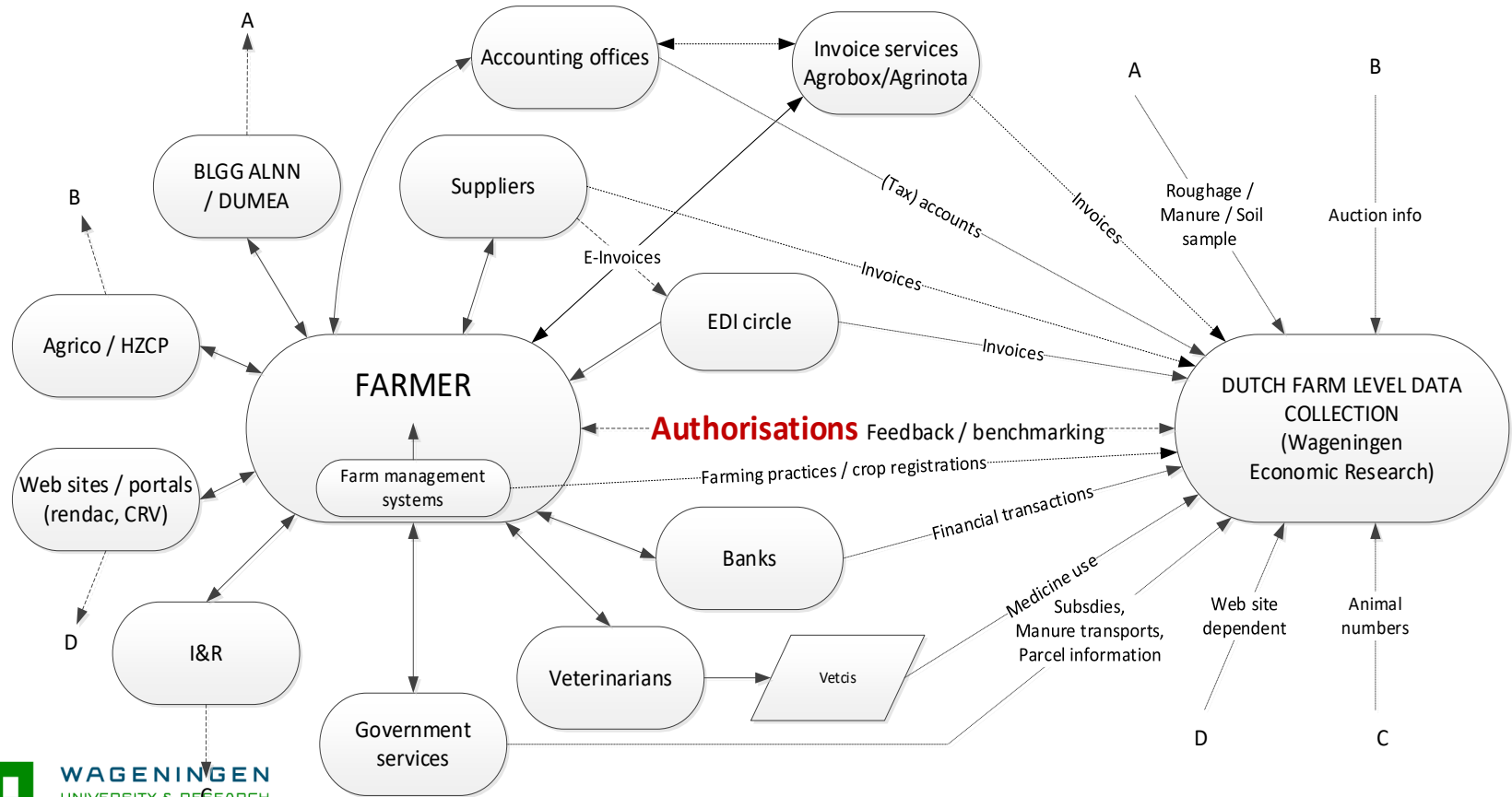
Sustainability topics in Dutch Policy and FADN

- Energy use and GHG emissions
- Manure and nutrients
- Use of antibiotics
- Use of pesticides
- Water quality
- Innovation
- Nature management
- Other income sources
- Farm tourism



Changing policy priorities lead to new information needs

Adopting to new information flows



My agrofoodportal for farm management

Kies een jaar

- 2017
- 2016
- 2015

Kies een sector

Kies een sector

Melkveebedrijven

Kies een subsector

Zuivere melkveebedrijven

10 bedrijven in groep die qua omvang 16086 benaderen.

[Mijn sector](#)

Kies een tabel

- Duurzaamheidskengetallen
- Bedrijfsopzet
- Arbeid
- Grondgebruik en gewassen
- Veebezetting
- Resultaat per ...
- Kostprijs melk
- Resultaat melkvee
- Saldo melkvee
- Resultaat graasvee
- Beweiding
- Voeropname en productie
- BEX
- Energie
- Broeikasgasemissie
- Gewasbescherming

De kosten (incl berekende kosten) worden eerst uitgedrukt per 100 kg melk en daarna op basis van de verdeling van de opbrengsten toegerekend naar het product melk (kostprijs). De gegevens worden alleen getoond voor zeer zuivere melkveebedrijven. Als gegevens niet worden getoond, dan is het belang van tweede tak of verbreding (inclusief zelfzuivelen) te groot om de kostprijs te kunnen bepalen.

Standaard data

Toelichting

Export naar Excel

Alle data

Variabelen	Eenheid					
Totale kosten per 100 kg melk	euro	41,51	49,31	42,59	49,39	48,03
▸ Toegerekende kosten	euro	14,06	14,89	14,89	15,17	17,85
▸ Arbeid en loonwerk	euro	8,83	10,65	11,52	16,04	14,72
▸ Rente, pacht en afschrijving	euro	12,56	17,00	8,45	13,61	10,27
▸ Overig	euro	6,06	6,78	7,72	4,56	5,18
Totale opbrengsten per 100 kg melk	euro	37,77	34,28	33,99	31,69	35,43
▸ Melk- en zuivelopbr. na aftrek superheffing	euro	33,39	32,12	31,68	32,19	33,30
▸ Niet melk opbrengsten (excl. subsidies)	euro	4,38	2,16	2,31	-0,50	2,14
Resultaat						
▸ Marge (=opbrengsten minus kosten)	euro	-3,74	-15,04	-8,60	-17,69	-12,60
▸ Kostprijs melk, per 100 kg	euro	36,69	46,20	39,70	50,16	45,13



Sustainability report for farm management

Feedback report with development over years:

- Make discussion of sustainability more specific
- Increases understanding of sustainability performance

Benchmark report with comparison of sustainability performance with a group of similar farms

- Makes differences explicit
- Helps to discuss and find ways to improve sustainability performance

Green house gasses		group average	farm nr
Emission (x 1.000 kg CO2-equivalents)		991	
Type	Methane (%)	51	
	NOx (%)	14	
	CO2 (%)	35	
Source	Manure (methane and NOx)	14	
	SOIL (Nox direct and indirect)	12	
	Energy use (CO2)	8	
	contract work and other (CO2)	1	
	Bought feeding stuff (CO2)	21	
	Bought artificial fertilizer (CO2 en NOx)	5	
	Other (CO2)	1	
	Intestine Fermentation	28	
Emission per cow (kg CO2-equivalents)		11,982	

Individual data hidden because of confidentiality

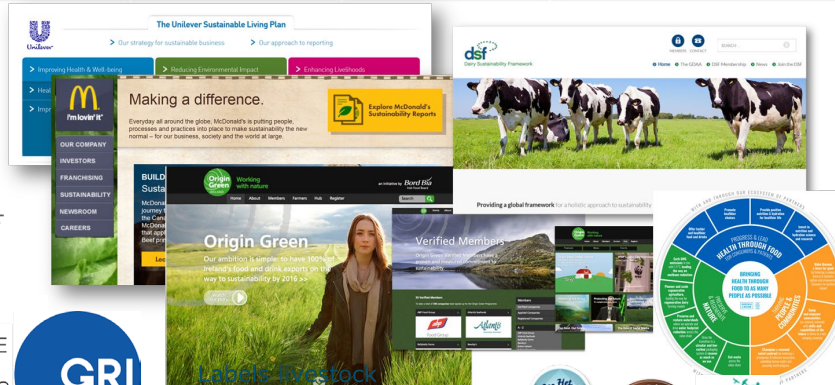
People		
Percentage cows in the meadow	▼	22
Health costs	▼	110
Labour input per 1000 kg milk	▲	5
Planet		
Pesticide use, kg active substance	▼	1
Pesticides environmental pressure points	▼	0
N surplus from farming, kg per ha	▲	204
F surplus from farming, kg per ha	▼	25
N surplus at soil (including mineralisation, kg per ha)	■	183
Energy use (MJ per cow)	▲	5,080
Use of water (tap) (m3 per cow)	▼	24

Individual data hidden because of confidentiality

Sustainability M&E: multitude of applications

Product Environmental Footprint (PEF)	Eco-Score	Planet-Score	EnviroScore	Eco-Impact	The Sustainability Consortium	Made Green in Italy	Coop Sweden Sustainability declaration	French government proposal

Agricultural Metrics Partners



(Sustainability) Monitoring and evaluation: multitude of meanings

- Monitoring and 'controlling' individual farm performance
- Monitoring trends towards the achievement of policy objectives
- Ex-ante, ex-durante, ex-post policy evaluations

- Impact on granularity of data, data sources, unit of observation, selection of units, quality demands, reporting level, privacy restrictions etc.

Policy evaluation needs an Integrated data set

- Measurement of different sustainability indicators on the same set of farms
- Allows the analysis of the full chain from: Policy objective -> policy measure -> impact on farm -> farm management decisions -> up to: sustainability performance of farms
- Trade-off and jointness of performance on different sustainability measures as a consequence of policy measures
 - (for example is the economic performance at the expense of environmental performance, sustainability performance of large farms, most cost effective ways to reduce emissions etc.)



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
- Data spaces (agriculture, green deal)
- (Private) sector sustainability initiatives
- Availability of Data at farm level

Current development: Farm Sustainability Data Network

Basic Act – Topics

In **bold**: new topics compared to current FADN

Economic	Environmental	Social
General information on the holding	Farming practices	Labour
Type of occupation	Soil management	Education
Assets and investments	Nutrient use and management	Gender balance
Quotas and other rights	Carbon farming	Working conditions
Debts/credits	Greenhouse gas emissions and removals	Social inclusion
Value added tax	Air pollution	Social security
Inputs	Water use and management	Infrastructure and essential services
Land use and crops	Plant protection use	Generation renewal
Livestock production	Antimicrobial use	
Animal products and services	Animal welfare	
Market integration	Biodiversity	
Quality products – Geographical indications	Organic farming	First year of data collection for FSDN: 2025
Membership in producer organisations	Certification schemes	Data available: in 2026/27
Risk management	Energy consumption and energy production	
Innovation and digitalisation	Food loss on primary production level	
Other gainful activities related to the holding	Waste management	
Subsidies	Implementing act with definition of variables	
Indicative share of off-farm income		



Use of data – FADN / FSDN at its' best

- Detailed Farm level data: Distribution, Differences, Development over years
- Linking and grouping of different variables (planet – profit, organic <-> conventional, best 25% <-> worst 25%)
- Why do some farmers perform better than others?
 - Targeted government policy (Education, Setting of Goals/regulation, Subsidies)
 - Improvement potential, Advice to farmers (best practices)
- Impact assessments
 - How are different farmers affected by policy measures?
 - How do different type of farmers respond to changes?

Requirements for future sustainability reporting

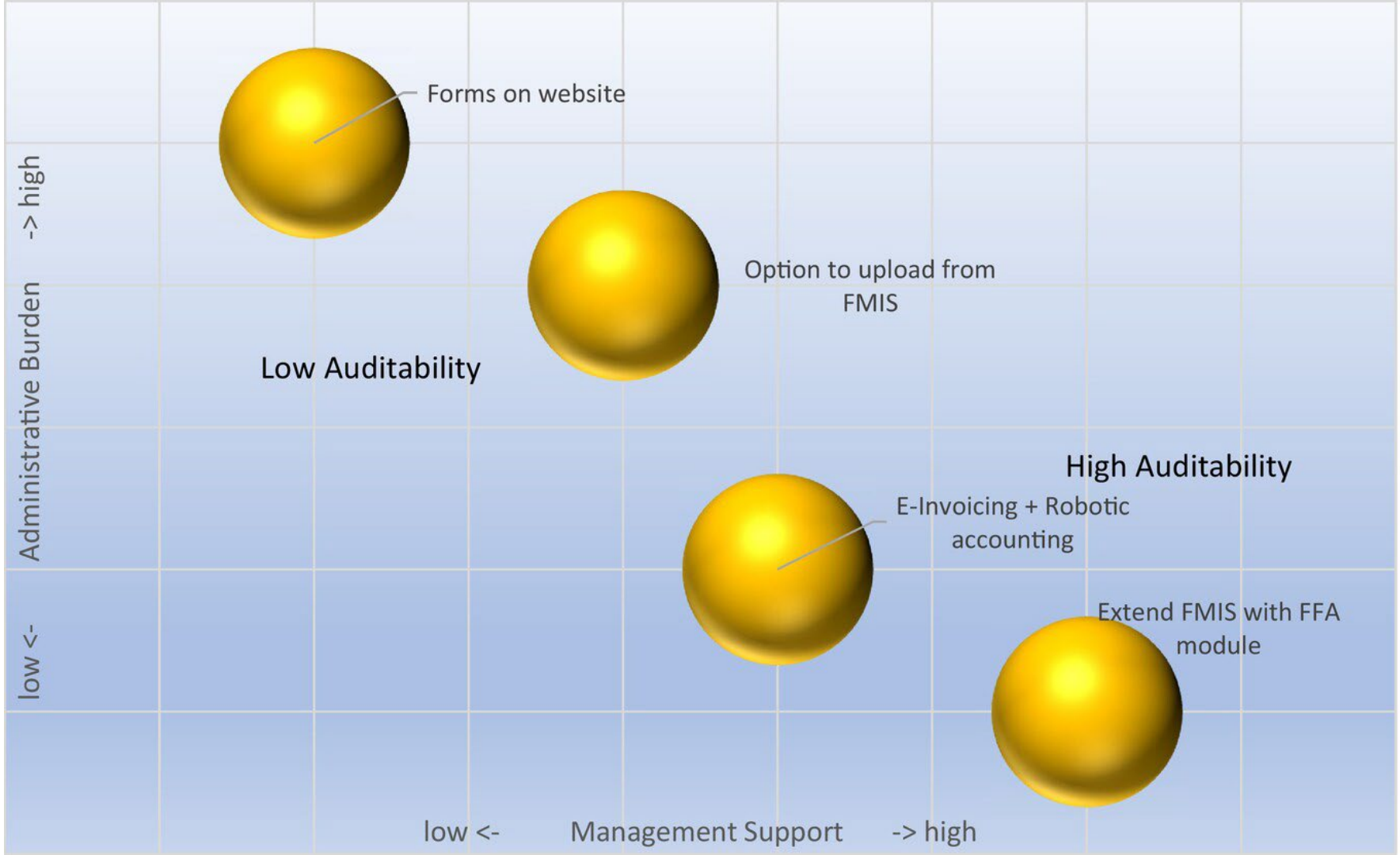
1. Minimize the administrative burden,
2. Create systems and indicators that can be used for different purposes (farm management, policy evaluation, certification etc.).
3. Guarantee a certain level of auditability

How to get these data: Availability of Data at Farm Level

- Statistics and registers (but where do those come from?)
- Two important elements in the management of farm data:
 - Farm Financial Accounting (FFA)
 - uses financial transactions to calculate financial statements (for value added tax, income tax 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.

Ways to provide sustainability data

- Farmers fill in a **paper form** or a **form on a website** using a mobile phone or computer.
- A **digital Farm (Field) Book** (which can be provided by the government) in which the farmer records each application of inputs (e.g. pesticide) including quantity, timing and crop or field.
- **Robotic accounting** where challenge of manual data entry can be tackled by digitizing invoices and delivery notes, that are currently often on paper or at best in pdf format.
- **Integration of FFA and FMIS** to combine information on financial and material flows at farm and animal/crop/field level



Key messages

- Continuous need for fact-based policy making at national and international level
- Different interpretations of monitoring and evaluation pose different quality demands for data
- Integrated dataset for tradeoffs and jointness in ex-ante and ex-post evaluations
- Data for farm management and monitoring – find synergies
- Adopt new technologies - smart farming but also smart accounting

Further information

www.agrimatie.nl

www.cei.wur.nl

www.mef4cap.eu

hans.vrolijk@wur.nl

researchgate.net/profile/Hans-Vrolijk

