



Supplement of

Changing global cropping patterns to minimize national blue water scarcity

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Table S1. Change in harvested area per product group per continent in absolute terms (10⁶ ha) when shifting from the cropping pattern in the reference period (1996-2005) to the optimised cropping pattern (with $\alpha = 1.1$).

		Cereal	Fibres	Fruits	Nuts	Oil crops	Pulses	Roots	Spices	Stimulants	Sugar crops	Vegetables
Africa	Rainfed	2.6	0.2	0.4	0.1	-2.9	-0.5	-0.4	-0.1	0.6	0.1	-0.3
	Irrigated	-3.0	-0.3	-0.4	0.0	-0.7	-0.1	-0.2	0.0	0.0	-0.2	-0.5
	Total	-0.4	0.0	0.0	0.1	-3.6	-0.6	-0.6	-0.1	0.6	-0.1	-0.7
Asia	Rainfed	1.5	0.9	1.0	-0.5	-1.7	-2.2	-0.1	0.2	-0.4	0.2	1.4
	Irrigated	-9.7	-2.7	-2.2	-0.1	-5.1	-0.3	-0.3	-0.2	-0.2	-1.2	-1.1
	Total	-8.2	-1.8	-1.2	-0.6	-6.8	-2.5	-0.5	0.0	-0.6	-1.0	0.3
Europe	Rainfed	1.3	-0.1	-0.3	0.0	-0.1	-0.2	0.0	0.0	0.0	0.1	-0.8
	Irrigated	0.0	0.1	-0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.1	-0.3
	Total	1.3	0.0	-0.3	0.0	0.1	-0.2	0.1	0.0	0.0	0.2	-1.1
North America	Rainfed	-1.4	0.3	0.1	0.0	1.4	0.4	-0.2	0.0	-0.6	0.2	-0.2
	Irrigated	-0.5	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	-0.1
	Total	-1.9	0.5	0.2	0.0	1.5	0.4	-0.2	0.0	-0.6	0.3	-0.3
Oceania	Rainfed	0.1	0.0	0.0	0.0	0.1	-0.2	0.0	0.0	0.0	0.0	0.0
	Irrigated	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.1	0.0	0.0	0.0	0.1	-0.2	0.0	0.0	0.0	0.0	0.0
South America	Rainfed	-2.3	0.2	0.2	-0.2	2.8	0.1	-0.8	0.0	-0.4	0.5	-0.1
	Irrigated	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
	Total	-2.3	0.2	0.2	-0.3	2.8	0.2	-0.8	0.0	-0.5	0.6	-0.1

Table S2. Change in production per product group per continent in absolute terms (10^6 t yr^{-1}) when shifting from the cropping pattern in the reference period (1996-2005) to the optimised cropping pattern (with $\alpha = 1.5$).

		Cereal	Fibres	Fruits	Nuts	Oil crops	Pulses	Roots	Spices	Stimulants	Sugar crops	Vegetables
Africa	Rainfed	1.5	1.7	5.5	0.2	-7.3	1.7	42.6	-0.1	0.1	11.3	-3.3
	Irrigated	-18.5	-0.9	-10.3	-0.1	-1.4	-0.5	-2.6	-0.1	0.0	-29.8	-13.2
	Total	-17.0	0.8	-4.7	0.1	-8.7	1.3	40.0	-0.2	0.0	-18.5	-16.5
Asia	Rainfed	10.5	5.8	31.8	0.7	8.1	-0.6	22.2	0.9	0.4	57.7	73.9
	Irrigated	-106.5	-9.7	-51.8	-0.6	-10.0	0.4	13.6	-0.8	-0.5	-331.5	-41.4
	Total	-96.0	-3.9	-20.0	0.1	-1.9	-0.2	35.9	0.1	-0.1	-273.8	32.5
Europe	Rainfed	49.6	-0.2	-7.9	-0.3	-0.5	0.0	-68.5	0.0	0.0	-11.1	-17.4
	Irrigated	-5.4	-0.7	-4.5	-0.1	-2.0	0.3	6.2	0.0	0.0	12.3	-0.5
	Total	44.2	-0.9	-12.4	-0.4	-2.5	0.3	-62.3	0.0	0.0	1.1	-18.0
North America	Rainfed	85.1	2.8	4.6	0.0	-17.3	1.7	2.5	0.0	0.0	44.0	-2.5
	Irrigated	20.9	-0.1	10.5	0.5	-8.0	0.5	10.0	0.0	0.0	23.2	7.2
	Total	106.0	2.7	15.1	0.4	-25.3	2.1	12.5	0.0	0.0	67.1	4.7
Oceania	Rainfed	0.6	0.0	0.2	0.0	0.5	-0.7	0.2	0.0	0.0	-6.2	-0.6
	Irrigated	-1.3	0.7	-0.3	0.0	0.0	0.0	0.6	0.0	0.0	7.0	-0.4
	Total	-0.7	0.7	-0.1	0.0	0.5	-0.7	0.8	0.0	0.0	0.8	-1.0
South America	Rainfed	-37.5	0.6	20.0	-0.1	37.6	-2.8	-28.4	0.0	0.2	177.0	-2.2
	Irrigated	1.0	0.0	2.0	-0.1	0.3	0.1	1.6	0.0	-0.1	46.3	0.4
	Total	-36.5	0.6	22.0	-0.2	37.9	-2.8	-26.8	0.1	0.1	223.3	-1.8

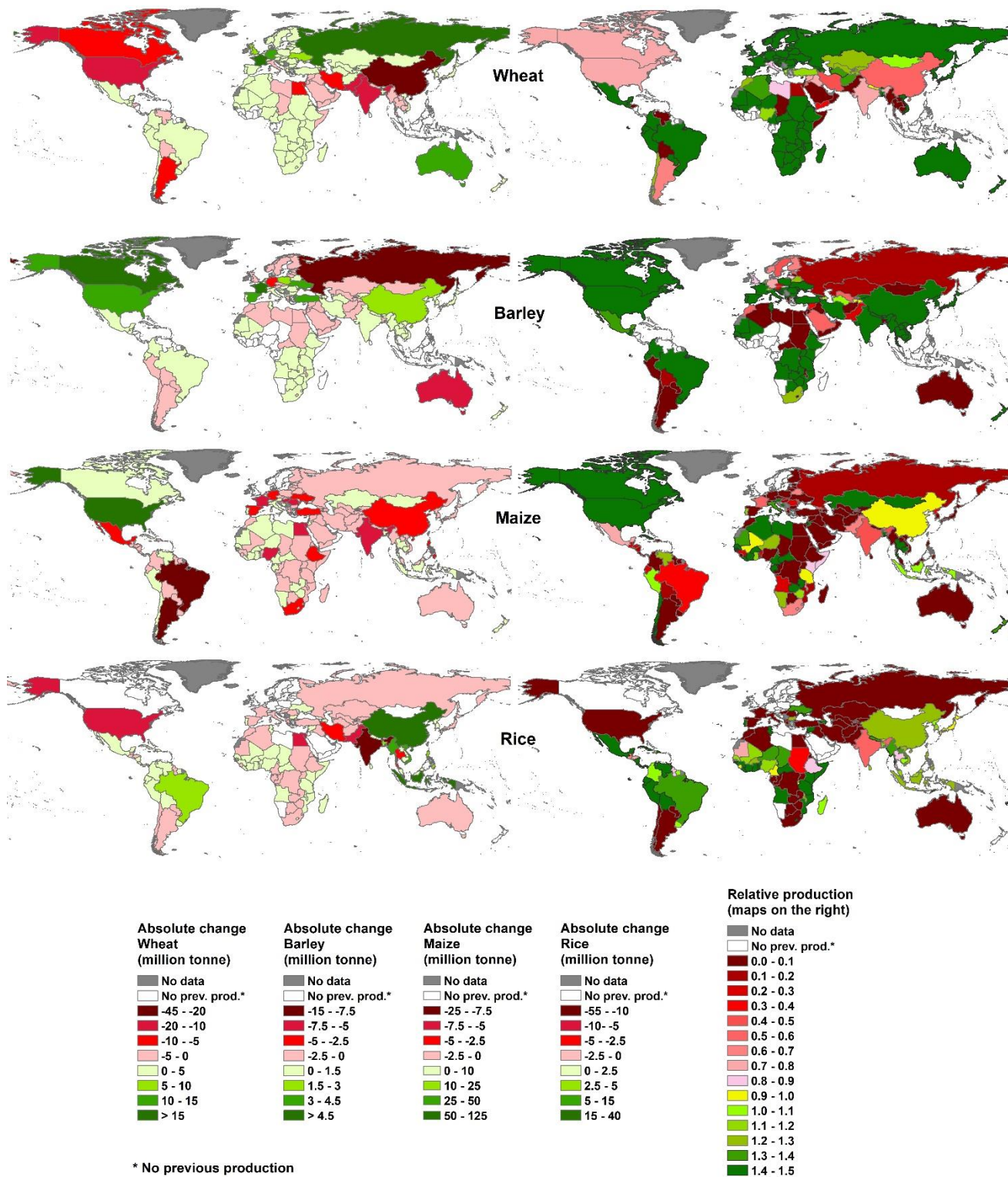


Figure S1. Absolute change in production for wheat, barley, maize and rice per country (in 10^6 t yr^{-1} ; maps on the left) and relative production (ratio of production in optimized and reference situation) for the same crops groups for the case of an optimized cropping pattern with $\alpha=1.5$ (maps on the right), all compared to the reference cropping period (1996-2005). Relative production = 1: no change; relative production < 1: national production is reduced; relative production > 1: national production is expanded.

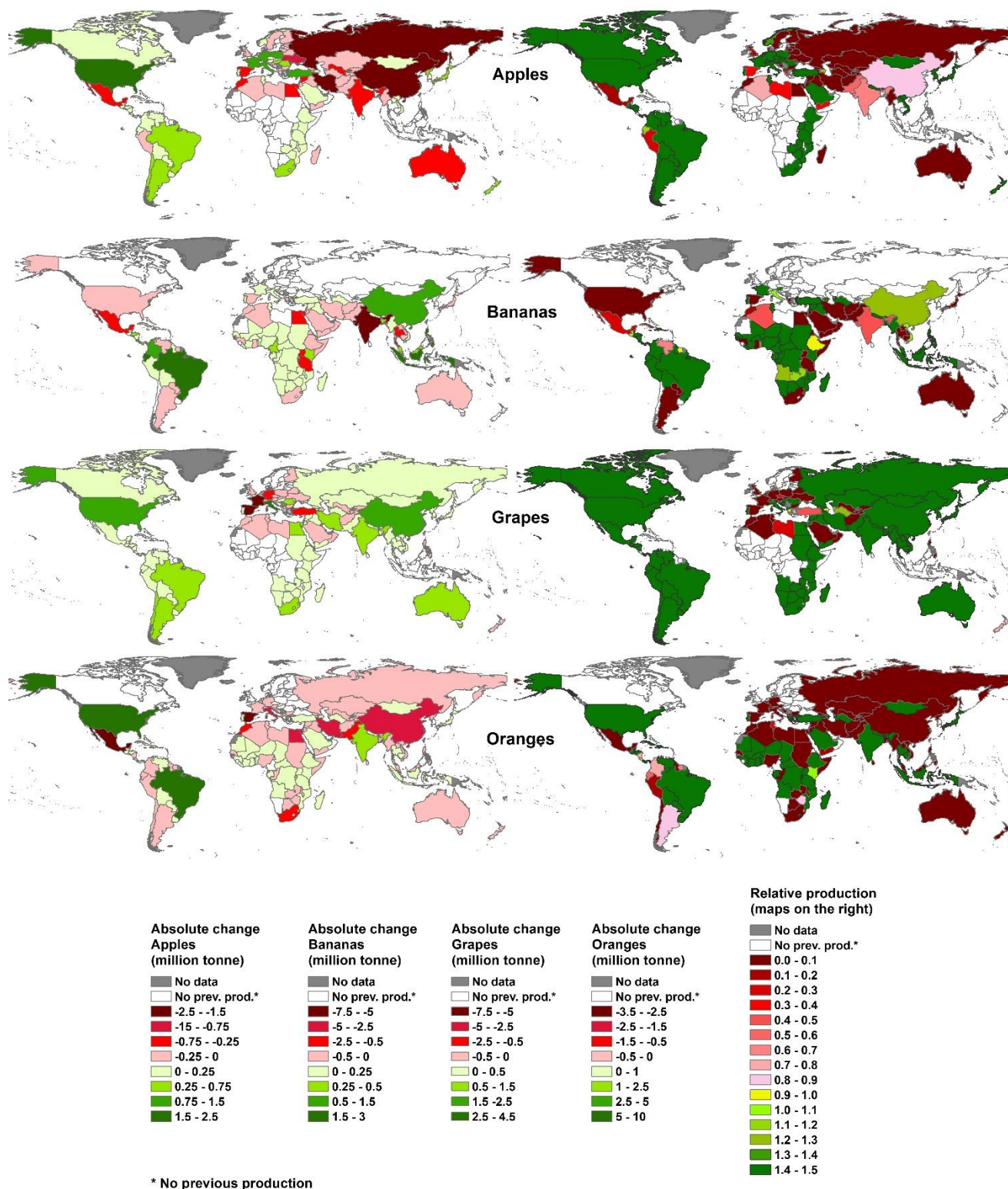


Figure S2. Absolute change in production for apples, bananas, grapes and oranges per country (in 10^6 t yr^{-1} ; maps on the left) and relative production (ratio of production in optimized and reference situation) for the same crops groups for the case of an optimized cropping pattern with $\alpha=1.5$ (maps on the right), all compared to the reference cropping period (1996-2005). Relative production = 1: no change; relative production < 1: national production is reduced; relative production > 1: national production is expanded.

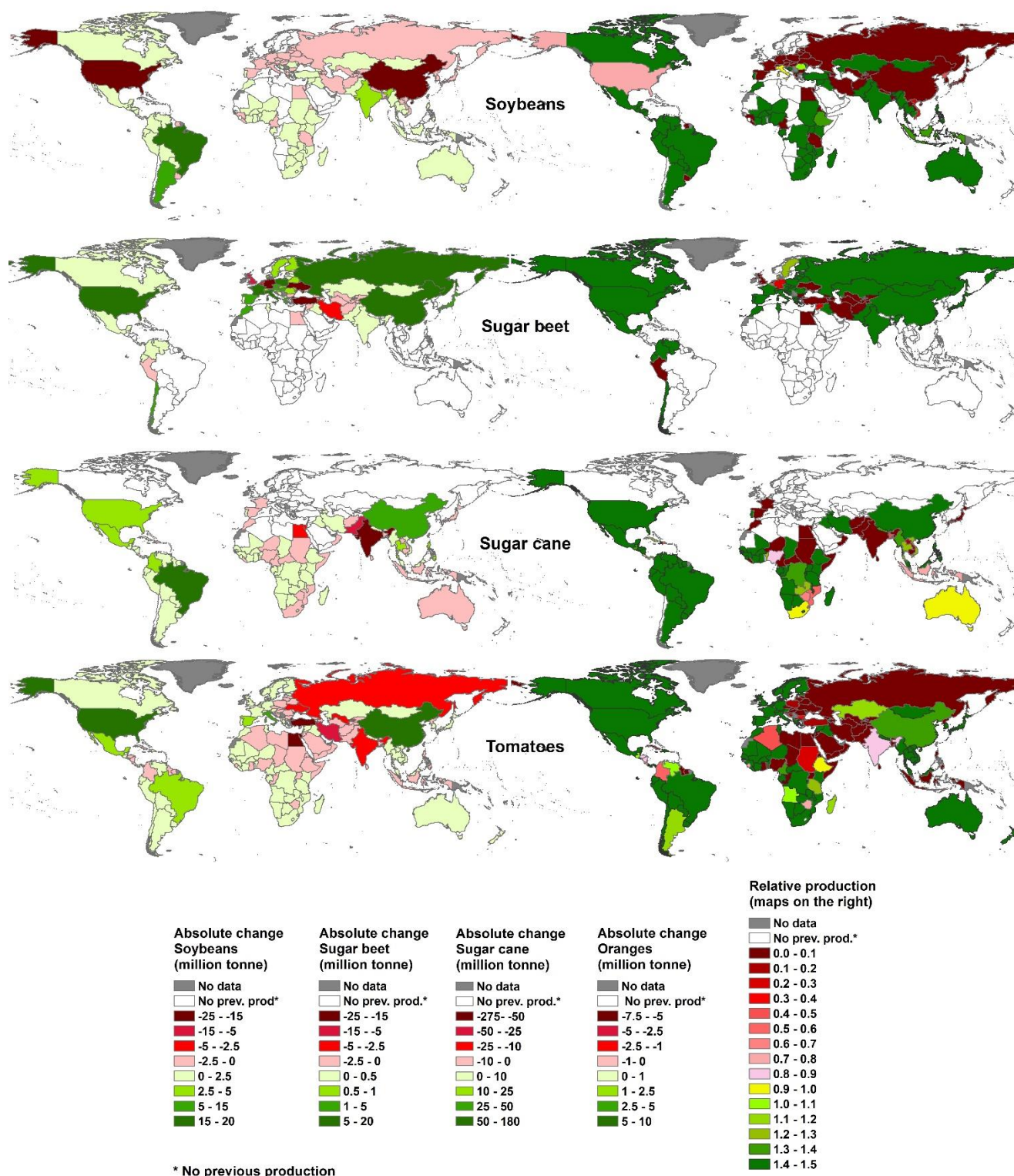


Figure S3. Absolute change in production for soybeans, sugar beet, sugar cane and tomatoes per country (in 10^6 t yr^{-1} ; maps on the left) and relative production (ratio of production in optimized and reference situation) for the same crops groups for the case of an optimized cropping pattern with $\alpha=1.5$ (maps on the right), all compared to the reference cropping period (1996-2005). Relative production = 1: no change; relative production < 1: national production is reduced; relative production > 1: national production is expanded.