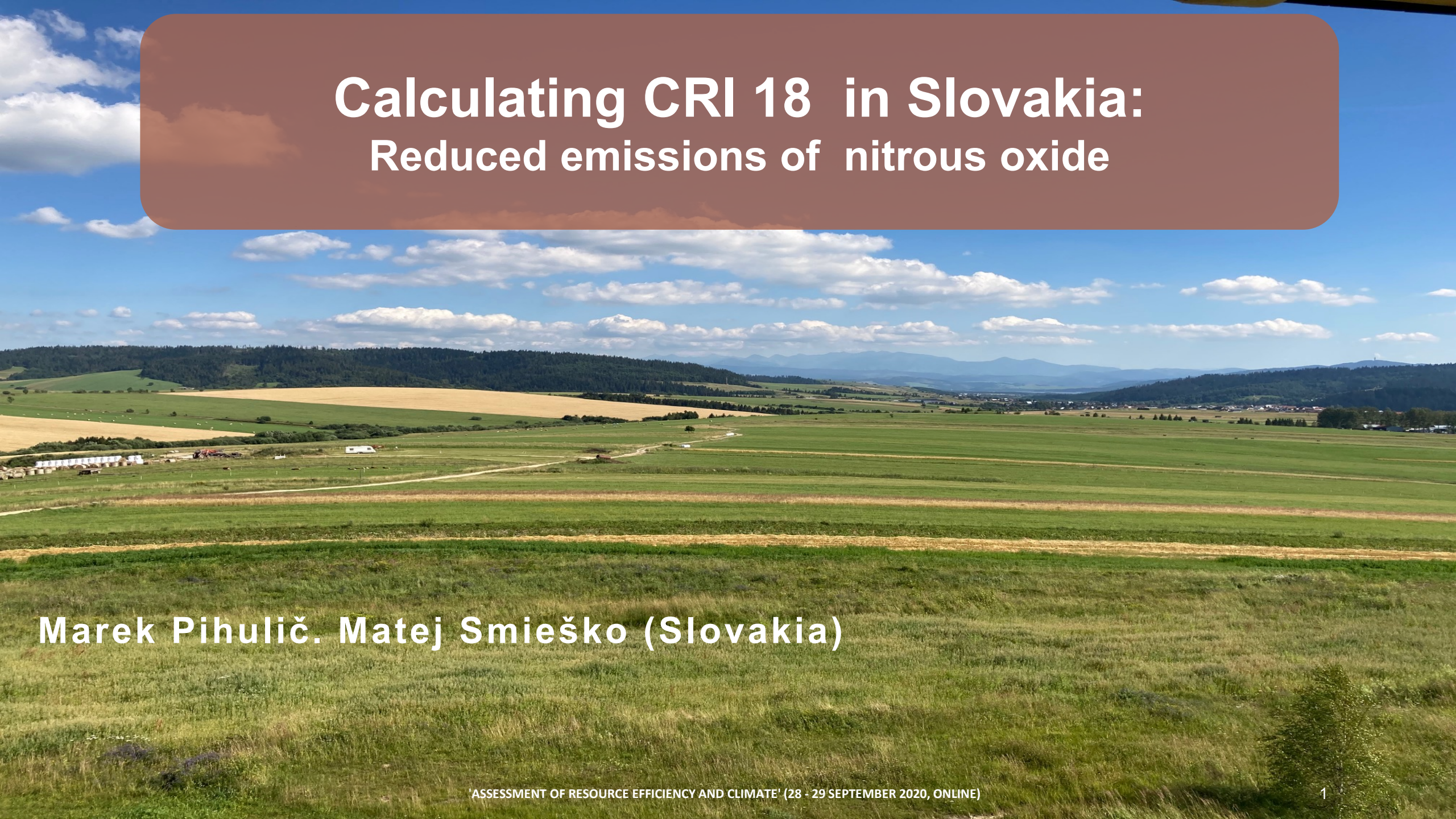
Calculating CRI 18 in Slovakia:
Reduced emissions of nitrous oxide



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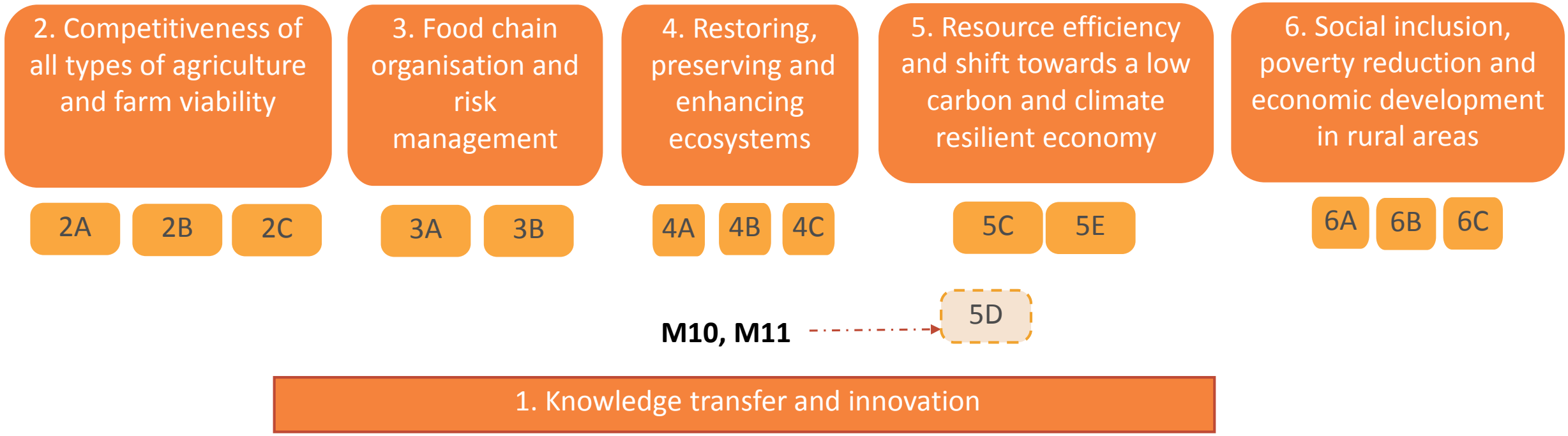
Background

RDP design

Focus area 5D is not implemented in SK RDP 2014 – 2020

Only secondary contributions were assessed



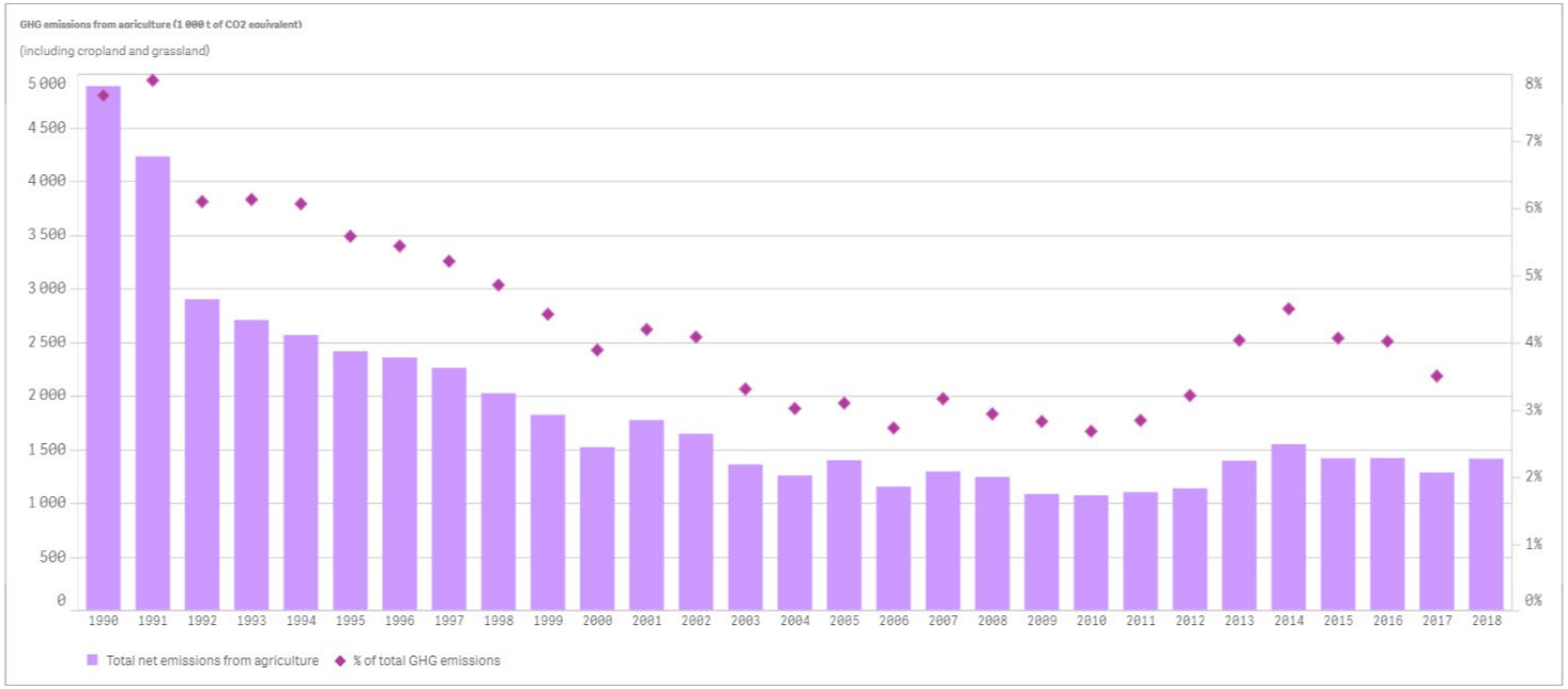
FA 5D

Primary contributions: none

Secondary contributions (2014-2018): M10, M11

GHG Emissions from Agriculture in Slovakia

- Agriculture achieves a very low share (including emissions from soil) in the total net emissions of the Slovak Republic - only 3.2% (CCI 45, 2017)
- Net emissions in Agriculture are gradually decreasing due to the annual decline in livestock and the overall negative emissions from agricultural land (high share of permanent grassland and pastures, low level of fertilisation)



Emissions from use of fertilisers – calculation summary

Quantitative method applied: PSM DiD

Size of sample: the sample consisted of 1 344 of farms

Data sources: National database on use of fertilisers, IL database

Emissions from use of fertilisers – calculation steps

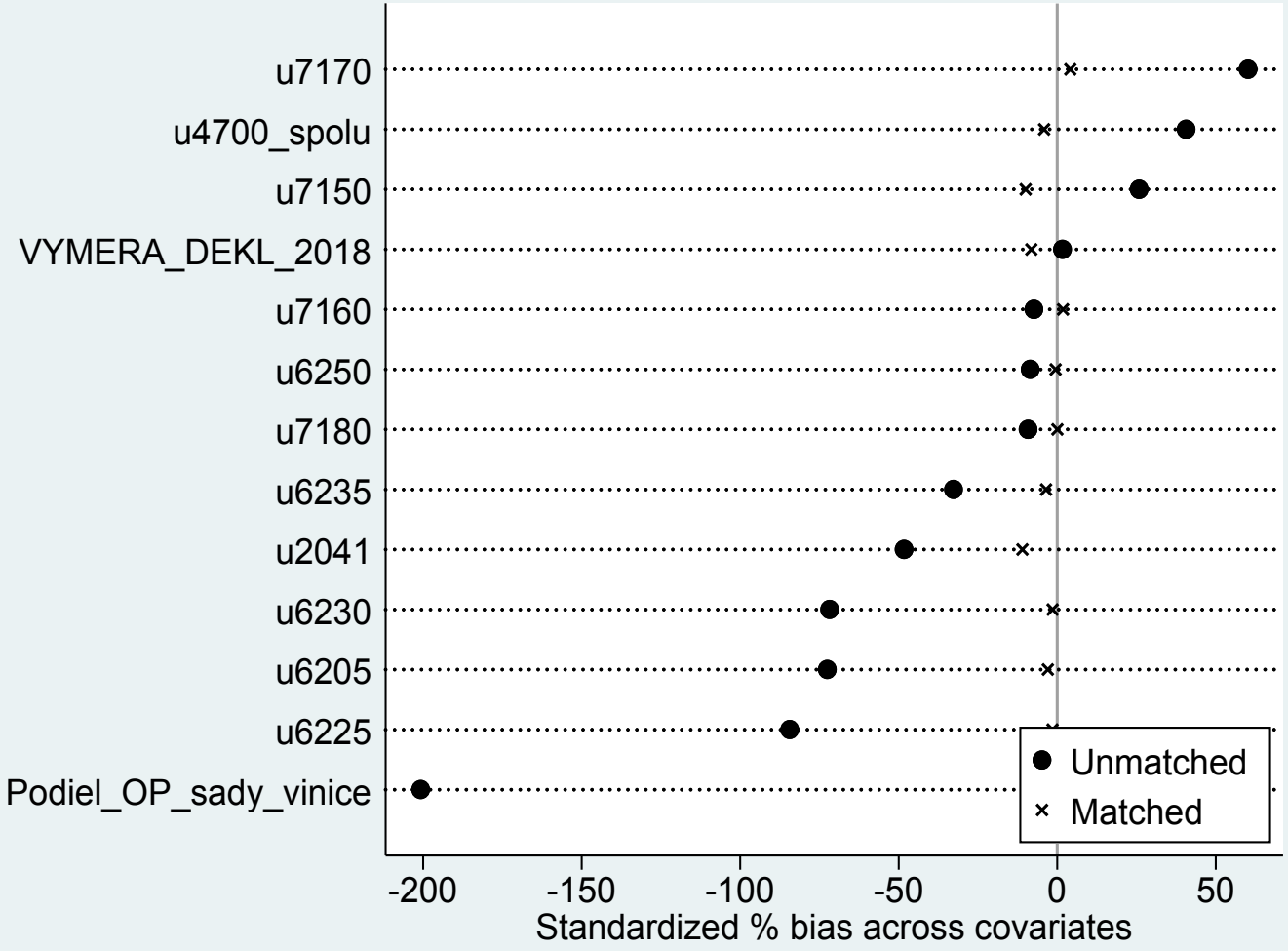
Step 1: The sample of **supported farms (treated)** was identified containing farms, which participated in **measures M10** or **M11** with 100% of their TAA**,** the control sample contained farms which did not participate in measures M10 or M11, farms with partial participation were excluded

Step 2: The sample of supported and unsupported farms was drawn from the overlap of **National database on use of fertilisers** and **Information letters database** (production, subsidy and economic data on farms). The reliable data on use of fertilisers was available only starting from 2016

Step 3: The relevant variables where identified assuring both “treated” and “control” group farms are comparable, **variables included types of agricultural land, structure of herd (species), farm type and size, agricultural income**, etc. The **target variable** was **represented** by difference in nitrogen content of used fertilisers between 2018 and 2016

Step 4: **PSM was applied** to achieve comparable samples of treated and control farms and the net effects on difference in nitrate was calculated

Emissions from use of fertilisers – decrease in standardised % bias after matching



Count of sheep

Non-investment subsidies in EUR

Count of bovine cattle

Total agricultural area (TAA) in 2013* in ha

Count of pigs

Area of vegetables in ha

Count of poultry

Area of sugarbeet in ha

Agricultural income

Area of rapeseed in ha

Area of cereals in ha

Area of oilseeds in ha

Share of arable land, orchards,wineyards on TAA

*There is a mistake in name of variable VYMERA_DEKL_2018, should be VYMERA_DEKL_2013 instead

Emissions from use of fertilisers - results

After matching, a statistically significant higher decrease in use of fertilisers by 0,03375 tons N /ha / 3 years was estimated for supported farms.

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
N_na_ha	Unmatched	.043239381	.285372845	-.242133464	.07124961	-3.40
	ATT	.043239381	.076990505	-.033751124	.019955068	-1.69

Note: S.E. does not take into account that the propensity score is estimated.

Emissions from use of fertilisers – results described

- Comparable unsupported farms applied 76,99 kg N / ha in 3 years, which is 33.75 kg N / ha in 3 years (or 11.25 kg N / ha / year) more than supported farms (43.24 kg N / ha / 3 years)
- According to the IPCC, on average per 100 kg of N applied in the form of fertiliser, 1 kg or 1% of N_2O is released
- The supported farms applied 11.25 kg N / ha less than unsupported per year and with the leakage of 1% of applied N in the form of N_2O they caused yearly emissions per 1 ha of 0.1125 kg N_2O less than unsupported farms, which represents **33.525 Kg CO_2 eq / ha / year less** (GWP 298)
- The supported area totaled 169 877 ha with average support of 212,3 EUR per ha. The total yearly **decrease in GHG emissions** equaled to **5 695 Tonnes CO_2 eq.**

Challenges and solutions for the calculation of CRI 18

Challenges	Solutions
Many farms participated on M10 with only a part of their TAA	Those farms could be excluded, since even then the sample size was sufficient and only farms with either 100% of their TAA or 0% of their TAA in M10 or M11 remained
The data on use of fertilisers was provided only starting from year 2016 and not prior to start of the RDP	The time period between 2016 and 2018 was analysed
The data was collected at the level of agricultural parcels, however identification of these parcels changed significantly in the observed time period	The estimation of the contribution of use of fertilisers to GHG emissions was performed at the farm level

Main conclusions and lessons learned

Conclusions	Lessons learned
The assessment of the secondary contributions of M10 and M11 to FA 5D confirmed the positive effects of the RDP on reducing GHG emissions in agriculture On the other hand, data on all different farming activities were missing, which makes it impossible to capture all potential contributions of the relevant RDP measures to CRI 18	Hard work is expected in order to obtain data at farm level on different activities connected to livestock production and to soil management for the coming programming period, which would enable direct evaluation of RDP measures to the decrease of GHG emissions

Recommendations / suggested improvements for ex post and future CAP

It is recommended to:

- establish the list of activities in area of soil management with their contribution to GHG emissions (both positive or negative) and collect data at the farm level on implementation of these activities
- continue in collection of data on use of fertilisers at farm level, or even at the level of agricultural parcels.
- improve comparability of data on use of fertilisers at the level of agricultural parcels over longer time period due to changes in LPIS with help of GIS
- establish the list of activities in area of livestock production (particularly manure management, diet, etc.), with their contribution to GHG emissions (both positive or negative) and collect data at the farm level on implementation of these activities

Thank you

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