WEIGHTING OF FINANCIAL AND ENVIRONMENTAL INDICATORS

Boris Tacquenier

TOPICS

- Sampling plan
- Farm income
- Environment
- Sustainability

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

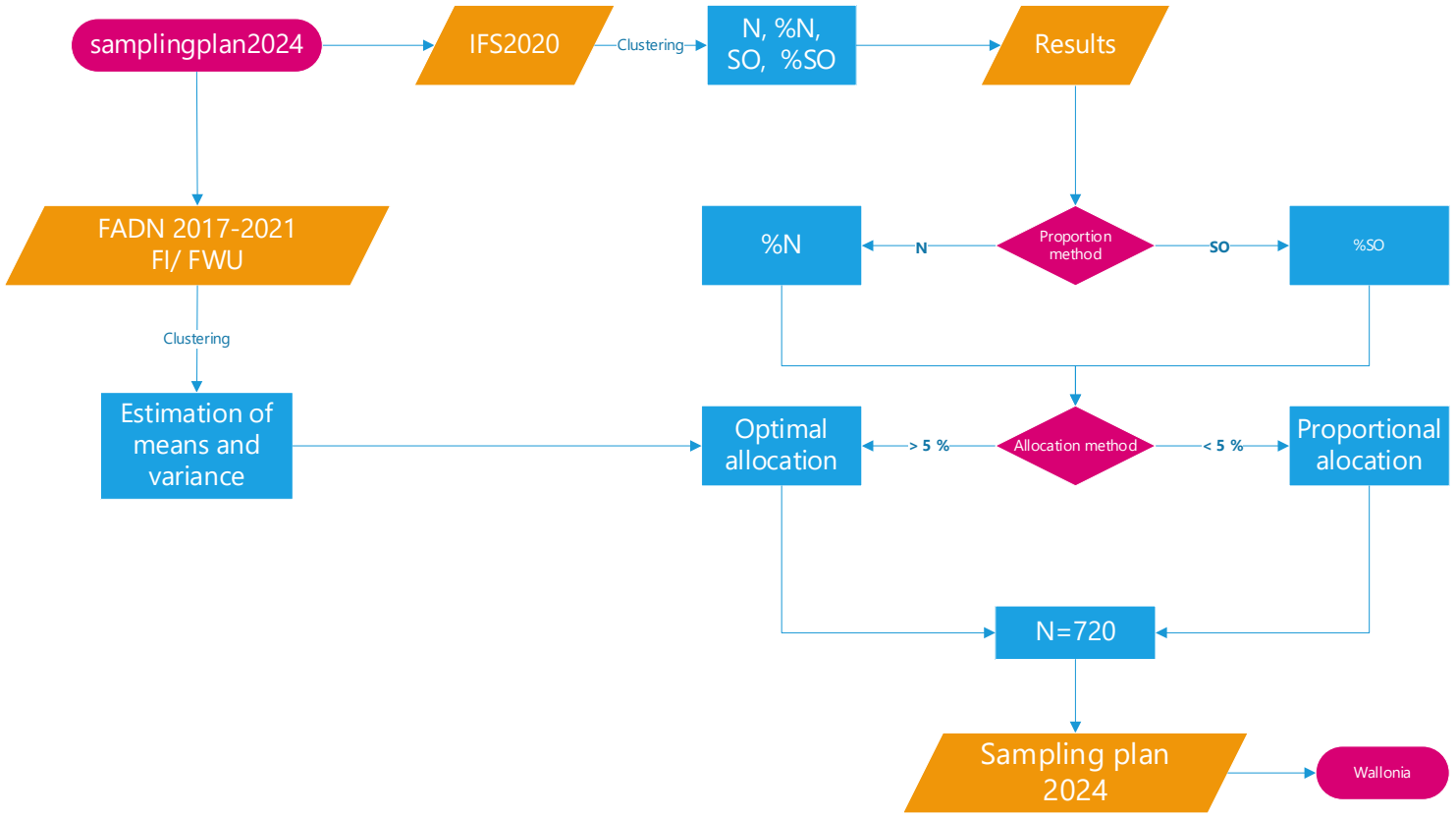
- Sample sizes of the strata are proportional to the population

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

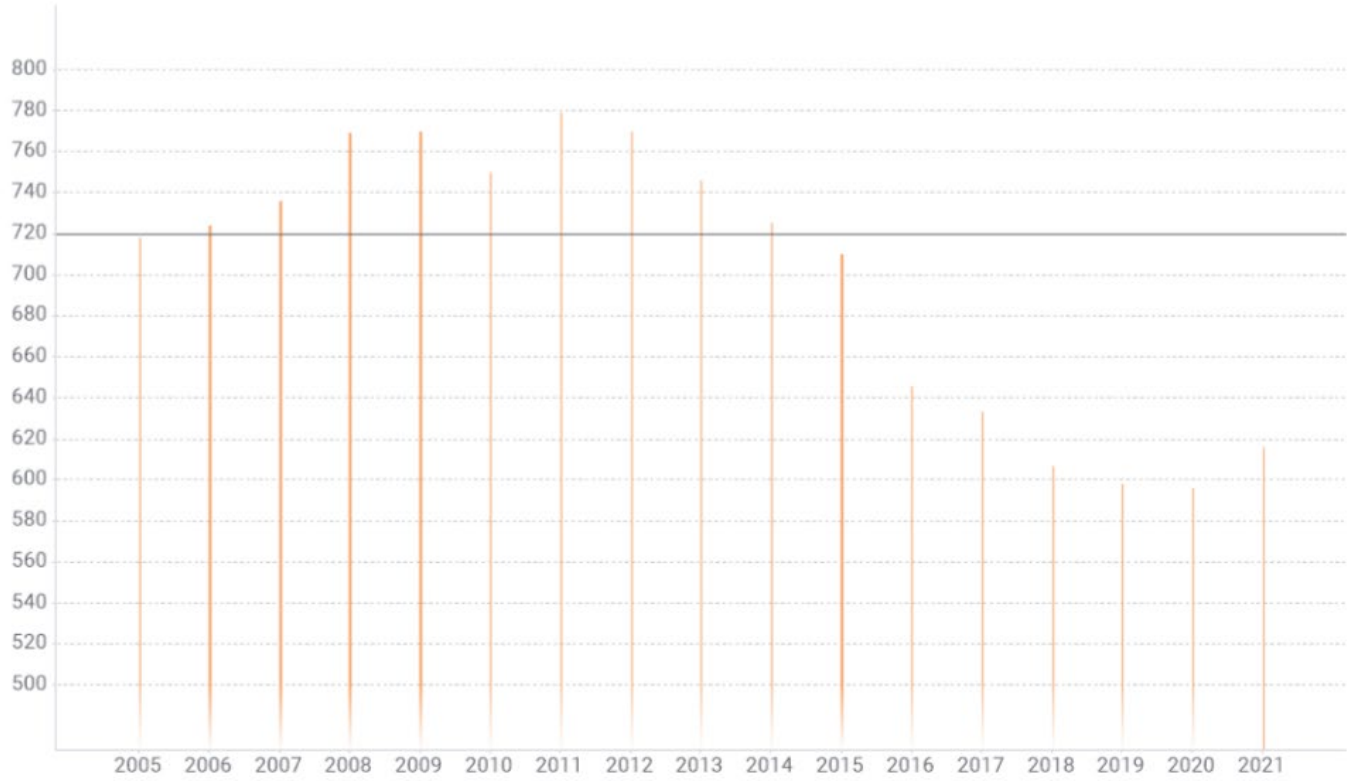
SAMPLING ISSUES

Decrease of sample size

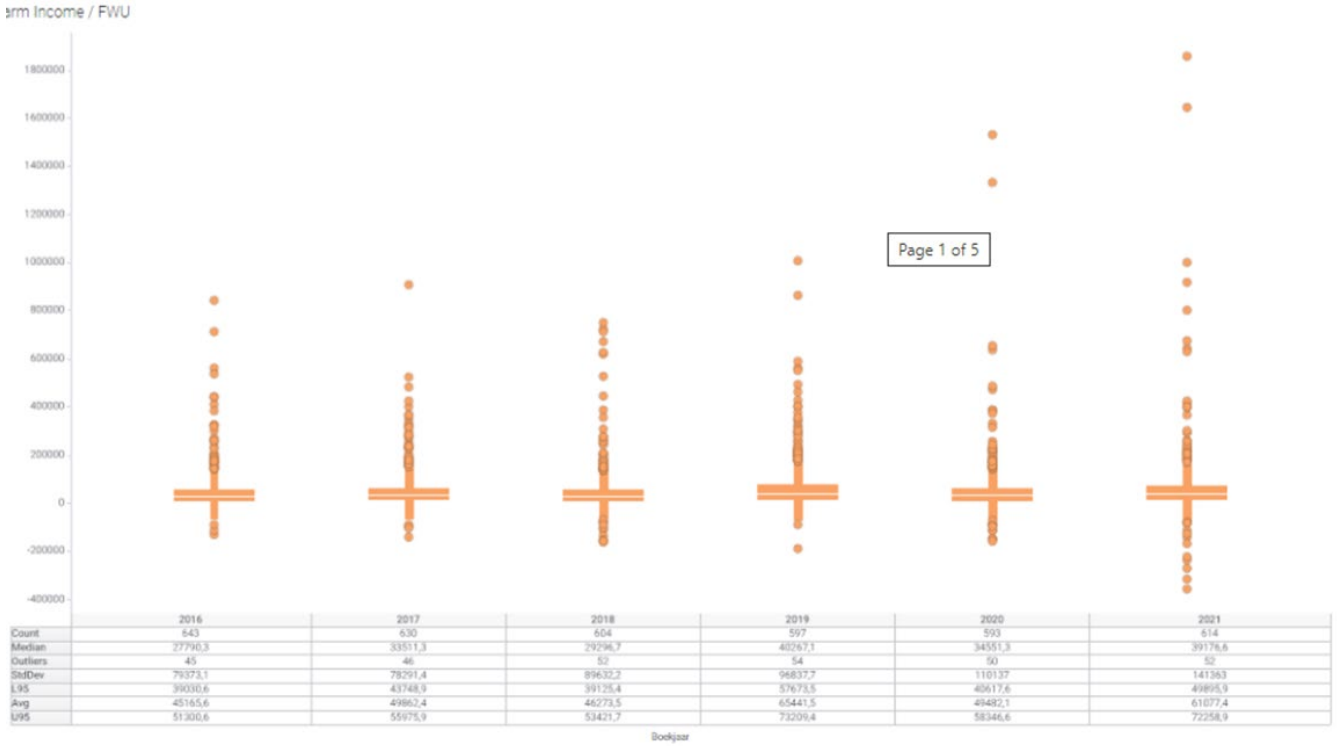
Increase of the variability of Farm Income

- 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



	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
D1
D2
D3
D4
actual
optimal
proportional
150
100
50
0
100
260
450
460
470
510
800
2019
2020
2021
2022
2023
2024


Samplesize: proportional vs optimal
D1
D4
actual
optimal
proportional
100
510
year
2019
2020
2021
2022
2023
2024

SAMPLING QUESTIONS

Method?

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

Environmental indicators?

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

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

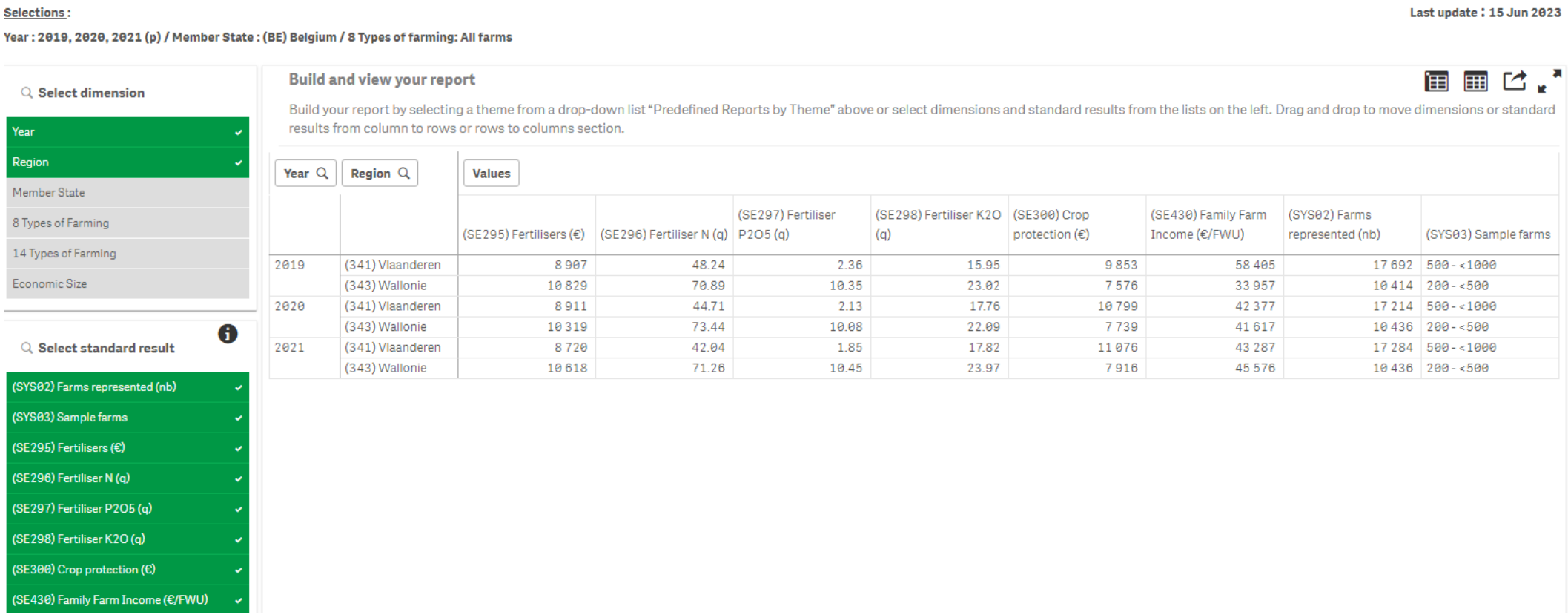
https://agridata.ec.europa.eu/extensions/FADNPublicDatabase/description.html

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).

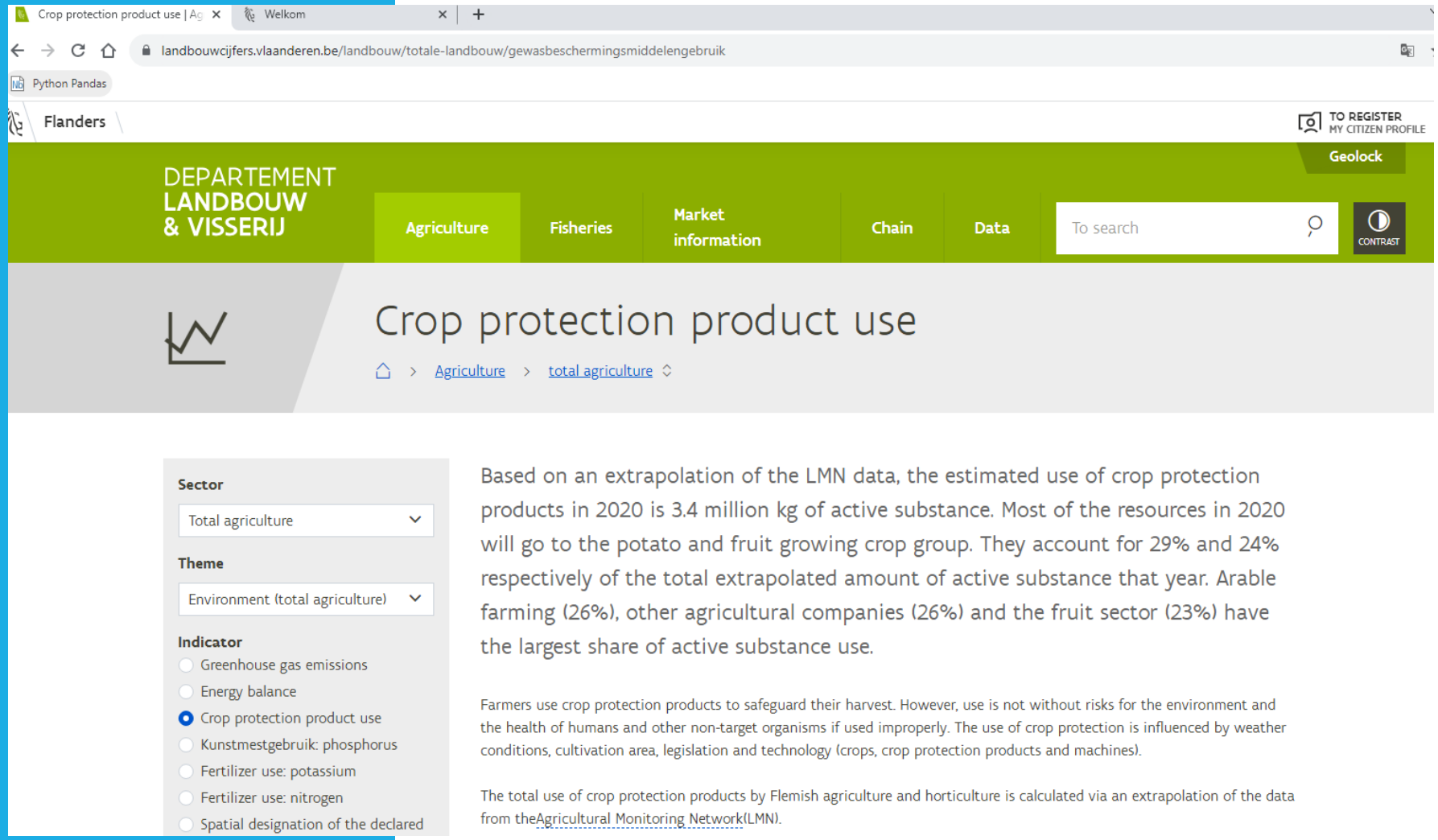
REPORT: FADN PUBLIC DATABASE



Year	Region	(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

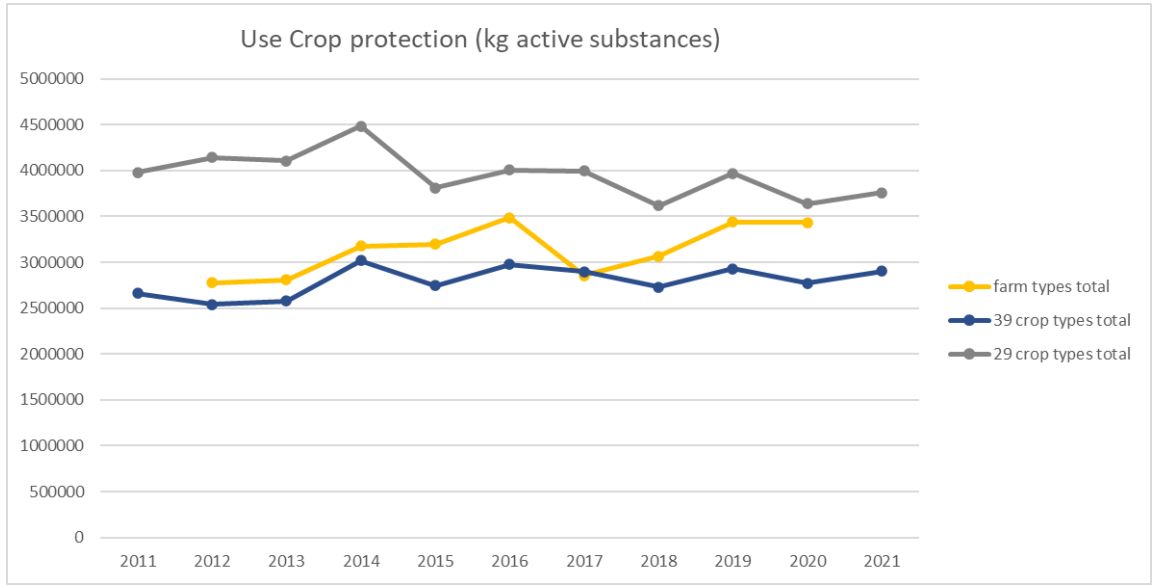


CROP PROTECTION

Indicator: Active substances in crop protection

Matching the crop types FADN to IFS

Result depend on detail of crop type grouping

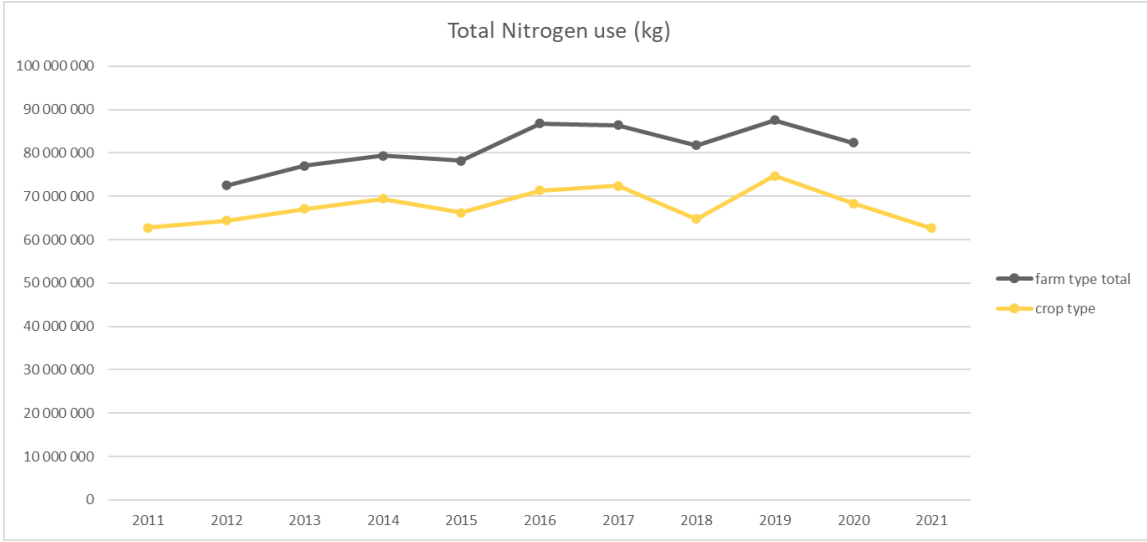


FERTILISERS

Indicator: N, P, K use

29 groups of crop types

Similar results for N, P, K



METHOD EN REPORTING ENERGY

Energy used

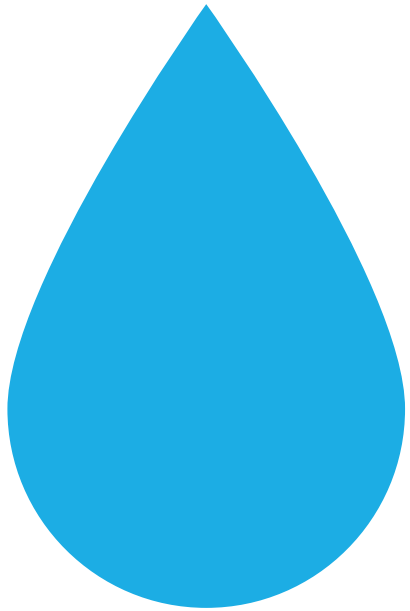
Energy produced

Related to farm type rather than crop type

Indicators

- Shallow water
- Ground water
- Tap water
- Rain

Collection difficulties



METHOD AND REPORTING WATER

FUTURE THOUGHTS

Stratified sample for sutainable indicators	No intention to change the plan
Weighting of and reporting on sustainable indicator	New methods