

**SUPPLEMENTAL MATERIAL****Worldwide Associations of Fruit and Vegetable Supply with Blood Pressure from 1975 to 2015**

**Appendix Table 1.** Sub-components of the fruit and vegetable groups used in analysis.

Item Group	Item
Fruits	Apples and products
	Bananas
	Citrus (other)
	Dates
	Fruits (other)
	Grapefruit and products
	Grapes and products (excluding wine)
	Lemons, limes, and products
	Oranges, mandarins
	Pineapples and products
	Plantains
Vegetables	Onions
	Tomatoes and products
	Vegetables (other)

**Appendix Table 2.** Countries included in analysis by World Bank income classification.

Region	Countries
Low income	Afghanistan, Benin, Burkina Faso, Central African Republic, Chad, Gambia, Guinea, Guinea Bissau, Haiti, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Niger, North Korea, Rwanda, Sierra Leone, Tajikistan, Tanzania, Togo, Uganda, Yemen
Lower middle income	Angola, Bangladesh, Bolivia, Cabo Verde, Cambodia, Cameroon, Congo, Cote d'Ivoire, Djibouti, Egypt, El Salvador, Eswatini, Ghana, Honduras, India, Indonesia, Kenya, Kiribati, Kyrgyzstan, Lao PDR, Lesotho, Mauritania, Moldova, Mongolia, Morocco, Myanmar, Nicaragua, Nigeria, Pakistan, Philippines, Sao Tome and Principe, Senegal, Solomon Islands, Timor-Leste, Tunisia, Ukraine, Uzbekistan, Vanuatu, Viet Nam, Zambia, Zimbabwe
Upper middle income	Albania, Algeria, Argentina, Armenia, Azerbaijan, Belarus, Belize, Botswana, Brazil, Bulgaria, China, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, Fiji, Gabon, Georgia, Grenada, Guatemala, Guyana, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Lebanon, Malaysia, Mauritius, Mexico, Namibia, Paraguay, Peru, Romania, Russian Federation, Saint Lucia, Saint Vincent and the Grenadines, Samoa, South Africa, Sri Lanka, Suriname, Thailand, Turkey, Turkmenistan, Venezuela
High income	Antigua and Barbuda, Australia, Austria, Bahamas, Barbados, Belgium, Canada, Chile, China (Hong Kong SAR), Cyprus, Czechia, Denmark, Estonia, Finland, France, French Polynesia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Panama, Poland, Portugal, Saint Kitts and Nevis, Saudi Arabia, Slovakia, South Korea, Spain, Sweden, Switzerland, Taiwan, Trinidad and Tobago, United Kingdom, United States of America, Uruguay

**Appendix Table 3.** Description of models fitted.

Model number	Response variable	Explanatory variable	Other terms included
1	RBP, DBP, or SBP	Energy-adjusted supply of fruits, vegetables, or both	Urbanisation, year
2			As Model 1 + energy-adjusted supply from fish, cereals, meat, milk, and total energy
3			As Model 2 + BMI
4			As Model 3 + World Bank region
5			As Model 4 + World Bank:explanatory variable interaction
6			As Model 5 + BMI:explanatory variable interaction

**Appendix Table 4.** Akaike Information Criterion (AIC) for the models fitted. Relative values are shown, with the best fitting models having values of zero.

Response variable	Explanatory variable	Time period	AIC					
			Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SBP	Fruits and vegetables	2005-2015	319.5	157.7	150.4	40.9	2.4	0
SBP	Fruits and vegetables	1995-2004	233.6	99.7	100.9	9.7	0.2	0
SBP	Fruits and vegetables	1985-1994	273.1	169.1	170.8	8.2	1.4	0
SBP	Fruits and vegetables	1975-1984	355.6	212.1	204.1	13.7	1.9	0
DBP	Fruits and vegetables	2005-2015	292.8	53.1	51.4	0	2.9	1.4
DBP	Fruits and vegetables	1995-2004	238.4	33.7	35.7	0	4.9	5.6
DBP	Fruits and vegetables	1985-1994	334.2	127.0	129.0	9.7	0	2.0
DBP	Fruits and vegetables	1975-1984	508.9	135.4	121.1	0	1.4	1.8
Raised BP	Fruits and vegetables	2005-2015	340.7	141.8	125.3	41.1	4.4	0
Raised BP	Fruits and vegetables	1995-2004	221.4	76.3	68.6	4.6	1.6	0
Raised BP	Fruits and vegetables	1985-1994	314.3	151.2	149.6	4.7	0	0.1
Raised BP	Fruits and vegetables	1975-1984	401.3	180.3	179.0	9.0	3.5	0
SBP	Fruits	2005-2015	325.3	152.6	144.0	31.6	0	1.7
SBP	Fruits	1995-2004	255.2	106.1	107.0	15.5	0	1.0
SBP	Fruits	1985-1994	288.0	178.0	179.7	22.2	23.7	0
SBP	Fruits	1975-1984	374.3	222.1	214.2	32.8	34.0	0
DBP	Fruits	2005-2015	312.2	68.4	65.3	9.7	0.7	0
DBP	Fruits	1995-2004	231.9	39.4	41.2	0.1	2.4	0
DBP	Fruits	1985-1994	332.1	150.1	152.0	33.0	14.4	0
DBP	Fruits	1975-1984	483.2	142.0	127.8	9.3	5.2	0
Raised BP	Fruits	2005-2015	292.4	106.0	90.4	5.3	0	0.9
Raised BP	Fruits	1995-2004	224.5	71.7	64.4	0	3.3	3.0
Raised BP	Fruits	1985-1994	336.5	170.5	168.9	23.7	21.1	0
Raised BP	Fruits	1975-1984	440.5	218.8	217.5	50.4	26.0	0

SBP	Vegetables	2005-2015	381.7	188.6	180.0	67.6	33.4	0
SBP	Vegetables	1995-2004	324.1	139.1	140.0	48.4	25.4	0
SBP	Vegetables	1985-1994	388.9	237.6	239.3	81.9	23.9	0
SBP	Vegetables	1975-1984	508.6	307.3	299.4	117.9	49.8	0
DBP	Vegetables	2005-2015	335.3	97.2	94.1	38.4	37.4	0
DBP	Vegetables	1995-2004	273.4	67.0	68.8	27.8	22.8	0
DBP	Vegetables	1985-1994	386.6	170.2	172.2	53.2	26.1	0
DBP	Vegetables	1975-1984	596.2	195.9	181.7	63.2	37.8	0
Raised BP	Vegetables	2005-2015	510.1	202.0	186.5	101.3	42.3	0
Raised BP	Vegetables	1995-2004	405.3	156.1	148.8	84.4	37.0	0
Raised BP	Vegetables	1985-1994	535.8	270.7	269.1	124.0	46.9	0
Raised BP	Vegetables	1975-1984	663.0	296.0	294.7	127.5	40.8	0

**Appendix Table 5.** Ranking of countries by fruit supply (portions/capita/day) in 1975 and 2015 and change from 1975 to 2015.

Rank	1975		2015		Change	
	Country	Supply	Country	Supply	Country	Supply
1	Rwanda	13.8	Dominica	12.8	Sao Tome and Principe	+5.9
2	Samoa	9.2	Dominican Republic	8.9	Dominica	+5.1
3	Ecuador	8.3	Rwanda	8.7	Albania	+4.3
4	Dominica	7.7	Sao Tome and Principe	7.2	Lao PDR	+4.1
5	Saint Lucia	6.9	Colombia	6.2	Cuba	+3.6
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155	Gambia	0.2	Zambia	0.3	Cote d'Ivoire	-3.3
156	Burkina Faso	0.2	Togo	0.3	Luxembourg	-3.9
157	Niger	0.2	Chad	0.3	Ecuador	-4.3
158	China	0.2	Gambia	0.2	Saint Lucia	-4.8
159	Mongolia	0.1	Burkina Faso	0.2	Rwanda	-5.0

**Appendix Table 6.** Ranking of countries by vegetable supply (portions/capita/day) in 1975 and 2015 and change from 1975 to 2015.

Rank	1975		2015		Change	
	Country	Supply	Country	Supply	Country	Supply
1	Greece	9.4	Armenia	14.2	China	+11.2
2	Israel	6.2	China	12.8	Armenia	+9.5
3	Spain	6.2	Tunisia	10.9	Lao PDR	+8.6
4	Italy	5.7	Uzbekistan	10.8	Guyana	+8.1
5	Portugal	5.7	Lao PDR	9.0	Albania	+6.7
....	....	....	....	....	....	....
155	Saint Lucia	0.4	Zimbabwe	0.5	Bahamas	-1.8
156	Chad	0.3	Burkina Faso	0.5	Moldova	-1.9
157	Samoa	0.2	Solomon Islands	0.5	Spain	-1.9
158	Cabo Verde	0.2	Sao Tome and Principe	0.5	Iraq	-2.6
159	Mauritania	0.1	Chad	0.3	Greece	-3.9



**Appendix Table 7.** Akaike Information Criterion (AIC) for the sensitivity analysis. Relative values are shown, with the best fitting models having values of zero.

Response variable	Explanatory variable	Time period	AIC					
			Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SBP	Fruits and vegetables	2005-2015	299.2	71.3	56.0	34.4	1.9	0
SBP	Fruits and vegetables	1995-2004	352.6	64.0	48.5	35.6	0	1.9
SBP	Fruits and vegetables	1985-1994	338.1	50.1	11.5	3.8	0.4	0
SBP	Fruits and vegetables	1975-1984	344.9	127.2	89.1	3.9	2.6	0
DBP	Fruits and vegetables	2005-2015	328.6	35.1	24.7	23.2	3.1	0
DBP	Fruits and vegetables	1995-2004	318.6	13.9	4.4	0	4.1	5.7
DBP	Fruits and vegetables	1985-1994	419.5	47.8	24.7	1.8	0	1.5
DBP	Fruits and vegetables	1975-1984	505.5	98.0	57.9	0	2.1	2.2
Raised BP	Fruits and vegetables	2005-2015	371.5	55.1	45.5	34.1	7.4	0
Raised BP	Fruits and vegetables	1995-2004	353.1	24.0	26.0	25.0	0	0.4
Raised BP	Fruits and vegetables	1985-1994	437.7	27.5	6.5	3.7	0	1.5
Raised BP	Fruits and vegetables	1975-1984	437.2	87.9	44.9	3.2	3.5	0
SBP	Fruits	2005-2015	328.0	86.5	68.5	45.0	0	1.8
SBP	Fruits	1995-2004	367.5	63.2	43.1	32.6	0.7	0
SBP	Fruits	1985-1994	369.7	75.9	36.6	31.6	30.0	0
SBP	Fruits	1975-1984	368.3	144.8	108.4	30.6	33.7	0
DBP	Fruits	2005-2015	424.4	52.9	39.2	35.2	0.3	0
DBP	Fruits	1995-2004	340.2	25.3	12.0	0.5	3.9	0
DBP	Fruits	1985-1994	416.7	71.9	48.5	18.2	15.3	0
DBP	Fruits	1975-1984	475.0	107.2	68.7	11.1	4.8	0
Raised BP	Fruits	2005-2015	293.3	28.3	19.7	7.6	0	0.9
Raised BP	Fruits	1995-2004	305.3	2.7	4.6	3.3	2.5	0
Raised BP	Fruits	1985-1994	449.9	50.7	29.6	25.0	27.7	0
Raised BP	Fruits	1975-1984	481.2	137.6	95.5	54.2	30.0	0

SBP	Vegetables	2005-2015	317.2	76.0	58.0	34.4	22.5	0
SBP	Vegetables	1995-2004	393.2	47.7	27.6	17.1	8.0	0
SBP	Vegetables	1985-1994	412.0	68.6	29.4	24.4	11.5	0
SBP	Vegetables	1975-1984	488.0	208.0	171.6	93.9	43.1	0
DBP	Vegetables	2005-2015	285.4	48.9	35.2	31.3	26.2	0
DBP	Vegetables	1995-2004	303.3	35.9	22.6	11.1	9.0	0
DBP	Vegetables	1985-1994	463.2	86.8	63.4	33.1	17.4	0
DBP	Vegetables	1975-1984	590.9	152.8	114.3	56.7	37.9	0
Raised BP	Vegetables	2005-2015	417.8	74.6	66.0	53.9	30.8	0
Raised BP	Vegetables	1995-2004	448.9	44.3	46.1	44.8	18.7	0
Raised BP	Vegetables	1985-1994	576.4	69.9	48.8	44.2	31.5	0
Raised BP	Vegetables	1975-1984	669.7	181.9	139.9	98.6	41.5	0

1 **Appendix Table 8.** Associations of explanatory variables with blood pressure variables by time period for the sensitivity analysis. Significant associations are  
 2 highlighted.  
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Response variable	Explanatory variable	Time period											
		1975-1984			1985-1994			1995-2004			2005-2015		
		Coef	CI	p-value	Coef	CI	p-value	Coef	CI	p-value	Coef	CI	p-value
SBP	Combined FV	-0.66	-0.99, -0.33	0.02	-0.47	-0.78, -0.15	0.72	-0.33	-0.64, -0.01	1	-	-1.10, -0.32	0.09
SBP	Fruits	-1.31	-1.79, -0.82	$2.9 \times 10^{-5}$	-0.72	-1.16, -0.28	0.32	-0.38	-0.83, 0.07	1	-	-1.23, -0.16	1
SBP	Vegetables	0.11	-0.38, 0.61	1	-0.39	-0.88, 0.11	1	-0.32	-0.81, 0.16	1	-	-1.48, -0.32	0.50
DBP	Combined FV	-0.17	-0.39, 0.04	1	-0.16	-0.36, 0.05	1	0.10	-0.12, 0.32	1	-	-0.43, 0.11	1
DBP	Fruits	-0.61	-0.92, -0.29	0.04	-0.61	-0.90, -0.31	0.01	-0.25	-0.56, 0.07	1	-	-0.91, -0.17	0.86
DBP	Vegetables	0.33	0.01, 0.66	1	0.25	-0.07, 0.58	1	0.51	0.18, 0.84	0.50	0.40	0.00, 0.79	1
Raised BP	Combined FV	-1.38	-1.78, -0.99	$2.0 \times 10^{-9}$	-0.82	-1.20, -0.44	$4.5 \times 10^{-3}$	-0.78	-1.16, -0.40	0.01	-	-1.65, -0.82	$1.84 \times 10^{-6}$
Raised BP	Fruits	-2.49	-3.07, -1.92	$1.0 \times 10^{-14}$	-1.23	-1.77, -0.69	$1.8 \times 10^{-3}$	-0.65	-1.20, -0.10	1	-	-1.62, -0.46	0.10

Raised BP	Vegetables	-0.15	-0.75, 0.44	1	-0.62	-1.21, -0.02	1	-0.90	-1.47, -0.32	0.48	-1.26	-1.88, -0.64	0.02
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**Appendix Table 9.** Regression coefficients for models of RBP against combined fruit and vegetable supply for the sensitivity analysis. Coefficients for life expectancy are highlighted.

Term	Time period							
	1975-1984		1985-1994		1995-2004		2005-2015	
	Coef	95% CI	Coef	95% CI	Coef	95% CI	Coef	95% CI
Intercept	42.13	39.38, 44.89	52.20	49.41, 54.99	51.97	49.62, 54.31	51.13	48.77, 53.49
Combined fruit and vegetable supply	-1.38	-1.78, -0.99	-0.82	-1.20, -0.44	-0.78	-1.16, -0.40	-1.23	-1.65, -0.82
Urban population proportion	0.17	0.16, 0.18	0.13	0.11, 0.14	0.05	0.04, 0.06	-0.03	-0.04, -0.02
Year	-0.15	-0.21, -0.09	-0.13	-0.19, -0.07	-0.15	-0.21, -0.10	-0.08	-0.13, -0.04
Energy-adjusted supply from fish	0.003	-0.009, 0.015	-0.003	-0.016, 0.009	-0.012	-0.024, 0.001	-0.013	-0.025, -0.001
Energy-adjusted supply from cereals	0.009	0.005, 0.014	0.012	0.007, 0.017	0.012	0.007, 0.017	0.014	0.009, 0.018
Energy-adjusted supply from meat	0.027	0.017, 0.037	0.028	0.018, 0.038	0.017	0.007, 0.027	0.025	0.016, 0.034
Energy-adjusted supply from milk	0.016	0.013, 0.020	0.020	0.017, 0.024	0.020	0.017, 0.023	0.017	0.014, 0.020
Total energy	0.002	0.002, 0.003	0.002	0.002, 0.003	0.002	0.001, 0.002	0.001	0.001, 0.002
BMI	0.85	0.56, 1.14	0.37	0.08, 0.66	-0.16	-0.42, 0.10	-0.45	-0.68, -0.23
Low-income group	3.91	1.97, 5.86	2.05	0.14, 3.96	-0.21	-1.93, 1.51	-1.22	-2.79, 0.34
Lower-middle-income group	2.14	0.55, 3.73	1.01	-0.57, 2.58	-2.36	-3.82, -0.90	-3.33	-4.67, -2.00
Upper-middle-income group	0.52	-0.74, 1.79	0.17	-1.07, 1.40	-1.46	-2.72, -0.21	-2.04	-3.23, -0.86
Life expectancy	-0.17	-0.20, -0.14	-0.34	-0.38, -0.31	-0.34	-0.37, -0.31	-0.32	-0.35, -0.29
Interaction: BMI	-0.16	-0.29, -0.03	-0.05	-0.20, 0.09	0.08	-0.05, 0.21	0.16	0.06, 0.26
Interaction: low-income group	-0.35	-1.23, 0.53	-0.61	-1.48, 0.26	-0.06	-0.84, 0.72	0.97	0.28, 1.65

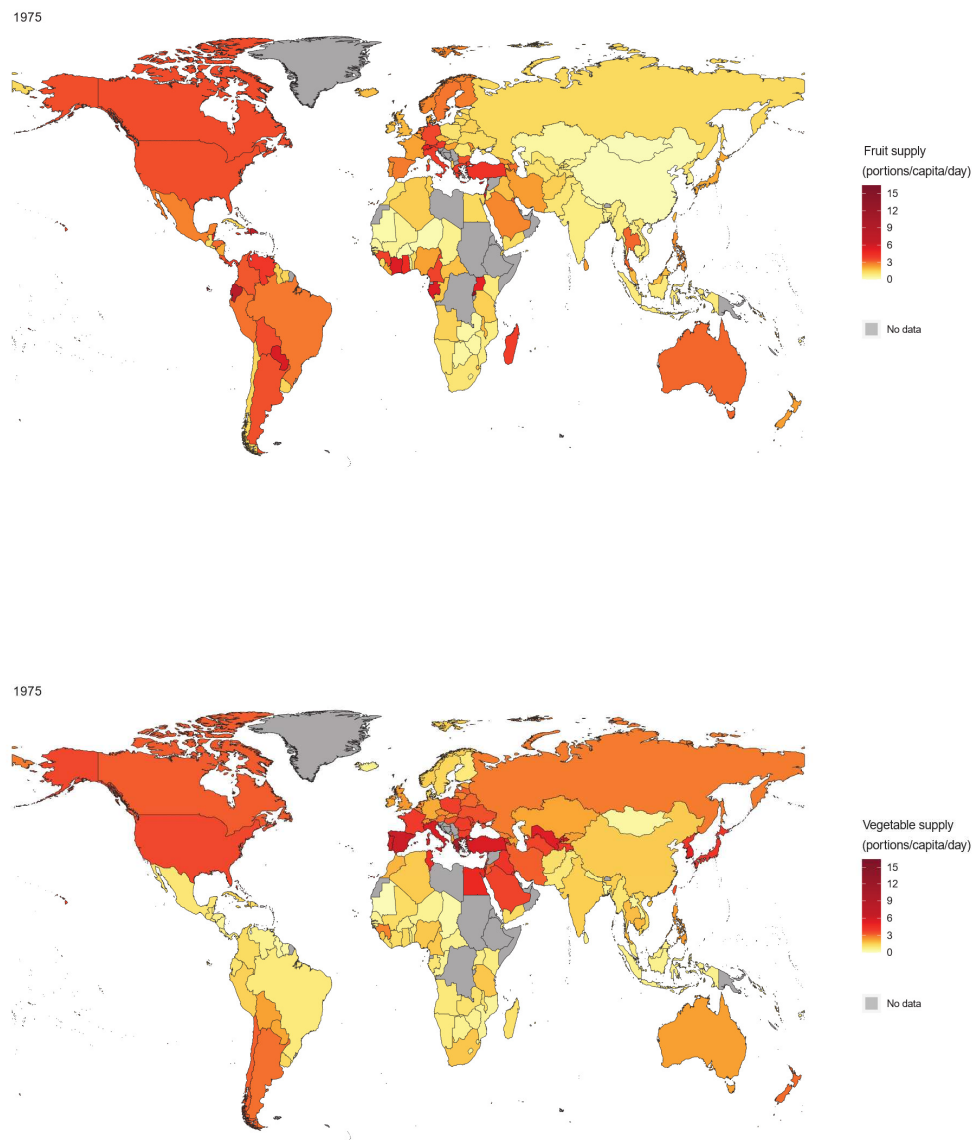
Interaction: lower-middle-income group	-0.41	-1.18, 0.35	-0.14	-0.89, 0.61	1.04	0.39, 1.68	1.64	1.09, 2.19
Interaction: upper-middle-income group	0.25	-0.28, 0.78	0.34	-0.17, 0.84	0.62	0.13, 1.12	0.99	0.51, 1.46

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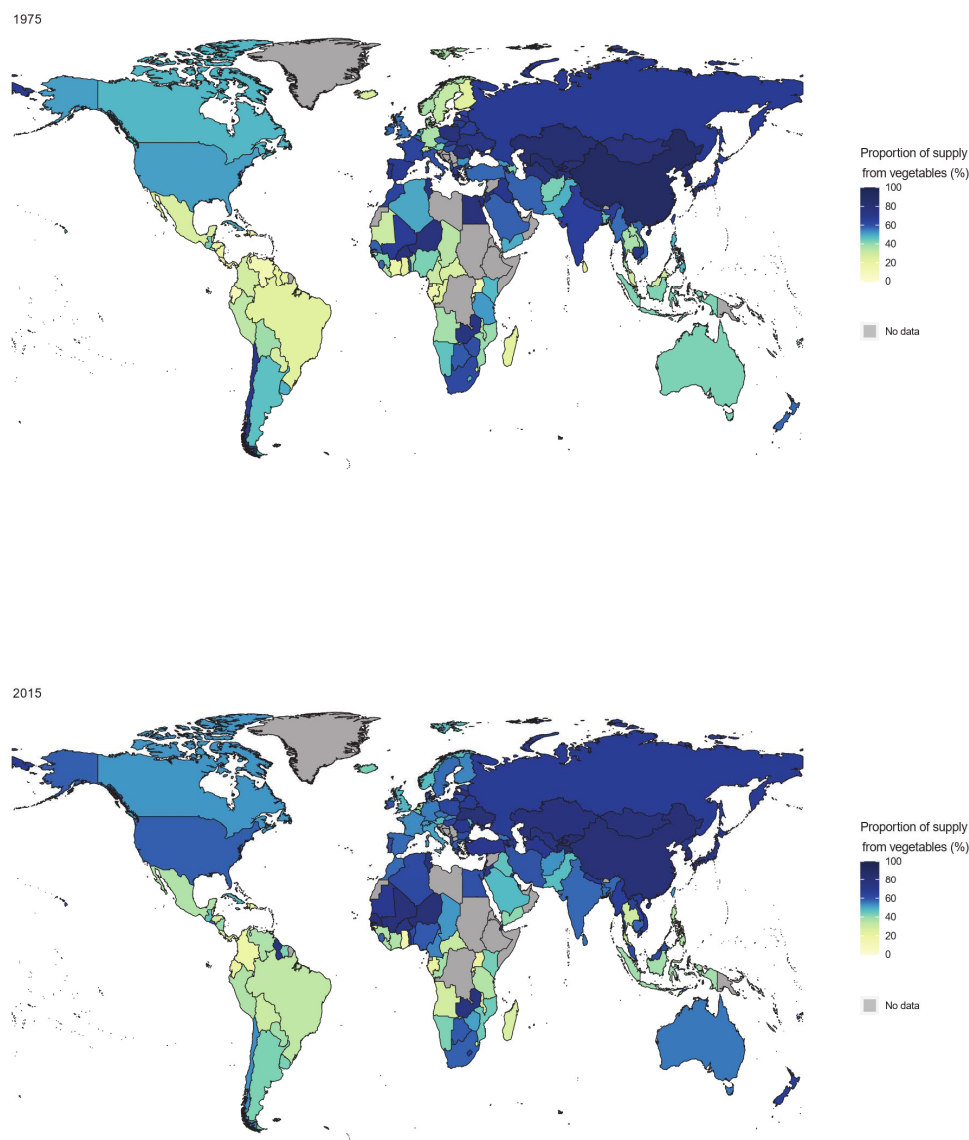
**Appendix Table 10.** Associations of explanatory variables with blood pressure variables for the whole period from 1975 to 2015. Significant associations are highlighted.

Response variable	Explanatory variable	Coef	95% CI	p-value
SBP	Combined FV	-0.76	-0.94, -0.57	$7.19 \times 10^{-15}$
SBP	Fruits	-0.95	-1.21, -0.68	$2.32 \times 10^{-11}$
SBP	Vegetables	-0.75	-1.04, -0.46	$2.97 \times 10^{-6}$
DBP	Combined FV	-0.30	-0.43, -0.18	$1.99 \times 10^{-5}$
DBP	Fruits	-0.74	-0.92, -0.56	$5.58 \times 10^{-15}$
DBP	Vegetables	0.07	-0.13, 0.26	1
RBP	Combined FV	-1.26	-1.50, -1.02	$5.05 \times 10^{-24}$
RBP	Fruits	-1.65	-2.00, -1.31	$6.81 \times 10^{-20}$
RBP	Vegetables	-1.16	-1.54, -0.79	$1.01 \times 10^{-8}$



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- 2 **Appendix Figure 1.** Fruit and vegetable supply by country in 1975. Grey colour indicates that countries
- 3 were not included in analyses.

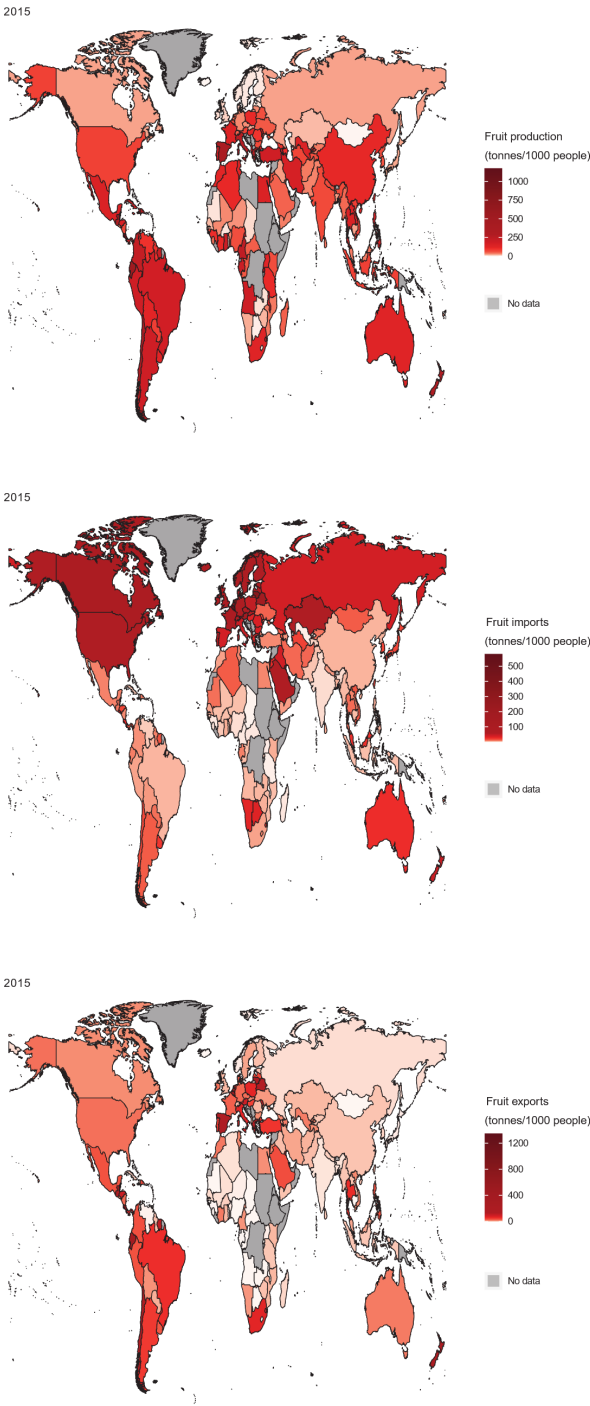




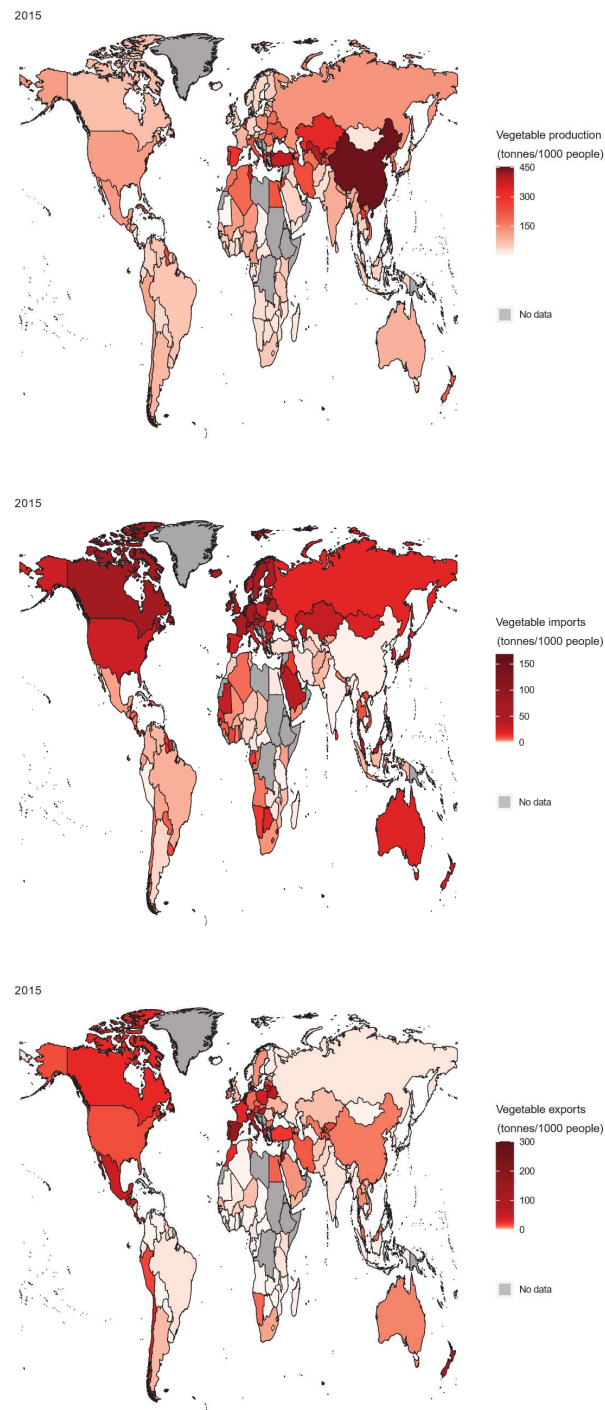
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2 **Appendix Figure 2.** Proportion of fruit and vegetable supply from vegetables by country in 1975 and

3 2015. Grey colour indicates that countries were not included in analyses.



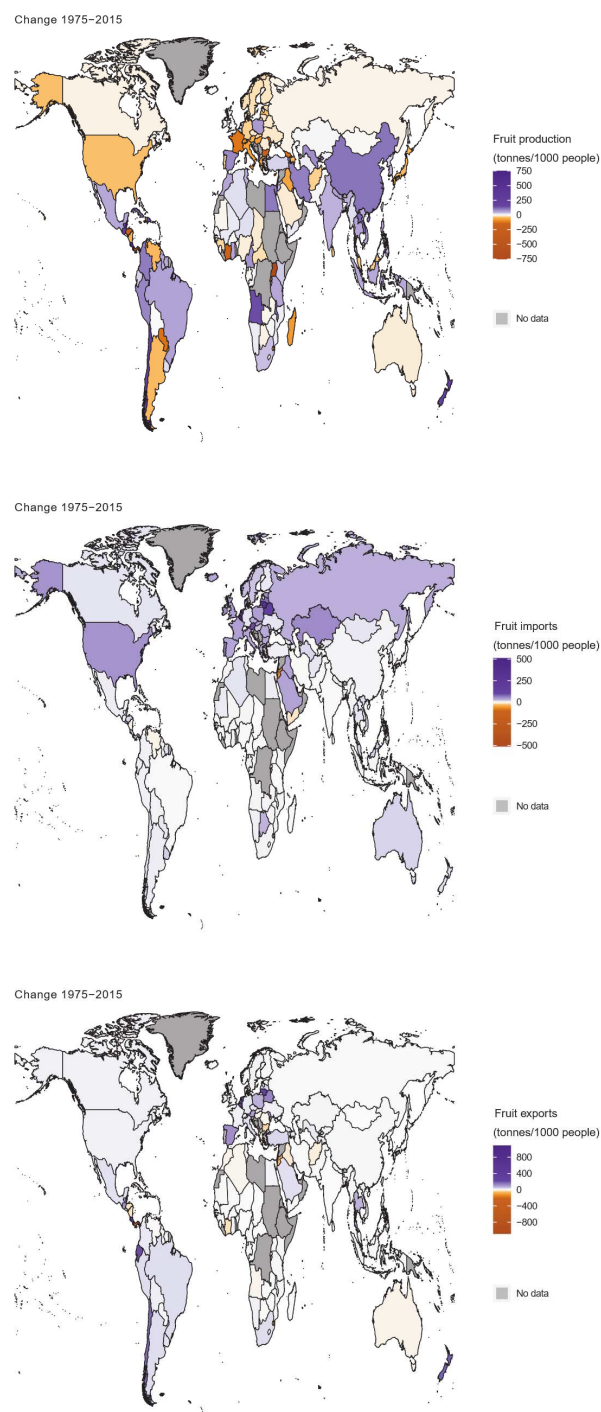
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2 **Appendix Figure 3a.** Fruit production, imports and exports by country in 2015. Grey colour indicates  
3 that countries were not included in analyses.



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2 **Appendix Figure 3b.** Vegetable production, imports and exports by country in 2015. Grey colour

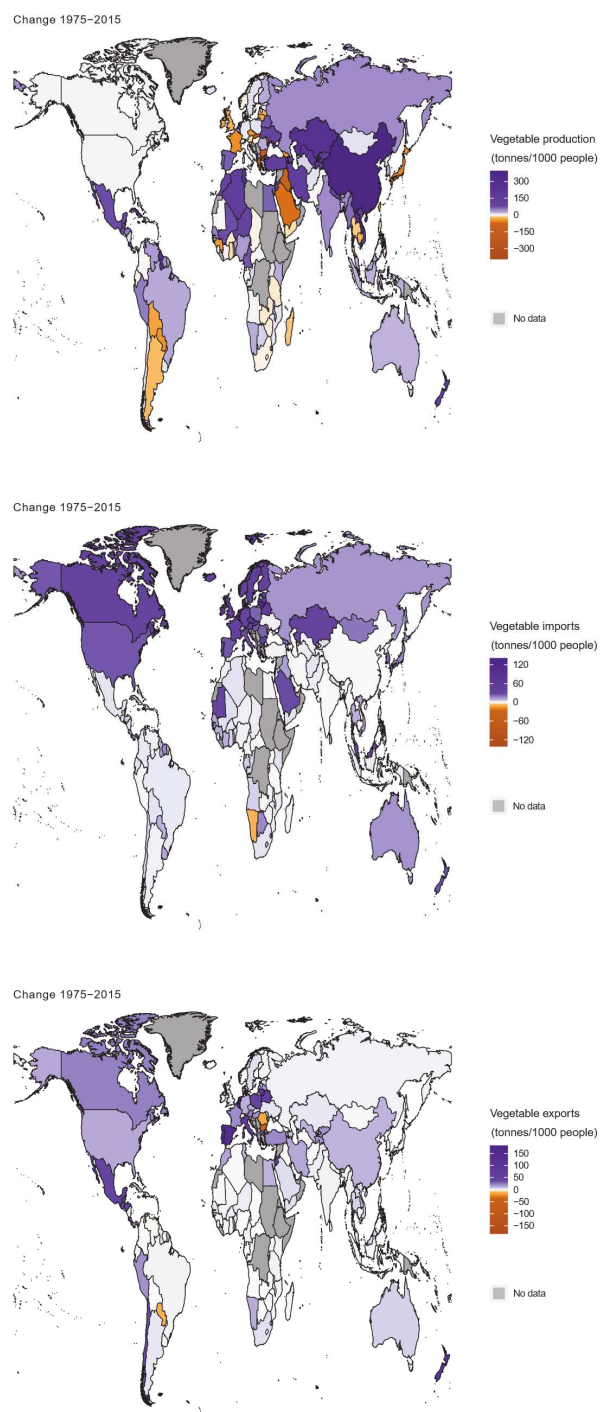
3 indicates that countries were not included in analyses.



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2 **Appendix Figure 4a.** Change in fruit production, imports and exports by country from 1975 to 2015.

3 Grey colour indicates that countries were not included in analyses.



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2 **Appendix Figure 4b.** Change in vegetable production, imports and exports by country from 1975 to

3 2015. Grey colour indicates that countries were not included in analyses.