Supporting information for "Global economic valuation of organic agriculture"

Table S1. Crops included in each FAO crop group.

Crop group	Included crops
Fruit & nuts	Grapes, chestnuts (in shell), walnuts (in shell), blueberries, other nuts (excluding wild edible nuts and groundnuts), in shell, n.e.c., dates, avocados, apples, bananas, oranges, kiwi fruit, pistachios (in shell), pomelos and grapefruits, almonds (in shell), raspberries, hazelnuts (in shell), figs, strawberries, pineapples, cranberries, lemons and limes, apricots, pears, other stone fruits, peaches and nectarines, cherries, tangerines, mandarins, clementines, plums and sloes, currants, persimmons, quinces, gooseberries
Cereals	Wheat, rice, maize (corn), barley, oats, cereals n.e.c., triticale, rye, buckwheat
Spices & stimulants	Tea leaves, coffee (green), cocoa beans, hop cones
Oil crops	Olives, soya beans, oil palm fruit, coconuts (in shell), sunflower seed, hempseed, rape or colza seed, other oil seeds, n.e.c., linseed, mustard seed
Vegetables	Peas (green), cabbages
Edible roots & tubers	Potatoes
Sugar crops	Sugar cane, sugar beet
Pulses	Lentils (dry), beans (dry), lupins

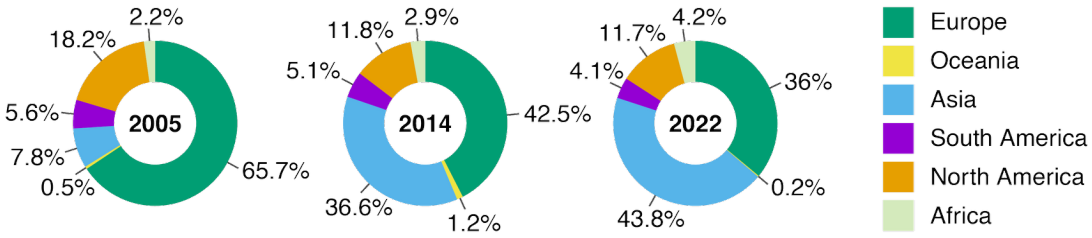

Fig. S1. Distribution of the total value of organic agriculture across continents and three time points (2005, 2014 and 2022).

Table S2. Organic (org) producer prices and yields relative to conventional (con) systems for individual crops.

	Price			Yield		
Crop	Organic premium	95% CI	n	Org:con yield	95% CI	n
Grapes	1.08	0.99–1.17	22	0.83	0.72–0.96	7
Wheat	1.14	0.96–1.32	22	0.65	0.58–0.74	163
Apples	1.17	1.08–1.25	75	0.94	0.76–1.15	17
Rice	1.37	1.23–1.51	130	0.72	0.50–1.05	10
Soya beans	1.05	0.97–1.13	77	0.88	0.82–0.94	113
Maize (corn)	1.28	1.12–1.44	55	0.80	0.74–0.87	222
Coffee, green	1.25	1.18–1.31	478	0.71	0.64–0.79	7
Barley	1.97	0.78–3.17	17	0.65	0.56–0.75	94
Potatoes	1.21	1.08–1.34	17	0.66	0.53–0.82	18
Strawberries	1.15	1.00–1.29	29	0.94	0.63–1.42	16

Table S3. Share of the total value of each crop or crop group accounted for by the three countries with the highest values for that crop or crop group.

	Countries with highest values (% of item total)		
Item	1st	2nd	3rd
Crop groups			
All crops	China (38%)	France (13%)	Italy (7%)
Fruit &nuts	France (25%)	China (25%)	United States (8%)
Cereals	China (36%)	France (9%)	United States (8%)
Spices & stimulants	China (76%)	Peru (5%)	Sierra Leone (3%)
Oil crops	Italy (36%)	China (17%)	Spain (8%)
Vegetables	Canada (24%)	Germany (23%)	Mexico (18%)
Edible roots & tubers	Egypt (22%)	Germany (20%)	France (14%)
Sugar crops	Paraguay (24%)	Colombia (18%)	Germany (12%)
Pulses	Canada (57%)	United States (27%)	Germany (6%)
Crops			
Grapes	France (52%)	Spain (12%)	Italy (9%)
Wheat	China (44%)	France (11%)	Italy (9%)
Apples	China (26%)	United States (20%)	France (19%)
Rice	China (63%)	Thailand (14%)	Pakistan (5%)
Soya beans	China (55%)	United States (11%)	Canada (6%)
Maize (corn)	United States (43%)	France (15%)	Ukraine (8%)
Coffee	Peru (34%)	Colombia (20%)	Honduras (10%)
Barley	France (18%)	Germany (17%)	Spain (12%)
Potatoes	Egypt (22%)	Germany (20%)	France (14%)
Strawberries	Mexico (33%)	France (11%)	Italy (10%)

Table S4. Organic (org) producer prices and yields relative to conventional (con) systems across all crops and for FAO crop groups.

	Price			Yield		
Crop group	Organic premium	95% CI	n	Org:con yield	95% CI	n
All crops	1.37	1.30–1.43	2459	0.80	0.76–0.84	1071
Fruit & nuts	1.18	1.14–1.22	658	0.88	0.79–0.98	52
Cereals	1.37	1.24–1.50	219	0.75	0.70–0.80	573
Spices & stimulants	1.63	1.46–1.80	896	0.85	0.69–1.04	20
Oil crops	1.05	0.97–1.12	144	0.83	0.72–0.95	119
Vegetables	1.23	1.19–1.27	455	0.83	0.74–0.94	242
Edible roots & tubers	1.21	1.08–1.34	17	0.77	0.61–0.97	28
Sugar crops	1.30	1.12–1.48	10	0.78	0.59–1.04	4
Pulses	1.42	1.22–1.63	60	0.85	0.76–0.96	17

Table S5. Effect sizes and 95% confidence intervals from our meta-analysis compared with estimates from de la Cruz, et al. [1].

FAO group	Our meta-regression	de la Cruz, et al. [1]
All crops	0.80 (0.76–0.84)	0.83 (0.77–0.89)
Cereals	0.75 (0.70–0.80)	0.82 (0.76–0.90)
Fruit & nuts	0.88 (0.79–0.98)	1.02 (0.75–1.39)
Vegetables	0.83 (0.74–0.95)	0.85 (0.76–0.94)
Pulses	0.85 (0.76–0.96)	0.75 (0.62–0.90)
Oil crops	0.83 (0.72–0.95)	0.84 (0.76–0.94)
Spices & stimulants	0.85 (0.69–1.04)	0.49 (0.26–0.92)

The main differences between our meta-analysis and that of de la Cruz, et al. [1] can be attributed to dataset composition. de la Cruz, et al. [1] used a subsample of the data compiled by Ponisio, et al. [2], included studies from Badgley, et al. [3] that were excluded in Ponisio, et al. [2] due to concerns about the validity of comparisons between organic and conventional systems[4], and incorporated 13 more recent studies not included in previous meta-analyses. Although some effect sizes differed between the two analyses, these differences were generally small, and there is no clear evidence to suggest that either set of estimates is more accurate. The larger divergence observed for spices and stimulants is likely driven by the sample size differences, where de la Cruz, et al. [1] included only three observations for these groups, while we included 20.

References

1 de la Cruz, V. Y. V., Tantriani, Cheng, W. & Tawaraya, K. Yield gap between organic and conventional farming systems across climate types and sub-types: A meta-analysis. *Agricultural Systems* **211**, 103732 (2023). https://doi.org/https://doi.org/10.1016/j.agsy.2023.103732

2 Ponisio, L. C. *et al.* Diversification practices reduce organic to conventional yield gap. *Proceedings of the Royal Society B: Biological Sciences* **282**, 20141396 (2015). https://doi.org/doi:10.1098/rspb.2014.1396

3 Badgley, C. *et al.* Organic agriculture and the global food supply. *Renewable Agriculture and Food Systems* **22**, 86-108 (2007). https://doi.org/10.1017/S1742170507001640

4 Connor, D. J. Organic agriculture cannot feed the world. *Field Crops Research* **106**, 187-190 (2008). https://doi.org/https://doi.org/10.1016/j.fcr.2007.11.010