Deliverable 3.5.

Value-Based Sustainability Indicators

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Sustainable financing for sustainable agriculture (SUFISA) project[2]

1. Meeting the objectives of D3.5.

In this deliverable, a sustainability performance analysis will be carried out. One objective has been formulated for D3.5. In the following it is briefly outlined how it was met.

1. Sustainability and environmental aspects

Environmental aspects, such as energy and water use, will be integrated using the sustainable value approach (Figge and Hahn 2004; Van Passel et al. 2007). A general sustainable value analysis of the EU-25 is made using farm level (FADN) data. In this context, the SVAPPAS (Sustainable Value Analysis of Policy and Performance in the Agricultural Sector) (FP6) project results are used as the starting point. Finally, the sustainable value measures will be used to simulate future land values and as such the sustainable value measure can be used in long term impact assessments (such as the long term economic impact of climate change on agricultural sustainable value –instead of land value).

2. Introduction

Deliverable 3.5. is part of Work Package 3 (WP3), which focuses on impact assessment.

The sustainable value (SV) approach integrated the farms' efficiency of environmental, social, and economic resources into a monetary analysis so that the SV indicator can be calculated. This SV indicator

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allows to adjust conventional economic performance measures (e.g., gross income, net value added, land value) by accounting for how efficiently farms use particular intermediate inputs of interest in the sustainability debate (e.g. land, fertilizers, pesticides, and water).

This deliverable links sustainability with environmental aspects. More specifically, it contains a general sustainable value analysis of the EU-25 using farm level data. The sustainable value measures will be used to simulate future land values and as such the sustainable value measure can be used in long term impact assessments.

3. Sustainable value approach: FADN data

3.1. Overview of Farm Accountancy Data Network dataset

Farm-specific data (farmed land, profitability, resources used, and subsidies) were gathered through the farm accountancy data collected by the FADN (Farm Accountancy Data Network)[3].

FADN provides farm-specific measures of approximately 80,000 farm holdings in the EU-25, which represent about 14 million farms, covering the total utilized agricultural area of about 216 million hectares. Within its field of observation, FADN provides data, which are representative in terms of region, economic size, and type of farming. Each Member State conducts the survey using uniform and consistent instruments, which is important in order to compare correctly different regions. In this analysis, we focused on specialized Field Crop (FC) agricultural holdings (General Type of Farming (TF8) = 1) according to the European classification of agricultural holdings typologies (European Commission 2008). This farm typology is present in all EU-25 countries, allowing for general EU-25 wide analysis of farms' sustainability. Average data from three years have been considered suitable to reduce the variability derived from yearly changes in management choices, land use, owned land, and input/output used by farms. We have modified the FADN sample by selecting only the farms replicated for the three consecutive years from 2010 to 2012. The sample of 11,946 specialised FC farms is designed to be representative of the underlying population of 185,430 farms across Europe (EU-25) for the period 2010-2012 and includes population weights for each farm (European Commission 2009). We have removed greenhouses, farms with less than one hectare of owned land, farms with irrigate land and no water purchases, farms with no fertilisers but crop protection use (and vice versa), farms with crop protection and fertilisers use but no energy costs, and outliers. This results in a final sample of 11,051 farms. The following farms are removed: 10 farms with less than one hectare land in ownership, 65 farms under glass, 25 inconsistent farms and 589 outliers (e.g. farms with a high output with (nearly) no farmland, farms with low farmland with high level of assets or labour force).

[3] FADN is well documented on http://ec.europa.eu/agriculture/rica/index.cfm and the information about weighting can be found on http://ec.europa.eu/agriculture/rica/methodology3_en.cfm.

3.2. Method

The data drawn from the FADN database were analysed using the Sustainable Value (SV) approach. Grounded in the "constant natural capital" and eco-efficiency theory (Figge and Hahn 2004) the SV is a value-oriented method integrating environmental, social, and economic resources efficiency in one indicator. This non-parametric approach has been used for several interesting applications: oil company (Figge and Hahn 2005); Europeans countries' economies (Ang et al. 2011), and agricultural sectors (Hou et al. 2014; Merante et al. 2015; Moretti et al. 2016; Van Passel et al. 2007; Van Passel et al. 2009).

The contribution to sustainability of a firm is measured by comparing the capital resource use efficiency of a firm to the capitals resources efficiency of a benchmark. The SV approach estimates sustainability of a company relative to the chosen benchmark, without claiming for its absolute sustainability (Van Passel et al. 2007). The opportunity cost illustrates how much return the benchmark alternative would generate by using the same amount of resources. It indicates how efficiently resources have been allocated between different economic entities (Figge and Hahn 2004). The opportunity cost for each form of resource can be calculated:

$$opportunity\ cost = \frac{value\ added_i}{resource_i} - \frac{value\ added_{benchmark}}{resource_{benchmark}} \tag{1}$$

Hence, if the return achieved by an economic unit using a defined amount of the resource exceeds the opportunity cost of this resource, then the economic unit contributes to the sustainable use of the resource at the benchmark level (Eq. 2).

$$value\ spread_i = \frac{value\ added_i}{resource_i} - \frac{value\ added_{benchmark}}{resource_{benchmark}} \tag{2}$$

Finally, the sustainable value generated by the economic unit *i* is calculated:

$$sustainable\ value_i = \frac{1}{n}\sum_{s=1}(value\ spread_i^s * resource_i^s) \tag{3}$$

where *s* indicates the number of resources accounted in the model.

3.3. Model specifications

Before starting with the calculation of the SV approach, five issues needed to be considered: (1) the choice of the economic activity, (2) the definition of the life span, (3) the selection of the resources, (4) the choice of the economic return figure, and (5) the definition of the benchmark (Figge et al. 2006). In this study, we focused on specialized field crops agricultural holding across Europe and we analysed farms' accountancy data for a three years lifespan (2010-2012). Previous studies at the economic entity level choose firms' net value added as economic return figure (Hahn et al. 2007; Hou et al. 2014; Moretti et al. 2016; Van Passel et al. 2007; Van Passel et al. 2009). However, the four selected resources categories accounted on average for around 53% of total intermediate consumption of the sampled farms. Therefore, to avoid double counting bias, the Total Output (TO) was used in this study to illustrate the economic performance of each farm in the sample. This economic return figure accounts for sales, farm use, farmhouse consumption, and other farm output (e.g., leased land, external contract work, forestry products, etc.) while it excludes subsidies and taxes (European Commission 2007). Four resources categories were considered: (1) used land in ownership, (2) capital assets (excluding land capital), (3) labour, and (4) natural resources. The FADN provides information about non-financial resources use only in the form of purchasing costs. For each farm, the annual expenses for energy (electricity, heat, and machine fuels), fertilisers, crop protection materials (hereinafter simply pesticides), and water were deemed proxies for the natural resources used. Farm's fertilizers and pesticides use is considered as the main driver of groundwater degradation and soil fertility and crop diversity reduction (Tilman et al. 2002). Thus, the SV was expressed as a function of used land, farm assets, labour, energy, fertilisers, pesticides, and water:

$$sustainable\ value_i \int (land\ used_i, farm\ assets_i, labour_i, energy_i, fertilizers_i, pesticides_i, water_i)$$

The choice of the benchmark determines the explanatory power of the analysis (Ang and Van Passel 2010). Several benchmarks forms could be chosen, without affecting the firm's ranking (Moretti et al. 2016; Van Passel et al. 2007). However, since the purpose was to assess the sustainability performance of specialised field crops farms at European level, the average benchmark alternative including all the observations in the sample was used in this study.

3.4. Data description

Table 1 provides an overview and detailed description of all model variables sourced from the FADN dataset.

The average farm level total output is nearly 176,000 Euro and the owned capital is nearly 360,000 Euro, but there is a wide range in values. The amount of land actively farmed exceeds 140 ha per farm. The average farm level labour effort is around three annual working unit (AWU)[4] , and average farm level expenses on direct inputs vary from nearly 10,000 Euro for crop protection materials to nearly 22,000 Euro for fertilizers and it amounts to nearly 1,000 Euro for water resource. It is helpful to understand how the selected variables vary across countries. Besides the country levels, the FADN data set divides the European Union into a set of territorial units called NUTS2 (Nomenclature of Territorial Units for Statistics) regions. In our dataset, 213 out of 287 NUTS2 regions[5] are represented in the dataset accounting for an average of 46 agricultural holdings sampled per each NUTS2 region.

TABLE 1: OVERVIEW OF THE RESOURCES USED IN THE SV MODEL, DESCRIPTIVE STATISTICS FOR ALL SAMPLED FARMS AND THE WEIGHTED AVERAGE EU-25 BENCHMARK

Variable	Mean	Min	Max	St. Dev.	Average EU-25 benchmark
Total Output (€)	175,663.2	1,982.67	11,400,000	435,573.2	448,910.90
Land used (ha)	143.25	1.24	8,875.67	367.87	377.42
Assets (€)	359,034.7	735.14	30,800,000	855,982.8	801,955.10
Labour (AWU)	2.63	0.05	136.60	6.15	5.22
Energy (€)	16,831.06	7.77	847,083.30	43,774.81	43,297.77
Fertilisers (€)	21,759.57	0.00	1,365,644	53,979.81	57,494.67
Pesticides (€)	13,819.86	0.00	849,718.60	35,918.97	36,639.96
Water (€)	848.09	0.00	302,054.70	4,746.84	1,376.87
Farms represented (N)	49.22	1.71	2,158	85.17	

Table A in Appendix shows the descriptive statistics of our model variables per ha grouped by country. Specialized field crops agricultural holdings are not evenly distributed across Europe. In Western Europe, the average farm level TO per hectare ranges from nearly 750 Euro to around 4,500 Euro. Farms in Eastern European countries perform worse with an average TO per ha ranging from nearly 600 to almost 1,200 Euro.

Only Slovenia records an average value (around 3,000 Euro) close to Western European countries. United Kingdom and Ireland achieve an average farm level TO of around 1,500 Euro per ha. Bigger farms are located in Eastern Europe, where the average land use ranges from around 1,000 to barely 80 hectares in Poland. In Western Europe, the bigger farms size equals around 250 hectares (Denmark and UK) in Northern Europe, while it reaches around 25 hectares (Greece and Portugal) in the Southern regions. Financial investments per unit of cultivated land at farm level are largely higher in Western compared with Eastern European countries. Farm assets fluctuates from around 1,200 to nearly 13,000 Euro in Latvia, Bulgaria, Slovakia, and the Netherlands respectively. Labour force input is higher in Eastern and Southern Europe, with Bulgaria, Poland, Romania, Slovenia, Greece, Portugal, and Italy recording on average from

[4] One AWU equals the work performed by one person who is occupied on agricultural holding on a full-time basis.
[5] No specialised FC are sampled in 61 NUTS2 regions and 13 NUTS2 regions have been deleted because they counted only one observation.

0.06 to 0.13 AWU per hectare. On average, specialised field corps farms consume more natural resources in Western than Eastern Europe, and water is more exploited in Southern European countries.

3.5. Results

Figure 1 shows the distribution of the SV per hectare (hereinafter simply SV) across European countries. Overall, farmers in North Western European countries use their resources more efficiently compared with the average benchmark. While Eastern and Southern countries show right skewed distributions and several negative outliers (e.g., Greece, Italy, Spain, Romania).

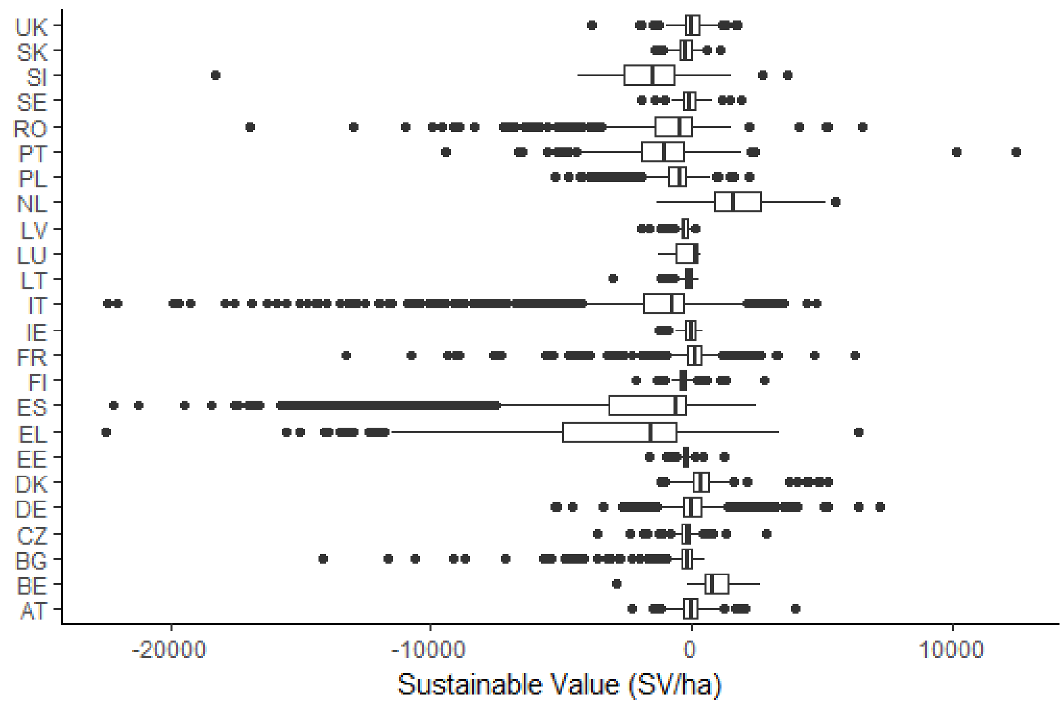

FIGURE 1: COUNTRIES SUSTAINABLE VALUE DISTRIBUTIONS

[AT: Austria; BE: Belgium; BG: Bulgaria; CZ: Czech Republic; DE: Germany; DK: Denmark; EE: Estonia; EL: Greece; ES: Spain; FI: Finland; FR: France; IE: Ireland; LT: Lithuania; LU: Luxemburg; LV: Latvia; NL: The Netherlands; PL: Poland; PT: Portugal; RO: Romania; SE: Sweden; SI: Slovenia; SK: Slovakia; UK: United Kingdom]

Figure 2 and Table 2 clearly indicate the existence of frontrunners (North Western European countries) and laggards (Eastern and Southern European countries). The Netherlands, Denmark, and Belgium are frontrunners reporting the highest average SVs ranging from around 500 to more than 1,500. Germany and France disclose SVs values ranging from around +50 to -80 respectively. However, these countries clearly show a net division between North and South. In both countries, the northern part results in positive SVs coefficients, while the southern reports negative ones. In Germany, the same clear difference exists between the western and the eastern part of the country, with the latter reporting SVs scores below the benchmark threshold. The same performances are recorded in the United Kingdom (SV ≈ 57). Although the SVs scores are below the benchmark threshold, Finland and Sweden, together with Ireland, result in higher sustainable efficiency compared with Southern and Eastern countries. In Southern and Eastern Europe, farms report average SVs values below zero, which means their sustainable efficiency performances is lower than the average benchmark. Southern countries result in negative SVs coefficients, ranging from around -3,000 for Greece, to around -1,000 for Portugal. Romania and Slovenia ensue in SVs values comparable with Southern countries, ranging from around –1,000 to almost -1,800, respectively.

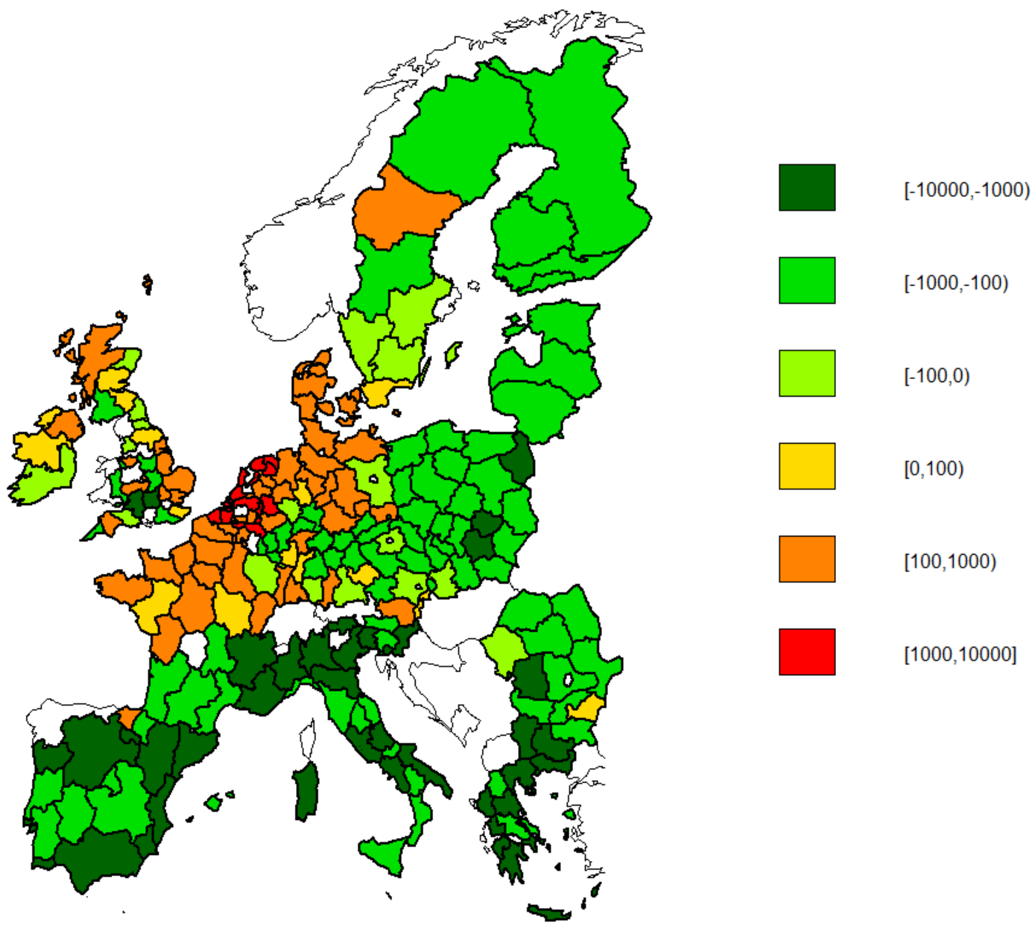

FIGURE 2: WEIGHTED AVERAGE SUSTAINABLE VALUE INDICATOR AT THE EU-25 NUTS2 LEVEL

Table 2 describes the countries' average contributions of each resource capital form to the SV indicator.

Frontrunner countries (Belgium, Denmark, and the Netherlands) report a positive contribution from land use, labour, and all natural resources. These countries diverge between each other in terms of financial resource use. Among these countries, only Belgium reports a positive contribution from this form of resource, while negative contributions are recorded in Denmark and the Netherlands. Other North Western European countries, including Sweden, Ireland, and the United Kingdom show a positive contribution for land use and labour (except for Austria and Ireland). The contribution of financial capital resources is negative for most of these countries. Only France records a positive contribution for this form of resource. Natural resources use show fluctuating contribution to the SVs coefficients between these countries. Germany shows positive contributions to the SVs indicator form fertilizers, energy, and pesticides use. Negative contributions from fertilizers and pesticides resources are recorded in Ireland, energy and fertilizes resources use in Finland, only energy in Sweden, while pesticides contribute negatively to the average SV in France and United Kingdom. All North Western countries, excluding the frontrunners (Belgium, Denmark and The Netherlands) and Austria, present a negative contribution from water resource use, suggesting this resource as a limiting factor for the sustainable performances of specialised field crop farms in these regions.

TABLE 2: AVERAGE SUSTAINABLE VALUE PER HECTARE AND VALUE CONTRIBUTIONS OF THE DIFFERENT CAPITAL RESOURCES USED BY FARMS

Country	SV per Ha	Land use	Net Assets	Labour	Fertilisers	Energy	Pesticides	Water
Austria	-3.93	594.32	-2,529.97	-475.69	740.41	466.00	675.68	501.72
Belgium	903.60	1,699.04	558.79	609.30	1,427.28	1,607.98	167.72	255.10
Bulgaria	-692.77	-281.66	216.49	-3,963.57	110.83	-113.83	261.40	-1,079.03
Czech Republic	-201.95	58.05	-123.08	-885.32	299.94	-219.37	-271.42	-272.43
Germany	48.50	852.42	-366.86	135.98	372.56	178.45	69.22	-902.27
Denmark	532.45	970.30	-1,831.97	1,187.17	978.16	979.64	764.36	679.45
Estonia	-248.01	-594.18	-212.09	-526.86	-328.18	-236.33	70.39	91.19
Greece	-3,064.93	754.54	-241.72	-5,724.51	304.49	-827.73	118.10	-15,837.68
Spain	-2,446.98	-13.26	-749.80	-1,774.47	106.17	98.67	239.41	-15,035.57
Finland	-279.42	-438.49	-879.64	-229.62	-159.66	-446.55	199.91	-1.85
France	-72.84	578.03	132.01	228.27	134.41	788.05	-92.24	-2,278.37
Ireland	-85.37	193.89	-172.32	-190.16	-373.32	361.20	-226.51	-190.35
Italy	-1,650.79	1,063.67	-2,392.02	-4,544.83	857.19	-72.19	867.00	-7,334.39
Lithuania	-170.92	-328.09	-187.00	-582.71	-517.97	27.51	13.53	378.27
Luxemburg	-244.05	829.84	-644.51	583.68	558.13	608.19	588.06	-4,231.75
Latvia	-319.35	-542.01	14.27	-1,058.34	-337.64	-337.67	-6.80	32.74
the Netherlands	1,839.26	3,563.88	-2,329.02	2,771.83	3,157.73	2,259.38	19.32	3,431.67
Poland	-636.82	35.67	-585.24	-4,252.69	-119.50	10.48	232.36	221.20
Portugal	-1,153.77	1,810.93	382.77	-12,511.43	1,361.98	88.70	786.85	3.80
Romania	-1,090.96	109.79	-36.99	-7,987.06	523.03	352.18	517.71	-1,115.40
Sweden	-50.56	144.97	-713.04	210.21	46.51	-352.53	355.34	-45.38
Slovenia	-1,720.49	1,912.01	-4,016.43	-8,292.50	1,365.87	14.70	763.96	-3,791.03
Slovakia	-248.22	-267.78	200.57	-1,008.88	52.90	-351.77	-175.27	-187.32
United Kingdom	57.03	488.15	-177.01	474.80	188.35	340.61	-106.04	-809.63

Within North Western countries, Finland records the lowest average SVs score. As showed in Figure 2, Southern European countries are the worst performers, with Greece and Spain reporting the lowest SVs scores among all EU-25 countries. Overall, these countries report positive contribution from land use. Only Spain disclose negative contribution for this natural resource. The negative contribution from energy use affects the SVs scores of Italy and Greece, while all these countries record positive contributions from energy, fertilizers and pesticides use. However, all Southern European countries show a negative contribution from financial, labour, and water resources (only Portugal reports a positive value for net assets and water). This outcome suggests these resources as limiting factors for the sustainable performances of specialised field crop farms in these regions compared with the average benchmark. Slovenia, Romania, and Bulgaria display similar patterns compared with Southern countries, reporting positive contributions from land use, fertilizers, energy, and pesticides, while financial capital, labour, and water resources contributions are negative. Within these countries, only Bulgaria shows negative contributions from land and energy resources, while reporting a positive contribution from net assets. All other Eastern European countries (Poland, Latvia, Lithuania, Slovakia, Czech Republic, and Estonia), reveal approximately the same pattern. Net assets, and labour, contribute negatively to the sustainable performances of field crop farms compared with the benchmark. Land use contribute positively to the SVs scores of only Poland and Czech Republic. Besides land use, Lithuania and Poland report positive contributions for all natural resources used with the exception of fertilizers, while Czech Republic and Slovakia show negative contributions from energy use, pesticides and water resources.

3.6. Conclusion

This study presents the first application of the SV approach at farm level for all EU-25 countries. The SV approach integrates the farms' efficiency of environmental, social, and economic resources into a monetary analysis so that the SV indicator can be calculated. Concretely, we assessed the use of five environmental (land use, energy, fertilizers, pesticides, and water), one social (labour), and one economic resource (financial assets) in combination with the total output for all EU-25 specialized field crop farms from 2010 to 2012. An essential component of the SV measure is the benchmark. We calculated the SV for the weighted average benchmark at the European level (EU-25). The results show that North Western countries perform better compared to the other countries. The contribution analysis suggests that the sustainable efficiency of specialized crop farms in Southern and Eastern European countries could be improved by implementing strategies for increasing the efficiency of financial capital, labour, and water resources use.

In the difficult sustainability debate, through its practical, communicative and synthesising nature, the SV approach is a promising measure of farms' performance. The SV indicator allows to adjust conventional economic performance indicators (e.g., gross income, net value added, land value) by accounting for the use efficiency of intermediate inputs of particular interest in the sustainability debate. For example, comparing the spatial distribution of the SVs indicator (Figure 2) with the weighted average land value for the same sample (Figure A in Appendix), it is clear that Southern countries are favoured when the latter is accounted as measure of farms' performance. The authors believe that the SV indicator could be used as an instrument for fine-tuning farms' performances indicators, when these are distorted by policies (e.g.

regulated land market in France) or by resources scarcity (e.g. agricultural land in Ireland, freshwater in Southern European countries, etc.). Further interesting applications of these concepts could involve using the SV indicator as indicator of farms' performance in the cross-sectional studies of the impacts climate change on agriculture.

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Appendix

TABLE A: DESCRIPTIVE STATISTICS OF THE SV MODEL VARIABLES GROUPED BY COUNTRY

Country		Total Output (€/ha)	Land used (ha)	Assets (€/ha)	Labour (AWU/ha)	Energy (€/ha)	Fertilisers (€/ha)	Pesticides (€/ha)	Water (€/ha)
Austria (N=298)	mean	1,783.72	59.24	7,706.32	0.03	127.1	130.38	88.37	1.87
	min	328.14	9.28	908.53	0.01	32.89	0.00	0.00	0.00
	max	6,761.53	264.08	34,186.47	0.18	468.12	369.74	288.68	38.2
	st. dev.	988.7	37.13	5,090.48	0.02	62.76	69.19	53.45	3.61
Belgium (N=87)	mean	2,887.87	84.51	4,156.4	0.03	123.33	186.98	221.38	4.31
	min	1,415.39	15.49	533.36	0.01	8.48	41.54	53.03	0.00
	max	8,078.9	225.51	15,623.25	0.11	739.32	376.12	693.75	86.46
	st. dev.	1,208.53	50.63	2,710.34	0.02	107.86	69.62	120.15	10.21
Bulgaria (N=271)	mean	907.74	1,088.75	1,234.9	0.06	98.53	102.07	52.75	5.21
	min	227.18	2.18	41.11	0.00	11.26	8.99	2.23	0.00
	max	11,419.03	8,875.67	15,158.02	1.12	1,182.14	1,043.39	483.92	205.17
	st. dev.	901.98	1,249.96	1,731.79	0.15	83.68	84.50	45.85	20.87
Czech Republic (N=256)	mean	1,247.45	428.88	2,448.42	0.02	141.48	121.36	123.97	4.02
	min	363.9	11.86	239.21	0.00	50.12	23.12	3.33	0.00
	max	6,568.41	3,434.35	20,133.37	0.10	426.03	359.5	582.74	58.92
	st. dev.	730.43	565.31	1,970.57	0.02	52.77	56.77	65.38	7.41
Germany (N=1,144)	mean	2,041.82	214	4,303.06	0.02	179.73	211.96	159.84	8.33
	min	233.09	6.06	361.03	0.00	1.65	0.00	0.00	0.00
	max	11,290.6	5,668.76	83,192.02	0.22	1,255.28	849.01	1,050.85	209.92
	st. dev.	1,423.33	436.64	4,780.73	0.03	127.43	89.5	93.03	13.41
Denmark (N=134)	mean	2,159.7	248.55	7,131.04	0.01	113.82	151.33	113.89	3.35
	min	607.68	14.7	1,388.12	0.00	2.92	37.86	24.07	0.00
	max	9,078.84	1,674.31	37,168.5	0.09	308.29	342.37	399.13	42.95
	st. dev.	1,399.43	238.91	5,259.42	0.01	50	60.28	54.88	5.95
Estonia (N=118)	mean	595.14	309.7	1,442.15	0.01	80.19	115.5	41.08	0.09
	min	222.82	15.3	228.64	0.00	26.22	0.00	0.00	0.00
	max	3,855.47	3,236.16	10,628.34	0.13	216.56	308.81	159.31	1.41
	st. dev.	391.31	398.16	1,224.33	0.02	29.92	58.24	25.49	0.23
Greece (N=1,099)	mean	1,943.65	23.78	3,906.96	0.09	267.33	209.72	149.09	53.09
	min	256.27	1.6	82.27	0.01	2.94	0.00	0.00	0.00
	max	11,393.94	179.1	41,318.65	0.63	1,370.76	963.5	1,638.29	607.84
	st. dev.	1,565.62	20.22	3,607.92	0.10	191.44	126.55	150.13	69.54
Spain	mean	1,158.07	72.59	3,411.75	0.03	102.2	134.92	75.28	49.11

(N=1,506)	min	204.89	3.37	197.73	0.00	2.32	0.00	0.00	0.00
	max	11,016.35	600	36,467.37	0.31	1,790.74	1,209.95	1,577.91	930.08
	st. dev.	1,189.79	65.23	3,839.42	0.04	132.44	121.82	130.8	83.09
Finland (N=192)	mean	750.91	78.01	2,912.95	0.01	115.5	115.96	44.55	1.32
	min	205.83	16.2	458.16	0.00	27.43	0.00	0.00	0.00
	max	5,382.47	257.93	12,226.78	0.05	334.79	350.54	198.56	37.62
	st. dev.	622.35	48.14	1,580.01	0.01	45.63	51.17	31.05	3.32
France (N=567)	mean	1,781.61	110.24	2,942.37	0.02	94.82	210.17	151.65	12.31
	min	446.66	11.33	111.59	0.00	2.08	0.00	0.00	0.00
	max	11,266.7	793.6	15,209.33	0.19	646.48	872.22	709.82	299.52
	st. dev.	1,135.92	74.06	1,830.03	0.02	72.06	78.92	75.16	30.68
Ireland (N=40)	mean	1,383.29	79.82	2,779.07	0.02	98.58	223.05	130.16	2.33
	min	590.9	15.87	335.09	0.00	5.52	0.00	0.00	0.00
	max	3,200.41	464.99	6,933.19	0.05	307.11	373.62	321.47	19.57
	st. dev.	503.39	78.74	1,414.08	0.01	66.5	79.82	59.57	4.51
Italy (N=1,531)	mean	2,255.5	40.41	8,310.55	0.08	224.38	178.27	112.8	26.95
	min	243.62	1.29	355.5	0.01	0.5	0.00	0.00	0.00
	max	11,450.78	583.15	187,698.7	0.75	1,989.58	1,394.34	1,245	616.4
	st. dev.	2,044.22	54.91	8,963.41	0.08	190.32	128.58	135.95	61.41
Lithuania (N=169)	mean	861.31	325.94	1,872.78	0.02	80.42	176.24	68.93	1.16
	min	211.18	11.2	626.28	0.00	29.14	0.00	0.00	0.00
	max	1,851.69	1,895.05	6,369.37	0.13	177.79	407.61	207.08	28.32
	st. dev.	317.13	293.32	864.33	0.02	23.18	83.59	42.29	2.52
Luxemburg (N=3)	mean	2,019.24	67.45	4,758.74	0.02	136.1	187.14	116.81	19.17
	min	1,424.34	61.31	3,048.56	0.01	89.97	145.01	89.9	0.54
	max	2,979.94	77.52	6,115.99	0.02	171.65	234.46	131.1	28.87
	st. dev.	839.84	8.79	1,563.87	0.00	41.85	44.95	23.32	16.14
Latvia (N=187)	mean	647.39	364.68	1,131.07	0.02	95.01	125.25	52.81	0.09
	min	210.24	9.67	147.22	0.00	6.79	0.00	0.00	0.00
	max	2,148.3	5,640.76	4,892.49	0.21	406.28	381.02	264.09	2.01
	st. dev.	329.03	554.4	696.18	0.03	48.62	79.99	42.71	0.33
the Netherlands (N=142)	mean	4,753.28	111.58	12,652.4	0.02	240.54	204.35	386.39	3.28
	min	1,376.63	12.18	4,525.03	0.01	68.75	15.61	1.39	0.00
	max	11,122.74	686.24	38,486.37	0.10	665.86	474.97	913.69	29.74
	st. dev.	1,913.77	91.52	5,179	0.02	125.38	88.27	164.8	4.55
Poland (N=2,122)	mean	1,225.06	79.63	3,234.07	0.06	117.15	171.80	80.76	2.52
	min	207.57	4.96	130.93	0.01	14.53	0.00	0.00	0.00

	max	10,021.03	3,452.32	27,606.61	0.39	1,282.69	790.28	701.86	30.91
	st. dev.	699.94	169.47	2,280.44	0.06	69.08	78.47	51.19	3.12
Portugal (N=118)	mean	1,981.21	24.86	3,530.05	0.13	191.82	149.13	120.89	0.93
	min	215.78	2	54.36	0.01	4.19	1.37	1.23	0.00
	max	11,419.37	382.33	30,124.94	0.49	1,057.03	1,778.21	1,483.55	41.69
	st. dev.	1,941.14	42.99	4,672.69	0.11	197.1	210.41	175.54	4.29
Romania (N=566)	mean	1,228.55	220.28	2,331.73	0.10	86.5	90.91	60.84	7.58
	min	251.47	1.24	60.66	0.00	0.55	0.00	0.00	0.00
	max	10,803.99	6,417	81,216.22	0.81	1,623.49	510.13	482.74	1,261.87
	st. dev.	1,332.04	530.86	4,956.42	0.14	117.73	60.94	74.02	55.41
Sweden (N=138)	mean	1,332.18	116.02	3,655.33	0.01	162.1	164.74	79.52	2.64
	min	217.9	12.57	663.78	0.00	33.4	27.22	0.58	0.00
	max	5,762.23	656.1	12,882.83	0.06	728.27	564.86	322.23	43.56
	st. dev.	752.64	106.99	2,311.8	0.01	79.27	75.4	63.49	5.33
Slovenia (N=51)	mean	3,101.41	24.12	12,715.89	0.13	297.72	222.29	190.79	20.65
	min	421.95	5.06	1,390.41	0.02	40.21	14.76	12.56	0.00
	max	11,016.77	97.25	43,786.75	0.55	1,645.11	652.69	930.05	378.44
	st. dev.	2,376.01	18.75	9,796.19	0.10	253.04	144.19	179.47	52.37
Slovakia (N=95)	mean	921.62	561.27	1,288.15	0.02	122.82	110.67	89.15	1.94
	min	241.25	28.22	133.61	0.00	5.59	0.00	0.00	0.00
	max	2,374.79	3,300.71	7,235.92	0.06	333.45	325.24	448.49	28.77
	st. dev.	460.22	788.06	1,024.47	0.01	55.82	56.9	60.24	5.08
United Kingdom (N=232)	mean	1,678.83	242.28	3,324.51	0.01	128.86	192.16	146.05	7.25
	min	407.86	23.23	951.02	0.00	0.09	13.08	2.16	0.00
	max	5,921.8	2,112.87	31,366.56	0.12	497.15	392.76	467.71	91.92
	st. dev.	774.95	260.44	2,290.21	0.01	74.59	66.95	68.82	8.47

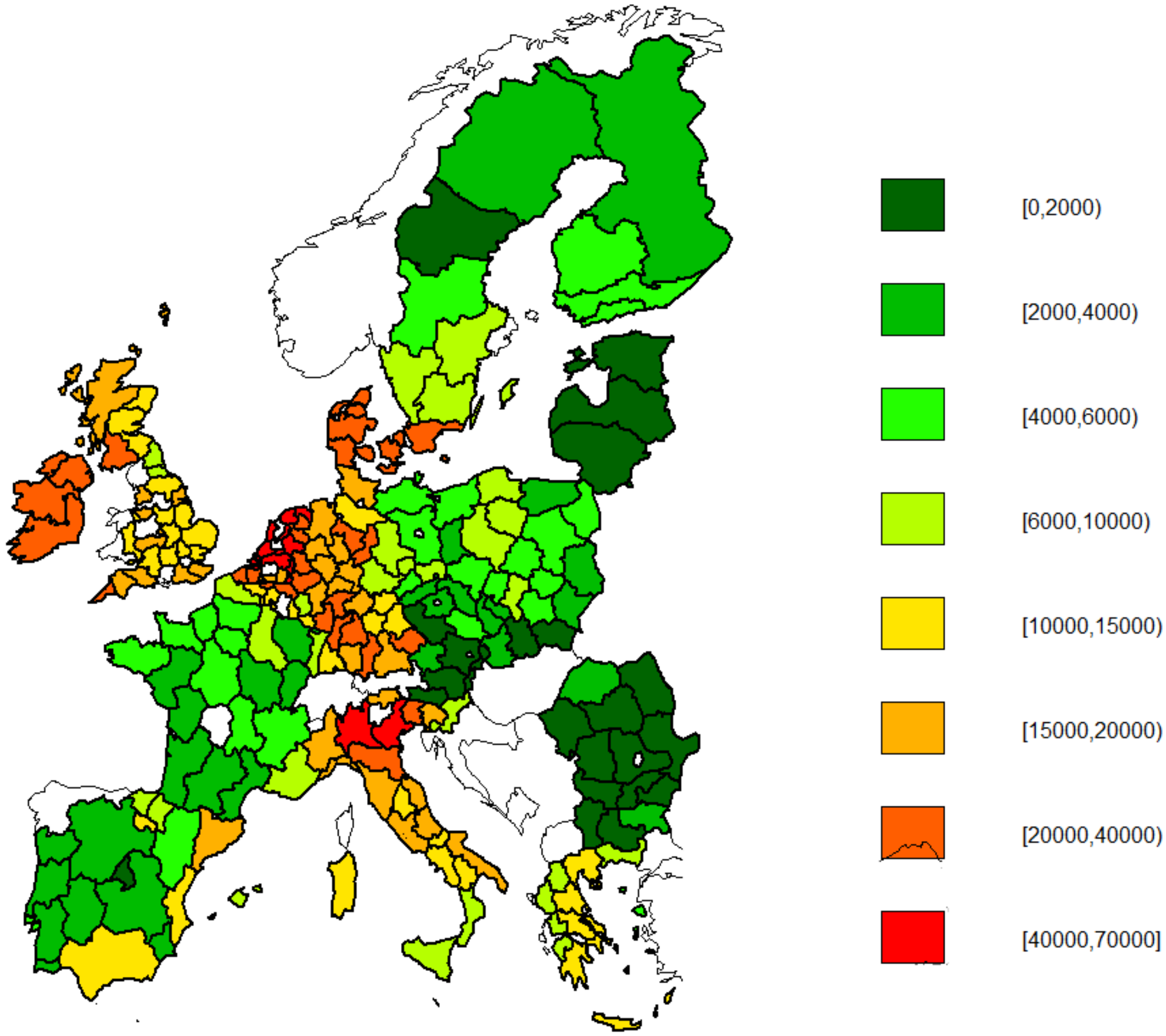

FIGURE A: AVERAGE LAND VALUE PER HA AT THE EU-25 NUTS2 LEVEL