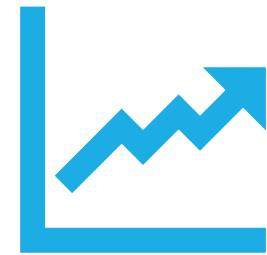
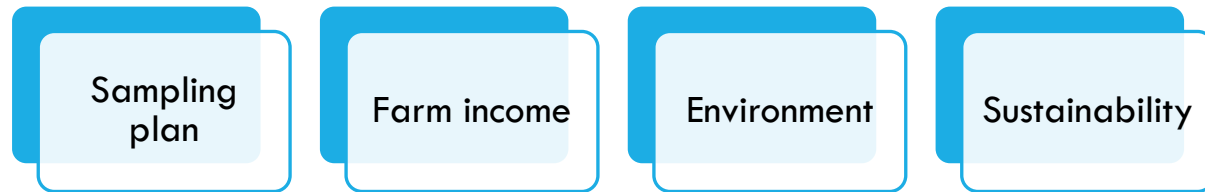


WEIGHTING OF FINANCIAL AND ENVIRONMENTAL INDICATORS

Boris Tacquenier





TOPICS

STRATIFIED SAMPLE

What do we want to measure?

- Farm income in agriculture

What is a stratified sample?

- Divide the sample into subgroups to obtain a representative sample

Why a stratified sample?

- Minimize sample size = Minimize cost
- Avoiding gaps in the sample

Which strata are relevant?

- Region
- Type of farming
- Economic size

SAMPLING PLAN

Strata: clustering farm type and economic size

- clustering farm types and economic sizes that might behave similar for the purpose of calculating the farm income

Proportional allocation

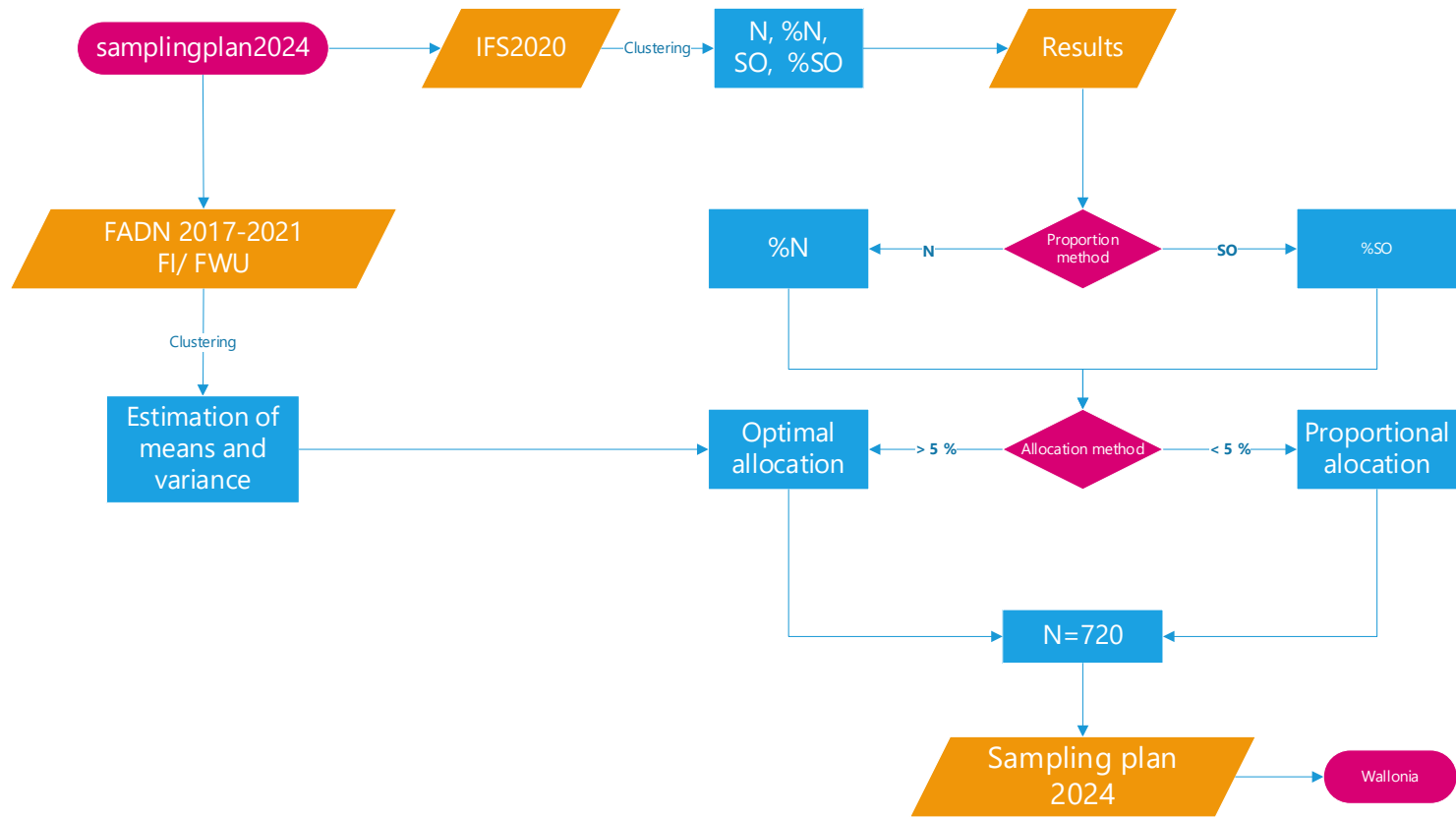
- Sample sizes of the strata are proportional to the population

Optimal allocation

- Take into account the distribution of the variable we want to measure
- Estimation of variability FADN data from previous years
- Normalization of the distributed data

Combination Proportional and Optimal allocation

- Least common (clustered) farm types: Proportional
- Most common (clustered) farm types : Optimal



SAMPLING SCHEME

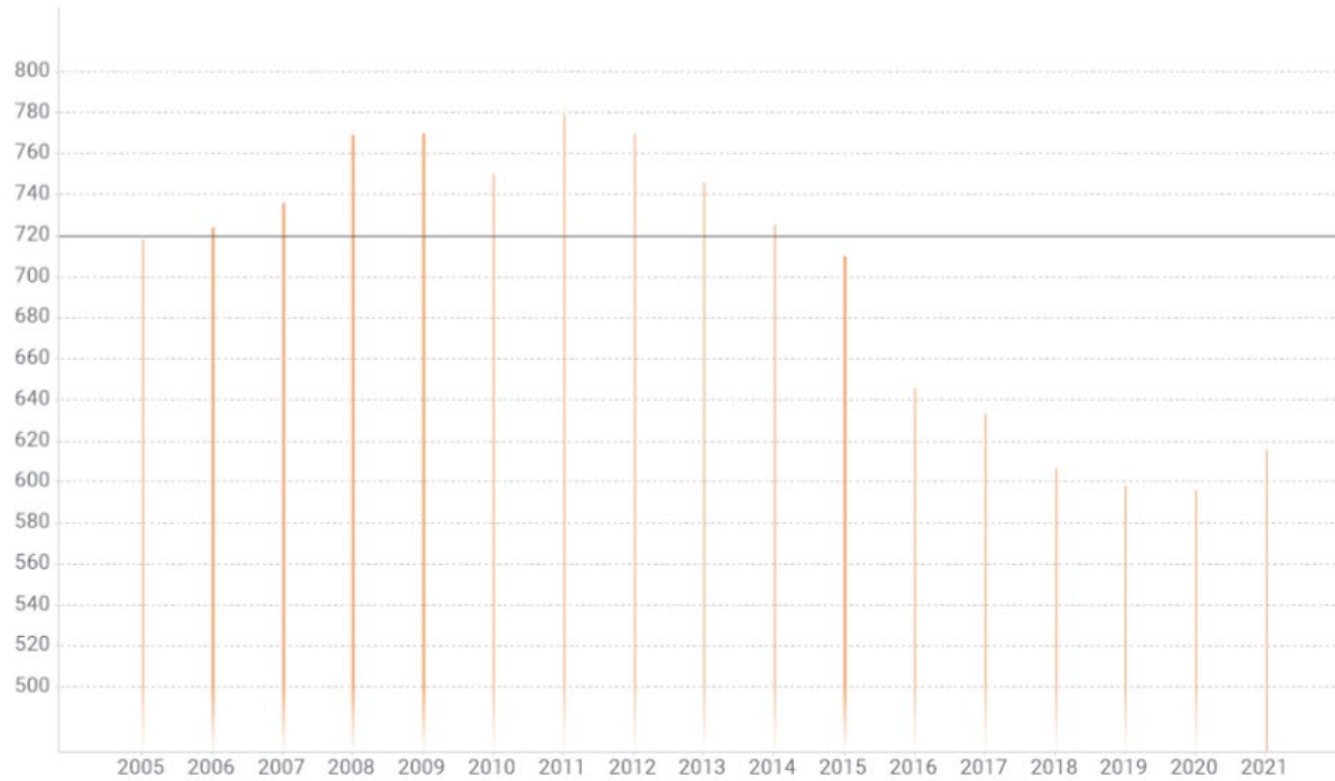
SAMPLING ISSUES

Decrease of sample size

Increase of the variability of Farm Income

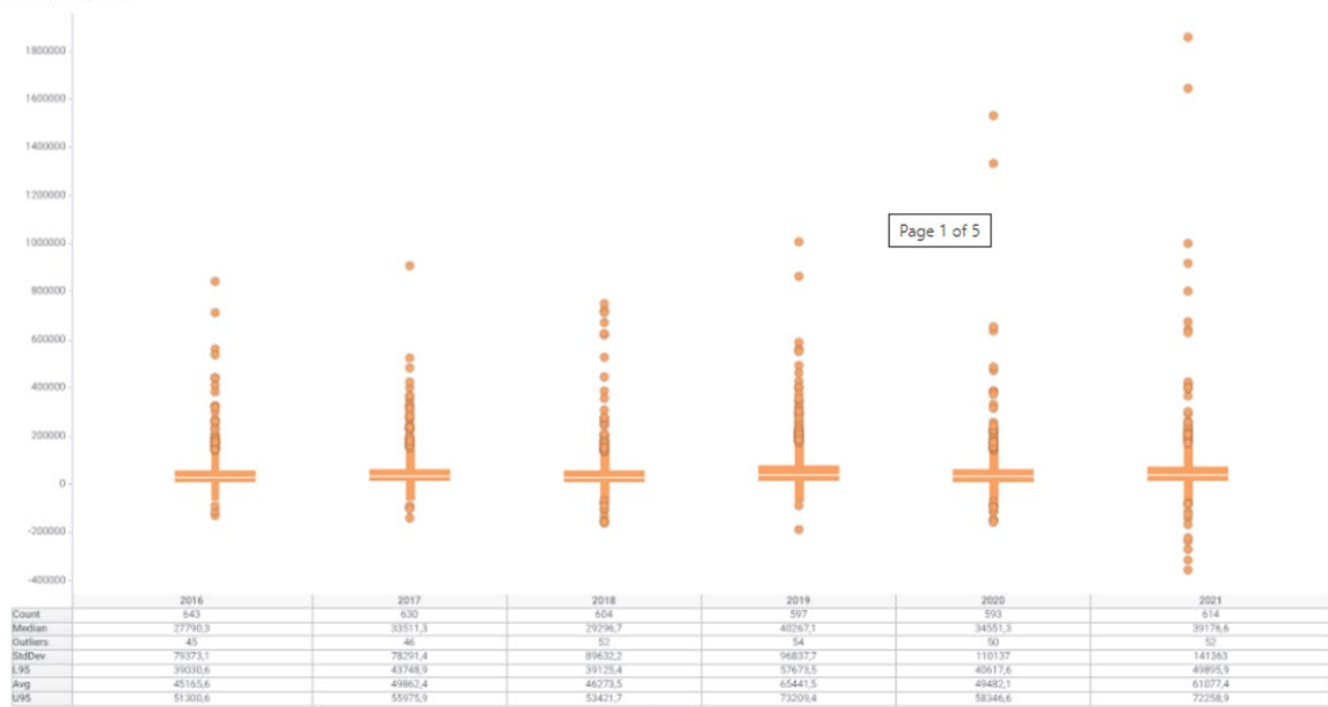
- Full sample in time
- Within some farm types in time
- Within economic sizes

Optimal allocation of the samples in the sampling plan getting unrealistic proportions



SAMPLE SIZE FLANDERS

farm Income / FWU



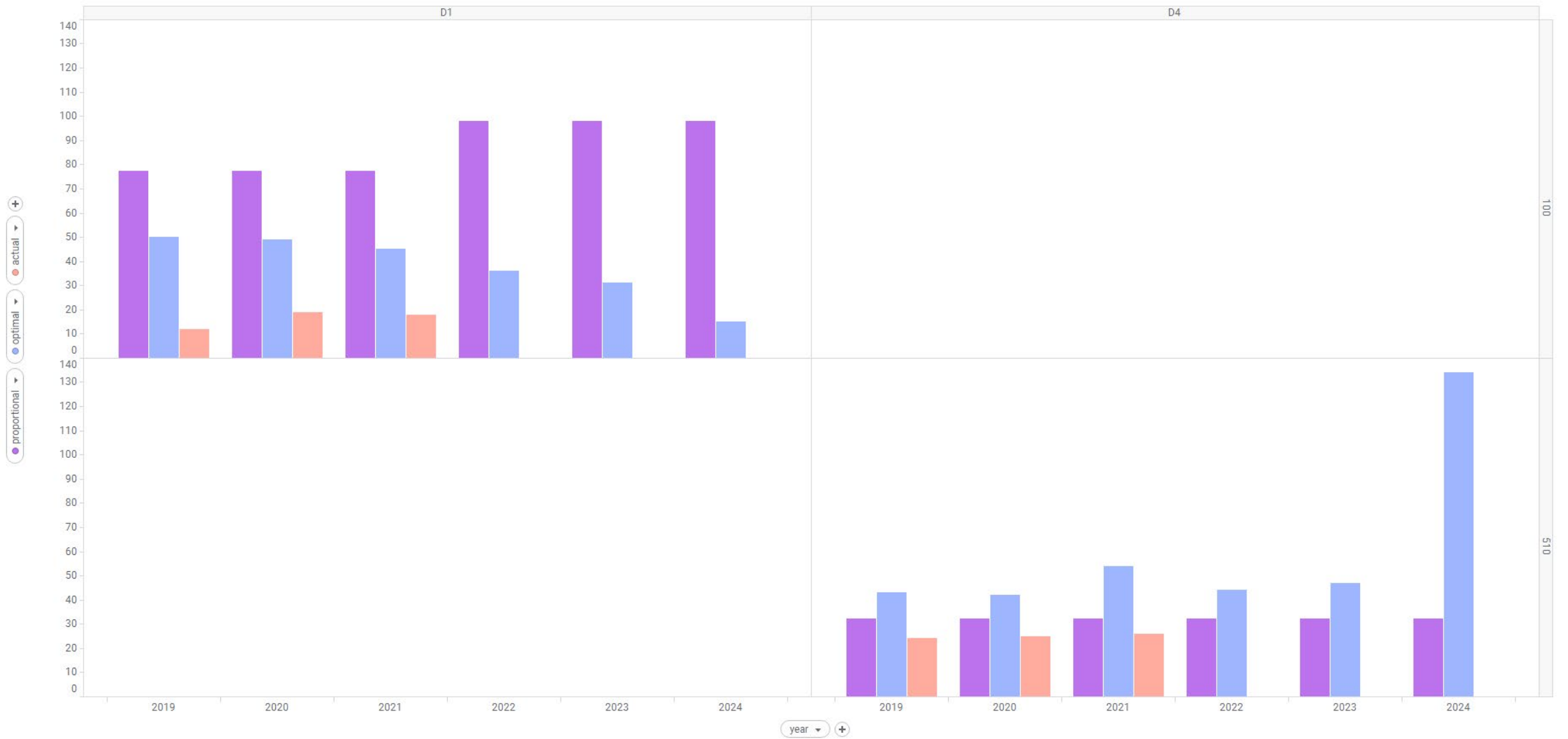
	2016	2021
Count	643	614
Median	27790,3	39176,6
Outliers	45	52
StdDev	79373,1	141363
L95	39030,6	49895,9
Avg	45165,6	61077,4
U95	51300,6	72258,9

FARM INCOME: FADN 2016-2021

Samplesize: proportional vs optimal



Sample size: proportional vs optimal



Method?

- N=720 enough?
- Is optimal allocation within the sample still useful?

Environmental indicators?

Conduct of a Statistical analysis of the sample, the sample size and the variables we want to measure and calculate



SAMPLING QUESTIONS

STUDY: FADN 2011-2017

Method:

- Estimation of Farm income /FWU confidence intervals with the sample size varying
- Estimation of Kg N/ha and active substances/ ha with the sample size varying

Conclusions:

- 720 is a small sample. Estimation of the indicators have a wide confidence interval.
- Farm income / FWU can be estimated with confidence level of 95% and a confidence interval of +- 6000 Euro/FWU.
- Distribution of the income is more spread than the environmental variables for the total of the sample
- Hence a different sampling plan is needed or one can choose a proportional sample design

Alternative:

- Estimation of environmental indicators based on crop types rather than farm types/economic size

Clear Selections

Download

Standard Results

Variable	Label	Unit	Description
SE295	Fertilisers	€	Purchased fertilisers and soil improvers (excluding those used for forests).
SE296	Fertiliser N	q	Quantity of N in mineral fertilisers used.
SE297	Fertiliser P	q	Quantity of P2O5 in mineral fertilisers used.
SE298	Fertiliser K	q	Quantity of K2O in mineral fertilisers used.
SE300	Crop protection	€	Plant protection products, traps and baits, bird scarers, anti-hail shells, frost protection, etc. (excluding those used for forests).

REPORT: FADN PUBLIC DATABASE

Selections :

Last update : 15 Jun 2023

Year : 2019, 2020, 2021 (p) / Member State : (BE) Belgium / 8 Types of farming: All farms

Select dimension

- Year ✓
- Region ✓
- Member State
- 8 Types of Farming
- 14 Types of Farming
- Economic Size

Select standard result

- (SYS02) Farms represented (nb) ✓
- (SYS03) Sample farms ✓
- (SE295) Fertilisers (€) ✓
- (SE296) Fertiliser N (q) ✓
- (SE297) Fertiliser P2O5 (q) ✓
- (SE298) Fertiliser K2O (q) ✓
- (SE300) Crop protection (€) ✓
- (SE430) Family Farm Income (€/FWU) ✓

Build and view your report



Build your report by selecting a theme from a drop-down list "Predefined Reports by Theme" above or select dimensions and standard results from the lists on the left. Drag and drop to move dimensions or standard results from column to rows or rows to columns section.

Year	Region	Values							
		(SE295) Fertilisers (€)	(SE296) Fertiliser N (q)	(SE297) Fertiliser P2O5 (q)	(SE298) Fertiliser K2O (q)	(SE300) Crop protection (€)	(SE430) Family Farm Income (€/FWU)	(SYS02) Farms represented (nb)	(SYS03) Sample farms
2019	(341) Vlaanderen	8 907	48.24	2.36	15.95	9 853	58 405	17 692	500 - <1000
	(343) Wallonie	10 829	70.89	10.35	23.02	7 576	33 957	10 414	200 - <500
2020	(341) Vlaanderen	8 911	44.71	2.13	17.76	10 799	42 377	17 214	500 - <1000
	(343) Wallonie	10 319	73.44	10.08	22.09	7 739	41 617	10 436	200 - <500
2021	(341) Vlaanderen	8 720	42.04	1.85	17.82	11 076	43 287	17 284	500 - <1000
	(343) Wallonie	10 618	71.26	10.45	23.97	7 916	45 576	10 436	200 - <500

REPORT: FADN PUBLIC DATABASE

REPORT: CIJFERWEBSITE FLANDERS

Crop protection product use | Ag x Welkom x +

landbouwcijfers.vlaanderen.be/landbouw/totale-landbouw/gewasbeschermingsmiddelengebruik

Python Pandas

Flanders

TO REGISTER MY CITIZEN PROFILE


Geolock

DEPARTEMENT LANDBOUW & VISSERIJ

Agriculture Fisheries Market information Chain Data

To search

CONTRAST

 Crop protection product use

[Home](#) > [Agriculture](#) > [total agriculture](#)

Sector

Total agriculture

Theme

Environment (total agriculture)

Indicator

- Greenhouse gas emissions
- Energy balance
- Crop protection product use
- Kunstmestgebruik: phosphorus
- Fertilizer use: potassium
- Fertilizer use: nitrogen
- Spatial designation of the declared

Based on an extrapolation of the LMN data, the estimated use of crop protection products in 2020 is 3.4 million kg of active substance. Most of the resources in 2020 will go to the potato and fruit growing crop group. They account for 29% and 24% respectively of the total extrapolated amount of active substance that year. Arable farming (26%), other agricultural companies (26%) and the fruit sector (23%) have the largest share of active substance use.

Farmers use crop protection products to safeguard their harvest. However, use is not without risks for the environment and the health of humans and other non-target organisms if used improperly. The use of crop protection is influenced by weather conditions, cultivation area, legislation and technology (crops, crop protection products and machines).

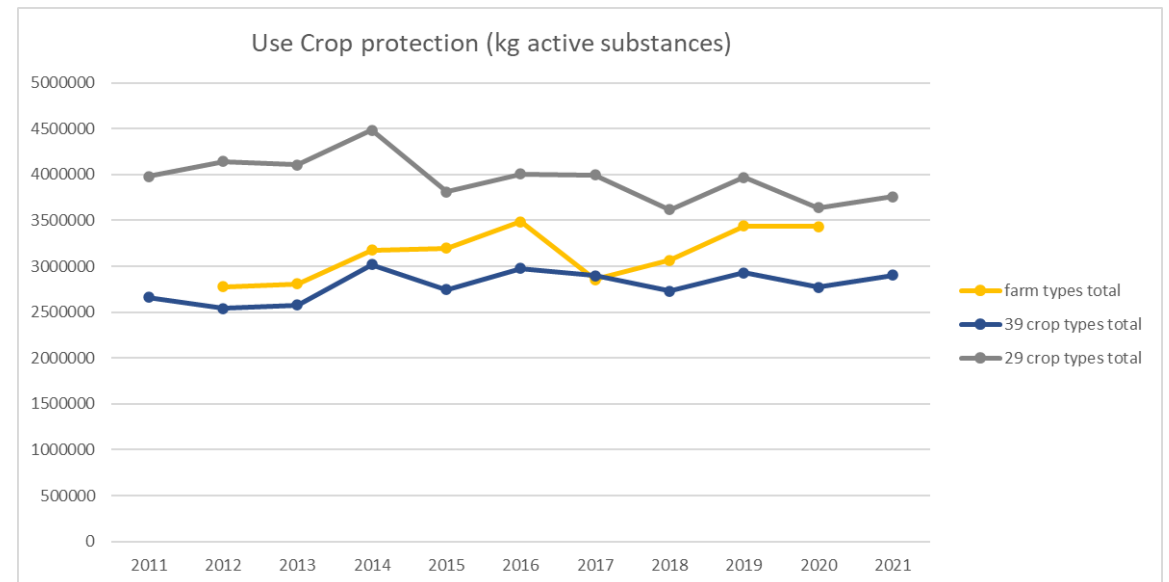
The total use of crop protection products by Flemish agriculture and horticulture is calculated via an extrapolation of the data from the [Agricultural Monitoring Network \(LMN\)](#).

CROP PROTECTION

Indicator: Active substances in crop protection

Matching the crop types FADN to IFS

Result depend on detail of crop type grouping

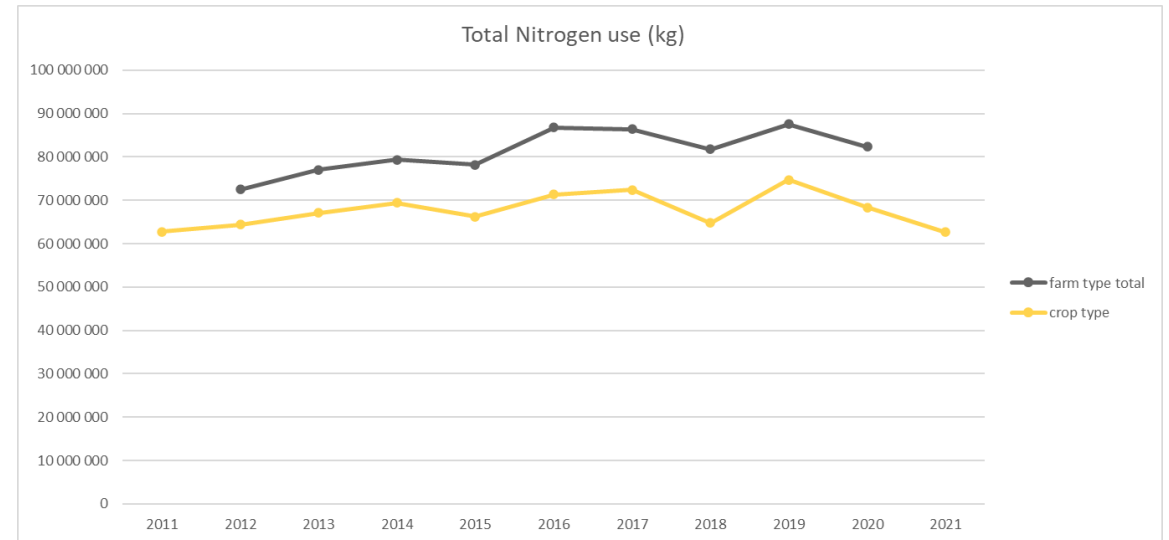


FERTILISERS

Indicator: N, P, K use

29 groups of crop types

Similar results for N, P, K





Energy used



Energy produced



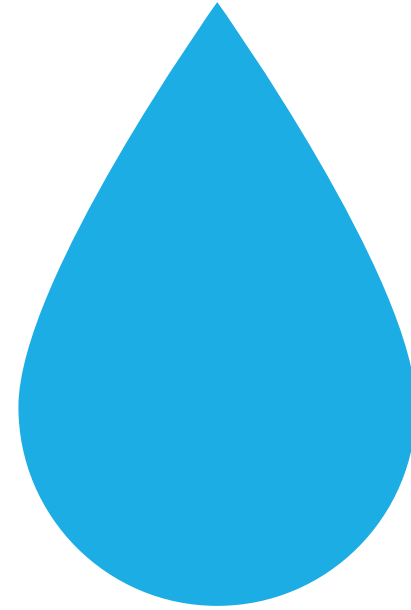
Related to farm type rather than crop type

METHOD EN REPORTING ENERGY

Indicators

- Shallow water
- Ground water
- Tap water
- Rain

Collection difficulties



METHOD AND REPORTING WATER



Stratified sample
for sustainable
indicators

No intention
to change
the plan



Weighting of and
reporting on
sustainable
indicator

New
methods

FUTURE THOUGHTS