Supplementary Material

Table S1. Hypothetical land use scenarios

	Scenarios		
Parameter	Economic and urban growth	Forest conservation	Integrated
Land use	70% urban surface 20% agriculture (primarily monoculture) 10 % forest	30% urban surface 25% agriculture (primarily monoculture) 45% forest	50% urban surface 30% agriculture (primarily monoculture) 20% forest
Land use for recommended nutrition	70% urban surface 2% apple (fruit) 2% barley (grain) 2% cabbage (vegetable) 2% cucumber (vegetable) 2% fava beans (legume) 2% maize (vegetable) 2% peas (legume) 2% pecan nuts (nut) 2% spinach (leafy green) 2% tomatoes (vegetable) 10% forest & water	30% urban surface 2.5% apple (fruit) 2.5% barley (grain) 2.5% cabbage (vegetable) 2.5% cucumber (vegetable) 2.5% fava beans (legume) 2.5% maize (vegetable) 2.5% peas (legume) 2.5% pecan nuts (nut) 2.5% spinach (leafy green) 2.5% tomatoes (vegetable) 45% forest & water	50% urban surface 3% apple (fruit) 3% barley (grain) 3% cabbage (vegetable) 3% cucumber (vegetable) 3% fava beans (legume) 3% maize (vegetable) 3% peas (legume) 3% pecan nuts (nut) 3% spinach (leafy green) 3% tomatoes (vegetable) 20% forest & water

Table S2. Required data and outputs generated by InVEST models*

InVEST model	**Data needs**	**Main outputs**
Crop produciton (Percentile)	-Workspace -Directory to model data -Projected LU/LC raster (as described in section 3.2) -CSV table containing the name of the crop as specified by the model with the respective LU code	-Total observed production. -Total area covered by each crop -Nutrient information for each crop (e.g, energy, vitamins, minerals).
Sediment Delivery Ratio	-Workspace -Digital Elevation Model -Rainfall Erosivity Index -Soil erodibility -Projected LU/LC raster (as described in section 3.2) -Watershed polygon -CSV table containing the LU code associated to class, cover management factor, and support practice factor -Threshold flow accumulation (default option) -Borselli k parameter (default option) -Borselli ICO parameter (default option) -Maximum SDR value (default option)	-Total amount of potential soil loss in the watershed (tons / watershed). -Total amount of sediment exported to the stream (tons / watershed). -Total amount of sediment deposited on the landscape (tons / watershed).

*based on Sharp et al (2020).

Table S3. Scenario 1: Nutrient comparison between agriculture land dominated by monocultures versus crop diversity: (a) Macronutrient production, (b) Mineral production, (c) Vitamin production

(a) Macronutrient production

Nutrition scenario	Crop	Energy	Protein	Fat
Monoculture	maize	213,000,000,000	1,316,651,950	662,519,134
Crop diversity	apple	38,386,999,481	45,782,660	29,934,816
	barley	141,005,927,331	948,654,949	111,043,364
	fava beans	93,893,848,083	1,721,057,763	100,812,342
	cabbage	25,682,419,982	1,294,822,007	192,618,150
	cucumber	12,811,826,704	128,118,267	21,681,553
	maize	19,706,959,163	121,571,418	61,172,879
	nuts (pecan)	123,522,349,609	542,729,498	2,788,705,282
	pea	59,523,834,634	1,025,480,800	48,454,490
	spinach	10,695,316,461	315,346,444	43,001,788
	tomato	54,415,623,587	638,476,650	145,108,330
	Total	**579,645,105,036**	**6,782,040,456**	**3,542,532,994**

(b) Mineral production

Nutrition scenario	Crop	Fe	Ca	Mg	K	Mn	Se	Zn	Lyc
Monoculture	maize	378,782,037	978,403,785	17,751,040,089	40,114,555,163	67,789,405	2,166,465,523	308,896,052	0
Crop diversity	apple	21,130,458	1,056,522,922	880,435,768	18,841,325,434	6,163,050	0	7,043,486	0
	barley	239,317,596	2,776,084,109	7,562,436,021	26,803,570,708	126,551,145	3,608,909,342	203,898,591	0
	fava beans	441,465,812	6,786,713,230	12,650,960,584	69,975,625,729	107,137,822	540,301,442	206,895,918	0
	cabbage	599,256,466	50,294,739,132	16,051,512,489	263,244,804,819	170,146,032	963,090,749	192,618,150	0
	cucumber	55,189,407	3,153,680,420	2,562,365,341	28,974,438,855	15,571,297	59,131,508	39,421,005	0
	maize	34,974,368	90,339,695	1,639,020,179	3,703,927,492	6,259,250	200,037,896	28,521,532	0
	nuts (pecan)	145,325,747	2,683,685,519	7,377,268,917	27,204,704,616	190,829,215	340,384,287	135,338,423	0
	pea	185,046,026	2,297,411,161	4,803,677,883	40,977,460,895	58,103,617	66,833,779	125,731,047	0
	spinach	298,807,295	10,915,838,450	8,710,618,561	61,525,634,899	98,904,112	110,260,994	58,438,327	0
	tomato	195,896,245	7,255,416,478	7,980,958,126	171,953,370,535	82,711,748	0	123,342,080	1,866,818,659,856
	Total	**2,216,409,420**	**87,310,431,115**	**70,219,253,869**	**713,204,863,980**	**862,377,289**	**5,888,949,998**	**1,121,248,560**	**1,866,818,659,856**

(c) Vitamin production

Nutrition scenario	Crop	Vit A	Vit C	Vit E	Vit K	Vit B1	Vit B2	Vit B3	Vit B5	Vit B6	Folate
Monoculture	**Maize**	**29,911,201,410**	**0**	**68,488,265**	**41,931,591**	**28,094,166**	**53,812,208**	**506,952,932**	**59,263,315**	**86,938,165**	**2,655,667,415**
Crop diversity	apple	9,508,706,294	810,000,906	31,695,688	387,391,738	2,993,482	4,578,266	16,023,931	10,741,316	7,219,573	528,261,461
	barley	2,105,994,841	0	1,914,541	207,153	18,283,864	10,912,882	440,727,284	26,995,025	24,889,030	2,201,721,880
	fava beans	3,492,192,245	92,246,588	3,294,521	0	36,569,183	21,941,510	186,601,669	64,309,050	24,115,894	27,871,647,536
	cabbage	134,832,704,907	54,575,142,462	0	2,117,122,490	53,505,042	32,103,025	321,030,250	149,814,117	101,659,579	60,995,747,458
	cucumber	20,696,027,753	551,894,073	5,913,151	4,444,370	5,321,836	6,504,466	19,316,293	51,050,202	7,884,201	1,379,735,184
	maize	2,761,813,530	0	6,323,779	1,462,429,498	4,968,683	2,594,040	46,808,868	5,472,004	8,027,327	245,207,743
	nuts (pecan)	5,537,206,491	223,084,193	191,440,684	605,681,124	28,433,298	8,305,784	108,739,531	37,299,596	16,917,303	2,757,265,595
	pea	6,223,895,692	75,188,002	3,759,400	53,245,034,216	30,325,827	8,980,789	120,676,743	73,433,615	7,268,173	11,445,284,694
	spinach	1,033,917,344,883	3,098,333,944	223,829,819	5,731,779,018	8,600,358	20,839,328	79,828,960	7,166,965	21,500,894	21,390,632,922
	tomato	604,376,192,639	9,214,378,927	391,792,490	547,580	26,845,041	13,785,291	430,971,739	64,573,207	58,043,332	10,883,124,717
	Total	**1,823,452,079,275**	**68,640,269,096**	**859,964,071**	**63,554,637,188**	**215,846,614**	**130,545,381**	**1,770,725,266**	**490,855,095**	**277,525,306**	**139,698,629,190**

Table S4. Scenario 2: Nutrient comparison between agriculture land dominated by monocultures versus crop diversity: (a) Macronutrient production, (b) Mineral production, (c) Vitamin production

(a) Macronutrient production

Nutrition scenario	Crop	Energy	Protein	Fat
Monoculture	**maize**	**357,808,754,874**	**2,207,307,447**	**1,110,683,365**
Crop diversity	apple	52,208,905,904	62,267,502	40,713,367
	barley	195,276,395,853	1,313,773,987	153,781,819
	fava beans	120,699,684,645	2,212,404,044	129,593,346
	cabbage	33,162,038,658	1,671,919,449	248,715,290
	cucumber	18,118,239,773	181,182,398	30,661,637
	maize	33,870,235,683	208,944,087	105,137,470
	nuts (pecan)	155,897,368,747	684,978,070	3,519,620,676
	pea	78,236,195,008	1,347,858,658	63,687,008
	spinach	12,947,087,439	381,738,867	52,055,300
	tomato	71,738,049,818	841,726,451	191,301,466
	Total	**772,154,201,529**	**8,906,793,513**	**4,535,267,378**

(b) Mineral production

Nutrition scenario	Crop	Fe	Ca	Mg	K	Mn	Se	Zn	Lyc
Monoculture	**maize**	**635,010,953**	**1,640,249,695**	**29,758,815,893**	**67,250,237,491**	**113,645,872**	**3,631,981,467**	**517,850,261**	**0**
Crop diversity	apple	28,738,847	1,436,942,364	1,197,451,970	25,625,472,164	8,382,164	0	9,579,616	0
	barley	331,426,334	3,844,545,472	10,473,072,147	37,119,749,381	175,258,245	4,997,909,113	282,375,236	0
	fava beans	567,500,272	8,724,257,908	16,262,694,352	89,953,028,136	137,724,693	694,552,571	265,962,814	0
	cabbage	773,780,902	64,942,325,706	20,726,274,161	339,910,896,247	219,698,506	1,243,576,450	248,715,290	0
	cucumber	78,047,802	4,459,874,406	3,623,647,955	40,975,096,101	22,020,630	83,622,645	55,748,430	0
	maize	60,110,241	155,266,306	2,816,974,415	6,365,918,560	10,757,737	343,803,964	49,019,791	0
	nuts (pecan)	183,415,403	3,387,075,394	9,310,839,831	34,335,016,137	240,845,261	429,598,489	170,810,417	0
	pea	243,218,487	3,019,642,614	6,313,798,194	53,859,443,721	76,369,507	87,844,149	165,256,805	0
	spinach	361,717,598	13,214,037,696	10,544,535,131	74,479,121,558	119,727,190	133,475,128	70,741,818	0
	tomato	258,256,979	9,565,073,309	10,521,580,640	226,692,237,426	109,041,836	0	162,606,246	2,461,093,362,439
	Total	**2,886,212,865**	**112,749,041,174**	**91,790,868,796**	**929,315,979,432**	**1,119,825,768**	**8,014,382,509**	**1,480,816,463**	**2,461,093,362,439**

(c) Vitamin production

Nutrition scenario	Crop	Vit A	Vit C	Vit E	Vit K	Vit B1	Vit B2	Vit B3	Vit B5	Vit B6	Folate
Monoculture	Maize	**50,144,776,387**	**0**	**114,817,479**	**70,296,415**	**90,213,733**	**47,098,598**	**849,883,663**	**99,352,267**	**145,747,901**	**4,452,106,315**
Crop diversity	apple	12,932,481,279	1,101,655,813	43,108,271	526,878,867	4,071,337	6,226,750	21,793,626	14,608,914	9,819,106	718,471,182
	barley	2,916,551,737	0	2,651,411	291,655,174	25,320,972	15,113,041	610,354,736	37,384,890	34,468,339	3,049,122,271
	fava beans	4,489,181,253	118,582,146	4,235,077	762,313,798	47,009,351	28,205,611	239,874,742	82,668,696	31,000,761	35,828,748,495
	cabbage	174,100,702,956	70,469,332,149	0	0	69,087,581	41,452,548	414,525,483	193,445,226	131,266,403	78,759,841,813
	cucumber	29,267,925,787	780,478,021	8,362,265	4,571,371,266	7,526,038	9,198,491	27,316,731	72,194,217	11,149,686	1,951,195,052
	maize	4,746,712,794	0	10,868,641	6,654,270	8,539,647	4,458,361	80,450,128	9,404,702	13,796,520	421,437,117
	nuts (pecan)	6,988,499,854	281,554,219	241,616,995	1,845,730,036	35,885,622	10,482,718	137,239,996	47,075,763	21,351,302	3,479,940,696
	pea	8,180,486,355	98,824,667	4,941,233	796,087,598	39,859,283	11,804,057	158,613,591	96,518,758	9,553,051	15,043,310,479
	spinach	1,251,596,277,513	3,750,651,104	270,954,510	64,455,139,427	10,411,060	25,226,799	96,635,993	8,675,883	26,027,650	25,894,174,879
	tomato	796,770,606,650	12,147,643,103	516,513,959	7,556,407,914	35,390,771	18,173,639	568,165,355	85,129,152	76,520,586	14,347,609,964
	Total	**2,291,989,426,178**	**88,748,721,222**	**1,103,252,361**	**80,812,238,350**	**283,101,661**	**170,342,016**	**2,354,970,380**	**647,106,202**	**364,953,405**	**179,493,851,947**

Table S5. Nutrient comparison between agriculture land dominated by monocultures versus crop diversity: (a) Macronutrient production, (b) Mineral production, (c) Vitamin production

a) Macronutrient production

Nutrition scenario	Crop	Energy	Protein	Fat
Monoculture	**maize**	**367,452,530,423**	**2,266,799,500**	**1,140,618,857**
Crop diversity	apple	56,436,125,143	67,309,140	44,009,822
	barley	228,980,105,551	1,540,524,675	180,323,776
	fava beans	138,389,194,206	2,536,649,651	148,586,293
	cabbage	37,973,860,874	1,914,515,486	284,803,957
	cucumber	21,141,486,119	211,414,861	35,777,900
	maize	33,570,610,185	207,095,709	104,207,395
	nuts (pecan)	180,558,837,653	793,335,033	4,076,390,919
	pea	88,820,164,893	1,530,200,034	72,302,731
	spinach	18,758,823,063	553,095,195	75,422,072
	tomato	81,310,754,418	954,046,185	216,828,678
	Total	**885,939,962,105**	**10,308,185,969**	**5,238,653,543**

(b) Mineral production

Nutrition scenario	Crop	Fe	Ca	Mg	K	Mn	Se	Zn	Lyc
Monoculture	**maize**	**652,125,971**	**1,684,458,227**	**30,560,884,980**	**69,062,787,316**	**116,708,891**	**3,729,871,789**	**531,807,526**	**0**
Crop diversity	apple	31,065,757	1,553,287,848	1,294,406,540	27,700,299,956	9,060,846	0	10,355,252	0
	barley	388,628,828	4,508,094,407	12,280,670,970	43,526,428,754	205,506,924	5,860,522,729	331,111,762	0
	fava beans	650,672,001	10,002,868,072	18,646,123,009	103,136,367,893	157,909,354	796,344,837	304,941,803	0
	cabbage	886,056,754	74,365,477,546	23,733,663,047	389,232,073,963	251,576,828	1,424,019,783	284,803,957	0
	cucumber	91,071,017	5,204,058,122	4,228,297,224	47,812,283,992	25,695,037	97,576,090	65,050,727	0
	maize	59,578,490	153,892,778	2,792,054,678	6,309,603,879	10,662,571	340,762,579	48,586,148	0
	nuts (pecan)	212,429,961	3,922,878,244	10,783,725,414	39,766,486,467	278,944,672	497,556,851	197,830,987	0
	pea	276,121,635	3,428,146,715	7,167,943,132	61,145,671,411	86,700,947	99,727,904	187,613,120	0
	spinach	524,086,706	19,145,602,920	15,277,804,350	107,911,580,094	173,470,766	193,389,928	102,496,662	0

	tomato	292,718,716	10,841,433,922	11,925,577,315	256,941,983,962	123,592,347	0	184,304,377	2,789,500,948,242
	Total	**3,412,429,865**	**133,125,740,574**	**108,130,265,679**	**1,083,482,780,371**	**1,323,120,292**	**9,309,900,701**	**1,717,094,795**	**2,789,500,948,242**

(c) Vitamin production

Nutrition scenario	**Crop**	**Vit A**	**Vit C**	**Vit E**	**Vit K**	**Vit B1**	**Vit B2**	**Vit B3**	**Vit B5**	**Vit B6**	**Folate**
Monoculture	Maize	**51,496,294,375**	**0**	**117,912,076**	**72,191,067**	**92,645,202**	**48,368,015**	**872,789,999**	**102,030,041**	**149,676,145**	**4,572,100,902**
Crop diversity	apple	13,979,590,632	1,190,854,017	46,598,635	569,538,878	4,400,982	6,730,914	23,558,199	15,791,760	10,614,134	776,643,924
	barley	3,419,933,688	0	3,109,031	341,993,369	29,691,242	17,721,475	715,698,850	43,837,332	40,417,398	3,575,385,219
	fava beans	5,147,106,872	135,961,314	4,855,761	874,037,016	53,898,949	32,339,370	275,030,314	94,784,459	35,544,172	41,079,739,754
	cabbage	199,362,769,591	80,694,454,358	0	0	79,112,210	47,467,326	474,673,261	221,514,188	150,313,199	90,187,919,577
	cucumber	34,151,631,423	910,710,171	9,757,609	5,334,159,575	8,781,848	10,733,370	31,874,856	84,240,691	13,010,145	2,276,775,428
	maize	4,704,722,056	0	10,772,494	6,595,405	8,464,103	4,418,921	79,738,443	9,321,505	13,674,473	417,708,968
	nuts (pecan)	8,094,013,521	326,093,397	279,838,486	2,137,706,830	41,562,384	12,140,983	158,950,048	54,522,697	24,728,873	4,030,433,946
	pea	9,287,161,101	112,193,892	5,609,695	903,784,134	45,251,537	13,400,937	180,071,197	109,576,035	10,845,410	17,078,403,636
	spinach	1,813,417,359,386	5,434,256,990	392,581,555	93,387,996,464	15,084,414	36,550,696	140,014,308	12,570,345	37,711,036	37,517,646,126
	tomato	903,091,445,739	13,768,621,081	585,437,432	8,564,732,799	40,113,306	20,598,724	643,981,175	96,488,762	86,731,471	16,262,150,884
	Total	**2,994,655,734,009**	**102,573,145,220**	**1,338,560,698**	**112,120,544,470**	**326,360,975**	**202,102,716**	**2,723,590,651**	**742,647,774**	**423,590,311**	**213,202,807,462**