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Organization of the
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2

The future of food and agriculture

Alternative pathways to 2050

SUPPLEMENTARY MATERIAL

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Abbreviations

BAU	Business as usual scenario
EAP	East Asia and the Pacific
ECA	Europe and Central Asia
FAO	Food and Agriculture Organization of the United Nations
GAEZ	FAO-IIASA Global Agro-Ecological Zones
GAPS	FAO Global Agriculture Perspectives System
GDP	Gross domestic product
GHG	Greenhouse gas
HIC	High-income countries
IIASA	International Institute for Applied Systems Analysis
LAC	Latin America and the Caribbean
LMIC	Low- and middle-income countries
NNA	Near East and North Africa
OECD	Organisation for Economic Co-operation and Development
PoU	Prevalence of Undernourishment
SAS	South Asia
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
SSP	Shared socioeconomic pathways
SSS	Stratified societies scenario
TSS	Towards sustainability scenario
USD	United States dollar

Introduction

The report “*The future of food and agriculture – Alternative pathways to 2050*” presents a foresight exercise led by the FAO Global Perspectives Studies Team and heavily relying on in-house expertise, skills and data, in addition to partnerships with external institutions. The aim of the report is to provide solid analytical ground and quantitative evidence for the identification and discussion of potential strategic options to move food and agricultural systems towards social, economic and environmental sustainability.¹

The overarching concern regarding the future of food and agriculture is whether these systems will be able to sustainably and effectively feed everyone by 2050 and beyond, while at the same time meeting additional demands for non-food uses of agricultural commodities.

Addressing the challenges of hunger, food insecurity and malnutrition in all its forms, features prominently in the targets of the second Sustainable Development Goal (SDG) of the 2030 Agenda for Sustainable Development. However, despite great progress in increasing income and wealth globally, billions of people still face pervasive poverty, hunger and malnutrition, different dimensions of inequality, joblessness, diseases and deprivation from vital goods and services. FAO’s most recent estimates indicate that 821 million people, approximately one out of every nine people in the world, were undernourished in 2017. Worse still, after a prolonged decline, both the absolute number and the prevalence of undernourishment (PoU) may have started increasing again, signalling a possible reversal of trends. At the same time, food insecurity is contributing to undernutrition, as well as overweight and obesity, and high rates of these forms of malnutrition coexist in many countries.

Additional concerns arise because much of humanity’s progress achieved so far has come at a considerable cost to the environment. To produce more food and other non-food agricultural goods, a combination of intensified agricultural production and the clearing of forests has led to the degradation of natural resources and is contributing to climate change. Should the development community continue to address these challenges with a “business as usual” approach, the future will not look promising. Sustainable food and agriculture systems cannot be achieved without significant additional efforts.

To address these concerns, the report analyses potential future scenarios that reflect, to varying degrees, the challenges to move food and agricultural systems towards social, economic and environmental sustainability. The first scenario is “business as usual”, whereby despite the efforts of many countries, several outstanding challenges facing food and agriculture are left unaddressed. The second scenario, “towards sustainability”, embodies proactive changes towards more sustainable food and agricultural systems. The third scenario, “stratified societies”, outlines a future with exacerbated inequalities across countries and throughout different layers of societies.

¹ In this report “agriculture” comprises all agricultural sectors including crops, livestock, fisheries and forestry.

The quantitative and qualitative analyses of the alternative scenarios provided in this report allow addressing fundamental questions regarding the future of food and agriculture, support the identification of strategic orientations that nurture national, regional and global dialogues and policy making processes and contribute to shape key messages for moving food and agricultural systems along sustainable patterns.

The evidence contained in this report, is based on solid qualitative assessments, and rigorous quantitative analysis. The reader is referred to the report or to its summary version for a description of the scenarios, the presentation of the methods applied to implement the foresight exercise, the analytical findings and the discussion of selected strategic options suggested to move food and agricultural systems towards sustainability.²

Quantitative analyses rely on both economy-wide and sector-specific simulation models. For each scenario at the regional and global level the results of the model-based exercise include separate and comparative analyses (across scenarios) of key variables and indicators, such as: the share of agricultural value added in the total economy; supply and demand for a set of food and agricultural products; long-term price trends; performances in food security and nutrition; natural resource use; net trade positions of the various regions for selected groups of products; and GHG emissions.

Given that the foresight exercise required and generated a very large amount of data, part of such data and related analysis is provided as supplementary material in this document. More specifically, this document provides the detailed analysis of selected commodity balances by region and scenario and related commodity balance tables, which complement information provided in the Section 4.6 “Commodity balances and net international trade” of the report. In addition this document provides statistical tables regarding historical and projected data by region, commodity or commodity group and scenario which complement, with more detail, selected sections and/or tables of the report. More specifically, the readers will find tables for projected yield shifters from technical progress and climate change, as a supplement to Table 3.7 of the report; gross agricultural output index, as a supplement to Table 4.1; historical dietary energy supply and projected dietary energy consumption, as a supplement to Table 4.2; per capita apparent consumption of proteins, as complementary information to the apparent per capita consumption of calories analysed in Section 4.5; projected harvested area, as supplement to Table 4.10; and historical and projected herd sizes, as a supplement to Table 4.11.³

² The FAO report “*The future of food and agriculture – Alternative pathways to 2050*” is available at www.fao.org/3/I8429EN/i8429en.pdf while all the other products can be found in the publication series webpage (available at www.fao.org/publications/fofa).

³ The full database at country level of the historical data and the projections to 2050 underlying the report is provided through the data publishing device available at www.fao.org/global-perspectives-studies/food-and-agriculture-projections-to-2050

1 | Commodity balances

Commodity balances are calculated as the difference between domestic production and domestic absorption and highlight whether a region or country is a net exporter or a net importer of a specific commodity. In other words, the balances define the “net-trade” position of a region or country. The ratio between domestic production and domestic absorption defines the self-sufficiency ratio. Particularly for food commodities such as cereals and meat, the self-sufficiency ratio has often been considered a strategic target variable, and thus heavily influences food and agricultural policies. Here below the commodity balances of cereals, meat, fruit and vegetables, dairy products, eggs, fish, oilseeds and cash crops are presented.

Cereals

■ **BAU:** Under the BAU scenario, compared with 2012, global cereal production is projected to increase by 54 percent in 2050. This increase in production is almost double in LMIC (excluding China, +77 percent) than in HIC (+36 percent). LMIC (excluding China) on average account for slightly less than half of global cereal production in 2012, while their share is getting close to 55 percent in 2050. This more than proportional growth in LMIC (excluding China) compared to HIC is led by expansion in SSA (+190 percent by 2050), followed by LAC (+ 115 percent by 2050) (see [Figure S 1.1](#) and [Table S 1.1](#)).

Worldwide, in 2012 almost 43 percent of cereal absorption was destined for food consumption. This percentage is projected to drop to 40 percent in 2050. Similarly in LMIC (excluding China), the share of food consumption in total absorption was close to 60 percent in 2012 and is projected to drop to 55 percent in 2050: first because per capita demand for food staple only slightly increases; and second because demand for animal feed increases at a higher pace compared to food demand.

The consumption of cereals for feed worldwide shifts from 35 percent of total consumption in 2012 to 41 percent in 2050. This is the result of opposite trends: in HIC, the share of feed remains almost stable throughout the simulation period and at around 50 percent of the total cereals consumption. In LMIC (excluding China) it grows from 25 to 34 percent and in China it grows from 38 to 54 percent from 2012 to 2050. This is due to increased consumption of meat and dairy food items.

Other uses of cereals – including feedstock for first generation biofuels – are expected to continue to account for nearly 20 percent of global production throughout the simulation period.¹

¹ Projections on feedstock biofuel are consistent with the medium-term projections in OECD-FAO (2017), and assume that capacities for first generation biofuels will continue being used beyond the medium term and will hence result in a steady demand for biofuel feedstock. Any further increase in biofuels is assumed to come from second-generation or more advanced technologies to produce biofuels.

Domestic absorption is expected to increase more than domestic production in LMIC excluding China, so that the self-sufficiency ratio for these countries in aggregate drops from 0.97 in 2012 to 0.93 in 2050. However, significant disparities exist within LMIC groups – while LAC dramatically increases its net exports, SAS and EAP (excluding China) and China keep their balance almost in equilibrium. The drop in the self-sufficiency ratio is particularly marked in SSA, where it shifts downward from 0.75 in 2012 to 0.60 in 2050; and in NNA, from 0.51 to 0.39 for the same periods (see [Table S 1.1](#)).

■ **TSS:** The TSS scenario projects an increase in global cereal production of 39 percent from 2012 to 2050, lower than the 54 percent growth projected in BAU. These differences are definitely more marked in HIC, ECA and China, while they are almost negligible in other EAP countries, SSA, and LAC. Thanks to the relative slowdown of HIC and China, by 2050 LMIC excluding China further increase their global predominance in cereal production compared with BAU.

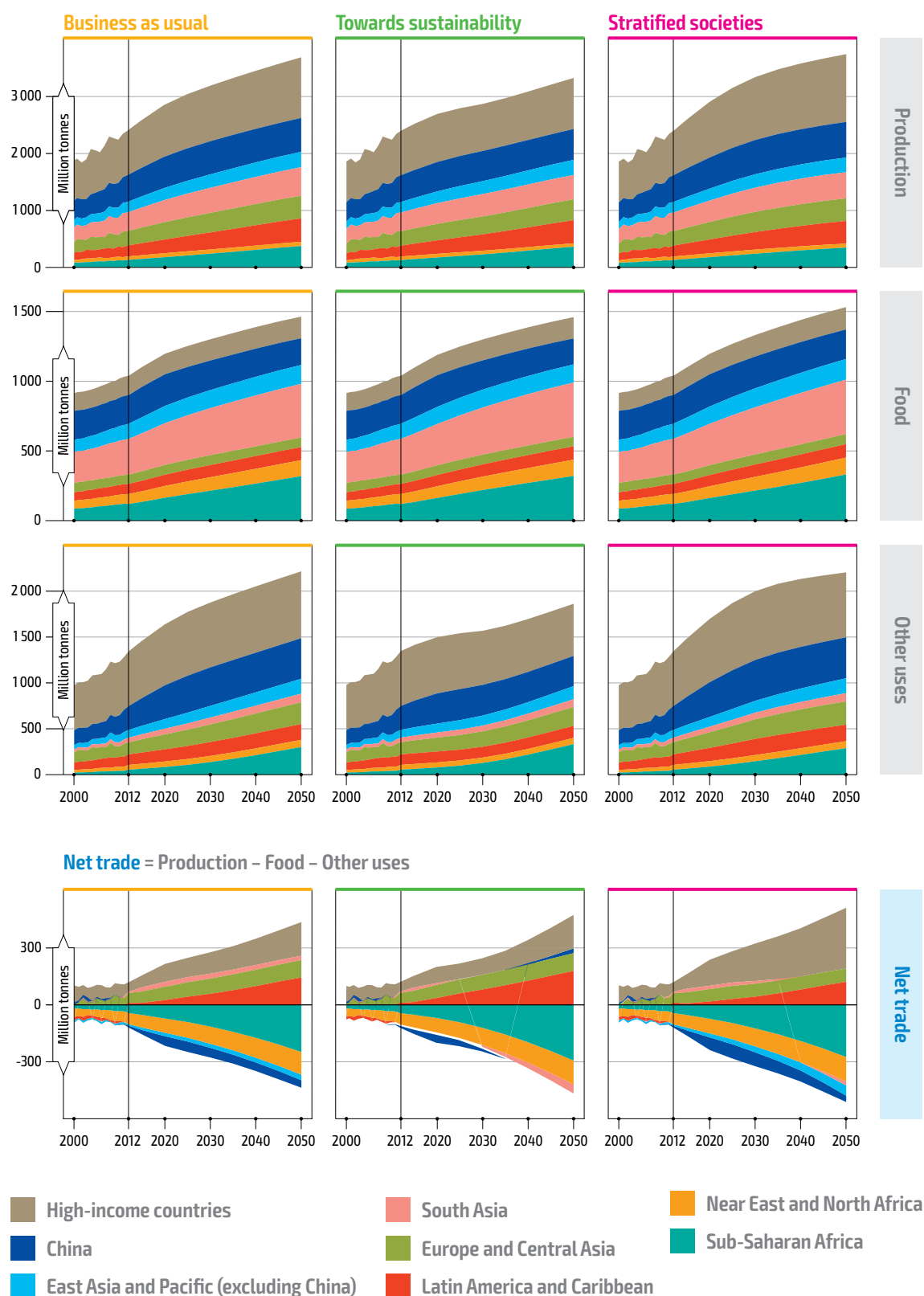
In TSS, demand for cereals as food consumption evolves in a similar manner as under BAU, both in HIC, China and LMIC excluding China. Minor differences arise in HIC, which show a slight reduction in cereals as a contribution to the overall reduction in calorie consumption in HIC (see [Table 4.2](#) of the report) and a slight reduction in SSA due to higher income growth compared with BAU. This turns the consumption of some cereals such as millet or sorghum into necessities (goods for which demand decreases as income increases).

The slowdown in the growth of cereal production in TSS is largely motivated by lower expansion of demand for cereals as feed, which increases by less than 50 percent worldwide between 2012 and 2050 (over the same period in BAU it increases by 81 percent). This slowdown in cereal demand for feed is particularly marked in HIC: by 2050, it drops by 17 percent compared to 2012.

HIC increase their trade surplus so that their self-sufficiency ratio in 2050 shifts to 1.25 – compared to 1.20 under BAU – while volumes in absolute terms remain almost unchanged. LAC, thanks to a very limited increase of feed demand, significantly increase their already large self-sufficiency ratio compared to BAU. In China, the reduction of feed demand overtakes that of production, so that net exports rise slightly. Sub-Saharan Africa is projected to maintain almost the same level of growth in cereal production and a similar self-sufficiency ratio as under BAU (see [Table S 1.1](#)).

■ **SSS:** The SSS scenario, characterized by higher income growth than BAU in all regions except SSA, shows the highest global expansion of cereals of all the three scenarios. This expansion is fuelled by demand for cereals as food particularly in HIC, EAP, ECA and NNA (see [Table S 1.1](#)). A further spur to production comes from the almost unabated demand for feed compared to BAU everywhere, except in SSA, NNA and HIC.

As related crop yields evolve at a higher pace in HIC than in LMIC due to disparities in investment for equipment, technologies and infrastructure – as well as positive differentials in climate change impacts – production in HIC increases faster than in LMIC relative to BAU. HIC therefore consolidate their net trade position, as highlighted by the self-sufficiency ratio, which in 2050, under TSS shifts to 1.37, compared to 1.20 under BAU. Conversely, in LMIC excluding China, higher food demand combined with lower production growth, leads to more net imports (or decreased net exports in the case of ECA) and so to a decrease of self-sufficiency ratio, which in 2050 under TSS drops to 0.90, compared to 0.94 in BAU.

Figure S 1.1 Commodity balances for cereals by region and scenario

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: feed, seed, food losses, non-food processing (e.g. biofuels) and other demand. Positive (negative) net trade denotes net exports (imports). "Cereals" comprise: wheat, barley, maize, millet, sorghum, rice and other grains.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.1 Cereals: commodity balances by region and scenario

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	781	975	827	1104	1064	897	1190	136	115	152
	Food	139	152	150	154	155	153	160	112	110	115
	Feed	361	433	324	475	447	298	424	124	83	117
	Other uses	230	276	265	277	284	269	285	123	117	124
	Net trade	50	113	88	198	178	177	320	354	351	636
	Self-sufficiency ratio	1.07	1.13	1.12	1.22	1.20	1.25	1.37	112	116	128
East Asia and Pacific	Production	655	818	757	837	865	807	884	132	123	135
	Food	314	342	338	365	327	316	360	104	101	115
	Feed	224	402	317	429	451	341	453	201	152	202
	Other uses	135	147	127	149	155	132	157	116	98	117
	Net trade	-17	-73	-25	-105	-69	18	-87	399	-	504
	Self-sufficiency ratio	0.97	0.92	0.97	0.89	0.93	1.02	0.91	95	105	93
China	Production	470	582	529	602	596	541	626	127	115	133
	Food	205	212	210	228	192	186	212	93	91	103
	Feed	180	323	250	348	343	244	345	190	136	192
	Other uses	94	98	85	100	101	85	102	108	91	109
	Net trade	-9	-51	-15	-73	-39	25	-33	431	-	363
	Self-sufficiency ratio	0.98	0.92	0.97	0.89	0.94	1.05	0.95	96	107	97
East Asia and Pacific (excluding China)	Production	185	236	228	235	269	266	257	145	144	139
	Food	108	130	128	136	135	130	148	125	120	137
	Feed	44	79	67	81	108	97	108	246	219	244
	Other uses	41	49	43	49	54	46	55	134	113	135
	Net trade	-8	-22	-10	-31	-29	-7	-54	363	87	663
	Self-sufficiency ratio	0.96	0.92	0.96	0.88	0.90	0.97	0.83	94	102	86
South Asia	Production	327	439	392	425	502	426	459	154	131	141
	Food	257	337	338	338	385	390	391	150	152	152
	Feed	17	33	29	31	45	48	42	263	280	244
	Other uses	46	43	34	42	49	37	48	107	80	104
	Net trade	7	26	-9	14	22	-49	-21	331	-	-
	Self-sufficiency ratio	1.02	1.06	0.98	1.03	1.05	0.90	0.96	103	88	94
Europe and Central Asia	Production	254	343	314	355	398	367	397	157	145	156
	Food	66	70	70	72	68	68	72	104	102	109
	Feed	86	135	116	154	172	148	188	200	172	218
	Other uses	49	58	51	60	66	57	67	133	116	136
	Net trade	53	80	77	68	92	94	70	174	179	134
	Self-sufficiency ratio	1.26	1.30	1.32	1.24	1.30	1.34	1.22	103	107	96

Table S 1.1 Cereals: commodity balances by region and scenario (continued)

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	191	298	288	308	411	406	398	215	213	208
	Food	73	87	88	88	94	96	97	129	132	133
	Feed	84	114	89	136	130	100	137	155	119	164
	Other uses	25	38	30	41	42	32	43	169	128	171
	Net trade	10	59	81	43	144	179	121	1500	1857	1259
	Self-sufficiency ratio	1.05	1.24	1.39	1.16	1.54	1.78	1.44	146	169	137
Near East and North Africa	Production	62	74	64	72	75	59	69	121	96	112
	Food	72	97	97	99	115	116	121	160	162	169
	Feed	38	49	44	50	58	53	56	153	139	146
	Other uses	11	19	14	19	21	15	21	188	135	189
	Net trade	-59	-90	-91	-95	-120	-125	-129	202	212	218
	Self-sufficiency ratio	0.51	0.45	0.41	0.43	0.39	0.32	0.35	75	63	68
Sub-Saharan Africa	Production	129	240	229	241	375	363	348	290	281	269
	Food	119	215	219	215	319	321	331	267	269	277
	Feed	26	84	82	94	212	248	204	827	967	795
	Other uses	27	55	49	55	92	88	88	336	320	323
	Net trade	-43	-115	-120	-124	-248	-293	-275	577	682	638
	Self-sufficiency ratio	0.75	0.68	0.66	0.66	0.60	0.55	0.56	80	74	75
Low- and middle-income countries	Production	1619	2213	2044	2239	2625	2429	2555	162	150	158
	Food	900	1148	1149	1177	1308	1307	1371	145	145	152
	Feed	475	817	677	893	1069	938	1079	225	197	227
	Other uses	293	360	306	366	426	360	424	145	123	145
	Net trade	-50	-113	-88	-198	-178	-177	-320	354	351	636
	Self-sufficiency ratio	0.97	0.95	0.96	0.92	0.94	0.93	0.89	97	96	92
Low- and middle-income countries (excluding China)	Production	1148	1630	1515	1636	2029	1888	1929	177	164	168
	Food	695	936	939	949	1117	1121	1159	161	161	167
	Feed	295	494	427	546	726	694	734	246	235	249
	Other uses	200	263	221	266	325	275	322	163	138	161
	Net trade	-41	-62	-73	-124	-139	-201	-287	337	489	697
	Self-sufficiency ratio	0.97	0.96	0.95	0.93	0.94	0.90	0.87	97	94	90
World	Production	2399	3187	2871	3343	3689	3326	3745	154	139	156
	Food	1039	1301	1299	1331	1464	1460	1531	141	140	147
	Feed	837	1250	1000	1369	1516	1237	1504	181	148	180
	Other uses	523	636	571	643	710	630	709	136	120	136
	Net trade	0	0	0	0	0	0	0	-	-	-
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production – aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Cereals" comprise: wheat, barley, maize, millet, sorghum, other grains and rice. "Other uses" refers to the sum of non-food domestic uses, including: seed, food losses, non-food processing, biofuels and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Meat

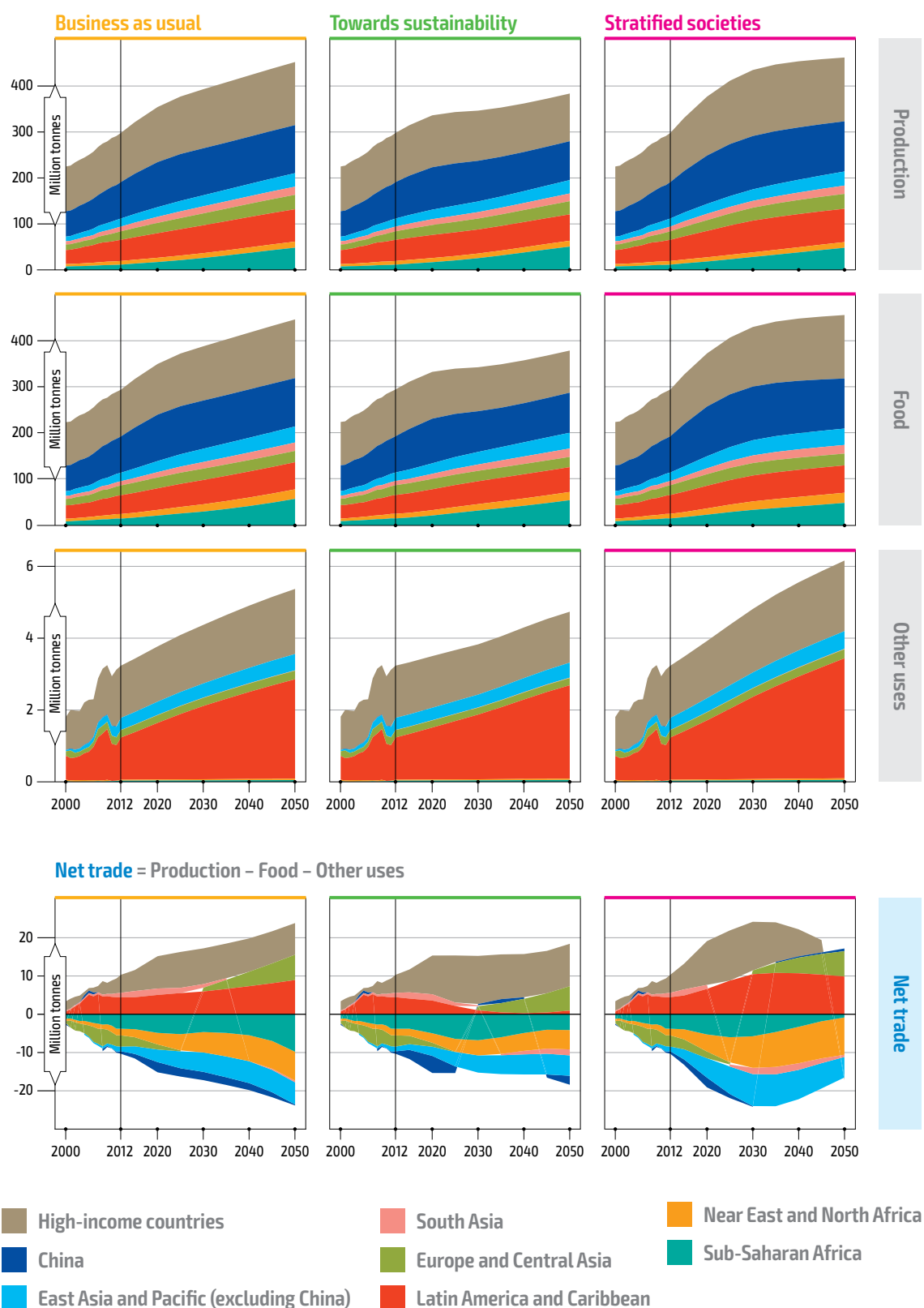
In 2012, high-income countries accounted for 36 percent of the world's meat production. China was the second-largest supplier of meat worldwide (27 percent of global meat production).

■ **BAU:** The BAU scenario projects that compared with 2012 levels, meat production and demand increase by around 52 percent in 2050; this follows the general increase of food consumption. Other uses of meat refer to non-food industries (e.g. cosmetics) and remain rather low, and thus current use levels are maintained in the projection (see Figure S 1.2 and Table S 1.2). Under BAU, HIC expand existing capacities, with their production augmented by 28 percent between 2012 and 2050. In so doing, HIC continue to provide about 30 percent of global meat production throughout the simulation period, thereby improving both self-sufficiency ratios and trade balances. Also, China expands its installed capacities to maintain its current self-sufficiency level, and production increases by 23 percent between 2012 and 2050. Food consumption in China increases by almost as much as production during the same period, so that the trade balance is maintained.

Sub-Saharan Africa is the only region that almost quadruples its production by 2050 (see Table S 1.2). Still, this increase only leads SSA to expand its share in global meat production from 4 percent in 2012 to 11 percent in 2050. Expanding production in SSA strengthens self-sufficiency but not enough to cover the high demand linked to growing population and higher per capita meat consumption due to income growth. Thus, SSA remains a net importer of meat.

■ **TSS:** The TSS scenario, on the other hand, delineates a pathway towards lower consumption of meat compared with BAU. Global meat production increases by no more than 16 percent by 2030, and just under 30 percent by 2050 compared with 2012, due to lower demand and the adoption of less-intense production practices. These changes are more visible in HIC, where excess supply decreases gradually. In China, meat production slows down more than food demand does (compared to BAU), and unlike in HIC, this country increases its net imports of meat. TSS assumes higher income growth for LMIC compared with BAU. There is, however, a modest expansion of meat demand compared with this under BAU, which would have been otherwise much higher since meat is a luxury good for some LMIC and its consumption would have expanded substantially, had it not been for consumer awareness regarding sustainability issues. Developments in supply and demand are projected to have very limited effect on the self-sufficiency situation throughout the projection period.

■ **SSS:** The SSS scenario, on the contrary, projects higher meat consumption than BAU, as meat-based diets are adopted. In SSA, however, meat consumption in 2050 falls below what is seen under BAU because economic growth in this region slows down after 2030. The intensification of production systems increases production compared with BAU in almost all regions (especially in LAC and in SSA) throughout the projection period, the exception being MNA where natural resources are particularly scarce. In this scenario, LAC has the highest expansion in net exports and ECA turns into a net exporter; meanwhile, MNA has the highest increase in net imports and HIC turns into a net importer by 2050.

Figure S 1.2 Commodity balances for meat by region and scenario

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports). "Meat" comprises: beef meat, sheep and goat meat, pig meat and poultry meat.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Table S 1.2 Meat: commodity balances by region and scenario

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	107	128	109	144	137	104	139	128	97	130
	Food	101	117	95	129	127	91	137	125	90	136
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	2	1	2	2	1	2	185	144	200
	Net trade	5	9	13	13	8	11	–1	176	235	–
	Self-sufficiency ratio	1.05	1.08	1.13	1.10	1.06	1.12	1.00	102	107	95
East Asia and Pacific	Production	97	126	112	141	134	114	140	138	118	145
	Food	97	133	115	149	140	121	144	144	125	149
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	2	0	0	0	0	0	0	27	25	29
	Net trade	–2	–7	–4	–9	–6	–8	–5	319	405	245
	Self-sufficiency ratio	0.98	0.95	0.96	0.94	0.96	0.94	0.97	98	96	99
China	Production	79	102	89	116	105	84	109	132	107	138
	Food	79	104	88	116	105	87	108	133	110	138
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	0	0	0	0	0	0	0	0	–1
	Net trade	–1	–2	0	0	0	–2	1	40	360	–
	Self-sufficiency ratio	0.99	0.98	1.00	1.00	1.00	0.97	1.01	101	98	101
East Asia and Pacific (excluding China)	Production	18	24	23	25	29	29	31	168	167	175
	Food	18	29	27	33	35	34	35	189	186	194
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	0	0	0	0	0	0	0	111	103	120
	Net trade	–1	–5	–4	–8	–6	–5	–5	466	428	431
	Self-sufficiency ratio	0.93	0.83	0.84	0.75	0.84	0.85	0.85	89	91	91
South Asia	Production	10	15	14	15	18	17	18	172	162	176
	Food	9	14	14	17	18	18	19	199	199	204
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	0	0	0	0	0	0	0	162	184	202
	Net trade	1	1	0	–2	0	–2	–1	–	–	–
	Self-sufficiency ratio	1.13	1.07	1.02	0.90	0.98	0.91	0.97	87	81	86
Europe and Central Asia	Production	19	26	24	28	31	29	32	170	155	175
	Food	21	25	23	27	25	22	26	116	105	120
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	0	0	0	0	0	0	0	103	86	107
	Net trade	–3	1	1	1	7	6	7	–	–	–
	Self-sufficiency ratio	0.86	1.04	1.05	1.04	1.27	1.29	1.26	147	149	145

Table S 1.2 Meat: commodity balances by region and scenario (continued)

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	46	61	52	69	70	57	73	153	125	157
	Food	41	53	49	56	59	54	59	144	132	145
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	2	2	2	3	3	3	335	314	404
	Net trade	4	6	1	10	9	1	10	201	21	222
	Self-sufficiency ratio	1.11	1.11	1.02	1.18	1.15	1.02	1.16	103	92	105
Near East and North Africa	Production	8	10	10	10	13	13	12	164	159	154
	Food	10	16	14	18	21	18	22	208	178	221
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	0	0	0	0	0	0	0	–24	–23	–27
	Net trade	–2	–5	–4	–8	–8	–5	–10	433	291	559
	Self-sufficiency ratio	0.82	0.66	0.72	0.55	0.64	0.72	0.56	77	87	68
Sub-Saharan Africa	Production	11	26	25	28	48	51	48	427	447	425
	Food	15	31	32	34	58	55	49	380	359	320
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	0	0	0	0	0	0	0	–49	–48	–42
	Net trade	–4	–5	–7	–6	–10	–4	–1	259	109	22
	Self-sufficiency ratio	0.75	0.85	0.79	0.83	0.83	0.92	0.98	111	123	131
Low- and middle-income countries	Production	191	265	237	291	315	280	323	165	147	169
	Food	193	271	247	301	320	288	318	165	149	165
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	2	3	2	3	4	3	4	149	139	174
	Net trade	–5	–9	–13	–13	–8	–11	1	175	235	–
	Self-sufficiency ratio	0.98	0.97	0.95	0.96	0.97	0.96	1.00	100	99	103
Low- and middle-income countries (excluding China)	Production	112	162	149	175	210	195	214	188	175	192
	Food	115	167	159	185	215	201	210	187	175	183
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	3	2	3	4	3	4	317	295	371
	Net trade	–4	–7	–13	–13	–8	–9	0	197	215	1
	Self-sufficiency ratio	0.96	0.96	0.92	0.93	0.96	0.96	1.00	100	99	104
World	Production	298	393	346	435	452	384	462	152	129	155
	Food	295	389	343	430	447	379	456	152	129	155
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	3	4	4	5	5	5	6	160	141	182
	Net trade	0	0	0	0	0	0	0	–	–	–
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production – aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Meat" comprises: beef meat, sheep and goat meat, pig meat and poultry meat. "Other uses" refers to the sum of non-food domestic uses, including: food losses, non-food processing, and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Fruit and vegetables

Fruit and vegetables gain prominence in diets due to income growth in LMIC, which enhances trends towards higher per capita consumption, as pointed out in Section 4.5 of the report. China plays a dominant role in fruit and vegetable markets, and in 2012 accounted for nearly 40 percent of global production.

■ **BAU:** In the BAU scenario, production worldwide is projected to increase by 33 percent between 2012 and 2030, and by 49 percent between 2012 and 2050. Most of the fruit and vegetables produced are for human consumption (83 percent in 2012, which increases to 84 percent in 2030 and to 85 percent in 2050; see [Figure S 1.3](#) and [Table S 1.3](#)). Relatively few regions use fruit and vegetables as animal feed, in which feed use is projected to decline throughout the simulation period as high prices make it less attractive to use fruit and vegetables for compound feed. Other uses generally mean non-food industry uses (e.g. cosmetics) when referring to HIC; this category grows until 2050 following the evolution of the entire economy. In most LMIC, on the other hand, other uses primarily refer to post-harvest losses due to the perishability of the commodities and the lack of adequate infrastructure.

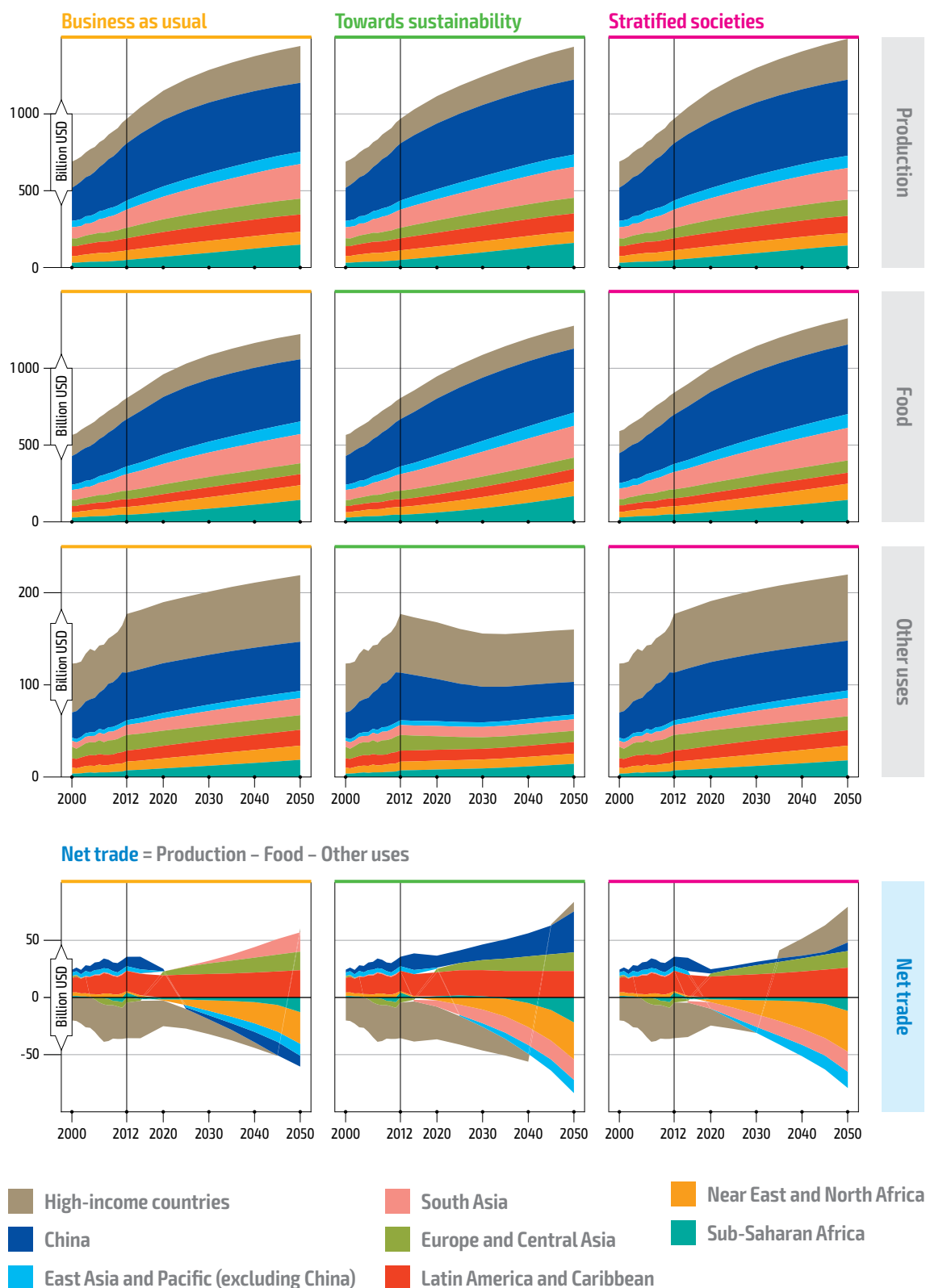
The highest increase of production in BAU takes place in SSA, where production is expected to triple by 2050 compared with 2012. This increase, however, falls short of substantially lifting the relevance of SSA on world markets, and by 2050 the region manages to supply just 11 percent of the world's fruit and vegetable production. Income and population growth in SSA triples food demand by 2050. Other uses of fruit and vegetables in SSA, as shown in [Table S 1.3](#), refer to post-harvest losses and are assumed to follow historical trends and thus increase proportionally to production volume. Had post-harvest losses been prevented through the installation of adequate infrastructure for marketing perishable products, SSA would have managed to maintain its self-sufficiency and stay a net exporter, but this is not the case under BAU projections.

While China's production is projected to increase by some 31 percent by 2050, food consumption also rises by more than 30 percent during the same period, causing the country to face a small excess demand and to become a net importer to satisfy its aggregate demand needs.

■ **TSS:** In the TSS scenario, more sustainable agricultural practices lead to slightly lower production expansion compared with BAU. The consumption of fruit and vegetables is higher, nonetheless, both because of the adoption of more sustainable diets – namely relatively lower consumption of animal protein, particularly in HIC and China – and of the greater economic growth and large population in LMIC. Until 2050, post-harvest losses are reduced and in LAC are kept to even lower levels than in 2012. The higher value of fruit and vegetables also reduces their use for animal feed, and so despite the lower production levels compared with BAU, regions and countries such as LAC, China, ECA and HIC manage to improve their trade balance and to maintain self-sufficiency ratios well above 1, with the latter becoming a small net exporter by 2050. By contrast, net importing regions (namely EAP, SSA and SAS) maintain self-sufficiency ratios around 0.9. In HIC, lower food consumption compared with BAU is due to lower economic growth.

■ **SSS:** In the SSS scenario, the patterns regarding demand and supply are similar to those under BAU, but different factors shape them. Under BAU, HIC and China already have intensive production systems, which they maintain under SSS, and thus expand their production by slightly more than under BAU. The higher level of economic growth in these regions also results in increased food consumption. Maintaining the same level of animal feed and other uses, combined with relatively unchanged food consumption compared to BAU, increases excess supply in both regions – this excess is exported to world markets. LMIC, and particularly SSA, are faced with lower economic growth and so fruit and vegetables in some countries are treated as luxury goods, implying that food consumption is overall lower than under BAU. These effects become more evident in the second half of the simulation period, when income disparities between the two scenarios become stronger and the different climate change patterns start affecting agriculture. Post-harvest losses when expressed as a share of production are above those of BAU, whereby production keeps expanding at the same pace or slightly slower in most LMIC. As a result, these countries become less self-sufficient and weaken their trade balance, thus increasing their net imports of fruit and vegetables.

Figure S 1.3 Commodity balances for fruit and vegetables by region and scenario, 2012 exchange rates



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: feed, seed, food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports). "Fruit and vegetables" comprise: bananas, citrus fruit, other fruit and vegetables.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.3 Fruit and vegetables: commodity balances by region and scenario

REGIONS	BALANCE ITEMS	billion USD, 2012 exchange rates							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	160	212	185	225	240	214	266	150	134	167
	Food	138	156	148	156	164	149	163	119	108	119
	Feed	14	13	10	14	12	9	11	89	64	80
	Other uses	40	56	48	55	60	48	61	151	121	154
	Net trade	-31	-13	-21	0	3	8	31	-	-	-
	Self-sufficiency ratio	0.84	0.94	0.90	1.00	1.01	1.04	1.13	121	124	135
East Asia and Pacific	Production	432	530	537	546	528	568	575	122	132	133
	Food	357	477	482	486	487	503	520	136	141	145
	Feed	17	9	5	9	7	3	5	42	19	29
	Other uses	44	52	39	53	54	37	57	122	84	129
	Net trade	12	-7	10	-2	-20	24	-7	-	198	-
	Self-sufficiency ratio	1.03	0.99	1.02	1.00	0.96	1.04	0.99	94	101	96
China	Production	372	457	464	473	449	488	495	120	131	133
	Food	308	406	412	415	405	417	434	132	135	141
	Feed	17	8	5	9	7	3	5	41	19	28
	Other uses	40	46	34	47	46	32	49	117	81	125
	Net trade	8	-4	14	3	-9	36	7	-	433	90
	Self-sufficiency ratio	1.02	0.99	1.03	1.01	0.98	1.08	1.02	96	106	99
East Asia and Pacific (excluding China)	Production	59	73	72	73	80	80	80	135	136	135
	Food	50	70	71	71	82	87	86	165	174	172
	Feed	0.45	0.40	0.31	0.44	0.36	0.21	0.33	78	45	74
	Other uses	5	7	5	7	8	5	8	155	102	163
	Net trade	4	-4	-3	-5	-10	-12	-14	-	-	-
	Self-sufficiency ratio	1.07	0.95	0.96	0.93	0.88	0.87	0.85	82	82	79
South Asia	Production	119	177	161	167	226	201	206	190	170	174
	Food	109	159	161	162	190	207	203	175	190	187
	Feed	0	0	0	0	0	0	0	-	-	-
	Other uses	10	16	11	16	18	13	20	187	127	201
	Net trade	0.01	2	-12	-11	17	-18	-18	149 245	-	-
	Self-sufficiency ratio	1.00	1.01	0.93	0.94	1.08	0.92	0.92	108	92	92
Europe and Central Asia	Production	68	93	89	93	103	102	106	150	149	155
	Food	56	67	68	69	70	73	76	126	131	137
	Feed	6	4	3	4	3	2	2	49	35	30
	Other uses	10	12	10	12	13	10	13	123	95	127
	Net trade	-4	9	9	8	16	16	15	-	-	-
	Self-sufficiency ratio	0.94	1.11	1.11	1.09	1.19	1.19	1.16	127	127	123

Table S 1.3 Fruit and vegetables: commodity balances by region and scenario (continued)

REGIONS	BALANCE ITEMS	billion USD, 2012 exchange rates							index, 2012 = 100		
		2012 BASE YEAR	2030			2050			2050		
			BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	79	100	100	98	113	117	111	144	149	142
	Food	50	64	66	63	72	81	69	146	163	138
	Feed	1	1	1	1	1	1	1	137	91	132
	Other uses	11	15	11	14	16	12	16	154	115	151
	Net trade	18	20	23	20	24	23	26	134	130	146
	Self-sufficiency ratio	1.29	1.26	1.30	1.26	1.27	1.25	1.30	98	96	101
Near East and North Africa	Production	62	78	73	76	84	75	81	134	120	131
	Food	51	75	73	76	96	96	101	187	188	197
	Feed	0	0	0	0	0	0	0	31	27	20
	Other uses	9	13	10	13	15	11	16	164	118	170
	Net trade	1	-9	-11	-12	-28	-32	-36	-	-	-
	Self-sufficiency ratio	1.02	0.89	0.87	0.86	0.75	0.70	0.70	73	68	68
Sub-Saharan Africa	Production	50	96	99	94	149	160	143	301	323	289
	Food	45	86	88	84	143	168	137	314	369	301
	Feed	0	0	0	0	0	0	0	454	198	463
	Other uses	0	12	9	12	18	14	18	14 939	11 554	14 437
	Net trade	4	-2	1	-3	-13	-22	-12	-	-	-
	Self-sufficiency ratio	1.09	0.98	1.01	0.97	0.92	0.88	0.92	84	81	85
Low- and middle-income countries	Production	809	1 074	1 058	1 075	1 202	1 223	1 223	149	151	151
	Food	668	928	939	940	1 059	1 128	1 106	158	169	165
	Feed	25	14	8	14	12	6	8	47	26	33
	Other uses	85	119	90	120	136	97	140	160	115	166
	Net trade	31	13	21	0	-3	-8	-31	-	-	-
	Self-sufficiency ratio	1.04	1.01	1.02	1.00	1.00	0.99	0.98	96	96	94
Low- and middle-income countries (excluding China)	Production	436	617	594	601	754	735	728	173	169	167
	Food	361	522	527	525	654	711	672	181	197	186
	Feed	8	5	4	5	5	3	3	60	41	44
	Other uses	45	74	56	74	89	65	91	198	144	202
	Net trade	23	16	7	-3	6	-44	-39	26	-	-
	Self-sufficiency ratio	1.06	1.03	1.01	1.00	1.01	0.94	0.95	96	89	90
World	Production	969	1 286	1 244	1 299	1 442	1 437	1 489	149	148	154
	Food	806	1 085	1 088	1 096	1 223	1 277	1 269	152	158	157
	Feed	38	26	18	28	24	15	19	62	40	49
	Other uses	124	175	138	176	195	145	201	157	117	162
	Net trade	0	0	0	0	0	0	0	-	-	-
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production – aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Fruit and vegetables" comprise: bananas, citrus fruit, other fruit and vegetables. "Other uses" refers to the sum of non-food domestic uses, including: seed, waste, non-food processing, and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Dairy products²

■ **BAU:** In the BAU scenario global production increases by 26 percent between 2012 and 2030 and by 40 percent between 2012 and 2050 (see [Figure S 1.4](#) and [Table S 1.4](#)). Production of milk-based commodities is closely linked to meat production of the respective animals and so production is not only motivated by developments in food consumption for dairy but by the expansion of ruminant herds to supply meat.

Milk, however, is considered as a basic commodity in HIC and a few LMIC, such as China, and so their per capita consumption hardly expands due to higher incomes compared to meat consumption. Furthermore, as with meat, more dairy products are expected to be consumed in LMIC, as markets become more globalized and as incomes increase. This however leads to changes in production in the long term with LMIC (excluding China) expanding their production by some 80 percent in 2050 compared to 2012. They overtake HIC in world markets and account for 75 percent of the global milk production in 2050, compared with 60 percent in 2012. HIC, on the contrary, lose 15 percent of their market share and their production shrinks by 14 percent between 2012 and 2050. To satisfy their domestic demand, which increases at rates similar to those of their population, they turn into net importers sourcing from LMIC.

Sub-Saharan Africa is the region with the highest increase in food consumption of dairy, which increases on 2012 by 2.2 times in 2030 and by 3.7 times in 2050. Production, following also the changes in meat production, is projected to expand more than in other regions and to more than double by 2030 and nearly quadruple by 2050, allowing for a notable improvement of the SSA trade balance. The expansion of net exports in ECA is because of a dynamic increase in production motivated by growing meat demand rather than any growing demand for dairy. ECA countries accounted for 14 percent of milk production in 2012, implying that increased meat production leads to subsequent increases of dairy herds and thus excess milk supply.

■ **TSS:** The TSS scenario delineates lower production and consumption of milk compared with BAU, but consuming milk as a basic product results in smaller differences compared to those between TSS and BAU in meat markets. In HIC, consumer awareness of sustainability issues and lower income expansion lead to a greater decrease in milk production, which by 2050 falls 37 percent lower than in 2012. This leads HIC to double their net imports against BAU, sourcing these imports from LMIC. Consumer awareness also results in LMIC not expanding consumption more than in BAU, although consumers enjoy higher income growth. Greater economic growth, however, leads LMIC to expand their production capacities, with SSA in particular increasing its production more than 5 times by 2050 compared to 2012 (against nearly 4 times in the BAU scenario) and substantially boosting its net exports.

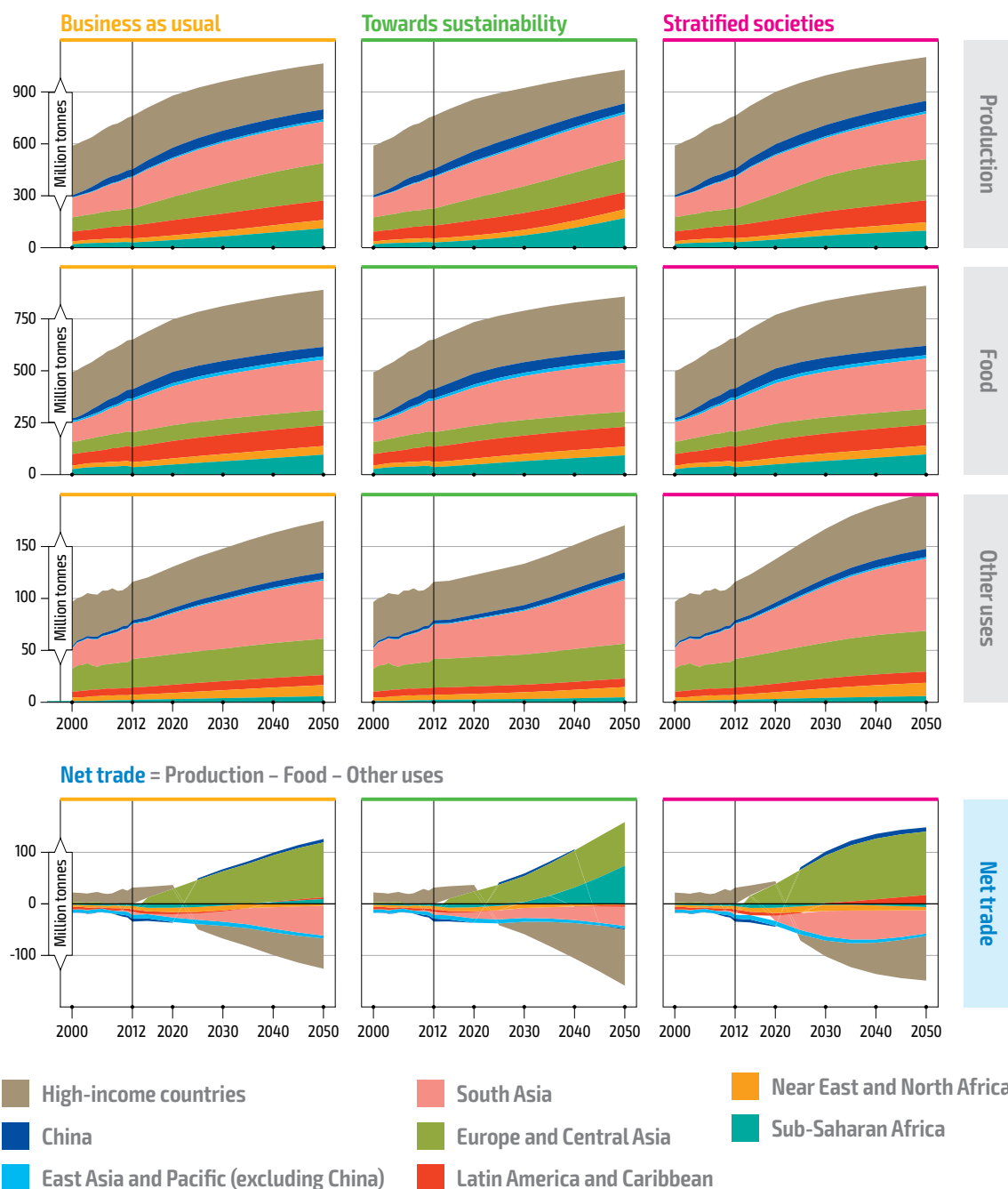
■ **SSS:** The SSS scenario projects similar global production and consumption of dairy as in BAU, though for different reasons in LMIC. These countries are faced with lower incomes, which makes their consumers treat milk as a luxury rather than as a normal or inferior good, thus resulting in consumption levels similar to those in BAU. These developments together with the changes in meat markets lead to an expansion of the ruminant herds

² All dairy products (e.g. cheese, milk powder etc. but excluding butter – butter is part of the animal fats in FAOSTAT's Food Balance Sheets) are expressed in liquid milk equivalent (whole milk equivalent). Reference to milk hence does not involve only fresh milk but all dairy products.

and subsequently to increases in milk production. In some regions production increases more than in BAU, such as ECA, where dairy herds prevail.

Other uses of milk-based products are a small portion of milk production and comprise: in LMIC, primarily losses in processing, due to the perishability of the commodities (and lack of adequate infrastructure to prevent perishing); and, in HIC, industrial uses, e.g. for cosmetics and pharmaceuticals.

Figure S 1.4 Commodity balances for dairy products by region and scenario
(in whole milk equivalent)



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Table S 1.4 Dairy products: commodity balances by region and scenario

REGIONS	BALANCE ITEMS	million tonnes, whole milk equivalent							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	308	283	264	287	266	194	253	86	63	82
	Food	239	264	248	270	275	258	286	115	108	119
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	37	44	40	48	50	45	54	135	122	145
	Net trade	32	–25	–24	–31	–59	–109	–87	–	–	–
	Self-sufficiency ratio	1.11	0.92	0.92	0.90	0.82	0.64	0.74	73	57	67
East Asia and Pacific	Production	47	70	70	74	71	63	74	152	134	159
	Food	56	67	67	67	62	62	61	112	111	110
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	4	6	6	8	8	8	10	173	169	215
	Net trade	–13	–4	–2	0	1	–7	3	–	51	–
	Self-sufficiency ratio	0.78	0.94	0.97	0.99	1.01	0.90	1.05	130	116	135
China	Production	41	60	60	65	58	49	61	141	118	147
	Food	44	51	51	51	45	45	44	104	103	102
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	4	5	5	6	6	6	8	173	167	217
	Net trade	–6	4	5	8	7	–2	8	–	39	–
	Self-sufficiency ratio	0.88	1.07	1.09	1.13	1.13	0.96	1.16	129	109	132
East Asia and Pacific (excluding China)	Production	5	9	10	10	13	14	14	240	260	257
	Food	12	16	16	16	17	17	17	142	140	140
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	1	1	1	1	1	2	175	178	204
	Net trade	–8	–8	–7	–8	–6	–5	–5	76	60	64
	Self-sufficiency ratio	0.42	0.53	0.57	0.54	0.69	0.75	0.74	167	182	178
South Asia	Production	182	239	234	222	239	260	264	132	143	145
	Food	151	213	211	218	241	235	239	160	156	159
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	34	47	42	54	56	61	69	166	181	206
	Net trade	–3	–20	–19	–50	–58	–37	–45	1 818	1 160	1 418
	Self-sufficiency ratio	0.98	0.92	0.92	0.82	0.81	0.88	0.85	82	89	87
Europe and Central Asia	Production	98	171	154	204	216	191	237	221	196	243
	Food	71	76	75	77	75	73	75	105	103	105
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	28	31	29	35	35	33	39	124	119	140
	Net trade	–1	63	50	92	107	85	123	–	–	–
	Self-sufficiency ratio	0.99	1.59	1.48	1.83	1.97	1.80	2.08	200	182	211

Table S 1.4 Dairy products: commodity balances by region and scenario (continued)

REGIONS	BALANCE ITEMS	million tonnes, whole milk equivalent							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	74	99	97	105	112	99	127	151	134	172
	Food	73	92	89	94	99	95	99	135	130	136
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	7	9	7	10	10	8	11	137	117	152
	Net trade	–6	–2	0	2	3	–4	17	–	71	–
	Self-sufficiency ratio	0.92	0.98	1.00	1.02	1.03	0.96	1.16	112	104	125
Near East and North Africa	Production	23	33	33	33	49	50	48	209	216	208
	Food	24	35	34	36	42	42	42	172	174	173
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	5	8	7	9	11	10	13	201	186	242
	Net trade	–6	–9	–8	–12	–4	–2	–6	57	25	103
	Self-sufficiency ratio	0.79	0.78	0.80	0.74	0.93	0.97	0.88	118	123	112
Sub-Saharan Africa	Production	30	65	71	69	112	172	97	370	568	322
	Food	36	64	64	66	96	93	97	269	259	271
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	–1	4	3	4	6	5	6	–463	–379	–467
	Net trade	–4	–3	3	–2	9	74	–6	–	–	138
	Self-sufficiency ratio	0.88	0.95	1.05	0.98	1.09	1.76	0.94	125	201	108
Low- and middle-income countries	Production	453	677	659	708	799	834	848	176	184	187
	Food	410	547	541	558	615	600	614	150	146	149
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	77	105	94	120	125	125	148	162	162	191
	Net trade	–34	25	24	31	59	109	87	–	–	–
	Self-sufficiency ratio	0.93	1.04	1.04	1.05	1.08	1.15	1.11	116	124	120
Low- and middle-income countries (excluding China)	Production	412	616	599	643	741	785	788	180	191	191
	Food	367	496	490	507	570	555	569	155	151	155
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	74	100	89	114	119	119	140	161	162	190
	Net trade	–29	21	19	23	52	111	78	–	–	–
	Self-sufficiency ratio	0.94	1.03	1.03	1.04	1.08	1.17	1.11	115	125	119
World	Production	762	960	923	995	1 065	1 028	1 101	140	135	145
	Food	650	811	789	828	890	857	899	137	132	138
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	112	148	134	168	175	171	202	157	153	181
	Net trade	0	0	0	0	0	0	0	–	–	–
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" refers to the sum of non-food domestic uses, including: food losses, non-food processing, and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Eggs

Developments in egg production and consumption are analogous to those of milk and follow developments in meat (poultry), although egg production is less connected to the expansion of poultry meat. The shorter life cycle of poultry compared to ruminants allows production to adjust in a more flexible way and to expand towards less laying hens and more broilers and vice versa, depending on whether meat or eggs are most in demand. Moreover, eggs are considered as normal to inferior goods in some countries (e.g. China), so that in the long term an increase in per capita income leads to a small decrease in per capita food consumption. In these countries it is thus population growth that changes food consumption rather than income or prices.

■ **BAU:** Continuation of historical trends and consumer preferences in the BAU scenario increases global egg consumption by some 39 percent between 2012 and 2050, followed by similar increases in global production (see [Figure S 1.5](#) and [Table S 1.5](#)). In HIC and in China increases of consumption between 2012 and 2050 are mainly due to population growth and are around 27 percent in HIC and 19 percent in China. In other LMIC (namely excluding China) egg consumption increases not only because of population growth but also because of income growth and is affected more by price developments. LMIC excluding China are projected to consume 67 percent more eggs in 2050 compared with 2012. Production increases in LMIC (excluding China) are projected to be of similar magnitude, allowing LMIC to expand their market share from 37 percent of the world's egg production in 2012 to 47 percent in 2050. As with meat and milk markets, SSA is the region with the highest increase in production (6.1 times more in 2050 compared to 2012). While China is projected to maintain its self-sufficiency and to remain the biggest egg producer, HIC are projected to expand their production at a slower pace than their consumption, adjusting to the higher production in LMIC, leading them to increase their net imports to cover domestic demand.

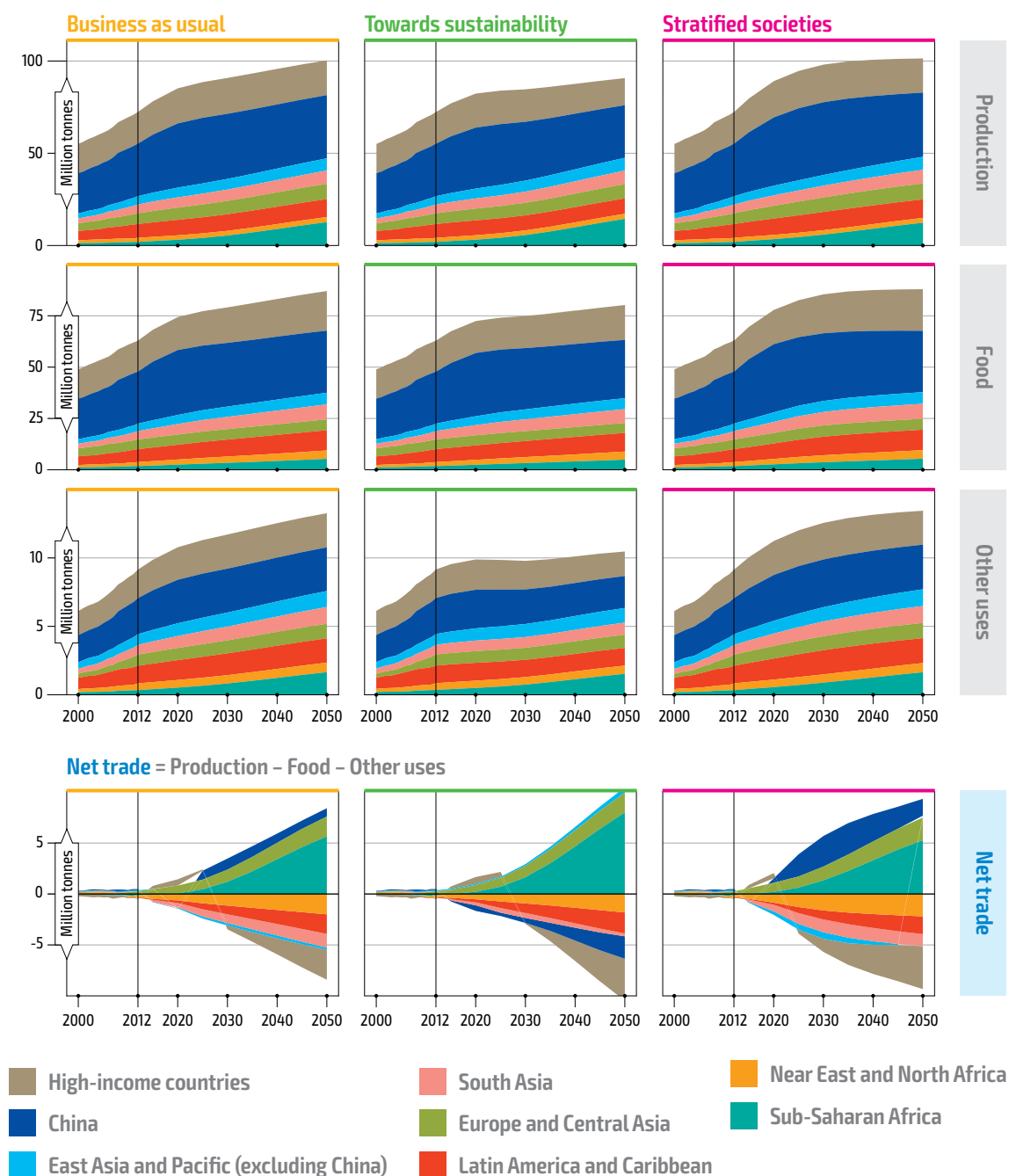
■ **TSS:** As with milk and dairy, the TSS scenario projects lower consumption and production of eggs in HIC and in China in particular, motivated mainly by consumer awareness for less animal-based products but also by the higher food prices. In HIC, production is expected to decrease by 14 percent in 2050 compared to 2012 and in China to return to the historical levels of 2012, decreasing the share of HIC in global egg production from 24 percent to 16 percent in 2050 and of China from 39 percent to 31 percent. In LMIC, consumer awareness on sustainability issues constrains consumption to lower levels than under BAU, which would have been otherwise higher if affected only by the greater income growth. The simultaneous slowdown of production, especially in HIC leaves more ground to LMIC and in particular SSA to expand their production and to improve their trade balance.

■ **SSS:** In SSS, consumption of eggs in HIC and in China increases more than in BAU, motivated by consumer preferences towards animal products, rather than by higher income growth (since income hardly affects per capita egg consumption in these countries). In LMIC excluding China, both higher income than in BAU and consumer preferences towards more animal products leads to higher food consumption of eggs; 12 percent higher than in BAU between 2012 and 2030 and, thereafter, similar increases to BAU due to price increases. As in BAU, production increases in China slightly more than consumption. In LMIC production increases more than in HIC, motivated by simultaneous

changes in consumption both in LMIC and in HIC – this allows LMIC to take market share from HIC already in 2030 and to expand further their production by some 80 percent by 2050 compared with 2012.

Other uses of eggs are a very small proportion of production, as shown in Table S 1.5, and involve primarily losses in processing, as well as uses in industry for cosmetics and pharmaceuticals. Industrial uses grow in each scenario following the growth of the economy, while losses in processing are lower in TSS as explained in Section 3.6 of the report.

Figure S 1.5 Commodity balances for eggs by region and scenario



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Table S 1.5 Eggs: commodity balances by region and scenario

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	17	19	18	20	19	15	19	110	86	108
	Food	15	17	16	19	19	17	20	127	112	134
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	2	2	2	3	2	2	2	118	85	117
	Net trade	0	0	0	–1	–3	–4	–4	3 025	4 220	4 329
	Self-sufficiency ratio	0.99	0.98	1.00	0.94	0.86	0.78	0.81	87	79	82
East Asia and Pacific	Production	33	41	38	45	41	35	42	124	107	127
	Food	29	36	35	38	36	34	36	124	116	123
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	4	4	3	5	4	3	4	114	89	117
	Net trade	0	1	0	2	1	–2	2	299	–	902
	Self-sufficiency ratio	1.01	1.02	0.99	1.06	1.02	0.95	1.05	101	95	104
China	Production	28	35	32	39	34	29	35	120	100	122
	Food	25	31	30	33	30	28	30	119	112	118
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	3	3	3	3	3	2	3	105	77	107
	Net trade	0	1	0	3	1	–2	2	783	–	1 586
	Self-sufficiency ratio	1.00	1.03	0.98	1.08	1.02	0.93	1.05	102	93	105
East Asia and Pacific (excluding China)	Production	5	6	6	6	7	7	7	147	153	156
	Food	4	5	5	5	6	5	6	156	147	156
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	1	1	1	1	1	1	148	135	155
	Net trade	0	0	0	–1	0	1	0	–	529	183
	Self-sufficiency ratio	1.02	0.96	1.03	0.90	0.97	1.08	1.03	95	106	100
South Asia	Production	5	6	6	6	7	7	7	151	154	154
	Food	4	6	6	7	7	7	7	179	165	179
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	1	1	1	1	1	1	179	129	180
	Net trade	0	–1	0	–1	–1	0	–1	–	–	–
	Self-sufficiency ratio	1.00	0.88	0.93	0.84	0.84	0.96	0.86	84	96	86
Europe and Central Asia	Production	6	7	7	8	8	8	9	142	133	149
	Food	5	5	5	6	5	5	5	111	102	113
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	1	1	1	1	1	1	129	118	135
	Net trade	0	1	1	1	2	2	2	743	743	850
	Self-sufficiency ratio	1.05	1.20	1.19	1.21	1.31	1.33	1.35	125	127	128

Table S 1.5 Eggs: commodity balances by region and scenario (continued)

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	7	9	8	10	10	8	10	130	111	134
	Food	6	8	8	9	10	9	10	157	145	159
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1	2	1	2	2	1	2	139	101	143
	Net trade	0	–1	–1	–1	–2	–2	–2	3 151	3 377	2 863
	Self-sufficiency ratio	0.99	0.91	0.90	0.92	0.84	0.80	0.85	84	81	86
Near East and North Africa	Production	2	3	3	2	3	3	3	125	123	119
	Food	2	3	3	3	4	4	4	203	197	207
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	0	1	1	1	1	1	1	166	143	160
	Net trade	0	–1	–1	–2	–2	–2	–2	944	858	1039
	Self-sufficiency ratio	0.91	0.69	0.73	0.60	0.58	0.60	0.54	64	66	60
Sub-Saharan Africa	Production	2	5	6	6	13	14	12	653	747	636
	Food	2	3	3	4	5	5	5	301	278	304
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	0	1	1	1	2	2	2	611	563	611
	Net trade	0	1	2	1	6	8	5	–	–	–
	Self-sufficiency ratio	0.95	1.28	1.41	1.29	1.81	2.24	1.75	191	236	185
Low- and middle-income countries	Production	55	71	67	78	82	76	83	148	138	150
	Food	48	62	59	67	68	63	68	142	132	141
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	7	9	8	10	11	9	11	148	119	150
	Net trade	0	0	0	1	3	4	4	3 080	4 296	4 408
	Self-sufficiency ratio	1.00	1.01	1.00	1.02	1.04	1.06	1.05	104	106	105
Low- and middle-income countries (excluding China)	Production	27	36	35	38	47	48	48	177	178	180
	Food	22	31	29	34	38	35	38	167	155	168
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	4	6	5	6	8	6	8	178	149	181
	Net trade	0	–1	1	–2	2	6	3	–	–	–
	Self-sufficiency ratio	1.00	0.98	1.02	0.96	1.05	1.15	1.06	105	115	106
World	Production	72	91	85	98	100	91	101	139	125	140
	Food	63	79	75	85	87	80	88	138	127	140
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	9	12	10	13	13	10	13	141	111	143
	Net trade	0	0	0	0	0	0	0	–	–	–
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" refers to the sum of non-food domestic uses, including: food losses, non-food processing, and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Fish

Fish will likely gain relevance in LMIC diets as these countries' income grows, boosting per capita consumption, as discussed in Section 4.5 of the report. Consumption, however, will remain concentrated in those countries where production takes place, namely with extended coastal zones. The perishability of the commodity makes it difficult to transfer it to continental areas when adequate infrastructure is missing. This makes consumers in continental areas generally more reactive to price changes and has also shaped consumer preferences over time. The food use of fish in 2012 was more than 83 percent of the total absorption, as [Table S 1.6](#) shows. The remaining part is for animal feed and for non-food industry (e.g. pharmaceuticals).³

In all scenarios the supply of fish follows changes in potential catch due to climate change and expectations on the growth of aquaculture.⁴

■ **BAU:** In the BAU scenario, global fish production is projected to increase by 35 percent between 2012 and 2050 (see [Figure S 1.6](#) and [Table S 1.6](#)). EAP is expected to maintain its prominence, with China expanding its production by almost 57 percent by 2050. South Asia is expected to expand production by nearly 75 percent to 2050; however, this increase will only translate into a 1 percent increase of its share in global production (from 7 percent in 2012 to 8 percent in 2050).

The expected expansion of fish production under BAU is essentially linked to satisfying food demand, which is projected to increase by nearly 15 percent between 2012 and 2050. Consumption increases slow down after 2030 because of higher prices for fish, which partly offset higher food demand due to income growth. This effect will be felt more in HIC, where income growth also slows down, with food demand expected to decline by 6 percent and 13 percent by 2030 and 2050, respectively, compared with 2012 levels.

Sub-Saharan Africa, on the other hand, almost triples food use of fish by 2050, thus becoming an important consumer of fish at a world level. By 2050 SSA accounts for about 16 percent of the fish consumed worldwide. Given the constraints in marine and aquaculture systems, SSA is projected to satisfy its demand not only by expanding domestic production but also by increasing imports. The picture is similar in EAP (excluding China), where the expansion of food use is projected to grow by 36 percent between 2012 and 2050, thereby exceeding domestic supply. As a result, EAP (excluding China), is projected to turn into a net importer of fish. China, due to its slower population expansion, is projected to show a 6 percent drop in fish consumption between 2012 and 2050, thus directing its excess supply to the world markets.

■ **TSS:** The TSS scenario accounts for the effects of more favourable climatic conditions on marine production systems. By 2050, global fish production under this scenario increases by 37 percent compared to 2012, instead of 35 percent under BAU. Production is expected to be slightly higher in EAP, SAS and SSA. This increased production, however, is not expected to alter the relative shares of the three regions in world production. Slower income growth in HIC and China under TSS reduces food demand by about 20 percent in 2030 and 8 percent in 2050 when compared with BAU (prompting lower consumption globally). In LMIC (excluding China), higher income growth goes hand in hand with higher

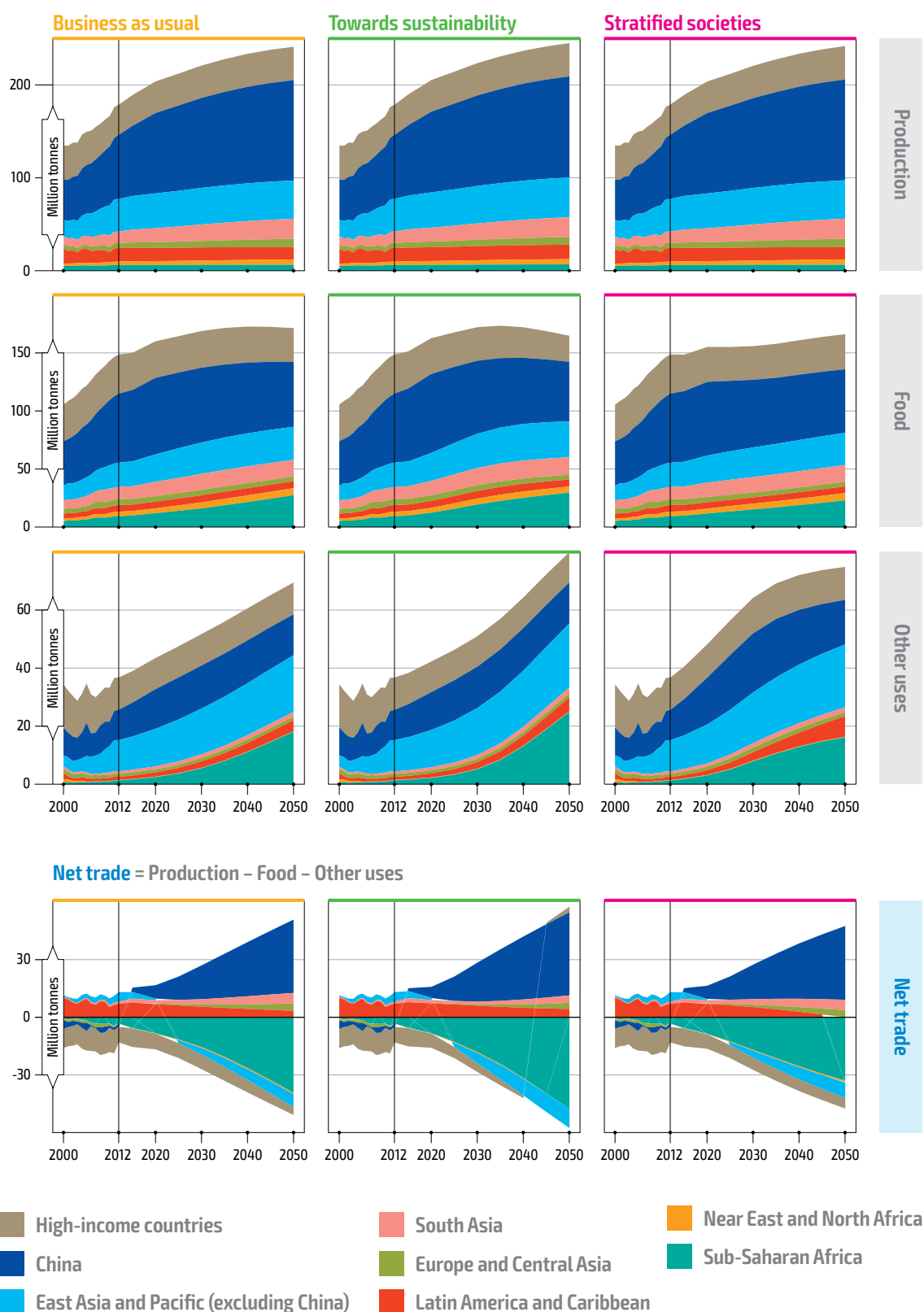
³ Fishmeal is a separate commodity and is not included under feed demand in this report.

⁴ As explained in Section 3.12 of the report, contrary to all the other commodities included in the FAO GAPS model, the supply of fish is exogenous.

consumption levels, which in the case of EAP (excluding China) in 2050 are projected to be 48 percent higher than in 2012 (against 36 percent under BAU).

■ **SSS:** The SSS scenario borrows the BAU assumptions on fish supply, as explained in Section 3.12 of the report. Given, however, more inequality in income distribution across countries, by 2050 food demand for fish in LMIC (excluding China) is expected to increase by 18 percent less than under BAU, while more prominence is given to HIC than in BAU. Sub-Saharan Africa is projected to increase its food demand by 2.5 times by 2050 compared with 2012 (against almost 3 times under BAU), whereas China is projected to reduce its food demand by nearly 8 percent in 2050 with respect to 2012. Although import needs in SSA are projected to be lower than under BAU, a larger excess supply is seen in China such that no visible changes in net trade are projected compared with BAU.

In each country, “other uses” follows the evolution of the entire economy and throughout the projected period – and in all three scenarios analysed – it maintains its relatively small share in total fish absorption.

Figure S 1.6 Commodity balances for fish by region and scenario

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: feed, food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.6 Fish: commodity balances by region and scenario

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	33	35	35	35	36	36	36	110	110	111
	Food	34	32	29	29	29	22	30	87	67	90
	Feed	5	5	5	6	5	4	5	83	77	86
	Other uses	2	6	6	6	6	6	7	402	385	415
	Net trade	-8	-8	-5	-6	-4	3	-6	51	-	68
	Self-sufficiency ratio	0.80	0.82	0.88	0.84	0.90	1.09	0.87	112	136	108
East Asia and Pacific	Production	104	136	138	136	149	152	150	143	146	144
	Food	80	91	92	84	84	82	82	105	102	103
	Feed	11	18	17	25	19	20	21	174	186	198
	Other uses	10	13	13	13	15	16	16	156	168	164
	Net trade	3	14	15	14	31	33	30	927	986	898
	Self-sufficiency ratio	1.03	1.12	1.12	1.12	1.27	1.28	1.25	123	124	121
China	Production	69	97	97	97	108	109	108	157	158	157
	Food	60	64	63	58	56	51	55	94	86	92
	Feed	9	12	12	18	11	11	13	133	133	146
	Other uses	3	2	2	2	3	3	3	104	109	111
	Net trade	-2	18	20	18	38	43	38	-	-	-
	Self-sufficiency ratio	0.98	1.22	1.26	1.23	1.55	1.66	1.55	158	170	158
East Asia and Pacific (excluding China)	Production	35	39	40	39	41	43	41	118	122	118
	Food	21	27	29	25	28	31	28	136	148	133
	Feed	2	5	5	7	7	9	9	331	395	396
	Other uses	7	11	11	11	12	13	13	175	190	183
	Net trade	5	-3	-5	-4	-7	-10	-8	-	-	-
	Self-sufficiency ratio	1.17	0.92	0.88	0.92	0.86	0.81	0.84	74	70	72
South Asia	Production	12	18	18	18	22	21	22	175	171	176
	Food	10	14	15	13	14	15	15	138	144	139
	Feed	0	1	1	1	1	1	1	229	313	241
	Other uses	0	1	1	1	1	1	1	175	193	190
	Net trade	1	3	1	3	6	4	5	524	370	512
	Self-sufficiency ratio	1.09	1.18	1.09	1.19	1.34	1.23	1.33	123	112	122
Europe and Central Asia	Production	6	7	7	7	9	8	9	163	154	163
	Food	5	5	5	4	4	4	4	77	76	76
	Feed	1	1	1	2	1	1	1	115	131	128
	Other uses	-1	0	0	0	0	0	0	-5	-5	-6
	Net trade	0	1	1	1	4	3	4	-	-	-
	Self-sufficiency ratio	0.98	1.21	1.13	1.22	1.74	1.60	1.71	177	162	174

Table S 1.6 Fish: commodity balances by region and scenario (continued)

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	14	14	15	14	13	16	13	93	107	93
	Food	6	6	7	5	6	6	6	105	106	101
	Feed	1	2	2	3	4	5	7	488	623	936
	Other uses	1	0	1	1	1	1	1	53	68	114
	Net trade	7	5	6	5	3	4	0	47	60	–
	Self-sufficiency ratio	1.95	1.64	1.66	1.61	1.33	1.37	0.98	68	71	50
Near East and North Africa	Production	4	5	5	5	6	6	6	146	147	147
	Food	4	5	5	5	6	5	6	154	135	158
	Feed	0	0	0	0	0	0	0	105	123	111
	Other uses	0	0	0	0	0	0	0	–2	–2	–3
	Net trade	0	–1	–1	0	–1	0	–1	–	4 577	–
	Self-sufficiency ratio	1.00	0.90	0.90	0.92	0.90	1.02	0.88	90	102	88
Sub-Saharan Africa	Production	6	6	6	6	6	7	6	104	113	104
	Food	9	16	19	15	27	30	23	296	319	248
	Feed	1	5	5	8	18	25	16	1 590	2 200	1 424
	Other uses	–1	0	0	0	0	0	0	–36	–39	–34
	Net trade	–3	–15	–18	–17	–39	–48	–33	1 205	1 466	1 012
	Self-sufficiency ratio	0.65	0.29	0.26	0.27	0.14	0.13	0.16	21	19	25
Low- and middle-income countries	Production	146	186	189	186	205	209	206	140	143	141
	Food	115	137	143	127	142	142	136	124	124	118
	Feed	14	27	26	38	42	52	47	298	366	327
	Other uses	9	14	15	15	16	18	18	184	200	200
	Net trade	8	8	5	6	4	–3	6	51	–	68
	Self-sufficiency ratio	1.06	1.04	1.02	1.04	1.02	0.99	1.03	96	93	97
Low- and middle-income countries (excluding China)	Production	77	89	91	89	97	100	97	126	130	126
	Food	55	73	80	69	86	91	81	156	164	146
	Feed	6	14	14	20	31	41	34	546	718	600
	Other uses	6	12	12	12	14	15	15	216	236	235
	Net trade	10	–10	–16	–12	–34	–46	–33	–	–	–
	Self-sufficiency ratio	1.14	0.90	0.85	0.88	0.74	0.68	0.75	65	60	65
World	Production	179	221	223	221	241	245	242	135	137	135
	Food	149	169	172	156	171	165	166	115	111	112
	Feed	20	32	31	44	47	56	51	238	286	260
	Other uses	11	20	21	21	23	24	24	217	228	232
	Net trade	0	0	0	0	0	0	0	–	–	–
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food, feed and for “other uses”. “Other uses” in the table refers to the sum of food losses, non-food processing, and other demand. Positive (negative) net trade denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic absorption.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Oilseeds

More than 90 percent of the world's oilseeds are crushed to produce vegetable oils and oilcakes. Hence, oilseed production depends on the vegetable oil markets, which in turn depend on demand for food and biofuels. The direct use of oilseeds as animal feed or as food – that is, sunflower or sesame seeds directly eaten as food – is currently limited to less than 15 percent of global production as shown for year 2012 in [Table S 1.7](#). Other uses of oilseeds refer to food processing (crushing), post-harvest losses and to other industrial uses (e.g. producing cosmetics, medicines etc.). Currently HIC and LAC are the predominant regions in the production of oilseeds, accounting for 28 and 27 percent respectively of global production.

■ BAU: The BAU scenario projects an increase in world oilseed production of 50 percent by 2050, occurring broadly similarly across regions, except in SSA (68 percent) and NNA (not more than 20 percent), as can be seen in [Figure S 1.7](#) and [Table S 1.7](#). The share of oilseeds destined for direct food and feed consumption is projected to remain close to historical levels throughout the whole projection period, reaching 16 percent of total absorption in 2050. The largest oilseed share will continue to be destined to crushing for the production of vegetable oils, as highlighted by the large share of “other uses” in [Table S 1.7](#).⁵ Rise in demand for oilseeds for crushing by 2050, compared to 2012, is expected to be broadly similar across regions at rates ranging between 41 and 53 percent, except for NNA (where is projected to double) and EAP excluding China (63 percent). The increase in oilseed demand in the latter two regions – outstripping increases in production – leads to lower self-sufficiency ratios: between 2012 and 2050, NNA drops from 0.36 to 0.21 and EAP (excluding China) from 0.92 to 0.86. China remains a net importer until 2050, with a self-sufficiency ratio slightly above 0.50 for the whole period; while SSA, switches its trade position to net importer with its self-sufficiency ratio dropping from 1.04 in 2012 to 0.93 in 2050. Both LAC and HIC consolidate their position as net exporters.⁶

■ TSS: In the TSS scenario, a more sustainable consumption pathway implies a less dynamic demand for food (including vegetable oils), a reduction of food losses and waste, and a decrease in the production of “first generation” biodiesel. These factors translate into a global aggregate rise in demand for oilseeds of only 40 percent between 2012 and 2050 (compared to 50 percent in BAU). International trade plays a smaller role in general. Net exports from HIC and LAC by 2050 are lower than in BAU, while China and SSA reduce their imports. The only importing regions where the self-sufficiency ratio decreases compared to BAU are SAS and – to a much lesser extent – LAC, NNA and EAP (excluding China). This is due to more sustainable agricultural practices (including limited water withdrawals) and competing uses of relatively scarce land limiting the domestic production of oilseeds.

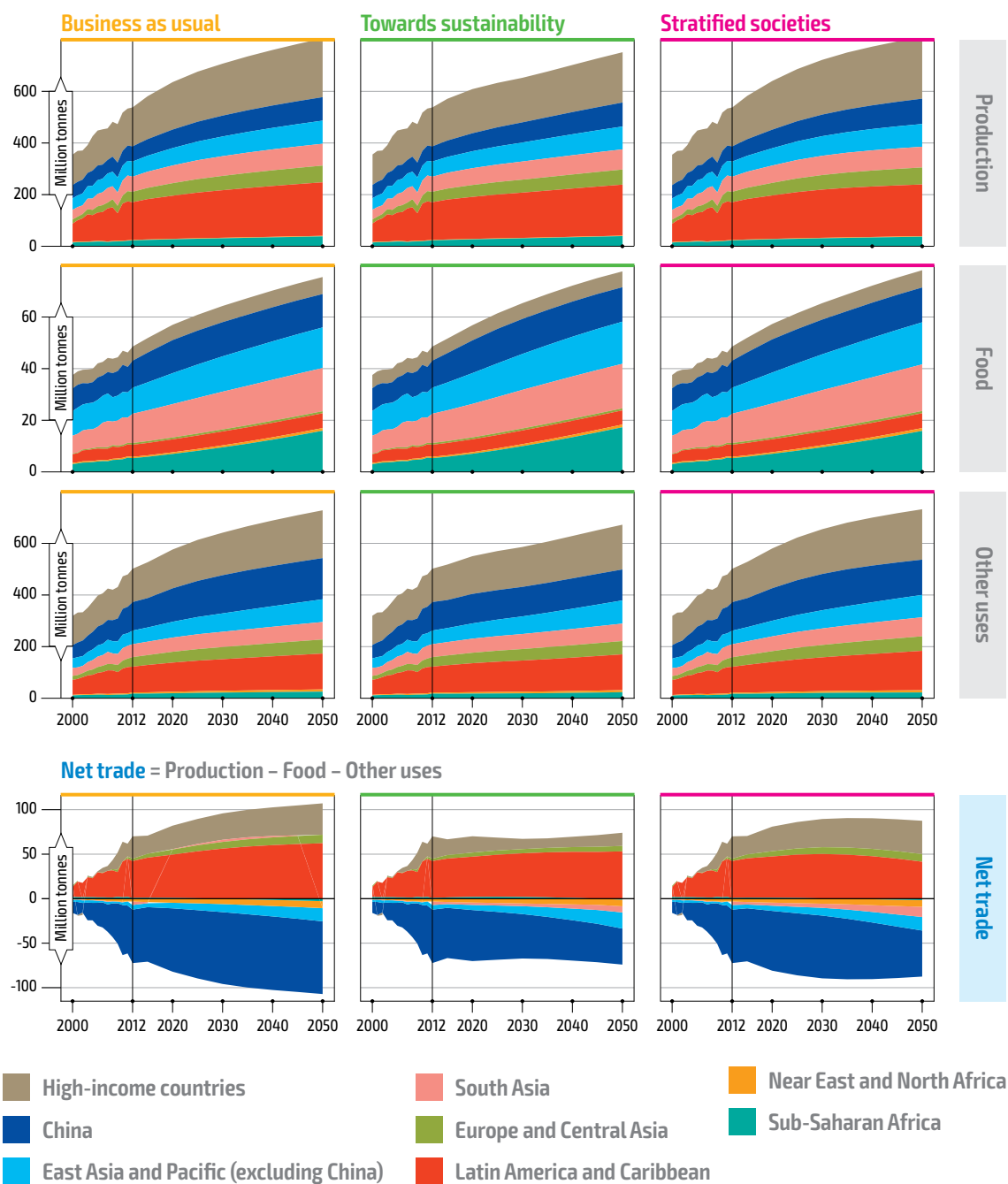
■ SSS: The SSS scenario, unlike TSS, leads to higher global production levels compared to BAU, and especially in HIC and China, which by 2050 increase their production by 59 and 67 percent respectively, compared to 51 and 55 percent respectively in BAU.

⁵ Projections on the food consumption of vegetable oils preceded in Section 4.5 of the report.

⁶ The item “other uses” in the commodity balance for oilseeds includes oilseeds destined to “first generation” biodiesel production. As explained in Section 3.6 of the report, demand for first generation biofuels does not expand more after 2026.

This however, does not directly translate into more food availability, particularly for SSA and SAS, as direct use of oilseeds as food remains almost unchanged compared to BAU, while post-harvest losses increase and oilseed demand for vegetable oil production remains almost unchanged compared to BAU.

Figure S 1.7 Commodity balances for oilseeds by region and scenario



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: food processing (crushing of oilseeds), food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports). "Oilseeds" comprises: coconuts, cottonseed, groundnuts, palm kernels, rapeseed, sesame seed, soybeans, sunflower seed and other oilseeds.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Table S 1.7 Oilseeds: commodity balances by region and scenario

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	151	201	172	212	227	195	239	151	129	159
	Food	5	6	6	6	7	6	7	120	112	122
	Feed	8	12	8	13	12	8	10	145	93	125
	Other uses	112	153	146	161	173	166	185	155	149	166
	Net trade	25	30	11	32	35	15	37	140	59	149
	Self-sufficiency ratio	1.20	1.17	1.07	1.18	1.18	1.08	1.19	99	90	99
East Asia and Pacific	Production	117	157	152	159	180	181	186	154	154	159
	Food	21	27	27	27	29	30	30	139	144	145
	Feed	14	23	18	26	24	18	22	175	129	160
	Other uses	148	197	165	185	224	192	201	151	130	136
	Net trade	-65	-90	-59	-79	-96	-59	-67	148	90	103
	Self-sufficiency ratio	0.64	0.64	0.72	0.67	0.65	0.76	0.74	101	118	114
China	Production	59	81	78	83	91	93	98	155	158	167
	Food	10	13	14	13	13	13	13	123	127	129
	Feed	14	22	17	25	23	17	21	170	125	155
	Other uses	95	126	97	115	137	103	115	144	109	122
	Net trade	-60	-81	-50	-71	-82	-40	-52	136	67	86
	Self-sufficiency ratio	0.49	0.50	0.61	0.54	0.53	0.70	0.65	107	141	132
East Asia and Pacific (excluding China)	Production	59	76	74	76	89	89	88	152	151	150
	Food	10	14	14	14	16	16	16	156	162	162
	Feed	0	1	0	1	1	1	1	508	432	502
	Other uses	54	71	68	70	87	89	86	163	167	161
	Net trade	-5	-9	-9	-9	-15	-18	-15	285	351	294
	Self-sufficiency ratio	0.92	0.89	0.89	0.90	0.86	0.83	0.85	93	90	93
South Asia	Production	58	76	70	74	84	78	80	145	134	137
	Food	11	15	15	15	17	17	18	147	152	159
	Feed	5	4	3	4	4	3	3	75	51	59
	Other uses	46	55	55	60	64	65	70	139	142	154
	Net trade	-4	2	-3	-5	0	-7	-11	4	173	286
	Self-sufficiency ratio	0.94	1.03	0.96	0.94	1.00	0.92	0.88	107	98	93
Europe and Central Asia	Production	40	55	50	56	65	58	66	161	145	163
	Food	1	1	1	1	1	1	1	119	121	131
	Feed	4	6	5	7	7	7	7	193	176	191
	Other uses	33	41	40	41	47	45	49	142	135	148
	Net trade	3	8	5	8	10	6	9	374	239	334
	Self-sufficiency ratio	1.07	1.16	1.11	1.16	1.17	1.12	1.15	110	105	108

Table S 1.7 Oilseeds: commodity balances by region and scenario (continued)

REGIONS	BALANCE ITEMS	million tonnes							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	146	184	175	187	207	197	200	142	135	137
	Food	5	5	5	5	6	5	6	123	117	123
	Feed	3	5	4	6	7	8	10	243	252	346
	Other uses	97	117	116	125	132	131	142	136	135	147
	Net trade	41	56	49	50	62	53	42	150	128	100
	Self-sufficiency ratio	1.40	1.44	1.39	1.37	1.43	1.37	1.26	102	98	90
Near East and North Africa	Production	2	2	2	2	2	2	2	116	96	116
	Food	1	1	1	1	1	1	1	199	198	210
	Feed	0	0	0	0	0	0	0	113	111	96
	Other uses	4	7	6	7	9	8	8	201	185	194
	Net trade	-3	-6	-5	-6	-8	-7	-8	248	236	241
	Self-sufficiency ratio	0.36	0.25	0.25	0.26	0.21	0.18	0.21	58	52	59
Sub-Saharan Africa	Production	23	31	31	31	39	40	38	168	172	162
	Food	5	10	10	10	16	17	16	300	326	299
	Feed	0	1	1	1	3	4	3	853	1082	872
	Other uses	17	21	18	20	23	20	20	136	119	121
	Net trade	1	0	2	0	-3	-1	-2	-	-	-
	Self-sufficiency ratio	1.04	0.99	1.07	1.01	0.93	0.97	0.96	90	94	92
Low- and middle-income countries	Production	387	506	480	510	577	557	572	149	144	148
	Food	43	58	59	59	69	72	71	160	166	166
	Feed	26	39	31	44	46	39	46	175	148	175
	Other uses	345	439	401	439	498	461	492	144	134	142
	Net trade	-28	-30	-11	-32	-35	-15	-37	128	54	136
	Self-sufficiency ratio	0.93	0.94	0.98	0.94	0.94	0.97	0.94	101	104	101
Low- and middle-income countries (excluding China)	Production	328	425	402	427	487	464	474	148	141	144
	Food	33	45	46	46	56	58	58	172	178	178
	Feed	13	17	14	19	23	22	25	180	172	198
	Other uses	251	313	304	324	362	359	377	144	143	150
	Net trade	33	51	38	39	46	26	14	142	79	44
	Self-sufficiency ratio	1.11	1.14	1.11	1.10	1.11	1.06	1.03	100	95	93
World	Production	538	707	652	722	805	752	811	150	140	151
	Food	49	64	65	65	75	78	78	155	160	161
	Feed	34	51	40	57	58	46	56	168	135	163
	Other uses	455	592	547	600	672	628	677	148	138	149
	Net trade	0	0	0	0	0	0	0	-	-	-
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production – aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Oilseeds" comprises: coconuts, cottonseed, groundnuts, palm kernels, rapeseed, sesame seed, soybeans, sunflower seed and other oilseeds. "Other uses" refers to the sum of all other domestic uses, including: food processing (crushing of oilseeds), food losses, non-food processing and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Cash crops

Cash crops include cocoa, coffee, cotton, rubber, tea, tobacco and other crop fibres. Most of the world's cash crops – more than 90 percent – are produced in LMIC (see [Figure S 1.8](#) and [Table S 1.8](#)). In 2012, China, SAS, and EAP each accounted for about 20 percent of global cash crop production, followed by LAC (16 percent) and SSA (10 percent). China, despite its large share in the global production of cash crops, is historically a net importer. Globally, food uses of cash crops account for a limited share of total absorption (less than 27 percent in 2012). Feed uses are almost non-existent. Coffee and tea are typically exported by LMIC to HIC. The item “other uses” for cash crops includes fibres used in the textile industry, especially in HIC, SAS and EAP, and other industrial uses (see [Table S 1.8](#)).

■ **BAU:** Under the BAU scenario, global cash crop production is projected to increase by about 44 percent by 2050 compared with 2012. The bulk of these commodities will continue to be produced in LMIC, as [Table S 1.8](#) suggests. In China, production is projected to increase by 54 percent in 2050, prompting China's share of global production to rise to almost 22 percent by 2050, from 20 percent in 2012. In LMIC (excluding China) cash crop production is projected to increase in 2050 by slightly more than 40 percent. NNA and ECA will lag behind with a growth of 22 and 30 percent respectively by 2050.

Globally, food uses of cash crops are projected to grow between 2012 and 2050 by 30 percent; that is at a slower pace than other (industrial) uses, projected to grow at 48 percent. In LMIC (excluding China) the growth of both absorption items is broadly balanced (52 and 56 percent respectively). Conversely, diverging growth patterns between these two categories are particularly marked in HIC, where food uses will only grow 11 percent compared to 47 percent of other (industrial) uses, and China (6.7 and 38 percent, respectively). Sub-Saharan Africa is the only region where food uses grow more than other (industrial) uses, by 158 and 83 percent, respectively.

In BAU, by 2050 all regions maintain their net trade position, except SAS, which shifts from net exporter – with a self-sufficiency ratio of 1.16 – to net importer, albeit with a self-sufficiency ratio very close to 1. However, EAP (excluding China) and SSA, which in 2012 show a self-sufficiency ratio of 2.15 and 2.49 respectively, will have a lower ratio by 2050 (at 1.88 and 1.62 respectively) thus weakening their relative export position. By contrast, LAC will reinforce its relative export position with a ratio shifting from 1.82 in 2012 to 2.1 in 2050.

■ **TSS:** In the TSS scenario – built upon the assumption that cultivation practices associated with lower yields are adopted and natural resources are used more sustainably – cash crop production in 2050 grows by 39 percent, compared with 44 percent in BAU. However, global figures hide significant variations across regions. In SAS and NNA the growth between 2012 and 2050 in TSS is markedly lower than in BAU (29 and 3.8 percent respectively in TSS, compared with 47 and 22 percent respectively in BAU). By contrast, in SSA and LAC, production growth between 2012 and 2050 is higher in TSS than in BAU (47 and 45 percent respectively in TSS, compared with 41 and 40 percent respectively in BAU). This is essentially due to the different natural resource constraints faced by the different regions that, while allowing cash crops to expand in LAC and SSA, limit their growth in SAS and NNA.

In TSS, globally, the two items of domestic absorption of cash crops – notably food uses and other (industrial) uses – grow in a more balanced way between 2012 and

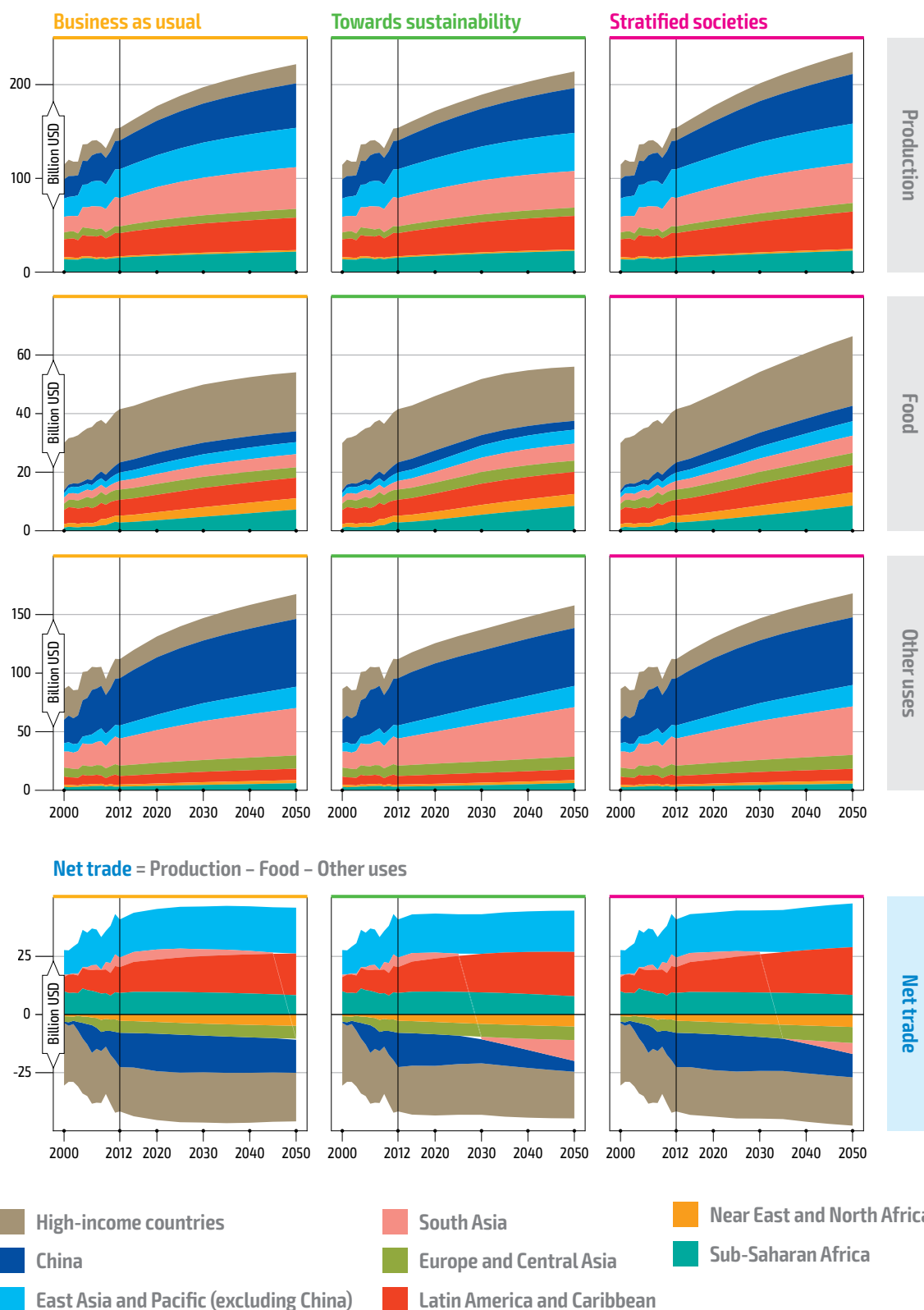
2050 than in BAU, with food uses gaining relative prominence over industrial uses. This is particularly marked in regions such as SAS, SSA and NNA – and, to a lesser extent, EAP (excluding China) – which see larger per capita income under TSS compared to BAU. This extra income favours the expansion of food consumption.

In TSS, by 2050 all regions maintain their historical trade position, except for SAS, which becomes a significant net importer, due to restricted expansion of domestic production linked to the limits in natural resource use. China, thanks to a marked reduction of other (industrial) uses of cash crops compared to BAU, increases its self-sufficiency ratio in 2050 from 0.77 in BAU to 0.91 in TSS.

■ **SSS:** The SSS scenario, on the other hand, projects higher global production growth of cash crops against BAU. This is due to higher economic growth patterns in almost all regions except SSA and looser constraints on the overuse of natural resources, albeit with significant regional differences, also influenced by the differentiated impact of climate change on crop yields (more pronounced in SSS than in BAU). At the global level, between 2012 and 2050 the production of cash crops is projected to increase by 53 percent, compared to 44 percent in BAU. The highest increase is projected to take place in HIC and China (with the same growth of 73 percent by 2050) and in LAC (61 percent by 2050), thanks to more investment in technologies and infrastructure which allow comparatively higher, though not sustainable, crop yields. Sub-Saharan Africa, NNA, ECA and EAP (excluding China), experience a growth pattern by 2050 broadly similar to BAU. South-Asia instead reveals lower growth by 2050 in SSS than in BAU (41 and 47 percent, respectively).

In SSS, by 2050, the self-sufficiency ratio of HIC and China increases compared to BAU, while it decreases in all other regions.

Figure S 1.8 Commodity balances for cash crops by region and scenario, 2012 exchange rates



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: feed, seed, food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports). "Cash crops" comprises: cocoa, coffee, cotton, rubber, tea, tobacco and other crop fibres.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.8 Cash crops: commodity balances by region and scenario

REGIONS	BALANCE ITEMS	billion USD, 2012 exchange rates							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	14	17	15	19	20	18	23	151	131	173
	Food	18	20	19	21	20	18	24	111	102	131
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	14	19	18	19	21	19	20	147	134	141
	Net trade	–19	–22	–22	–20	–21	–20	–21	109	105	109
	Self-sufficiency ratio	0.42	0.45	0.40	0.48	0.49	0.47	0.53	119	113	128
East Asia and Pacific	Production	61	79	77	81	89	89	95	146	144	155
	Food	6	8	8	9	8	8	10	123	123	161
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	53	69	62	69	76	68	76	143	127	143
	Net trade	2	3	7	3	5	13	9	337	806	536
	Self-sufficiency ratio	1.03	1.03	1.10	1.04	1.07	1.17	1.10	104	114	107
China	Production	31	42	40	44	47	48	53	154	156	173
	Food	3	4	4	5	4	3	5	107	87	152
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	42	54	47	54	58	49	58	138	118	138
	Net trade	–15	–16	–10	–15	–14	–5	–10	96	31	68
	Self-sufficiency ratio	0.68	0.73	0.80	0.75	0.77	0.91	0.84	114	135	124
East Asia and Pacific (excluding China)	Production	31	37	36	37	42	41	42	137	133	137
	Food	3	4	4	4	4	5	5	143	165	171
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	11	15	15	15	18	18	18	159	159	161
	Net trade	16	18	17	18	20	18	19	120	108	115
	Self-sufficiency ratio	2.15	1.96	1.89	1.92	1.88	1.77	1.81	88	83	84
South Asia	Production	30	40	36	39	44	39	43	147	129	141
	Food	3	4	5	5	4	6	6	153	198	201
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	23	33	33	33	40	42	41	174	182	178
	Net trade	4	3	–1	1	0	–9	–5	–	–	–
	Self-sufficiency ratio	1.16	1.08	0.97	1.03	0.99	0.81	0.90	86	70	78
Europe and Central Asia	Production	7	9	8	9	9	9	9	130	124	128
	Food	3	4	4	4	4	4	4	102	110	120
	Feed	0	0	0	0	0	0	0	41	27	11
	Other uses	9	10	10	10	11	11	12	129	124	135
	Net trade	–5	–5	–6	–6	–6	–6	–7	108	114	135
	Self-sufficiency ratio	0.58	0.63	0.59	0.60	0.63	0.60	0.57	107	103	98

Table S 1.8 Cash crops: commodity balances by region and scenario (continued)

REGIONS	BALANCE ITEMS	billion USD, 2012 exchange rates							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	25	31	32	33	35	36	40	140	145	161
	Food	5	7	7	7	7	8	9	129	138	170
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	8	9	8	9	10	9	10	119	113	124
	Net trade	11	16	17	16	18	19	21	161	171	185
	Self-sufficiency ratio	1.82	2.01	2.06	2.00	2.07	2.14	2.06	114	118	113
Near East and North Africa	Production	1	2	2	2	2	1	2	122	104	133
	Food	2	3	3	3	4	4	5	165	175	194
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	1.8	2.3	2.2	2.3	3	3	3	151	141	150
	Net trade	–3	–4	–4	–4	–5	–5	–5	178	189	197
	Self-sufficiency ratio	0.34	0.30	0.27	0.30	0.26	0.22	0.26	77	65	76
Sub-Saharan Africa	Production	15	19	20	19	22	23	23	141	147	148
	Food	3	5	5	5	7	8	9	258	301	307
	Feed	0	–	–	–	–	–	–	–	–	–
	Other uses	3	5	5	5	6	6	6	183	187	171
	Net trade	9	9	9	9	8	8	8	90	85	91
	Self-sufficiency ratio	2.49	2.00	1.95	1.96	1.62	1.53	1.59	65	61	64
Low- and middle-income countries	Production	140	180	174	182	201	196	211	143	140	151
	Food	23	30	33	34	34	38	43	145	161	183
	Feed	0	0	0	0	0	0	0	41	27	11
	Other uses	99	128	120	128	146	139	148	148	141	150
	Net trade	18	22	22	20	21	20	21	114	110	113
	Self-sufficiency ratio	1.15	1.14	1.15	1.13	1.12	1.11	1.11	97	97	96
Low- and middle-income countries (excluding China)	Production	110	138	134	139	154	148	158	140	135	144
	Food	20	26	29	29	30	35	37	152	174	188
	Feed	0	0	0	0	0	0	0	41	27	11
	Other uses	57	75	72	75	89	89	90	156	157	159
	Net trade	33	37	32	35	35	25	31	106	75	93
	Self-sufficiency ratio	1.43	1.37	1.32	1.34	1.30	1.20	1.24	91	84	87
World	Production	154	197	189	201	222	214	235	144	139	153
	Food	42	50	52	54	54	56	66	130	135	160
	Feed	0	0	0	0	0	0	0	41	27	11
	Other uses	112	147	137	147	168	158	168	149	141	150
	Net trade	0	0	0	0	0	0	0	–	–	–
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production – aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Cash crops" comprises: cocoa, coffee, cotton, rubber, tea, tobacco and other crop fibres. "Other uses" refers to the sum of all other domestic uses, including: seed, food losses, processing and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

2 | Statistical tables

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region

REGIONS	CROPS		YIELD	TECHNOLOGY (index, 2012 = 100)						CLIMATE (index, 2012 = 100)					
			2012	2030			2050			2030			2050		
			BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	All	RAINFED	5.28	112	72	112	121	77	121	101	100	99	102	100	98
		IRRIGATED	9.99	110	70	110	117	75	117	101	101	101	103	102	102
	Vegetables	RAINFED	25.45	115	92	115	126	100	126	100	99	98	101	99	96
		IRRIGATED	34.44	115	92	115	125	100	125	100	99	99	100	99	98
	Maize	RAINFED	8.32	108	87	108	112	90	112	101	100	99	102	100	98
		IRRIGATED	10.02	108	86	108	112	89	112	103	103	104	106	106	108
	Wheat	RAINFED	3.56	111	89	111	120	96	120	102	100	101	103	101	101
		IRRIGATED	4.60	111	89	111	119	95	119	100	100	99	101	99	98
	Soybeans	RAINFED	2.77	114	92	114	126	101	126	100	99	98	101	99	95
		IRRIGATED	1.95	119	96	119	133	106	133	100	100	100	99	101	100
East Asia and Pacific	All	RAINFED	8.21	117	95	114	130	105	123	99	99	97	97	98	94
		IRRIGATED	9.67	114	93	113	124	100	121	101	102	101	102	103	103
	Vegetables	RAINFED	18.66	117	106	117	133	119	132	99	99	99	97	99	97
		IRRIGATED	26.91	117	105	117	132	118	131	100	101	100	100	102	100
	Rice	RAINFED	3.49	122	109	118	138	124	130	98	99	96	96	97	92
		IRRIGATED	5.98	111	100	110	118	106	116	101	101	101	102	103	102
	Maize	RAINFED	4.67	118	106	116	130	117	127	102	101	102	103	103	104
		IRRIGATED	6.16	109	98	109	113	101	112	104	104	105	108	109	110
	Sugar cane	RAINFED	53.84	117	105	115	128	115	122	96	98	96	92	96	92
		IRRIGATED	73.56	116	104	114	127	114	123	101	102	102	103	104	103
	Palm oil	RAINFED	18.74	108	98	106	115	103	109	99	99	97	98	98	94
		IRRIGATED	13.49	100	90	100	101	90	101	102	102	101	104	105	102

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region (continued)

REGIONS	CROPS		YIELD	TECHNOLOGY (index, 2012 = 100)						CLIMATE (index, 2012 = 100)					
			2012	2030			2050			2030			2050		
			BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
China	All	RAINFED	9.08	116	94	116	128	103	128	100	100	99	99	101	99
		IRRIGATED	9.63	113	91	113	121	97	121	102	103	103	104	105	106
	Vegetables	RAINFED	20.53	116	105	116	131	118	131	99	100	99	98	100	98
		IRRIGATED	28.16	116	105	116	131	118	131	100	101	100	101	103	101
	Rice	IRRIGATED	6.72	105	94	105	106	95	106	102	103	102	104	105	105
	Maize	RAINFED	5.18	108	97	108	110	99	110	103	102	103	106	105	107
		IRRIGATED	6.25	108	97	108	110	99	110	104	104	105	108	109	110
	Wheat	RAINFED	3.92	114	103	114	119	107	119	98	99	96	96	98	92
		IRRIGATED	5.30	114	103	114	119	107	119	99	100	101	99	101	101
	Potatoes	RAINFED	14.82	123	111	123	138	124	138	98	99	96	96	98	91
		IRRIGATED	18.85	123	111	123	138	124	138	100	99	99	99	98	98
East Asia and Pacific (excluding China)	All	RAINFED	7.50	118	96	112	132	106	117	98	98	95	95	96	90
		IRRIGATED	9.80	120	97	114	135	109	120	99	98	97	97	97	93
	Rice	RAINFED	3.49	122	109	118	138	124	130	98	99	96	96	97	92
		IRRIGATED	5.06	122	110	119	139	125	131	100	99	99	100	98	99
	Palm oil	RAINFED	18.74	108	98	106	115	103	109	99	99	97	98	98	94
	Vegetables	RAINFED	9.57	127	114	123	151	136	143	95	94	92	89	88	83
		IRRIGATED	15.13	126	113	122	150	135	142	97	97	98	93	93	95
	Sugar cane	RAINFED	52.44	118	106	115	129	116	122	95	97	95	90	93	89
		IRRIGATED	77.45	117	105	113	128	115	121	98	98	95	95	96	89
	Maize	RAINFED	4.01	134	121	131	163	147	154	99	100	99	99	99	99
		IRRIGATED	4.58	135	122	132	166	149	156	102	100	103	104	100	107
South Asia	All	RAINFED	2.42	122	99	115	138	112	122	97	98	96	94	96	91
		IRRIGATED	7.04	122	99	115	140	113	122	98	97	94	95	93	88
	Rice	RAINFED	2.16	129	116	125	146	131	137	99	99	98	98	98	95
		IRRIGATED	4.32	128	115	125	146	131	137	99	99	99	99	99	97
	Wheat	RAINFED	1.72	129	116	125	150	134	140	96	96	93	91	91	84
		IRRIGATED	3.21	130	117	126	155	139	143	96	95	93	93	90	86
	Vegetables	RAINFED	9.38	119	107	115	134	121	126	97	97	94	94	93	87
		IRRIGATED	17.76	117	106	114	132	118	124	97	97	95	94	94	88
	Cotton	RAINFED	1.18	135	122	132	148	133	139	100	101	99	100	102	98
		IRRIGATED	1.96	134	120	129	153	137	141	99	98	98	99	97	96
	Cassava	RAINFED	34.29	115	104	112	120	108	113	97	98	94	95	95	87

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region (continued)

REGIONS	CROPS		YIELD	TECHNOLOGY (index, 2012 = 100)						CLIMATE (index, 2012 = 100)					
			2012	2030			2050			2030			2050		
			BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Europe and Central Asia	All	RAINFED	3.36	128	94	127	145	106	142	101	100	98	102	99	96
		IRRIGATED	7.33	121	93	117	134	103	125	100	100	99	100	99	97
	Vegetables	RAINFED	15.34	120	104	119	133	114	130	101	100	98	102	100	96
		IRRIGATED	33.58	119	106	116	134	119	127	100	100	98	99	99	96
	Wheat	RAINFED	1.94	121	105	120	137	120	135	102	100	99	104	101	97
		IRRIGATED	4.19	118	103	116	131	115	127	99	99	97	99	98	95
	Potatoes	RAINFED	14.68	123	105	123	141	120	141	101	101	98	102	103	95
		IRRIGATED	21.69	121	105	119	135	117	131	99	99	97	97	98	93
	Maize	RAINFED	4.64	135	111	135	153	125	153	102	97	96	103	95	92
		IRRIGATED	6.35	127	106	126	142	118	139	102	103	104	104	106	108
	Sunflower	RAINFED	1.55	130	110	130	154	129	154	100	98	96	99	95	91
		IRRIGATED	2.33	123	105	122	143	121	141	100	99	99	99	98	97
Latin America and Caribbean	All	RAINFED	6.73	116	94	109	130	105	113	98	98	96	95	96	91
		IRRIGATED	28.85	112	91	105	123	100	106	98	98	98	97	95	95
	Soybeans	RAINFED	2.68	117	106	113	131	118	121	99	99	96	98	97	92
		IRRIGATED	1.52	110	99	107	117	105	110	99	98	99	99	97	98
	Sugar cane	RAINFED	59.44	112	101	109	121	109	114	97	98	94	93	95	87
		IRRIGATED	87.09	111	100	107	120	108	112	98	98	97	96	95	94
	Maize	RAINFED	4.05	132	119	128	160	144	149	100	101	101	101	101	102
		IRRIGATED	5.19	130	117	124	158	142	143	100	100	100	100	101	100
	Vegetables	RAINFED	14.34	120	108	116	136	123	125	97	96	95	94	92	90
		IRRIGATED	18.56	118	107	114	134	120	124	98	98	98	96	96	95
	Coffee	RAINFED	0.96	129	116	124	140	126	131	99	99	98	98	98	95
		IRRIGATED	0.83	103	93	98	107	96	95	97	96	96	95	91	91
Near East and North Africa	All	RAINFED	1.64	119	97	113	133	108	119	100	100	96	100	100	91
		IRRIGATED	9.00	119	97	113	132	107	118	98	98	97	97	96	93
	Vegetables	RAINFED	9.59	122	110	119	137	123	130	99	94	98	99	88	95
		IRRIGATED	29.85	122	110	119	137	123	130	98	98	97	96	96	94
	Wheat	RAINFED	1.10	125	113	122	141	127	133	97	95	94	94	89	87
		IRRIGATED	2.96	125	113	122	141	127	133	97	97	95	95	93	89
	Potatoes	RAINFED	10.24	123	111	120	137	124	130	100	98	97	100	96	94
		IRRIGATED	27.06	123	111	120	137	124	130	97	96	95	94	93	89
	Citrus	RAINFED	14.00	116	105	113	131	118	124	105	124	90	121	161	89
		IRRIGATED	25.70	116	105	113	131	118	124	90	90	90	90	90	90
Near East and North Africa	Rice	IRRIGATED	6.74	113	102	110	119	107	112	100	100	99	99	99	99

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region (continued)

REGIONS	CROPS		YIELD	TECHNOLOGY (index, 2012 = 100)						CLIMATE (index, 2012 = 100)					
			2012	2030			2050			2030			2050		
			BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Sub-Saharan Africa	All	RAINFED	2.79	119	96	108	139	112	113	97	97	95	95	95	90
		IRRIGATED	11.19	113	91	101	126	102	100	99	99	98	98	98	95
	Cassava	RAINFED	9.37	114	103	109	129	116	117	97	97	95	93	94	89
	Yams	RAINFED	7.66	111	100	107	123	110	112	97	97	94	94	93	87
		IRRIGATED	11.01	122	110	116	144	130	128	97	97	95	93	94	89
	Vegetables	RAINFED	6.08	131	118	125	163	146	147	96	96	93	91	91	86
		IRRIGATED	10.74	137	124	130	176	158	157	95	96	93	90	92	85
	Maize	RAINFED	1.66	120	108	114	143	128	128	98	98	97	97	95	94
		IRRIGATED	5.33	119	108	113	142	128	126	98	98	98	96	95	95
	Rice	RAINFED	1.80	137	123	131	172	154	156	99	98	98	98	96	95
		IRRIGATED	3.21	130	117	123	163	147	145	99	99	98	98	98	96
Low- and middle-income countries	All	RAINFED	4.65	119	95	114	134	107	121	98	99	97	97	97	93
		IRRIGATED	9.84	117	94	112	129	104	117	99	99	98	98	98	96
	Vegetables	RAINFED	14.45	119	107	118	135	121	132	98	99	98	97	97	95
		IRRIGATED	24.47	118	106	117	133	120	130	99	100	99	98	99	97
	Rice	RAINFED	2.83	125	112	121	143	129	135	98	99	97	97	97	93
		IRRIGATED	5.20	118	106	116	129	116	124	100	100	100	101	101	100
	Maize	RAINFED	3.27	126	112	123	148	131	140	100	100	100	101	100	99
		IRRIGATED	5.70	116	104	115	127	114	123	102	103	103	105	106	107
	Wheat	RAINFED	2.03	121	107	119	137	121	133	100	99	97	100	99	94
		IRRIGATED	3.84	122	110	120	137	123	131	98	98	97	96	95	93
Low- and middle-income countries (excluding China)	All	RAINFED	4.18	120	96	113	135	108	119	98	98	96	96	96	92
		IRRIGATED	9.93	118	95	111	133	107	116	98	98	96	96	95	92
	Rice	RAINFED	2.83	125	112	121	143	129	135	98	99	97	97	97	93
		IRRIGATED	4.60	125	113	122	143	128	134	100	99	99	99	98	98
	Vegetables	RAINFED	9.74	123	110	120	142	127	134	98	97	95	95	93	89
		IRRIGATED	21.13	120	108	117	136	122	128	98	98	96	95	95	92
	Maize	RAINFED	3.02	131	116	127	156	138	147	100	99	99	100	98	98
		IRRIGATED	4.89	132	117	128	159	141	148	100	100	100	100	100	101
	Wheat	RAINFED	1.88	122	108	120	140	123	135	101	99	98	101	99	95
		IRRIGATED	3.35	127	114	123	147	132	138	97	96	94	94	92	88
	Cassava	RAINFED	11.72	119	107	114	134	120	123	96	96	93	92	92	85

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region (continued)

REGIONS	CROPS		YIELD	TECHNOLOGY (index, 2012 = 100)						CLIMATE (index, 2012 = 100)					
			2012	2030			2050			2030			2050		
			BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
World	All	RAINFED	4.79	117	90	113	131	100	121	99	99	97	98	98	94
		IRRIGATED	9.86	116	91	111	128	101	117	99	99	99	99	98	97
	Vegetables	RAINFED	15.35	118	105	117	134	118	131	99	99	98	97	97	95
		IRRIGATED	25.26	118	105	116	132	118	129	99	100	99	98	99	97
	Rice	RAINFED	2.84	125	112	121	143	129	135	99	99	97	97	98	93
		IRRIGATED	5.28	117	105	115	129	115	123	100	100	100	101	101	100
	Maize	RAINFED	4.45	118	101	117	132	113	128	101	100	99	101	100	99
		IRRIGATED	6.81	113	97	112	121	104	119	103	103	103	106	106	107
	Wheat	RAINFED	2.63	116	97	115	128	107	126	101	100	99	102	100	98
		IRRIGATED	3.97	120	106	118	134	118	129	98	98	97	97	96	94
	Soybeans	RAINFED	2.45	117	101	114	130	112	124	100	99	97	99	98	94
		IRRIGATED	1.85	116	104	115	129	116	126	100	100	99	100	101	99

Note: Crops are sorted by value of production, using base-year prices.

Sources: FAO Global Perspectives Studies, based on FAO-IIASA Global Agro-ecological Zones (GAEZ) v4, for climate change; expert judgement for technological change; and both sources for the combined effect.

Table S 2.2 Gross agricultural output at base-year prices

REGIONS	COMMODITY GROUPS	index						
		2012	2030			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Cereals and oilseeds	100	127	108	141	140	118	154
	Fruit and vegetables	100	134	117	143	155	136	171
	Animal products	100	110	96	120	114	85	113
	Industrial crops	100	131	117	148	153	136	188
	Other agriculture	100	122	101	128	125	104	137
	Total agriculture	100	120	104	131	130	106	139
East Asia and Pacific	Cereals and oilseeds	100	126	118	128	136	130	139
	Fruit and vegetables	100	125	125	129	128	135	137
	Animal products	100	132	118	147	140	119	146
	Industrial crops	100	146	136	149	179	169	192
	Other agriculture	100	117	115	122	120	123	135
	Total agriculture	100	128	121	134	135	130	141
China	Cereals and oilseeds	100	124	114	128	129	118	136
	Fruit and vegetables	100	124	125	129	124	134	137
	Animal products	100	130	114	148	133	107	139
	Industrial crops	100	154	143	161	195	182	219
	Other agriculture	100	117	119	125	114	129	134
	Total agriculture	100	127	120	135	130	125	139
East Asia and Pacific (excluding China)	Cereals and oilseeds	100	129	125	128	146	145	143
	Fruit and vegetables	100	129	125	128	144	140	139
	Animal products	100	140	135	147	174	175	182
	Industrial crops	100	127	121	119	140	138	126
	Other agriculture	100	117	110	120	127	115	136
	Total agriculture	100	130	125	130	149	147	147
South Asia	Cereals and oilseeds	100	132	120	129	149	131	140
	Fruit and vegetables	100	146	132	137	182	162	164
	Animal products	100	138	132	130	145	149	155
	Industrial crops	100	133	116	125	149	121	132
	Other agriculture	100	115	105	114	118	105	120
	Total agriculture	100	137	125	131	156	142	149
Europe and Central Asia	Cereals and oilseeds	100	136	124	140	159	146	159
	Fruit and vegetables	100	137	130	138	155	152	160
	Animal products	100	157	144	178	195	176	207
	Industrial crops	100	134	125	135	146	138	150
	Other agriculture	100	121	112	122	128	118	133
	Total agriculture	100	143	133	152	169	157	175

Table S 2.2 Gross agricultural output at base-year prices (continued)

REGIONS	COMMODITY GROUPS	index						
		2012	2030			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Cereals and oilseeds	100	140	134	143	176	172	169
	Fruit and vegetables	100	128	127	127	149	150	145
	Animal products	100	133	119	149	155	129	163
	Industrial crops	100	123	122	119	137	142	128
	Other agriculture	100	127	130	135	140	141	165
	Total agriculture	100	132	125	138	156	146	157
Near East and North Africa	Cereals and oilseeds	100	119	102	116	119	94	111
	Fruit and vegetables	100	126	115	122	134	118	130
	Animal products	100	136	132	132	184	180	174
	Industrial crops	100	112	101	114	111	90	121
	Other agriculture	100	117	108	117	117	106	121
	Total agriculture	100	127	117	124	145	131	139
Sub-Saharan Africa	Cereals and oilseeds	100	172	167	172	257	255	242
	Fruit and vegetables	100	156	153	156	219	221	210
	Animal products	100	218	219	233	378	441	363
	Industrial crops	100	119	120	115	131	140	120
	Other agriculture	100	120	118	122	131	128	137
	Total agriculture	100	168	166	172	251	264	241
Low- and middle-income countries	Cereals and oilseeds	100	134	125	135	155	146	152
	Fruit and vegetables	100	134	130	134	153	152	153
	Animal products	100	143	132	155	171	159	176
	Industrial crops	100	132	123	128	150	141	145
	Other agriculture	100	119	116	123	125	123	137
	Total agriculture	100	135	128	139	157	151	158
Low- and middle-income countries (excluding China)	Cereals and oilseeds	100	137	129	137	164	155	158
	Fruit and vegetables	100	140	133	137	171	164	164
	Animal products	100	149	140	158	188	183	193
	Industrial crops	100	128	120	122	141	133	130
	Other agriculture	100	120	115	122	128	121	138
	Total agriculture	100	139	132	141	170	163	167
World	Cereals and oilseeds	100	132	120	136	151	138	153
	Fruit and vegetables	100	134	128	135	153	150	156
	Animal products	100	131	118	142	150	132	153
	Industrial crops	100	132	122	131	150	140	150
	Other agriculture	100	119	115	123	125	121	137
	Total agriculture	100	132	122	137	150	140	153

Note: Gross agricultural output is measured as the sum of all primary agricultural commodities as defined in Annex III Table A 3.3 of the report, multiplied by their corresponding base-year prices. Note that this excludes natural rubber but includes both feed and animal products. Fish, on the other hand, is excluded to maintain comparability of this indicator with previous FAO studies.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Table S 2.3 Historical dietary per capita energy supply and projected dietary energy consumption

REGIONS	COMMODITY GROUPS	kcal/person/day								index, 2012 = 100		
		1961	2012	2030			2050			2050		
		HISTORICAL	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Cereals and products	986	933	953	959	923	940	944	930	101	101	100
	Fruit and vegetables	139	188	200	194	191	205	189	194	109	101	103
	Animal products	669	796	820	738	818	830	700	841	104	88	106
	Vegetable oil	206	481	494	477	483	500	477	509	104	99	106
	Other food	855	922	950	904	915	956	888	935	104	96	101
	Total food	2 855	3 311	3 408	3 271	3 303	3 421	3 198	3 380	103	97	102
East Asia and Pacific	Cereals and products	902	1 412	1 408	1 444	1 392	1 341	1 344	1 371	95	95	97
	Fruit and vegetables	69	257	316	332	296	324	348	318	126	135	124
	Animal products	62	521	596	577	563	580	551	537	111	106	103
	Vegetable oil	35	172	193	156	199	190	138	209	110	80	121
	Other food	460	496	543	541	530	549	547	545	111	110	110
	Total food	1 528	2 850	3 046	3 050	2 951	2 974	2 927	2 950	104	103	104
China	Cereals and products	800	1 378	1 362	1 401	1 347	1 292	1 304	1 313	94	95	95
	Fruit and vegetables	65	316	400	421	375	419	448	411	133	142	130
	Animal products	46	632	733	697	688	723	665	669	115	105	106
	Vegetable oil	26	169	190	131	207	184	99	224	109	58	133
	Other food	477	487	527	519	520	530	514	536	109	106	110
	Total food	1 414	2 971	3 202	3 168	3 104	3 137	3 029	3 120	106	102	105
East Asia and Pacific (excluding China)	Cereals and products	1 189	1 484	1 494	1 525	1 474	1 421	1 408	1 464	96	95	99
	Fruit and vegetables	78	133	159	165	150	171	186	166	129	140	125
	Animal products	106	288	340	356	329	347	366	323	121	127	112
	Vegetable oil	62	180	198	203	186	198	203	184	110	113	103
	Other food	412	516	571	582	548	579	600	559	112	116	108
	Total food	1 847	2 594	2 755	2 830	2 667	2 709	2 761	2 675	104	106	103
South Asia	Cereals and products	1 319	1 361	1 453	1 492	1 378	1 459	1 516	1 405	107	111	103
	Fruit and vegetables	51	107	128	133	123	135	151	136	126	140	127
	Animal products	122	238	274	280	266	276	278	260	116	117	109
	Vegetable oil	88	195	210	215	199	210	215	197	108	110	101
	Other food	445	479	543	553	522	551	576	538	115	120	112
	Total food	2 024	2 376	2 602	2 673	2 474	2 626	2 735	2 519	111	115	106
Europe and Central Asia	Cereals and products	1 720	1 227	1 265	1 283	1 227	1 241	1 260	1 231	101	103	100
	Fruit and vegetables	224	212	246	255	238	260	278	266	123	132	125
	Animal products	402	622	656	646	643	649	630	624	104	101	100
	Vegetable oil	177	336	361	366	343	364	369	344	108	110	102
	Other food	397	781	816	806	781	798	795	776	102	102	99
	Total food	2 921	3 171	3 338	3 355	3 212	3 305	3 332	3 221	104	105	102

Table S2.3 Historical dietary per capita energy supply and projected dietary energy consumption (continued)

REGIONS	COMMODITY GROUPS	kcal/person/day								index, 2012 = 100		
		1961	2012	2030			2050			2050		
		HISTORICAL	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Cereals and products	914	1 008	1 025	1 067	966	1 012	1 071	972	100	106	96
	Fruit and vegetables	105	139	153	162	139	158	183	139	113	131	100
	Animal products	307	564	603	599	584	605	587	566	107	104	100
	Vegetable oil	108	317	333	327	311	334	319	321	105	101	101
	Other food	813	860	904	885	856	907	873	876	105	102	102
	Total food	2 248	2 876	3 007	3 039	2 822	3 004	3 032	2 841	104	105	99
Near East and North Africa	Cereals and products	1 217	1 671	1 710	1 772	1 612	1 657	1 740	1 615	99	104	97
	Fruit and vegetables	127	258	285	290	265	298	310	289	116	120	112
	Animal products	157	287	321	316	317	321	313	305	112	109	106
	Vegetable oil	102	271	290	291	270	290	291	272	107	107	100
	Other food	312	539	594	569	545	594	575	562	110	107	104
	Total food	1 915	3 019	3 195	3 236	2 994	3 155	3 228	3 027	104	107	100
Sub-Saharan Africa	Cereals and products	929	1 069	1 220	1 286	1 143	1 189	1 234	1 154	111	115	108
	Fruit and vegetables	82	92	111	118	100	122	149	107	133	162	117
	Animal products	124	175	207	227	199	230	231	192	131	132	109
	Vegetable oil	130	188	204	212	188	202	207	184	108	110	98
	Other food	746	849	932	968	870	950	1 011	886	112	119	104
	Total food	2 011	2 363	2 664	2 810	2 468	2 683	2 831	2 490	114	120	105
Low- and middle-income countries	Cereals and products	1 064	1 307	1 358	1 401	1 302	1 321	1 361	1 297	101	104	99
	Fruit and vegetables	76	174	200	209	188	200	221	192	114	127	110
	Animal products	125	385	413	412	397	393	383	362	102	100	94
	Vegetable oil	74	212	229	221	220	227	215	220	107	101	104
	Other food	511	604	674	680	642	701	719	674	116	119	112
	Total food	1 850	2 674	2 866	2 923	2 724	2 833	2 898	2 720	106	108	102
Low- and middle-income countries (excluding China)	Cereals and products	1 188	1 286	1 356	1 402	1 291	1 326	1 372	1 294	103	107	101
	Fruit and vegetables	81	132	152	158	142	158	178	151	119	134	114
	Animal products	162	312	336	343	326	330	330	303	106	106	97
	Vegetable oil	97	225	238	243	223	235	237	219	104	105	97
	Other food	527	639	710	718	672	734	758	700	115	119	110
	Total food	2 055	2 587	2 784	2 863	2 632	2 775	2 873	2 644	107	111	102
World	Cereals and products	1 043	1 245	1 298	1 336	1 246	1 270	1 306	1 249	102	105	100
	Fruit and vegetables	93	177	200	207	188	200	217	192	113	123	109
	Animal products	269	452	473	460	459	451	425	425	100	94	94
	Vegetable oil	109	256	268	259	259	263	250	258	102	97	101
	Other food	602	656	715	713	682	735	741	709	112	113	108
	Total food	2 117	2 779	2 946	2 974	2 809	2 910	2 938	2 807	105	106	101

Note: Data for 1961 refer to per capita kilocalorie supply. Data for 2012 and thereafter refer to per capita kilocalorie consumption.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Table S 2.4 Historical and projected per capita protein supply

REGIONS	COMMODITY GROUPS	grams/person/day								index, 2012 = 100		
		1961	2012	2030			2050			2050		
		HISTORICAL	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Cereals and products	28	26	27	27	27	27	26	28	102	100	105
	Fruit and vegetables	4	5	5	5	5	5	5	5	107	97	106
	Animal products	42	58	60	52	63	61	49	64	104	84	110
	Other food	10	11	14	13	13	14	13	14	105	98	105
	Total food	86	103	106	97	109	107	93	111	104	90	108
East Asia and Pacific	Cereals and products	20	33	33	33	35	31	30	34	94	91	104
	Fruit and vegetables	3	11	13	13	13	13	14	14	124	128	132
	Animal products	4	32	37	35	38	36	33	36	113	105	114
	Other food	3	8	13	13	13	13	13	13	112	112	115
	Total food	40	88	96	93	99	93	90	98	107	104	112
China	Cereals and products	19	34	34	33	36	32	31	35	94	91	104
	Fruit and vegetables	3	14	18	18	18	18	19	20	133	136	142
	Animal products	3	37	42	39	43	41	37	42	114	102	115
	Other food	4	9	14	14	15	14	14	15	114	112	118
	Total food	39	97	108	104	112	106	101	112	110	104	115
East Asia and Pacific (excluding China)	Cereals and products	24	31	31	31	33	30	29	33	96	92	105
	Fruit and vegetables	2	4	4	4	4	5	5	5	129	135	133
	Animal products	8	23	27	27	28	27	28	27	121	124	121
	Other food	3	5	10	10	10	10	11	11	114	117	116
	Total food	41	67		73	76	72	73	76	109	109	114
South Asia	Cereals and products	30	32	35	35	35	35	36	36	107	109	109
	Fruit and vegetables	2	3	4	4	4	4	5	4	125	136	134
	Animal products	7	13	15	15	16	15	15	15	116	115	116
	Other food	2	3	12	12	12	12	13	12	114	119	118
	Total food	52	59	66	66	67	67	68	68	112	114	114
Europe and Central Asia	Cereals and products	52	37	38	38	39	38	37	40	101	100	106
	Fruit and vegetables	5	6	7	7	7	7	8	8	123	129	134
	Animal products	23	42	44	42	46	44	41	45	104	98	106
	Other food	6	13	12	12	12	12	12	13	104	103	107
	Total food	90	97	102	99	105	101	98	104	104	101	108
Latin America and Caribbean	Cereals and products	23	26	26	26	26	26	26	27	101	103	104
	Fruit and vegetables	2	3	3	3	3	3	4	3	114	127	107
	Animal products	21	40	43	42	45	43	41	44	108	101	108
	Other food	8	8	15	15	15	15	15	15	105	101	104
	Total food	60	83	88	86	89	88	86	88	105	103	106

Table S 2.4 Historical and projected per capita protein supply (continued)

REGIONS	COMMODITY GROUPS	grams/person/day								index, 2012 = 100		
		1961	2012	2030			2050			2050		
		HISTORICAL	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Near East and North Africa	Cereals and products	35	49	50	50	51	48	49	51	99	100	104
	Fruit and vegetables	3	7	8	7	8	8	8	8	117	117	123
	Animal products	9	22	25	23	27	25	23	26	114	104	118
	Other food	3	6	11	10	11	11	10	11	106	102	108
	Total food	53	88	93	91	96	92	90	96	105	103	110
Sub-Saharan Africa	Cereals and products	25	28	32	33	33	32	32	33	111	112	115
	Fruit and vegetables	2	2	3	3	3	3	4	3	133	156	127
	Animal products	9	12	15	17	16	18	17	16	134	132	119
	Other food	9	11	21	22	21	22	23	22	117	124	115
	Total food	50	62	72	75	73	75	76	73	118	121	116
Low- and middle-income countries	Cereals and products	25	33	34	34	35	33	33	35	102	102	107
	Fruit and vegetables	2	6	7	7	7	7	7	7	110	117	115
	Animal products	8	25	27	26	28	26	25	25	105	100	103
	Other food	4	7	14	14	14	15	16	15	120	123	120
	Total food	48	76	82	81	84	81	80	83	106	106	109
Low- and middle-income countries (excluding China)	Cereals and products	29	32	34	34	35	34	34	35	104	105	108
	Fruit and vegetables	2	4	4	4	4	4	5	4	119	130	122
	Animal products	10	21	23	23	24	23	22	22	108	105	106
	Other food	4	7	14	14	14	15	16	15	121	125	121
	Total food	53	70	76	76	77	76	76	77	109	110	110
World	Cereals and products	26	32	33	33	34	33	32	34	102	102	107
	Fruit and vegetables	3	6	7	7	7	6	7	7	110	115	115
	Animal products	17	30	32	30	33	30	28	31	101	92	101
	Other food	6	8	14	14	14	15	15	15	118	119	118
	Total food	58	80	85	84	87	84	82	86	105	102	107

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Table S 2.5 Balances of gross agricultural commodities, including fish

REGIONS	BALANCE ITEMS	million USD, 2012 exchange rates							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	Production	1 168	1 384	1 217	1 497	1 489	1 237	1 570	127	106	134
	Food	839	925	820	954	961	787	1 008	115	94	120
	Feed	142	160	123	178	161	113	153	113	80	108
	Other uses	229	321	298	329	350	317	365	153	138	159
	Net trade	-42	-21	-24	36	17	21	44	-	-	-
	Self-sufficiency ratio	0.97	0.99	0.98	1.02	1.01	1.02	1.03	105	105	107
East Asia and Pacific	Production	1 773	2 276	2 199	2 359	2 421	2 367	2 511	137	133	142
	Food	1 282	1 603	1 551	1 645	1 593	1 531	1 649	124	119	129
	Feed	166	248	205	289	263	220	266	158	132	160
	Other uses	311	388	342	388	425	374	428	136	120	138
	Net trade	13	36	102	37	140	241	168	1042	1796	1250
	Self-sufficiency ratio	1.01	1.02	1.05	1.02	1.06	1.11	1.07	105	110	106
China	Production	1 281	1 661	1 596	1 744	1 732	1 679	1 828	135	131	143
	Food	1 003	1 225	1 167	1 256	1 172	1 100	1 218	117	110	121
	Feed	137	194	156	228	189	147	188	138	107	138
	Other uses	201	238	199	238	254	208	256	127	103	127
	Net trade	-60	4	73	22	117	224	166	-	-	-
	Self-sufficiency ratio	0.96	1.00	1.05	1.01	1.07	1.15	1.10	112	121	115
East Asia and Pacific (excluding China)	Production	492	615	603	615	688	688	683	140	140	139
	Food	279	378	383	389	421	431	431	151	155	154
	Feed	30	54	49	61	74	73	78	250	248	264
	Other uses	111	150	142	150	170	167	172	154	151	156
	Net trade	73	32	28	15	23	17	2	31	23	2
	Self-sufficiency ratio	1.17	1.06	1.05	1.02	1.03	1.03	1.00	88	87	85
South Asia	Production	564	776	717	744	893	820	856	158	145	152
	Food	426	595	600	608	686	709	706	161	166	166
	Feed	11	17	15	17	22	23	20	197	210	180
	Other uses	125	159	143	163	186	171	194	149	136	155
	Net trade	2	5	-40	-44	-1	-83	-63	-	-	-
	Self-sufficiency ratio	1.00	1.01	0.95	0.94	1.00	0.91	0.93	100	91	93
Europe and Central Asia	Production	341	482	449	512	573	532	592	168	156	173
	Food	227	255	248	263	253	246	264	111	108	116
	Feed	43	59	49	67	70	59	72	163	138	167
	Other uses	75	92	85	96	104	95	111	138	126	147
	Net trade	-4	77	68	85	146	132	146	-	-	-
	Self-sufficiency ratio	0.99	1.19	1.18	1.20	1.34	1.33	1.33	136	135	134

Table S 2.5 Balances of gross agricultural commodities, including fish (continued)

REGIONS	BALANCE ITEMS	million USD, 2012 exchange rates							index, 2012 = 100		
		2012	2030			2050			2050		
		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	Production	566	726	695	758	842	799	846	149	141	149
	Food	303	381	372	391	419	409	419	138	135	138
	Feed	33	47	39	57	58	52	73	174	157	220
	Other uses	140	176	166	180	196	189	201	140	135	143
	Net trade	90	122	118	131	169	149	152	188	167	170
	Self-sufficiency ratio	1.19	1.20	1.20	1.21	1.25	1.23	1.22	105	103	103
Near East and North Africa	Production	154	195	182	190	223	204	215	144	133	139
	Food	151	219	209	229	273	260	286	181	172	190
	Feed	12	15	13	15	17	16	17	147	134	139
	Other uses	23.1	34.1	27.9	34.7	41	32	42	176	139	183
	Net trade	-32	-73	-68	-88	-109	-103	-130	342	325	411
	Self-sufficiency ratio	0.83	0.73	0.73	0.68	0.67	0.66	0.62	81	80	75
Sub-Saharan Africa	Production	321	527	523	537	782	827	751	244	258	234
	Food	274	501	527	507	831	859	775	304	314	283
	Feed	31	79	71	95	183	211	168	591	683	544
	Other uses	46	94	80	92	131	114	123	283	246	267
	Net trade	-30	-147	-154	-157	-362	-357	-316	1211	1193	1056
	Self-sufficiency ratio	0.91	0.78	0.77	0.77	0.68	0.70	0.70	75	76	77
Low- and middle-income countries	Production	3 719	4 983	4 765	5 100	5 733	5 549	5 770	154	149	155
	Food	2 663	3 554	3 507	3 642	4 055	4 013	4 099	152	151	154
	Feed	296	464	391	540	613	582	616	207	196	208
	Other uses	721	943	843	953	1 082	975	1 099	150	135	152
	Net trade	39	21	24	-36	-17	-21	-44	-	-	-
	Self-sufficiency ratio	1.01	1.00	1.01	0.99	1.00	1.00	0.99	99	99	98
Low- and middle-income countries (excluding China)	Production	2 439	3 322	3 169	3 356	4 001	3 871	3 942	164	159	162
	Food	1 660	2 329	2 339	2 387	2 884	2 913	2 881	174	176	174
	Feed	160	271	236	312	424	435	428	265	272	268
	Other uses	521	705	643	716	828	767	843	159	147	162
	Net trade	98	17	-49	-58	-135	-245	-211	-	-	-
	Self-sufficiency ratio	1.04	1.01	0.98	0.98	0.97	0.94	0.95	93	90	91
World	Production	4 888	6 366	5 982	6 597	7 222	6 786	7 340	148	139	150
	Food	3 501	4 479	4 327	4 596	5 016	4 800	5 107	143	137	146
	Feed	438	624	514	718	774	695	769	177	158	175
	Other uses	948	1 264	1 140	1 283	1 432	1 291	1 464	151	136	154
	Net trade	0	0	0	0	0	0	0	-	-	-
	Self-sufficiency ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100	100	100

Notes: Net trade is calculated as domestic production – aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Other uses" refers to the sum of non-food domestic uses, including: seed, food losses, non-food processing, biofuels and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the GAPs model.

Table S 2.6 Harvested area by region: total and top-five crops by production system

ALL SYSTEMS		million hectares							index, 2012 = 100		
		2012	2030			2050			2050		
REGIONS	CROPS	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	All	242.2	267.9	287.0	293.9	268.0	289.6	300.9	111	120	124
	Vegetables	4.7	5.6	6.0	6.0	5.7	6.2	6.5	120	132	137
	Maize	43.3	50.1	52.6	57.6	51.3	54.4	59.0	118	126	136
	Fruits	7.2	8.3	8.9	8.7	8.3	9.2	9.2	116	128	128
	Wheat	66.0	69.1	75.7	76.4	67.2	73.9	76.4	102	112	116
	Soybeans	34.3	39.6	42.3	42.4	39.6	43.1	43.3	115	126	126
East Asia and Pacific	All	298.9	322.6	336.6	330.3	313.3	333.7	329.7	105	112	110
	Vegetables	28.3	28.9	31.9	29.8	25.5	29.7	27.8	90	105	99
	Rice	80.3	86.4	88.4	87.2	85.9	88.3	87.7	107	110	109
	Fruits	13.5	13.5	14.9	14.0	11.8	13.7	12.8	87	101	95
	Maize	45.2	49.3	49.3	50.6	47.0	47.4	48.5	104	105	107
	Sugar cane	4.5	5.3	5.3	5.2	5.6	5.6	5.6	123	124	124
China	All	175.6	190.8	197.9	195.4	180.6	191.7	190.5	103	109	108
	Vegetables	24.2	24.6	27.2	25.4	21.2	25.1	23.3	88	104	96
	Fruits	10.0	9.9	11.0	10.2	8.3	9.9	9.0	83	99	90
	Rice	30.2	35.1	33.7	34.9	35.3	32.8	35.8	117	109	118
	Maize	35.0	38.7	38.6	39.6	36.7	36.9	37.8	105	105	108
	Wheat	24.2	26.3	27.0	27.1	25.4	26.0	26.6	105	107	110
East Asia and Pacific (excluding China)	All	123.3	131.8	138.7	134.9	132.7	142.1	139.2	108	115	113
	Rice	50.1	51.4	54.7	52.3	50.5	55.5	51.9	101	111	104
	Palm oil	11.9	14.7	15.7	15.2	15.7	16.9	17.4	132	142	147
	Vegetables	4.1	4.3	4.7	4.4	4.3	4.7	4.5	104	114	111
	Natural rubber	7.7	8.8	9.4	8.5	9.4	10.6	9.1	123	137	119
	Sugar cane	2.7	3.0	3.0	2.9	3.0	3.1	2.8	110	114	103
South Asia	All	241.8	260.6	263.0	263.9	262.0	260.9	269.1	108	108	111
	Rice	60.7	61.7	63.3	63.1	60.6	61.0	63.0	100	101	104
	Wheat	41.9	45.4	42.9	44.4	45.3	40.1	43.9	108	96	105
	Vegetables	9.4	11.7	11.9	11.7	13.1	13.2	13.4	138	140	142
	Fruits	6.2	7.7	7.5	7.5	8.6	8.2	8.5	140	132	139
	Cotton	14.9	15.6	15.4	15.5	15.5	15.0	15.5	104	101	104
Europe and Central Asia	All	146.4	156.5	168.4	165.9	157.4	172.0	170.4	108	117	116
	Vegetables	4.1	4.6	5.1	4.8	4.6	5.3	5.1	113	130	125
	Wheat	59.5	61.8	67.9	66.3	61.6	68.6	67.5	103	115	113
	Potatoes	5.0	5.6	5.9	5.9	5.9	6.2	6.3	117	124	126
	Fruits	3.9	4.4	4.8	4.5	4.4	4.9	4.7	111	124	120
	Maize	12.3	13.9	14.5	14.7	14.3	15.3	15.3	117	125	125

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

ALL SYSTEMS		million hectares							index, 2012 = 100		
		2012	2030			2050			2050		
REGIONS	CROPS	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	All	150.7	169.7	179.4	179.0	180.7	193.6	194.8	120	128	129
	Soybeans	48.7	52.4	54.7	56.1	52.7	55.0	58.1	108	113	119
	Sugar cane	13.0	14.5	14.8	14.0	14.8	15.8	14.0	114	121	108
	Maize	31.1	37.2	38.9	39.9	42.4	45.0	44.9	136	145	144
	Fruits	2.9	3.2	3.5	3.3	3.3	3.7	3.5	111	125	120
	Vegetables	2.6	2.9	3.2	2.9	3.0	3.3	3.1	114	128	120
Near East and North Africa	All	44.4	45.5	45.7	46.5	43.3	42.2	45.3	97	95	102
	Vegetables	2.9	3.1	3.0	3.1	2.9	2.7	3.0	98	93	102
	Fruits	2.6	2.7	2.9	2.8	2.6	2.8	2.8	101	108	109
	Wheat	16.8	16.9	16.8	17.3	15.9	15.1	16.5	95	90	99
	Other crops	1.2	1.2	1.2	1.2	1.1	1.1	1.1	97	93	97
	Potatoes	0.7	0.7	0.7	0.7	0.7	0.6	0.7	100	82	100
Sub-Saharan Africa	All	219.7	292.7	312.4	309.6	357.3	386.9	386.3	163	176	176
	Cassava	16.0	18.8	19.3	20.2	21.2	21.4	23.2	133	134	145
	Yams	10.3	11.9	12.2	12.6	13.2	13.3	14.1	128	129	137
	Vegetables	6.4	10.1	11.7	10.5	13.5	16.4	15.1	210	256	235
	Maize	35.3	51.8	53.5	54.7	66.7	69.5	70.0	189	197	198
	Fruits	2.5	3.9	4.3	4.0	5.1	5.8	5.5	203	229	219
Low- and middle-income countries	All	1 102.1	1 247.6	1 305.5	1 295.2	1 314.1	1 389.2	1 395.7	119	126	127
	Vegetables	53.7	61.2	66.8	62.8	62.5	70.8	67.5	116	132	126
	Rice	158.5	170.0	176.0	173.1	172.1	179.1	178.2	109	113	112
	Fruits	31.6	35.4	37.9	36.1	35.8	39.0	37.9	113	123	120
	Maize	136.9	166.2	170.1	174.4	184.1	190.6	192.8	134	139	141
	Wheat	152.9	163.5	169.1	169.1	163.6	167.4	171.3	107	109	112
Low- and middle-income countries (excluding China)	All	926.5	1 056.8	1 107.5	1 099.9	1 133.5	1 197.6	1 205.3	122	129	130
	Rice	128.2	135.0	142.4	138.2	136.8	146.2	142.4	107	114	111
	Vegetables	29.6	36.7	39.6	37.4	41.3	45.7	44.2	140	155	150
	Fruits	21.6	25.5	26.9	25.9	27.5	29.0	28.9	127	134	134
	Maize	101.9	127.5	131.5	134.8	147.4	153.7	155.0	145	151	152
	Wheat	128.8	137.2	142.1	142.0	138.2	141.5	144.7	107	110	112
World	All	1 344.2	1 515.5	1 592.4	1 589.2	1 582.1	1 678.9	1 696.6	118	125	126
	Vegetables	58.4	66.8	72.8	68.8	68.2	77.0	74.0	117	132	127
	Rice	163.0	175.1	181.1	178.9	177.3	184.0	184.5	109	113	113
	Fruits	38.8	43.7	46.8	44.8	44.1	48.2	47.1	114	124	121
	Maize	180.2	216.3	222.7	232.1	235.4	245.0	251.7	131	136	140
	Wheat	218.9	232.6	244.9	245.5	230.8	241.3	247.7	105	110	113

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

OF WHICH: IRRIGATED		million hectares							index, 2012 = 100		
		2012	2030			2050			2050		
REGIONS	CROPS	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	All	47.6	58.8	56.1	67.3	63.8	58.2	76.0	134	122	160
	Vegetables	1.8	2.3	2.2	2.6	2.5	2.3	3.0	143	132	173
	Maize	13.7	17.5	16.8	20.7	19.4	18.0	23.6	142	132	172
	Fruits	1.9	2.5	2.3	2.8	2.8	2.4	3.2	143	124	166
	Wheat	14.2	17.0	16.3	19.3	18.0	16.4	21.3	127	116	150
	Soybeans	0.1	0.1	0.1	0.1	0.1	0.1	0.1	116	104	136
East Asia and Pacific	All	141.7	168.0	165.2	164.9	174.6	171.4	172.8	123	121	122
	Vegetables	10.7	13.0	12.7	12.6	13.2	12.8	13.2	123	119	123
	Rice	54.4	61.9	62.4	60.7	62.9	64.4	62.0	116	118	114
	Fruits	3.5	4.2	4.0	4.1	4.2	4.0	4.2	123	117	121
	Maize	24.7	30.0	28.3	29.6	30.7	28.4	30.4	124	115	123
	Sugar cane	3.5	4.3	4.3	4.2	4.7	4.7	4.6	133	132	132
China	All	102.8	124.2	118.5	122.8	129.0	119.5	129.6	126	116	126
	Vegetables	9.7	11.8	11.4	11.5	12.0	11.3	12.1	123	117	124
	Fruits	3.1	3.8	3.6	3.7	3.8	3.6	3.8	123	115	123
	Rice	30.2	35.1	33.7	34.9	35.3	32.8	35.8	117	109	118
	Maize	23.4	28.5	26.7	28.2	29.1	26.5	28.9	124	113	123
	Wheat	18.3	21.5	20.9	21.5	21.9	20.7	22.3	119	113	122
East Asia and Pacific (excluding China)	All	39.0	43.9	46.7	42.1	45.5	51.9	43.2	117	133	111
	Rice	24.2	26.9	28.7	25.8	27.6	31.6	26.2	114	131	109
	Vegetables	1.0	1.2	1.3	1.1	1.2	1.5	1.2	120	139	112
	Natural rubber	7.7	8.8	9.4	8.5	9.4	10.6	9.1	123	137	119
	Sugar cane	1.9	2.1	2.2	2.0	2.2	2.3	2.0	117	124	106
South Asia	All	137.7	153.5	143.1	147.9	158.2	137.9	150.5	115	100	109
	Rice	44.7	47.6	46.8	46.9	48.0	45.6	47.2	107	102	106
	Wheat	34.6	38.1	35.1	36.8	38.6	32.6	36.7	112	94	106
	Vegetables	4.8	6.2	5.6	5.8	7.2	6.0	6.6	151	126	138
	Fruits	3.7	4.8	4.2	4.4	5.5	4.5	5.0	150	122	136
	Cotton	10.1	11.0	10.1	10.6	11.2	9.5	10.6	110	94	105
Europe and Central Asia	All	23.6	27.3	27.9	27.3	27.5	29.2	28.2	116	124	119
	Vegetables	1.2	1.4	1.5	1.4	1.4	1.5	1.5	121	126	125
	Wheat	8.5	9.7	9.9	9.7	9.7	10.1	9.9	114	120	117
	Potatoes	1.0	1.1	1.2	1.1	1.2	1.3	1.2	124	133	128
	Fruits	0.9	1.0	1.0	1.0	1.0	1.0	1.0	115	112	115
	Maize	2.6	3.1	3.2	3.2	3.1	3.6	3.4	119	135	129

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

OF WHICH: IRRIGATED		million hectares							index, 2012 = 100		
		2012	2030			2050			2050		
REGIONS	CROPS	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	All	25.5	32.6	34.4	31.2	37.2	41.9	35.3	146	165	139
	Soybeans	0.2	0.2	0.2	0.2	0.2	0.2	0.2	131	122	119
	Sugar cane	6.5	7.9	8.3	7.4	8.5	9.5	7.7	130	147	118
	Maize	4.6	6.3	6.6	6.1	7.7	8.5	7.3	168	187	159
	Fruits	0.7	0.9	0.9	0.8	1.0	1.1	0.9	134	147	127
	Vegetables	1.1	1.4	1.4	1.3	1.5	1.7	1.4	134	150	129
Near East and North Africa	All	20.9	21.6	19.9	21.4	19.8	16.5	20.0	95	79	96
	Vegetables	2.0	2.1	2.0	2.0	1.9	1.7	1.9	97	84	99
	Fruits	0.8	0.8	0.8	0.8	0.8	0.7	0.8	96	83	98
	Wheat	9.1	9.3	8.6	9.3	8.5	7.1	8.6	94	78	94
	Other crops	0.3	0.3	0.3	0.3	0.2	0.2	0.3	89	74	91
	Potatoes	0.7	0.7	0.6	0.7	0.7	0.5	0.6	99	80	99
Sub-Saharan Africa	All	9.3	13.2	14.7	12.8	16.8	20.6	16.3	182	222	176
	Cassava	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	126	165	114
	Yams	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	123	149	113
	Vegetables	0.7	1.1	1.3	1.1	1.6	2.2	1.6	247	334	240
	Maize	1.0	1.7	1.6	1.6	2.3	2.2	2.2	225	214	214
	Fruits	0.1	0.2	0.2	0.1	0.2	0.2	0.2	244	283	229
Low- and middle-income countries	All	358.7	416.3	405.3	405.5	434.0	417.4	423.0	121	116	118
	Vegetables	20.4	25.2	24.4	24.3	26.9	25.8	26.3	131	126	128
	Rice	107.4	120.5	121.4	118.4	124.0	126.0	122.2	115	117	114
	Fruits	9.6	11.8	11.1	11.3	12.7	11.5	12.1	132	119	126
	Maize	39.4	48.2	46.2	47.5	51.0	48.6	50.0	129	123	127
	Wheat	72.8	81.8	77.9	80.5	82.5	75.1	81.4	113	103	112
Low- and middle-income countries (excluding China)	All	255.9	292.1	286.8	282.7	305.0	297.9	293.4	119	116	115
	Rice	77.2	85.4	87.7	83.5	88.7	93.2	86.5	115	121	112
	Vegetables	10.7	13.4	13.1	12.8	14.9	14.5	14.2	139	135	132
	Fruits	6.5	8.1	7.5	7.6	8.9	7.9	8.3	136	121	128
	Maize	15.9	19.7	19.5	19.3	21.8	22.1	21.1	137	138	132
	Wheat	54.5	60.3	57.0	58.9	60.7	54.4	59.1	111	100	108
World	All	406.3	475.1	461.4	472.9	497.8	475.6	499.0	123	117	123
	Vegetables	22.2	27.4	26.6	26.9	29.4	28.1	29.3	132	127	132
	Rice	111.7	125.3	126.2	124.0	129.0	130.7	128.3	116	117	115
	Fruits	11.6	14.3	13.4	14.1	15.5	13.9	15.3	134	120	133
	Maize	53.1	65.7	62.9	68.2	70.4	66.6	73.6	133	125	139
	Wheat	87.0	98.7	94.2	99.8	100.5	91.5	102.7	115	105	118

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

OF WHICH: RAINFED		million hectares							index, 2012 = 100		
		2012	2030			2050			2050		
REGIONS	CROPS	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	All	194.6	209.0	230.9	226.6	204.2	231.5	224.9	105	119	116
	Vegetables	3.0	3.3	3.8	3.4	3.2	3.9	3.4	107	131	115
	Maize	29.6	32.6	35.8	36.9	31.9	36.4	35.4	108	123	119
	Fruits	5.2	5.8	6.6	6.0	5.6	6.8	6.0	106	130	115
	Wheat	51.8	52.1	59.5	57.1	49.2	57.4	55.1	95	111	106
	Soybeans	34.2	39.5	42.2	42.3	39.5	43.1	43.2	115	126	126
East Asia and Pacific	All	157.2	154.6	171.4	165.4	138.7	162.4	156.9	88	103	100
	Vegetables	17.5	15.9	19.2	17.2	12.3	17.0	14.6	70	97	83
	Rice	26.0	24.5	26.0	26.4	22.9	23.9	25.7	88	92	99
	Fruits	10.1	9.4	10.9	9.9	7.6	9.7	8.6	75	96	86
	Maize	20.4	19.3	21.1	21.0	16.3	19.0	18.1	80	93	89
	Sugar cane	1.0	1.0	1.0	1.0	0.9	0.9	1.0	91	94	97
China	All	72.9	66.7	79.4	72.5	51.5	72.1	60.9	71	99	84
	Vegetables	14.5	12.8	15.9	13.9	9.3	13.8	11.2	64	95	78
	Fruits	6.9	6.1	7.4	6.5	4.4	6.4	5.2	64	92	76
	Maize	11.6	10.3	12.0	11.4	7.6	10.4	8.8	65	90	76
	Wheat	5.8	4.8	6.1	5.5	3.5	5.2	4.3	60	90	74
East Asia and Pacific (excluding China)	All	84.3	87.9	91.9	92.8	87.2	90.2	96.0	103	107	114
	Rice	26.0	24.5	26.0	26.4	22.9	23.9	25.7	88	92	99
	Palm oil	11.9	14.7	15.7	15.2	15.7	16.9	17.4	132	142	147
	Vegetables	3.1	3.1	3.4	3.3	3.0	3.2	3.4	98	106	111
	Sugar cane	0.9	0.9	0.9	0.9	0.8	0.8	0.8	93	91	95
South Asia	All	104.1	107.1	119.9	116.1	103.9	123.0	118.6	100	118	114
	Rice	16.0	14.1	16.6	16.2	12.7	15.4	15.7	79	96	98
	Wheat	7.3	7.3	7.8	7.6	6.7	7.5	7.2	92	103	98
	Vegetables	4.7	5.5	6.4	5.9	5.8	7.2	6.8	125	155	146
	Fruits	2.5	2.9	3.3	3.1	3.1	3.7	3.5	125	148	142
	Cotton	4.7	4.6	5.3	4.9	4.3	5.5	4.9	91	116	103
Europe and Central Asia	All	122.8	129.2	140.5	138.6	129.9	142.8	142.2	106	116	116
	Vegetables	2.9	3.2	3.6	3.4	3.2	3.8	3.6	110	132	126
	Wheat	51.1	52.1	58.0	56.6	51.9	58.4	57.6	102	114	113
	Potatoes	4.1	4.5	4.7	4.8	4.7	4.9	5.1	116	122	126
	Fruits	3.1	3.4	3.8	3.5	3.4	3.9	3.7	110	128	122
	Maize	9.6	10.8	11.2	11.6	11.1	11.7	11.9	116	122	123

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

OF WHICH: RAINFED		million hectares							index, 2012 = 100		
		2012	2030			2050			2050		
REGIONS	CROPS	BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
Latin America and Caribbean	All	125.3	137.1	145.0	147.8	143.5	151.7	159.5	115	121	127
	Soybeans	48.5	52.2	54.5	56.0	52.5	54.8	57.9	108	113	119
	Sugar cane	6.5	6.6	6.5	6.6	6.3	6.2	6.4	97	95	97
	Maize	26.5	30.9	32.4	33.8	34.7	36.5	37.7	131	137	142
	Fruits	2.2	2.3	2.6	2.4	2.3	2.6	2.6	104	118	117
	Vegetables	1.5	1.6	1.7	1.6	1.5	1.7	1.7	100	111	113
Near East and North Africa	All	23.5	23.9	25.8	25.1	23.5	25.6	25.4	100	109	108
	Vegetables	1.0	1.0	1.1	1.0	1.0	1.1	1.0	101	111	108
	Fruits	1.8	1.9	2.1	1.9	1.8	2.1	2.0	104	119	113
	Wheat	7.7	7.6	8.2	8.0	7.4	8.1	7.9	96	105	104
	Other crops	0.9	0.9	0.9	0.9	0.9	0.9	0.9	99	99	99
	Potatoes	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	105	112	115
Sub-Saharan Africa	All	210.5	279.4	297.6	296.8	340.4	366.3	370.1	162	174	176
	Cassava	15.9	18.8	19.3	20.1	21.2	21.4	23.2	133	134	145
	Yams	10.3	11.9	12.2	12.6	13.1	13.3	14.1	128	129	137
	Vegetables	5.8	8.9	10.3	9.5	11.9	14.2	13.5	206	247	234
	Maize	34.3	50.1	51.9	53.1	64.4	67.3	67.8	188	196	198
	Fruits	2.4	3.7	4.1	3.9	4.9	5.5	5.3	201	227	219
Low- and middle-income countries	All	743.4	831.3	900.2	889.7	880.0	971.8	972.7	118	131	131
	Vegetables	33.3	36.0	42.4	38.5	35.7	45.0	41.2	107	135	124
	Rice	51.1	49.5	54.6	54.7	48.1	53.1	56.0	94	104	110
	Fruits	22.0	23.6	26.7	24.8	23.0	27.5	25.8	105	125	117
	Maize	97.5	118.0	124.0	126.9	133.1	142.0	142.8	137	146	146
	Wheat	80.1	81.8	91.2	88.6	81.1	92.3	90.0	101	115	112
Low- and middle-income countries (excluding China)	All	670.5	764.6	820.8	817.2	828.5	899.6	911.8	124	134	136
	Rice	51.1	49.5	54.6	54.7	48.1	53.1	56.0	94	104	110
	Vegetables	18.8	23.2	26.5	24.6	26.4	31.2	30.0	140	166	159
	Fruits	15.1	17.5	19.4	18.3	18.6	21.2	20.6	123	140	136
	Maize	85.9	107.7	112.0	115.5	125.5	131.6	133.9	146	153	156
	Wheat	74.2	76.9	85.1	83.1	77.5	87.1	85.7	104	117	115
World	All	938.0	1 040.3	1 131.1	1 116.3	1 084.3	1 203.2	1 197.6	116	128	128
	Vegetables	36.2	39.3	46.1	41.9	38.8	48.9	44.6	107	135	123
	Rice	51.3	49.7	54.9	54.9	48.3	53.3	56.1	94	104	109
	Fruits	27.3	29.3	33.3	30.8	28.6	34.3	31.8	105	126	117
	Maize	127.1	150.6	159.8	163.9	165.0	178.4	178.1	130	140	140
	Wheat	131.9	133.9	150.7	145.7	130.3	149.8	145.1	99	114	110

Note: Crops are ranked according to their value expressed as physical output at the base year times base-year prices in USD. The selection of the top-five crops is based on their total harvested area, that is both under irrigated and rainfed production systems. The table also reports how much of the total harvested area was under irrigated and rainfed production systems respectively.

Source: FAO Global Perspectives Studies, based on simulations with the GAPs model.

Table S 2.7 Large ruminants, standing herd size and growth rates

a) Levels

REGIONS	million heads									index, 2012 = 100		
	1970	2002	2012	2030			2050			2050		
	HISTORICAL		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	277	266	256	255	234	264	250	206	236	98	80	92
East Asia and Pacific	119	178	204	233	216	249	254	225	247	125	110	121
– China	73	121	137	149	137	160	146	125	141	106	91	103
– East Asia and Pacific (excluding China)	46	57	67	84	79	90	108	100	106	162	150	158
South Asia	298	370	413	490	447	453	474	428	473	115	103	114
Europe and Central Asia	21	74	73	102	93	112	119	105	117	162	144	159
Latin America and Caribbean	207	357	391	481	453	503	546	479	540	140	123	138
Near East and North Africa	19	25	30	35	33	36	46	42	44	156	143	149
Sub-Saharan Africa	103	187	290	487	462	514	683	666	638	236	230	220
Low- and middle-income countries	766	1191	1401	1830	1704	1867	2122	1947	2060	151	139	147
– Low- and middle-income countries (excluding China)	693	1070	1264	1681	1567	1707	1976	1822	1918	156	144	152
World	1043	1457	1657	2085	1938	2131	2372	2153	2296	143	130	139

b) Growth rate

REGIONS	percent											
	1970–2012	1970–2002	2003–2012	2012–2030			2031–2050			2012–2050		
	HISTORICAL			BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	–0.2	–0.1	–0.4	0.0	–0.5	0.2	–0.1	–0.6	–0.6	–0.1	–0.6	–0.2
East Asia and Pacific	1.3	1.3	1.4	0.7	0.3	1.1	0.4	0.2	0.0	0.6	0.3	0.5
– China	1.5	1.6	1.3	0.5	0.0	0.8	–0.1	–0.4	–0.6	0.2	–0.2	0.1
– East Asia and Pacific (excluding China)	0.9	0.7	1.6	1.3	0.9	1.6	1.3	1.2	0.8	1.3	1.1	1.2
South Asia	0.8	0.7	1.1	1.0	0.4	0.5	–0.2	–0.2	0.2	0.4	0.1	0.4
Europe and Central Asia	3.0	4.0	–0.1	1.9	1.3	2.4	0.8	0.6	0.2	1.3	1.0	1.2
Latin America and Caribbean	1.5	1.7	0.9	1.2	0.8	1.4	0.6	0.3	0.4	0.9	0.5	0.9
Near East and North Africa	1.1	0.9	1.8	1.0	0.7	1.1	1.4	1.2	1.0	1.2	0.9	1.1
Sub-Saharan Africa	2.5	1.9	4.5	2.9	2.6	3.2	1.7	1.8	1.1	2.3	2.2	2.1
Low- and middle-income countries	1.4	1.4	1.6	1.5	1.1	1.6	0.7	0.7	0.5	1.1	0.9	1.0
– Low- and middle-income countries (excluding China)	1.4	1.4	1.7	1.6	1.2	1.7	0.8	0.8	0.6	1.2	1.0	1.1
World	1.1	1.1	1.3	1.3	0.9	1.4	0.6	0.5	0.4	0.9	0.7	0.9

Sources: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Table S 2.8 Small ruminants, standing herd size and growth rates**a) Levels**

REGIONS	million heads									index, 2012 = 100		
	1970	2002	2012	2030			2050			2050		
	HISTORICAL		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	398	312	255	270	235	298	297	244	291	116	95	114
East Asia and Pacific	170	353	450	505	449	559	513	441	508	114	98	113
– China	140	298	366	405	358	451	399	337	393	109	92	107
– East Asia and Pacific (excluding China)	29	55	83	100	92	108	114	104	115	137	125	138
South Asia	173	322	381	504	477	515	571	534	560	150	140	147
Europe and Central Asia	83	112	150	168	149	185	181	157	178	121	105	118
Latin America and Caribbean	125	96	100	123	105	140	137	115	134	137	115	135
Near East and North Africa	120	182	208	244	221	255	284	246	270	137	118	130
Sub-Saharan Africa	165	358	593	1048	954	1144	1485	1364	1423	250	230	240
Low- and middle-income countries	836	1422	1881	2591	2356	2798	3172	2856	3072	169	152	163
– Low- and middle-income countries (excluding China)	696	1124	1515	2186	1998	2347	2773	2518	2680	183	166	177
World	1234	1734	2136	2861	2591	3096	3469	3099	3363	162	145	157

b) Growth rate

REGIONS	percent											
	1970–2012	1970–2002	2003–2012	2012–2030			2031–2050			2012–2050		
	HISTORICAL			BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	–1.1	–0.8	–2.0	0.3	–0.5	0.9	0.5	0.2	–0.1	0.4	–0.1	0.3
East Asia and Pacific	2.3	2.3	2.5	0.6	0.0	1.2	0.1	–0.1	–0.5	0.3	0.0	0.3
– China	2.3	2.4	2.1	0.6	–0.1	1.2	–0.1	–0.3	–0.7	0.2	–0.2	0.2
– East Asia and Pacific (excluding China)	2.5	2.0	4.3	1.0	0.5	1.4	0.7	0.6	0.3	0.8	0.6	0.8
South Asia	1.9	2.0	1.7	1.6	1.3	1.7	0.6	0.6	0.4	1.1	0.9	1.0
Europe and Central Asia	1.4	0.9	3.0	0.6	0.0	1.2	0.4	0.2	–0.2	0.5	0.1	0.4
Latin America and Caribbean	–0.5	–0.8	0.4	1.2	0.3	1.9	0.6	0.4	–0.2	0.8	0.4	0.8
Near East and North Africa	1.3	1.3	1.4	0.9	0.3	1.1	0.8	0.5	0.3	0.8	0.4	0.7
Sub-Saharan Africa	3.1	2.4	5.2	3.2	2.7	3.7	1.8	1.8	1.1	2.4	2.2	2.3
Low- and middle-income countries	1.9	1.7	2.8	1.8	1.3	2.2	1.0	1.0	0.5	1.4	1.1	1.3
– Low- and middle-income countries (excluding China)	1.9	1.5	3.0	2.1	1.6	2.5	1.2	1.2	0.7	1.6	1.3	1.5
World	1.3	1.1	2.1	1.6	1.1	2.1	1.0	0.9	0.4	1.3	1.0	1.2

Sources: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Table S 2.9 Pigs, standing herd size and growth rates

a) Levels

REGIONS	million heads									index, 2012 = 100		
	1970	2002	2012	2030			2050			2050		
	HISTORICAL		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	190	264	256	273	246	285	290	249	289	113	97	113
East Asia and Pacific	205	454	546	626	571	652	628	552	629	115	101	115
– China	173	390	468	532	484	557	522	456	524	112	97	112
– East Asia and Pacific (excluding China)	32	64	78	94	87	96	105	97	105	134	124	134
South Asia	6	15	12	13	12	14	14	13	14	119	110	120
Europe and Central Asia	8	36	41	48	44	50	53	48	53	131	118	130
Latin America and Caribbean	61	69	84	107	97	111	122	108	122	145	128	145
Near East and North Africa	0	0	0	0	0	0	0	0	0	106	106	106
Sub-Saharan Africa	7	23	33	63	58	67	107	99	106	327	302	323
Low- and middle-income countries	288	597	716	857	783	895	924	821	925	129	115	129
– Low- and middle-income countries (excluding China)	115	206	248	325	299	338	402	365	401	162	147	162
World	477	860	972	1130	1029	1179	1214	1070	1213	125	110	125

b) Growth rate

REGIONS	percent											
	1970–2012	1970–2002	2003–2012	2012–2030			2031–2050			2012–2050		
	HISTORICAL			BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	0.7	1.0	–0.3	0.3	–0.2	0.6	0.3	0.1	0.1	0.3	–0.1	0.3
East Asia and Pacific	2.4	2.5	1.9	0.8	0.2	1.0	0.0	–0.2	–0.2	0.4	0.0	0.4
– China	2.4	2.6	1.8	0.7	0.2	1.0	–0.1	–0.3	–0.3	0.3	–0.1	0.3
– East Asia and Pacific (excluding China)	2.1	2.1	2.1	1.0	0.6	1.1	0.6	0.5	0.5	0.8	0.6	0.8
South Asia	1.4	2.6	–2.3	0.6	0.1	0.9	0.3	0.4	0.1	0.5	0.2	0.5
Europe and Central Asia	3.9	4.8	1.2	0.9	0.4	1.2	0.5	0.4	0.3	0.7	0.4	0.7
Latin America and Caribbean	0.8	0.4	2.0	1.3	0.8	1.6	0.7	0.5	0.5	1.0	0.6	1.0
Near East and North Africa	–2.5	–1.3	–6.3	0.3	0.3	0.2	0.1	0.0	0.1	0.2	0.1	0.2
Sub-Saharan Africa	3.7	3.7	3.7	3.7	3.2	4.0	2.7	2.7	2.3	3.2	3.0	3.1
Low- and middle-income countries	2.2	2.3	1.8	1.0	0.5	1.2	0.4	0.2	0.2	0.7	0.4	0.7
– Low- and middle-income countries (excluding China)	1.8	1.8	1.8	1.5	1.0	1.7	1.1	1.0	0.9	1.3	1.0	1.3
World	1.7	1.9	1.2	0.8	0.3	1.1	0.4	0.2	0.1	0.6	0.3	0.6

Sources: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Table S 2.10 Poultry, standing herd size and growth rates**a) Levels**

REGIONS	million heads									index, 2012 = 100		
	1970	2002	2012	2030			2050			2050		
	HISTORICAL		BASE YEAR	BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	2	5	5	6	6	6	6	5	6	131	113	129
East Asia and Pacific	1	7	9	10	10	11	11	10	11	121	110	120
– China	1	5	6	6	6	7	6	6	6	108	96	106
– East Asia and Pacific (excluding China)	0	2	3	4	4	4	4	4	4	145	135	146
South Asia	0	1	1	2	2	2	2	2	2	164	156	162
Europe and Central Asia	0	1	1	2	1	2	2	2	2	140	128	139
Latin America and Caribbean	1	2	3	4	3	4	4	4	4	135	119	133
Near East and North Africa	0	1	2	2	2	2	2	2	2	131	119	127
Sub-Saharan Africa	0	1	1	4	3	4	7	7	7	584	553	574
Low- and middle-income countries	2	13	18	23	22	24	29	26	28	161	148	159
– Low- and middle-income countries (excluding China)	2	8	12	17	16	17	22	21	22	187	173	185
World	5	18	22	29	27	30	35	32	34	155	140	153

b) Growth rate

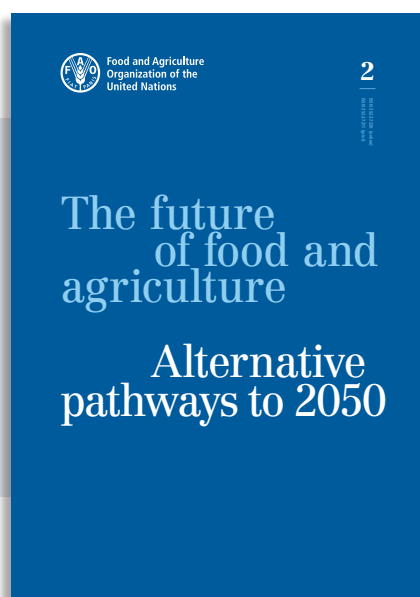
REGIONS	percent											
	1970–2012	1970–2002	2003–2012	2012–2030			2031–2050			2012–2050		
	HISTORICAL			BAU	TSS	SSS	BAU	TSS	SSS	BAU	TSS	SSS
High-income countries	1.6	2.0	0.3	1.3	0.8	1.5	0.1	–0.2	–0.1	0.7	0.3	0.7
East Asia and Pacific	5.0	5.9	2.2	0.8	0.4	1.0	0.3	0.1	0.1	0.5	0.2	0.5
– China	4.9	5.9	1.7	0.5	0.1	0.8	–0.1	–0.3	–0.4	0.2	–0.1	0.2
– East Asia and Pacific (excluding China)	5.3	5.9	3.2	1.2	1.0	1.3	0.8	0.6	0.7	1.0	0.8	1.0
South Asia	4.3	3.9	5.5	1.6	1.4	1.6	1.1	1.0	1.0	1.3	1.2	1.3
Europe and Central Asia	5.8	6.6	3.2	1.1	0.7	1.3	0.7	0.6	0.5	0.9	0.7	0.9
Latin America and Caribbean	4.3	4.6	3.1	1.0	0.5	1.3	0.6	0.4	0.3	0.8	0.5	0.8
Near East and North Africa	5.8	5.8	6.0	0.9	0.6	1.0	0.5	0.4	0.3	0.7	0.5	0.6
Sub-Saharan Africa	3.6	3.6	3.7	6.2	5.9	6.3	3.5	3.5	3.3	4.8	4.6	4.7
Low- and middle-income countries	4.8	5.3	3.1	1.5	1.1	1.6	1.1	0.9	0.9	1.3	1.0	1.2
– Low- and middle-income countries (excluding China)	4.7	5.0	3.8	1.9	1.6	2.0	1.4	1.4	1.3	1.7	1.5	1.6
World	3.7	4.1	2.4	1.5	1.1	1.6	0.9	0.7	0.7	1.2	0.9	1.1

Sources: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

THE FUTURE OF FOOD AND AGRICULTURE ALTERNATIVE PATHWAYS TO 2050

This report explores three different scenarios for the future of food and agriculture, based on alternative trends for key drivers, including income growth and distribution, population growth, technical progress and climate change. Building on the report *The future of food and agriculture – Trends and challenges*,

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