

Sawah Technology(Statistics 1-4) Asia's paddy production ranking No.1 to No.10 and below countries on rice production and related data during 1961 to 2016

T. Wakatsuki & N. Iwashima, Shimane Univ., 28th December 2018

1. Ranking trend based on paddy production during 2011 to 2015 mean
No. 1 China, No. 2 India, No. 3 Indonesia, No. 4 Bangladesh,
No. 5 Viet Nam, No. 6 Thailand, No. 7 Myanmar, No. 8 Philippines,
No. 9 Japan, No. 10 Pakistan, No. 11 Cambodia, No. 12 South
Korea, No. 13 Nepal, No. 14 Sri Lanka, No. 15 Lao PDR, No.16
North Korea, No. 17 Iran, No. 18 Malaysia, No. 19 Taiwan, No. 20
Turkey, No. 21 Afghanistan
2. Ranking trend based on paddy production during 1961 to 1965 mean
No. 1 China, No. 2 India, No. 3 Japan, No.4 Bangladesh, No.5 Indonesia,
No. 6 Thailand, No. 7 Viet Nam, No. 8 Myanmar, No. 9 South Korea,
No. 10 Philippines, No. 11 Taiwan, No. 12 Cambodia, No. 13 Nepal, No.
14 North Korea, No.15 Pakistan, No.16, Malaysia, No. 17 Sri Lanka,
No. 18 Iran, No. 19 Lao PDR, No. 20 Afghanistan, No. 21 Turkey

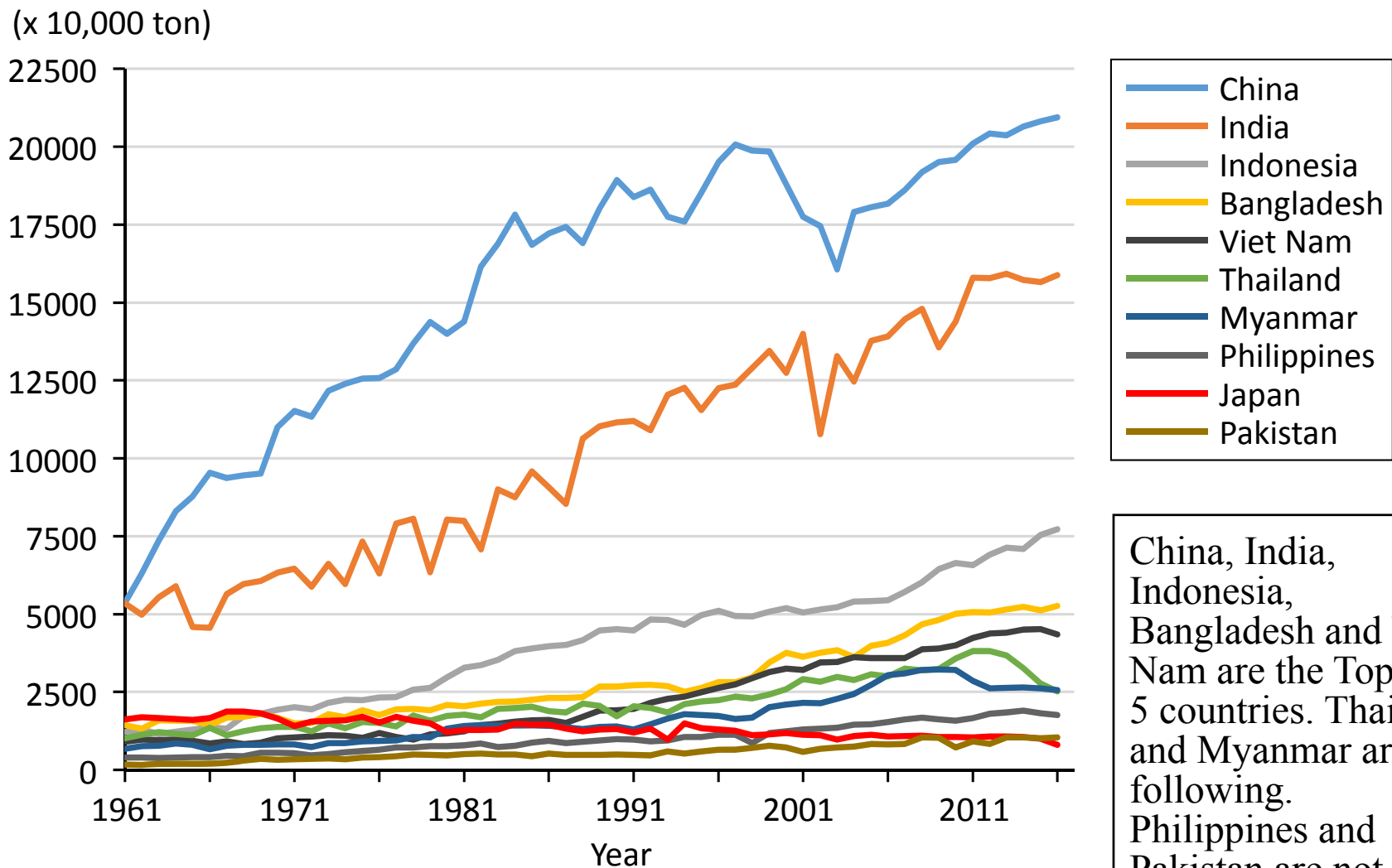
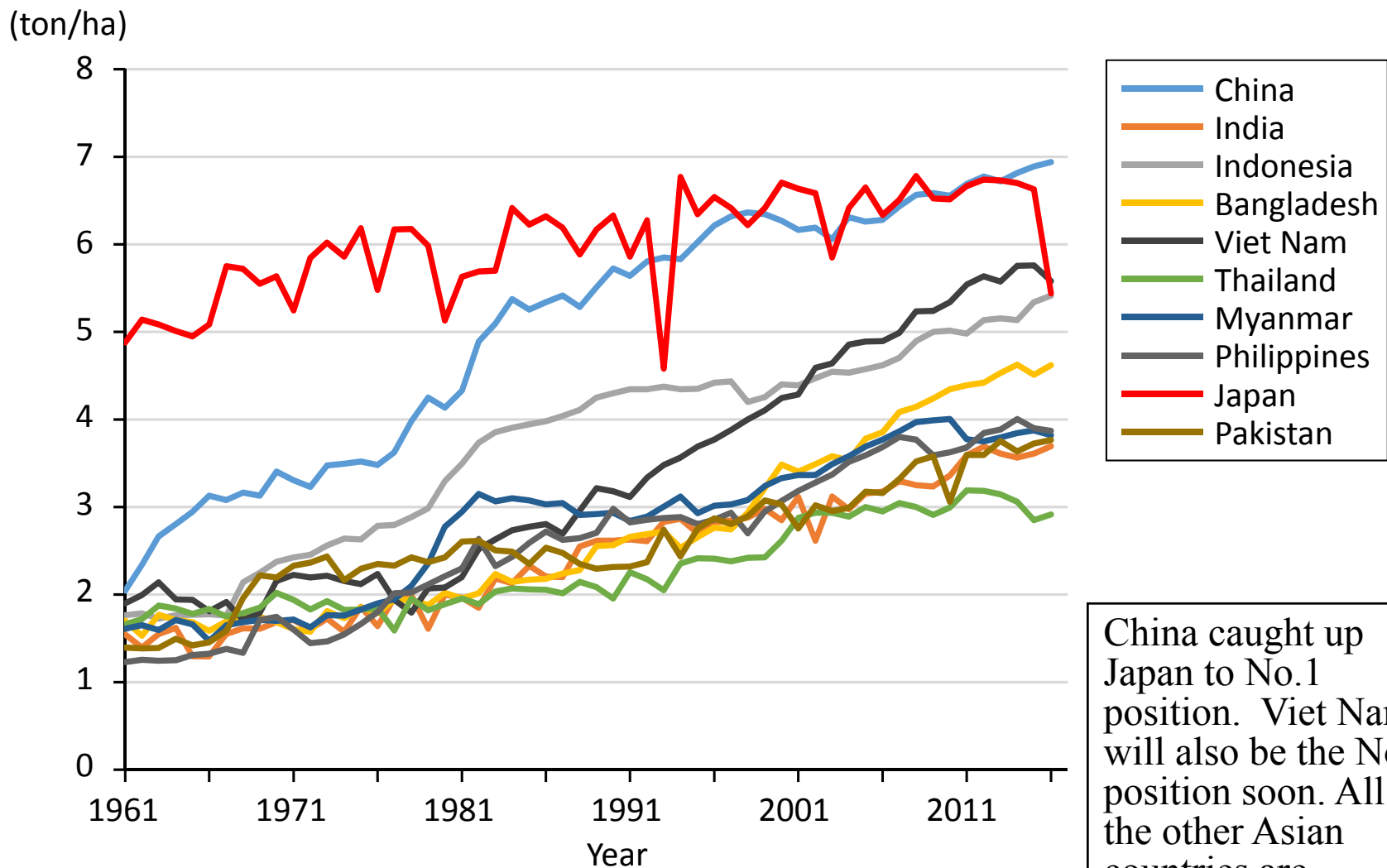


Fig. Paddy Production during 1961-2016.
(Asian Rank 1-10 rice production countries)

Data source: FAOSTAT 2018

China, India, Indonesia, Bangladesh and Viet Nam are the Top No. 5 countries. Thailand and Myanmar are following. Philippines and Pakistan are not clear expansion. Japan was once No.3, but now No.10



**Fig. Paddy Yield during 1961-2016
(Asian Rank 1-10 rice production countries)**

Data source: FAOSTAT 2018

China caught up Japan to No.1 position. Viet Nam will also be the No.1 position soon. All the other Asian countries are catching up these leading countries, too.

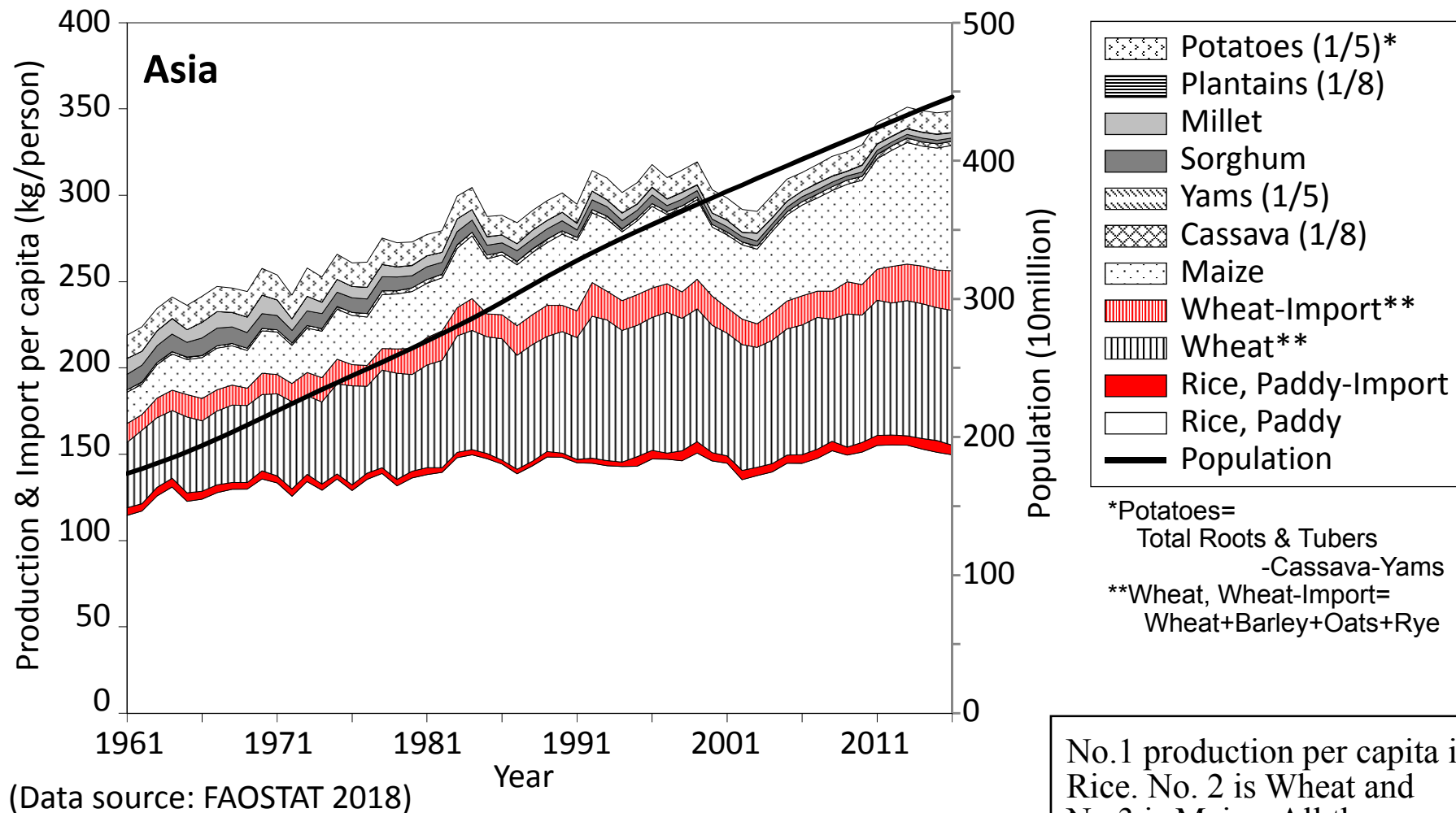
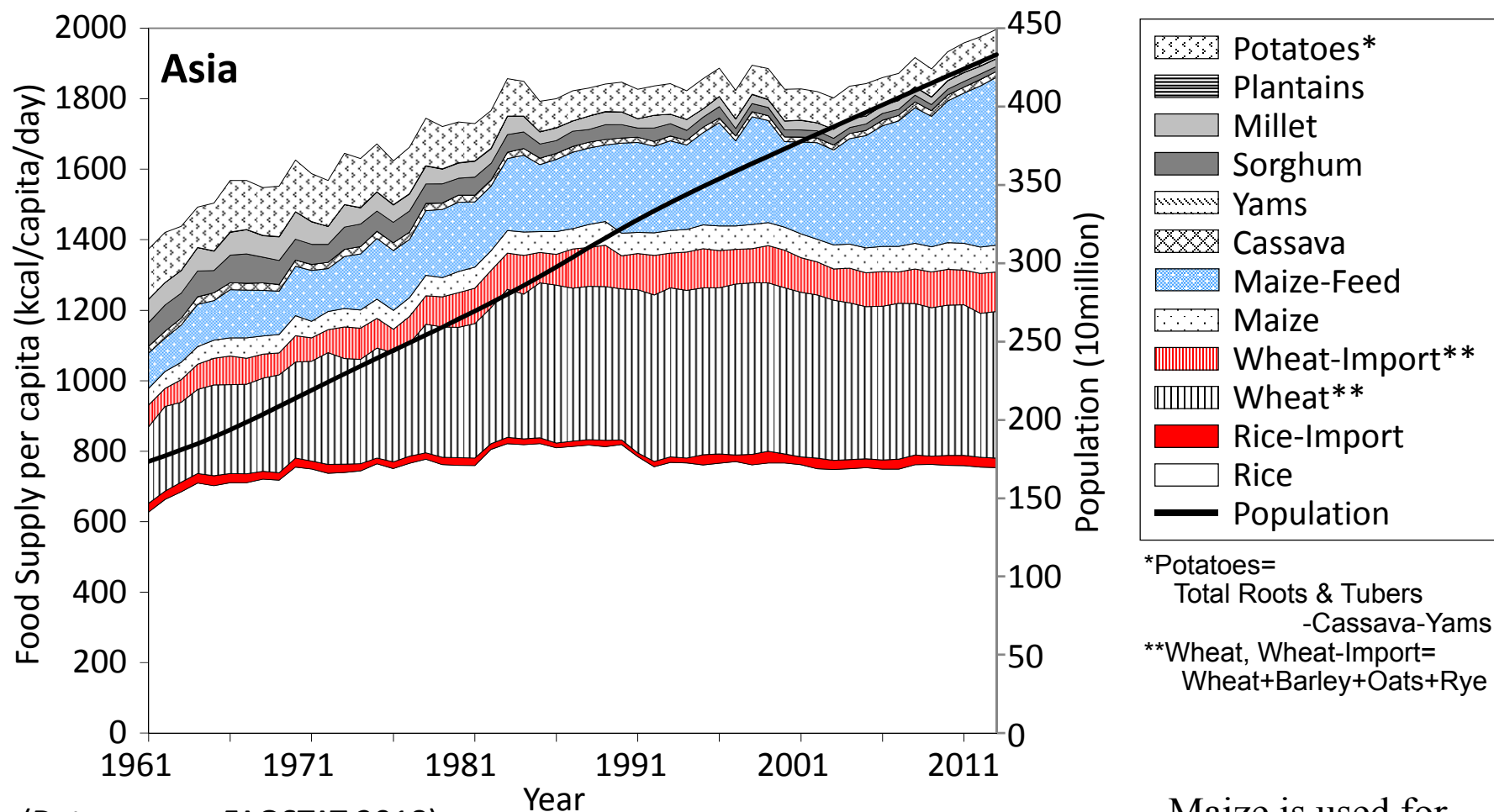


Fig. Per Capita various Food Production & Import (kg/person) in Asia during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

No.1 production per capita is Rice. No. 2 is Wheat and No.3 is Maize. All these three grains increased significantly per Capita production thanks to the Green Revolution during last 50 years. This is the basic foundation of sustainable and rapid economic growth of Asian counties.

Feed (FAOSTAT, Production-Food Supply Quantity) 追加

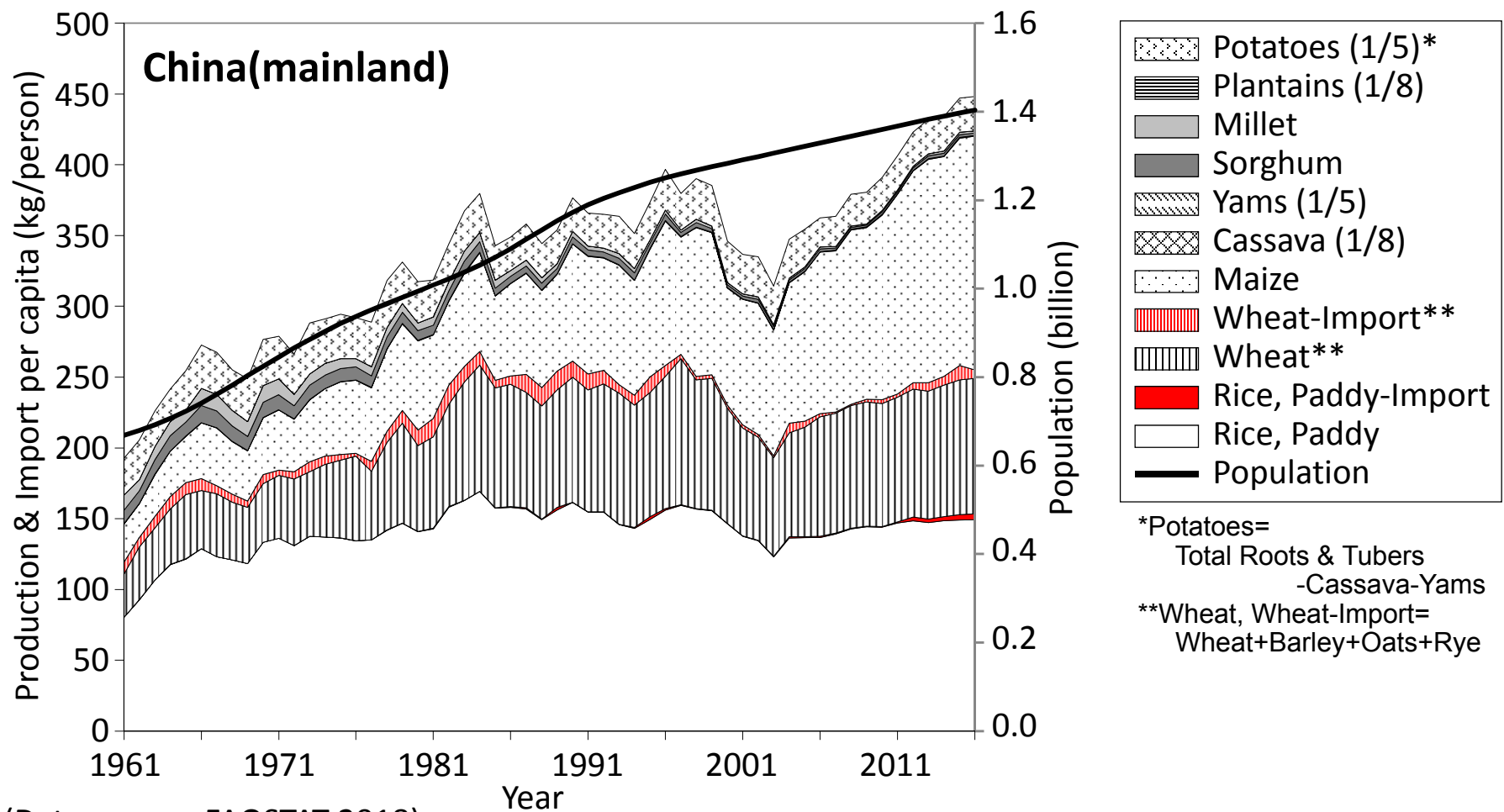


(Data source: FAOSTAT 2018)

Fig. Per capita various Food Supply (kcal/capita/day) in Asia during 1961-2013.

Maize is used for animal feed in Asia

We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

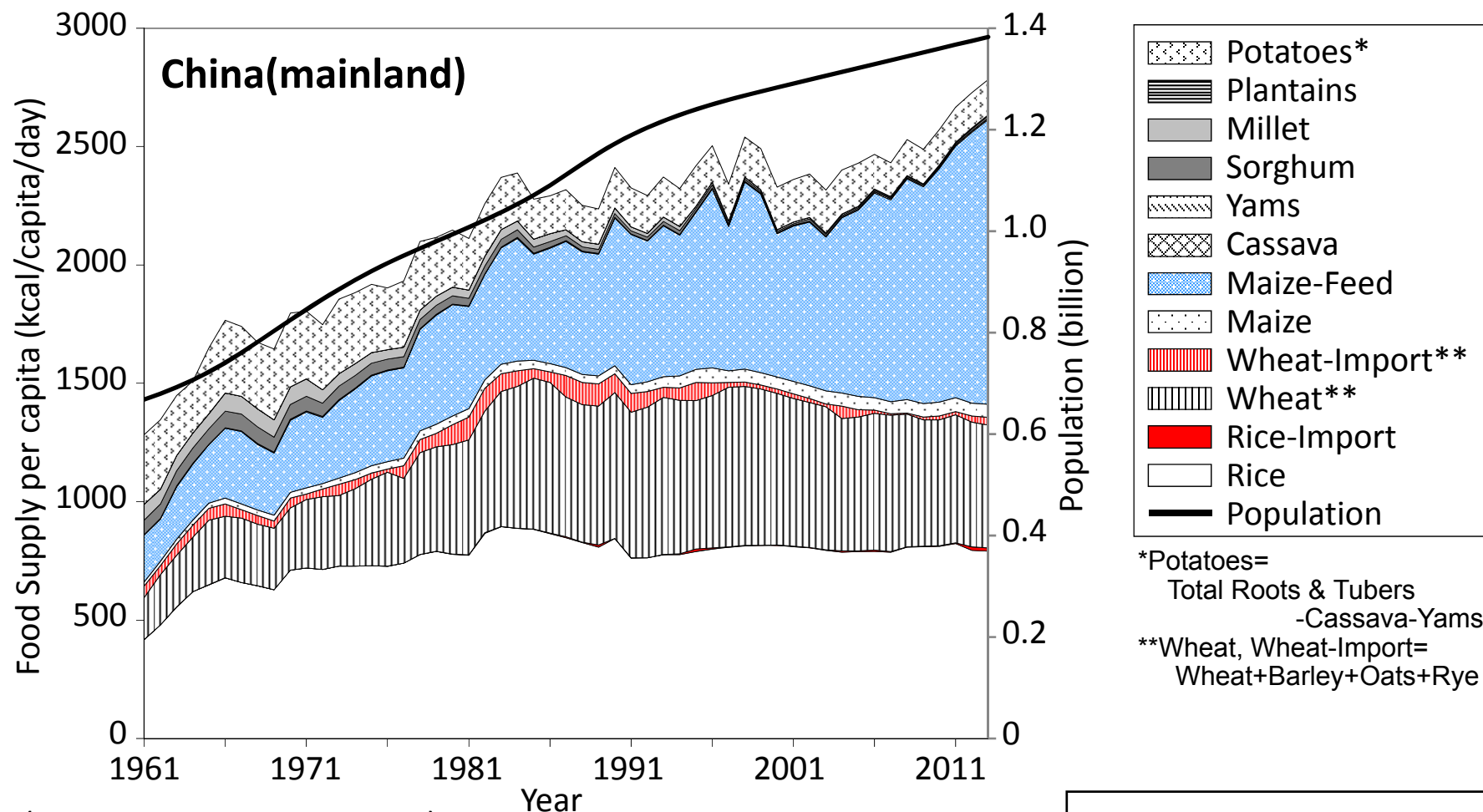


(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in China (No.1 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

Feed = Production - Food Supply Quantity (FAOSTAT)

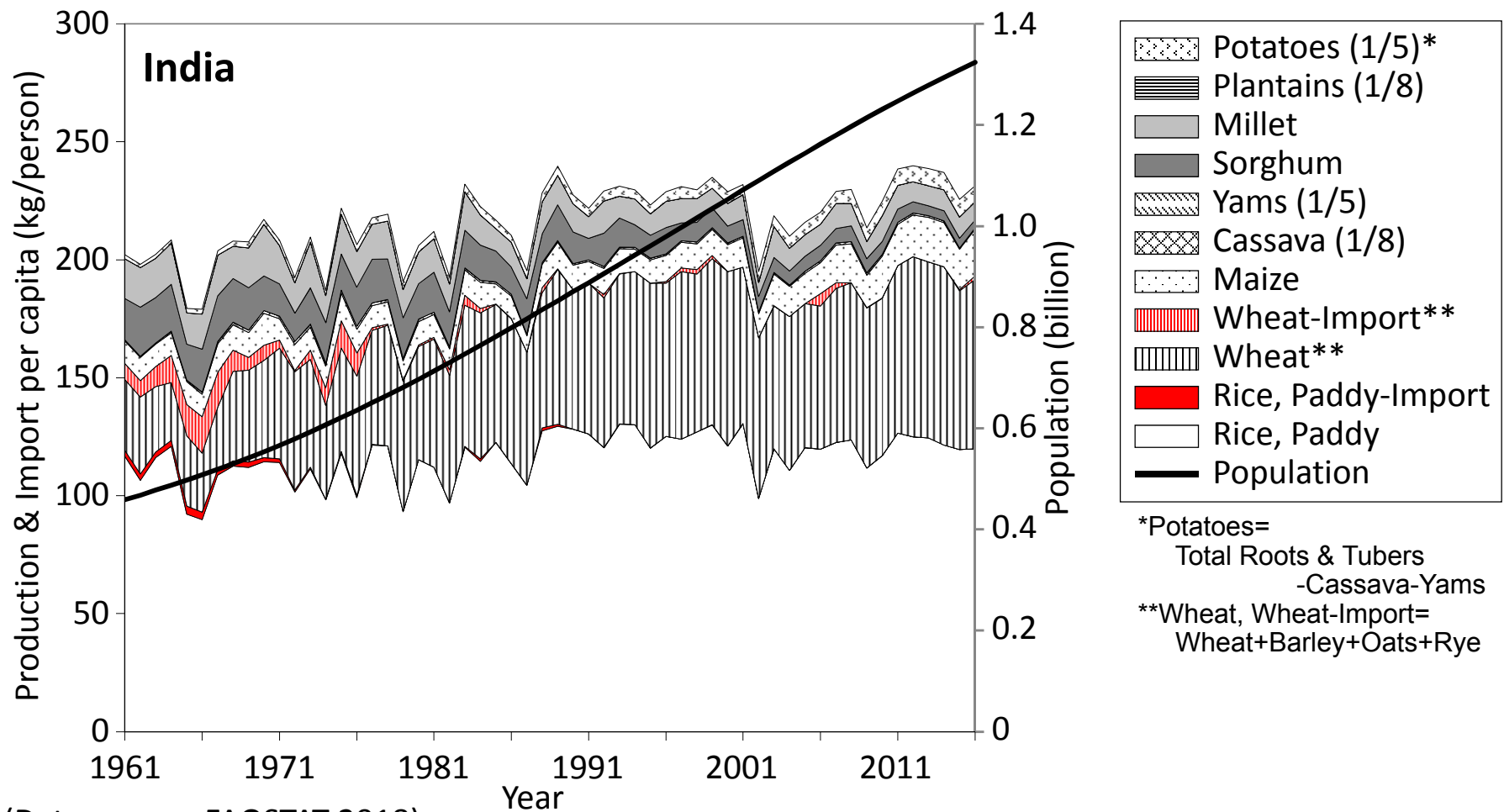


(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in China (mainland) (No.1 rice producing country in Asia) during 1961-2013.

Maize is mainly for feed to produce meat in China.

We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

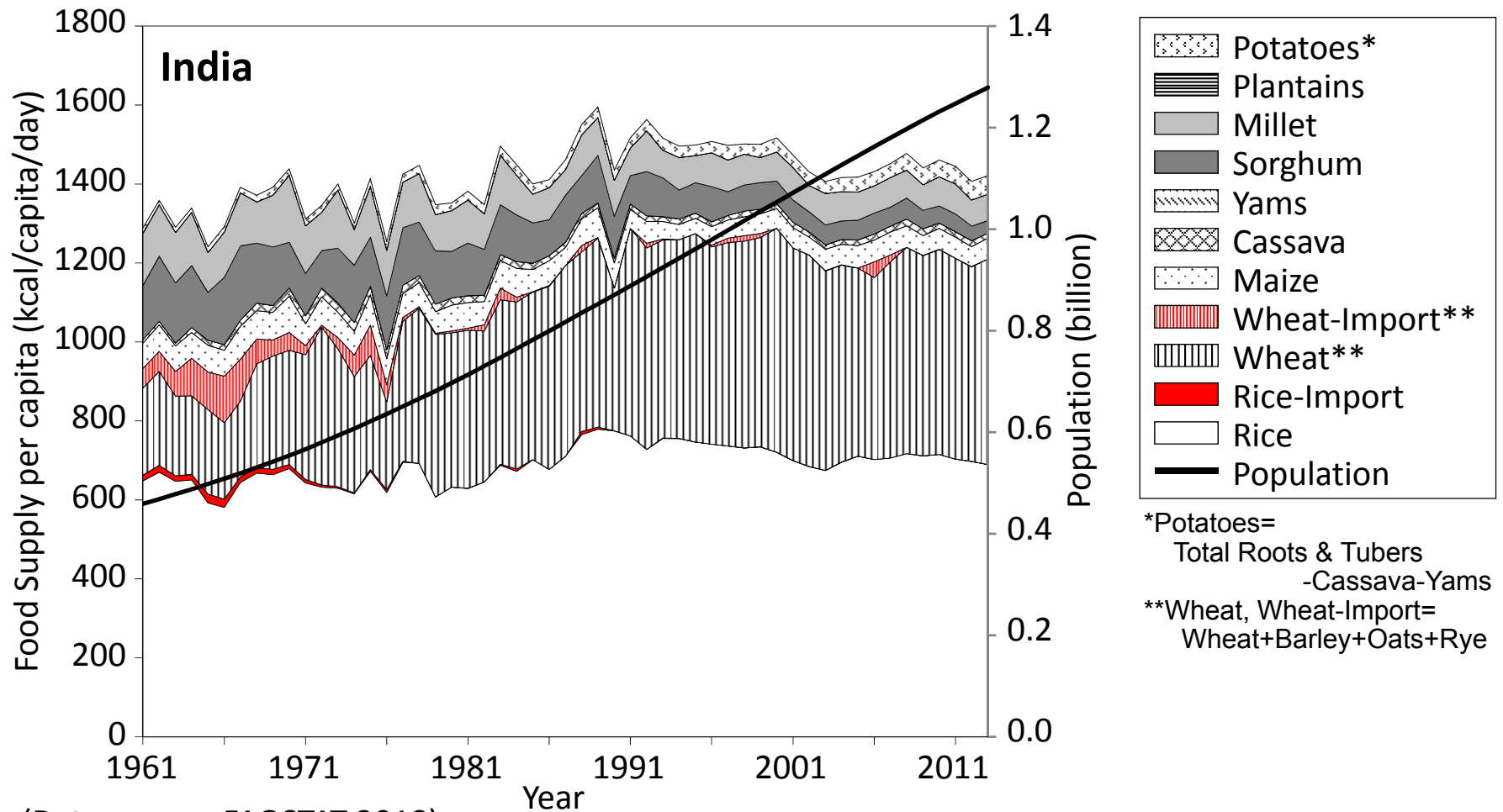


(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in India (No.2 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

Although per Capita food production of India has been no surplus during 1961-2013, Gradually improving recently. Thus importation became small.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in India (No.2 rice producing country in Asia) during 1961-2013.

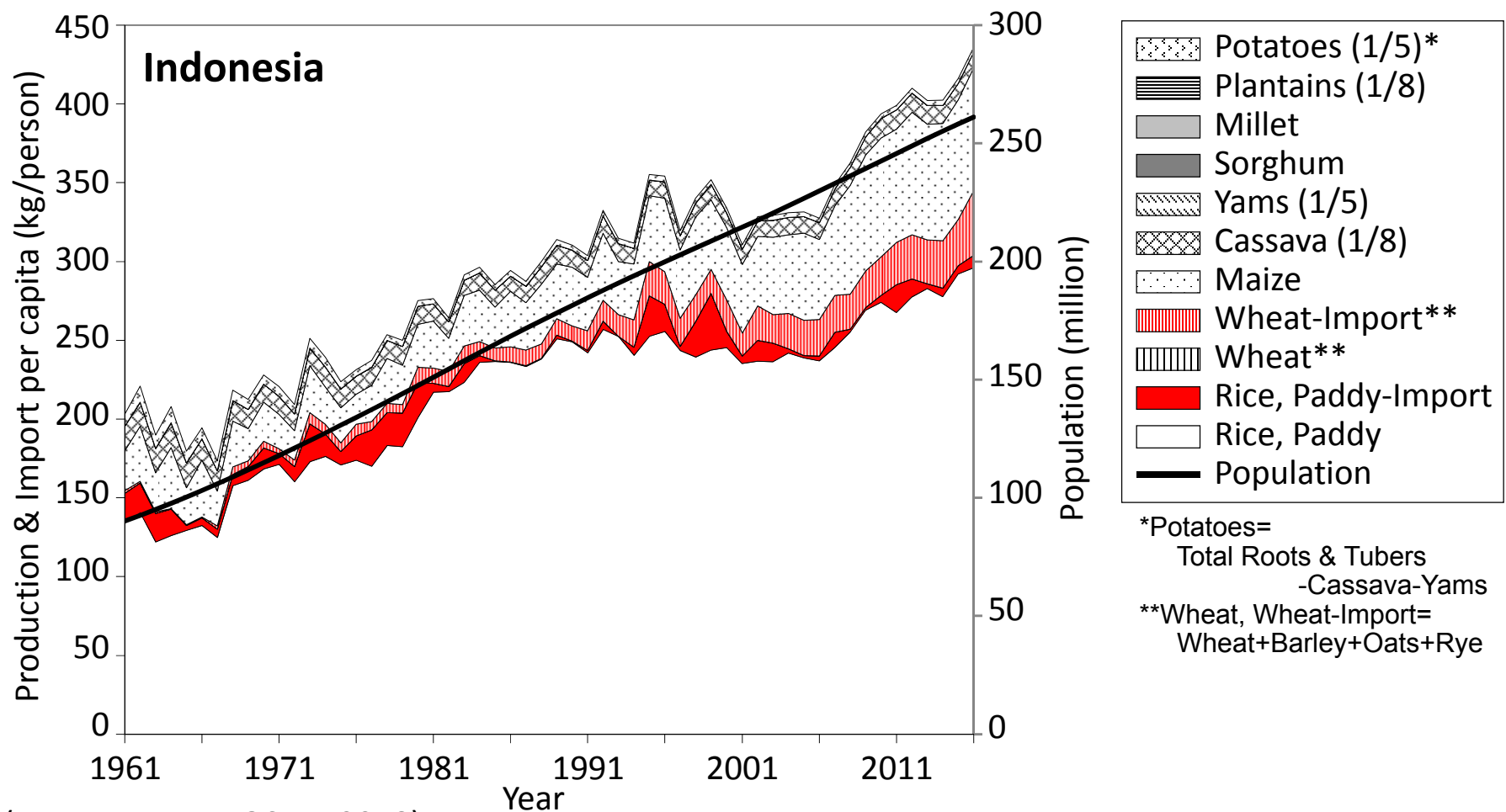
We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

Table. Rice Value Trends in China (No.1 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	694	782	884	966	1038	1132	1216	1267	1306	1344	1344	1383	1404
Area harvested (10,000 ha)	2804	3070	3524	3476	3294	3244	3119	3113	2815	2924	2932	3021	3020
Index (%) of area harvested (100 for mean of 1971-1980)	80.1	87.7	101	99.3	94.1	92.7	89.1	88.9	80.4	83.5	83.8	86.3	86.3
Irrigated rice area harvested (10,000 ha)	2496	2732	3242	3211	3053	3017	2877	2883	2815	2912	2920	3008	
Index (%) of irrigated area (100 for mean of 1971-1980)	77.4	84.7	100	99.5	94.6	93.5	89.2	89.4	87.2	90.2	90.5	93.2	
Percent of Irrigated rice area harvested (%)	89.0	89.0	92.0	92.4	92.7	93.0	92.3	92.6	100.0	99.6	99.6	99.6	
Paddy production (10,000 ton)	7222	9773	11995	13499	16425	17701	18174	19619	17449	19190	19010	20472	20950
Index (%) of paddy production (100 for mean of 1971-1980)	56.7	76.7	94.1	106	129	139	143	154	137	151	149	161	164
Production (10,000 ton, milled rice)	4514	6108	7497	8437	10266	11063	11359	12262	10906	11993	11881	12795	13094
Paddy yield (ton/ha)	2.56	3.18	3.40	3.89	4.99	5.45	5.83	6.30	6.20	6.56	6.48	6.78	6.94
Index (%) of paddy yield (100 for mean of 1971-1980)	70.2	87.2	93.3	107	137	150	160	173	170	180	178	186	190
Yield (ton/ha, milled rice)	1.60	1.99	2.13	2.43	3.12	3.41	3.64	3.94	3.87	4.10	4.05	4.24	4.34
Imported quantity (1,000 ton, milled rice)	70.6	23.5	5.40	108	176	489	499	347	406	293	436	2207	3523
Self-Sufficiency ratio (%)	99.8	100	100	99.9	99.8	99.6	99.6	99.7	99.6	99.8	99.6	98.3	97.4
Imported rice price (\$/ton, milled rice)	126	168	344	298	215	199	312	447	359	625	558	510	450
Consumption per capita (kg/person, milled rice)	64.9	78.1	84.8	87.4	99.0	98.1	93.9	97.1	83.8	89.4	88.7	94.1	95.8

Table. Rice Value Trends in India (No.2 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	478	530	593	666	747	835	924	1016	1108	1197	1197	1278	1324
Area harvested (10,000 ha)	3563	3679	3802	3977	4050	4131	4252	4431	4285	4554	4361	4368	4296
Index (%) of area harvested (100 for mean of 1971-1980)	91.6	94.6	97.8	102	104	106	109	114	110	117	112	112	110
Irrigated rice area harvested (10,000 ha)	1309	1381	1456	1512	1760	1978	1991	2207	2346	2510	2518	2638	
Index (%) of irrigated area (100 for mean of 1971-1980)	88.2	93.0	98.1	102	119	133	134	149	158	169	170	178	
Percent of Irrigated rice area harvested (%)	36.8	37.5	38.3	38.0	43.5	47.9	46.8	49.8	54.8	55.1	57.7	60.4	
Paddy production (10,000 ton)	5273	5714	6451	7329	8481	10086	11590	12744	12856	14804	14228	15773	15876
Index (%) of paddy production (100 for mean of 1971-1980)	76.5	82.9	93.6	106	123	146	168	185	187	215	206	229	230
Production (10,000 ton, milled rice)	3296	3571	4032	4581	5301	6304	7244	7965	8035	9252	8892	9858	9922
Paddy yield (ton/ha)	1.48	1.55	1.69	1.84	2.09	2.44	2.73	2.88	3.00	3.25	3.26	3.61	3.70
Index (%) of paddy yield (100 for mean of 1971-1980)	83.7	87.7	95.9	104	118	138	154	163	170	184	185	204	209
Yield (ton/ha, milled rice)	0.92	0.97	1.06	1.15	1.31	1.52	1.70	1.80	1.87	2.03	2.04	2.26	2.31
Imported quantity (1,000 ton, milled rice)	820	778	297	111	168	253	39.4	10.9	0.31	0.09	0.11	1.20	1.00
Self-Sufficiency ratio (%)	97.5	97.8	99.3	99.7	99.7	99.6	99.9	100	100	100	100	100	100
Imported rice price (\$/ton, milled rice)	135	169	251	319	273	294	312	702	244	1471	994	992	947
Consumption per capita (kg/person, milled rice)	70.8	68.7	68.4	69.0	71.1	75.7	78.4	78.4	72.5	77.3	74.3	77.1	74.9



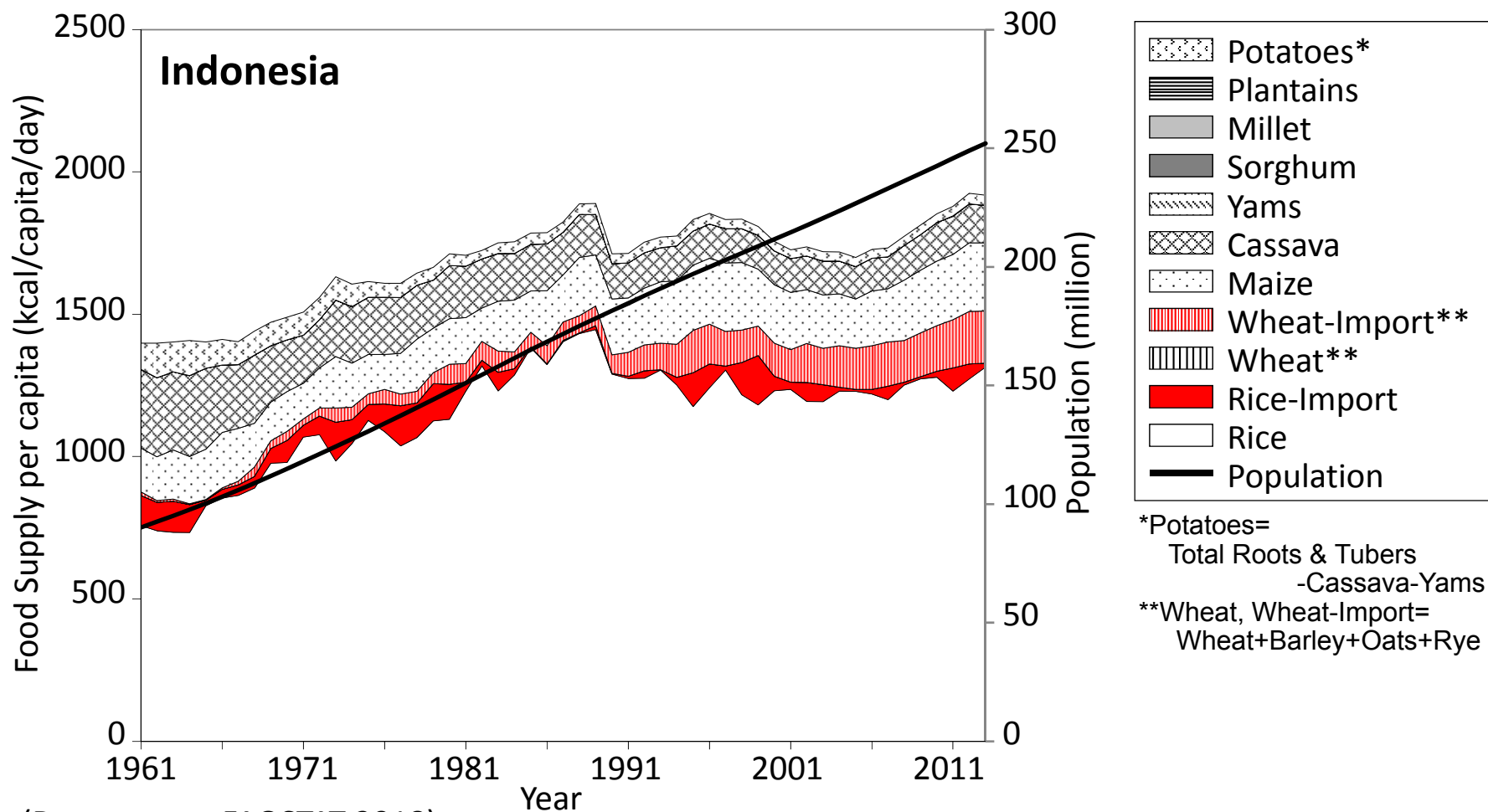
(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Indonesia

(No.3 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

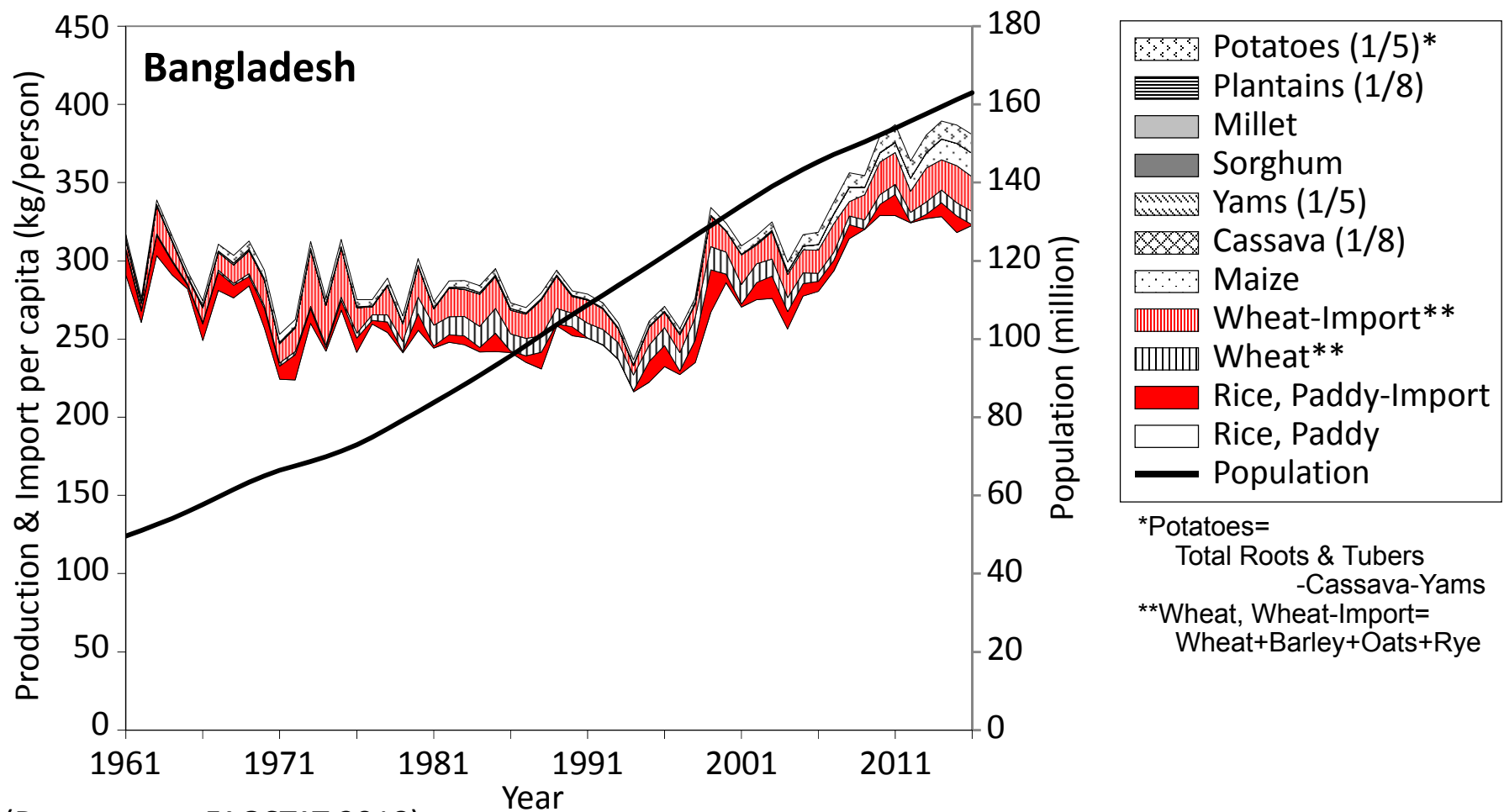
Per Capita rice production of Indonesia has been increasing during 1961-2013.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Indonesia (No.3 rice producing country in Asia) during 1961-2013.

We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

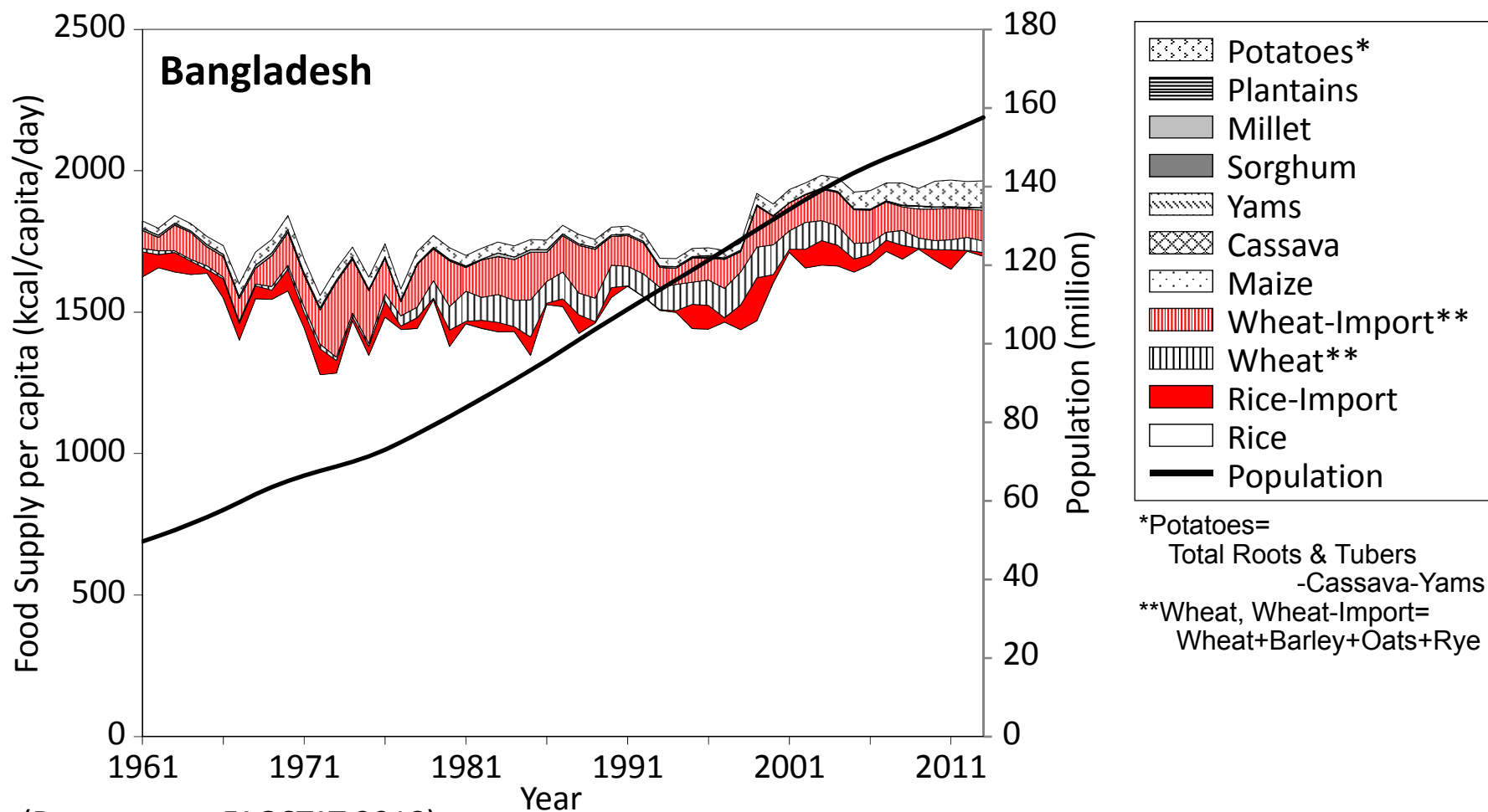


(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Bangladesh (No.4 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

Per Capita rice production of Bangladesh has been maintaining during 1961-2013.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Bangladesh (No.4 rice producing country in Asia) during 1961-2013.

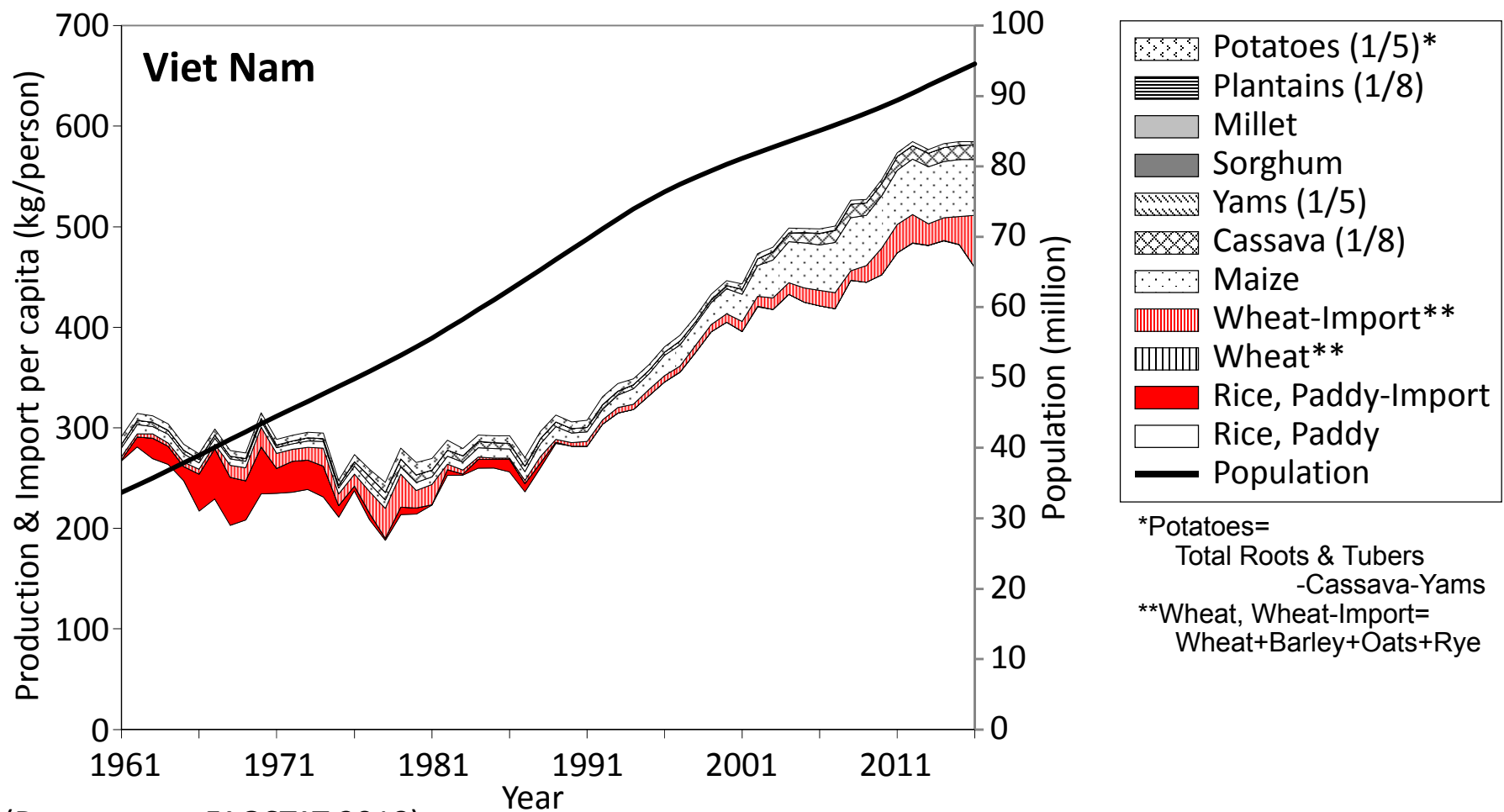
We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

Table. Rice Value Trends in Indonesia (No.3 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	95.1	109	124	141	158	175	191	206	221	236	236	252	261
Area harvested (10,000 ha)	704	788	833	869	944	1022	1091	1164	1165	1231	1248	1368	1428
Index (%) of area harvested (100 for mean of 1971-1980)	82.7	92.5	97.8	102	111	120	128	137	137	145	147	161	168
Irrigated rice area harvested (10,000 ha)	512	512	546	580	638	773	686	792	1057	1138	1138	1138	
Index (%) of irrigated area (100 for mean of 1971-1980)	90.9	90.9	96.9	103	113	137	122	141	188	202	202	202	
Percent of Irrigated rice area harvested (%)	72.8	65.0	65.6	66.8	67.6	75.6	62.9	68.1	90.7	92.4	91.2	83.2	
Paddy production (10,000 ton)	1239	1628	2118	2567	3577	4228	4750	5050	5247	6025	6055	7047	7730
Index (%) of paddy production (100 for mean of 1971-1980)	52.9	69.5	90.4	110	153	180	203	216	224	257	258	301	330
Production (10,000 ton, milled rice)	775	1017	1324	1604	2235	2642	2969	3156	3279	3766	3784	4404	4831
Paddy yield (ton/ha)	1.76	2.06	2.54	2.95	3.79	4.14	4.35	4.34	4.50	4.89	4.85	5.15	5.41
Index (%) of paddy yield (100 for mean of 1971-1980)	64.1	75.0	92.6	107	138	151	159	158	164	178	177	188	197
Yield (ton/ha, milled rice)	1.10	1.29	1.59	1.84	2.37	2.58	2.72	2.71	2.81	3.06	3.03	3.22	3.38
Imported quantity (1,000 ton, milled rice)	891	540	985	1810	493	86.6	918	2276	924	288	616	1345	1282
Self-Sufficiency ratio (%)	89.8	95.2	93.2	89.9	97.8	99.7	97.2	93.5	97.3	99.2	98.4	97.0	97.4
Imported rice price (\$/ton, milled rice)	113	165	291	333	325	254	285	302	229	431	403	493	415
Consumption per capita (kg/person, milled rice)	91.0	98.0	114	127	144	151	160	164	153	161	163	180	190

Table. Rice Value Trends in Bangladesh (No.4 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	52.6	61.5	68.8	77.1	88.4	101	114	126	139	149	149	158	163
Area harvested (10,000 ha)	896	979	979	1010	1028	1041	1004	1042	1059	1128	1106	1140	1139
Index (%) of area harvested (100 for mean of 1971-1980)	90.1	98.4	98.4	102	103	105	101	105	106	113	111	115	115
Irrigated rice area harvested (10,000 ha)	43.8	72.3	113	117	140	196	267	396	455	615	617	660	
Index (%) of irrigated area (100 for mean of 1971-1980)	38.2	63.0	98.5	102	122	171	233	345	397	536	537	575	
Percent of Irrigated rice area harvested (%)	4.90	7.38	11.5	11.5	13.6	18.8	26.6	38.0	43.0	54.6	55.7	57.8	
Paddy production (10,000 ton)	1503	1657	1679	1932	2160	2462	2661	3162	3765	4674	4578	5125	5259
Index (%) of paddy production (100 for mean of 1971-1980)	83.3	91.8	93.0	107	120	136	147	175	209	259	254	284	291
Production (10,000 ton, milled rice)	940	1036	1050	1207	1350	1539	1663	1976	2353	2921	2861	3203	3287
Paddy yield (ton/ha)	1.68	1.69	1.71	1.91	2.10	2.36	2.65	3.03	3.56	4.14	4.13	4.50	4.62
Index (%) of paddy yield (100 for mean of 1971-1980)	92.6	93.3	94.5	106	116	130	146	167	196	229	228	248	255
Yield (ton/ha, milled rice)	1.05	1.06	1.07	1.20	1.31	1.48	1.66	1.89	2.22	2.59	2.58	2.81	2.89
Imported quantity (1,000 ton, milled rice)	301	377	360	285	301	286	220	1000	809	839	550	717	38.3
Self-Sufficiency ratio (%)	96.9	96.5	96.6	97.7	97.9	98.2	98.7	95.3	96.7	97.2	98.1	97.8	99.9
Imported rice price (\$/ton, milled rice)	109	120	149	247	224	174	186	213	177	345	292	439	512
Consumption per capita (kg/person, milled rice)	184	175	158	160	156	155	148	164	175	202	196	208	202

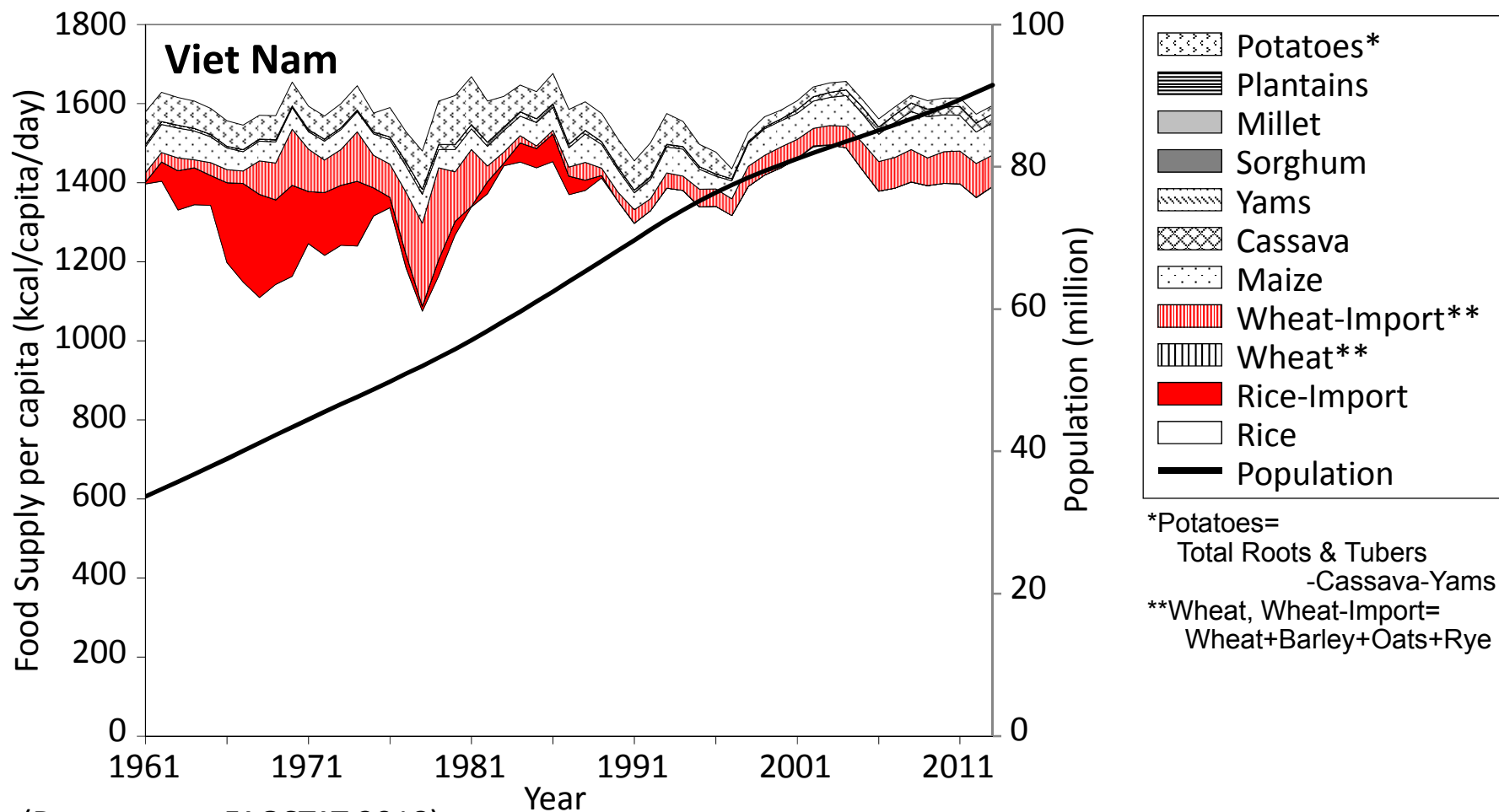


(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Viet Nam (No.5 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

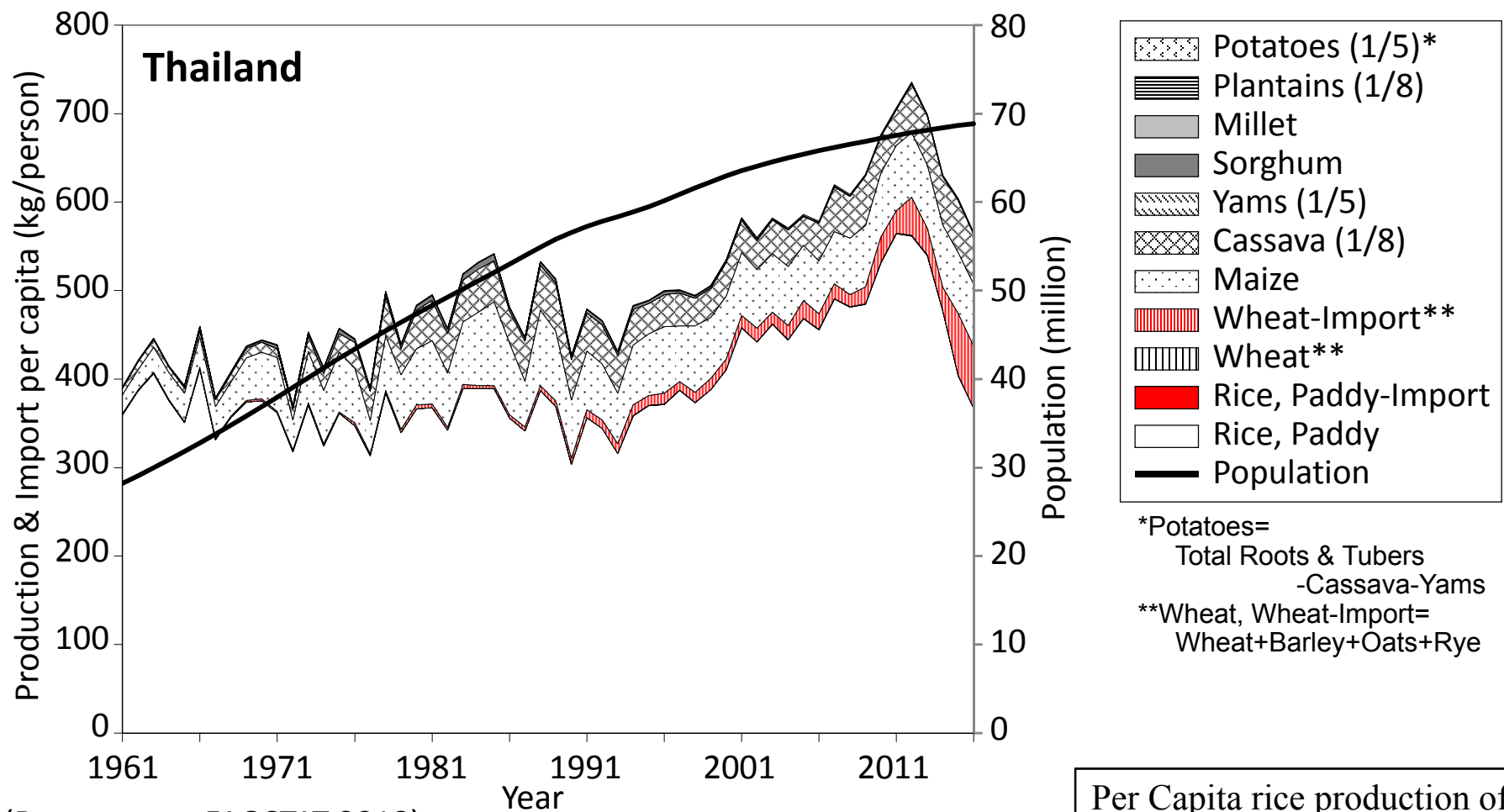
Per Capita rice production of Viet Nam has been rapidly increasing recently, which makes Viet Nam major rice exporter recently.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Viet Nam (No.5 rice producing country in Asia) during 1961-2013.

We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

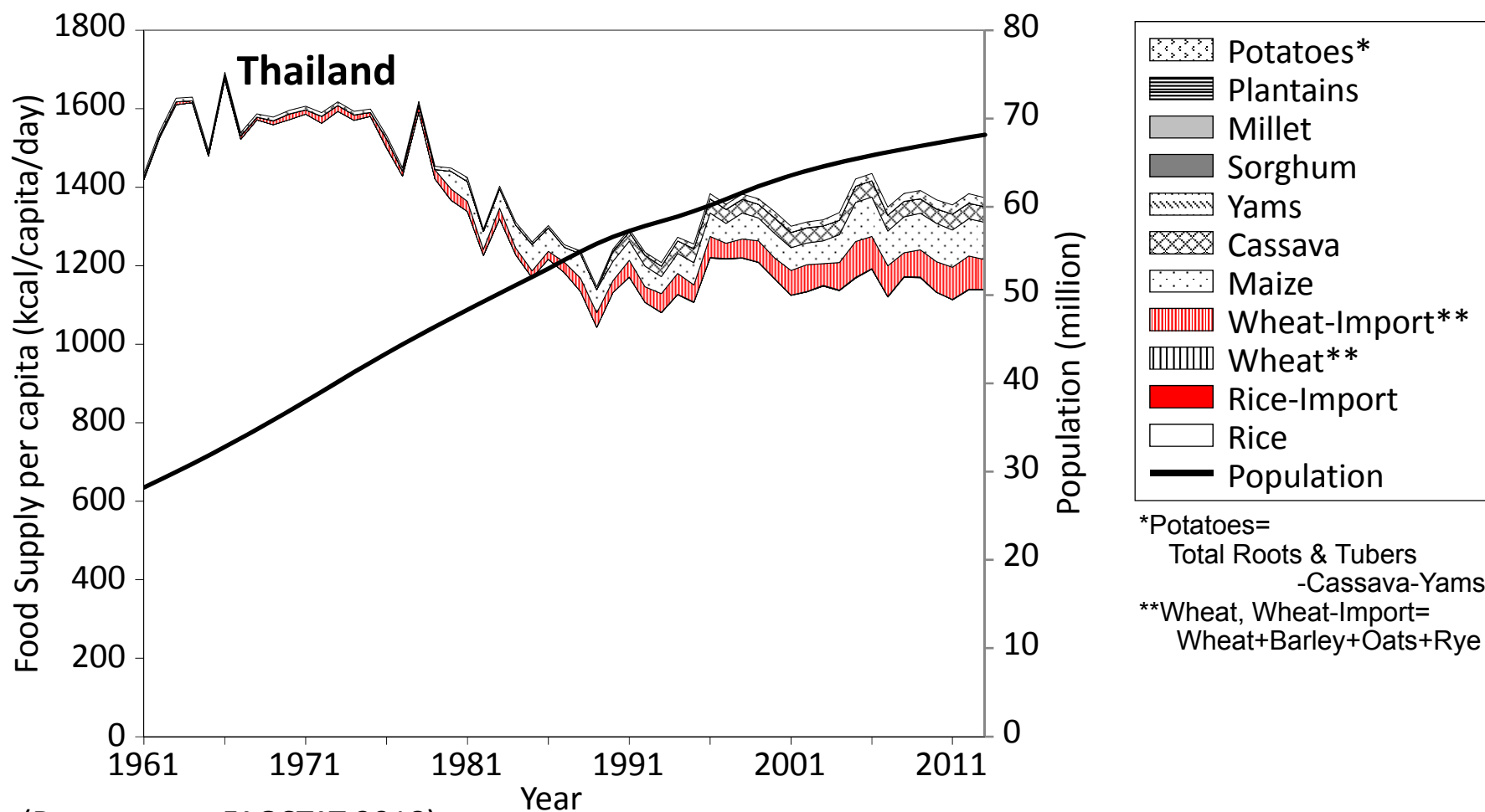


(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Thailand (No.6 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

Per Capita rice production of Thailand has been increasing recently, which makes maintain Thailand major rice exporter.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Thailand (No.6 rice producing country in Asia) during 1961-2013.

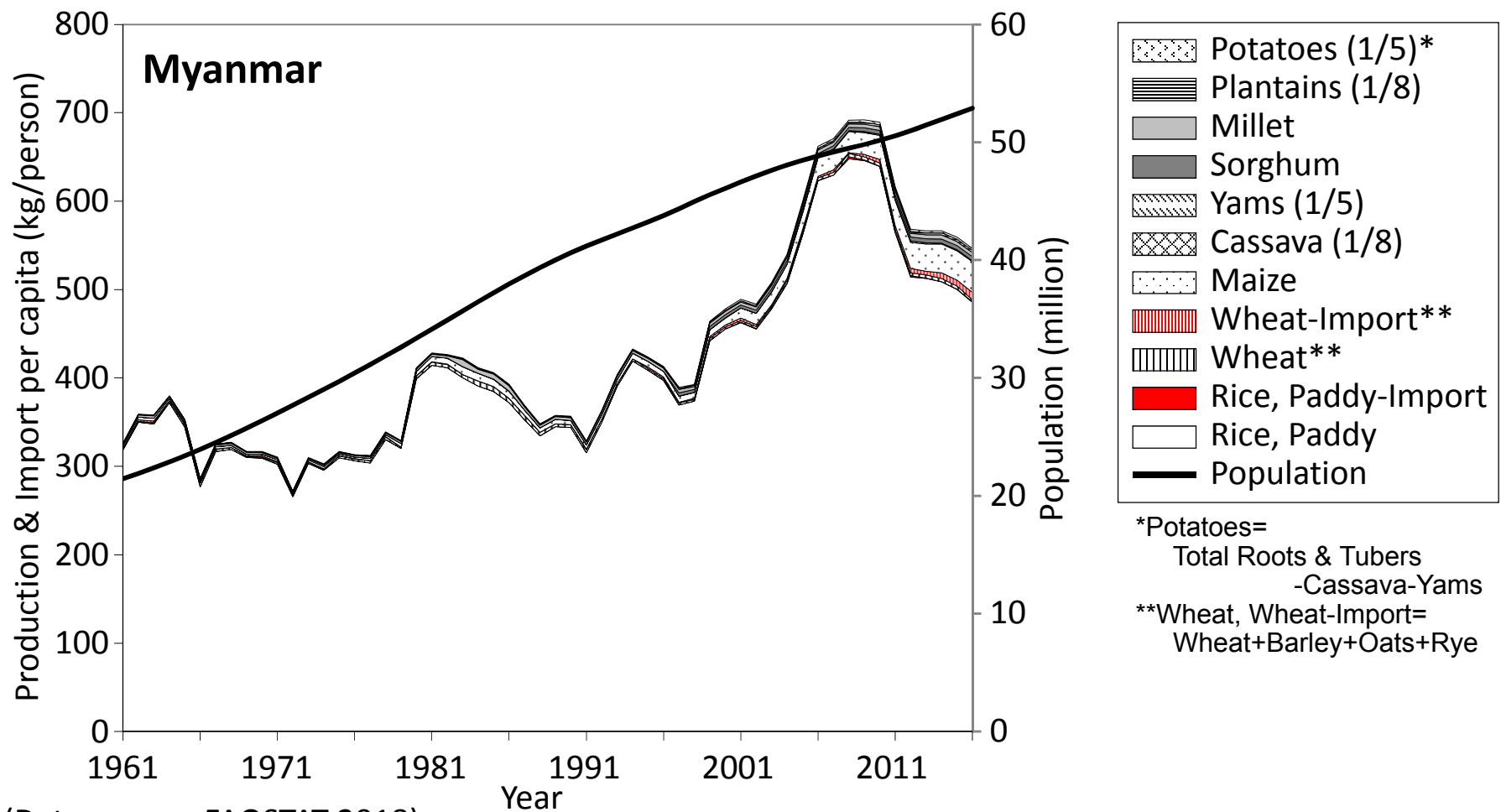
We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

Table. Rice Value Trends in Viet Nam (No.5 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	35.7	41.2	46.6	52.1	58.3	65.3	72.5	78.4	82.7	86.7	86.7	91.5	94.6
Area harvested (10,000 ha)	479	481	492	546	567	580	654	735	744	740	737	779	778
Index (%) of area harvested (100 for mean of 1971-1980)	92	93	95	105	109	112	126	142	143	143	142	150	150
Irrigated rice area harvested (10,000 ha)	142	156	182	212	242	294	366	594	664	678	678	746	
Index (%) of irrigated area (100 for mean of 1971-1980)	72.2	79.4	92.4	108	123	149	186	301	337	344	344	378	
Percent of Irrigated rice area harvested (%)	29.7	32.6	37.0	38.8	42.7	50.8	56.0	80.7	89.2	91.6	91.9	95.7	
Paddy production (10,000 ton)	949	900	1073	1104	1459	1727	2251	2945	3462	3873	3790	4405	4344
Index (%) of paddy production (100 for mean of 1971-1980)	87.1	82.7	98.5	101	134	159	207	271	318	356	348	405	399
Production (10,000 ton, milled rice)	593	563	670	690	912	1079	1407	1841	2164	2421	2368	2753	2715
Paddy yield (ton/ha)	1.98	1.87	2.18	2.02	2.57	2.97	3.44	4.00	4.65	5.23	5.14	5.65	5.58
Index (%) of paddy yield (100 for mean of 1971-1980)	94.3	89.2	104	96.2	122	141	163	190	221	249	244	269	265
Yield (ton/ha, milled rice)	1.24	1.17	1.36	1.26	1.61	1.86	2.15	2.50	2.91	3.27	3.21	3.53	3.49
Imported quantity (1,000 ton, milled rice)	286	1133	736	173	182	212	3.92	1.30	9.05	0.68	1.03	14	27
Self-Sufficiency ratio (%)	95.5	83.3	90.2	97.6	98.2	98.0	100	100	100	100	100	99.9	99.9
Imported rice price (\$/ton, milled rice)	149	158	282	571	281	212	273	271	426	1070	722	1171	1335
Consumption per capita (kg/person, milled rice)	174	164	160	136	159	168	194	235	262	279	273	301	287

Table. Rice Value Trends in Thailand (No.6 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	30.0	34.8	40.2	45.4	50.2	54.9	58.4	61.6	64.5	66.5	66.5	68.1	68.9
Area harvested (10,000 ha)	635	696	746	874	942	938	906	971	1003	1068	1092	1120	868
Index (%) of area harvested (100 for mean of 1971-1980)	78.4	85.9	92.1	108	116	116	112	120	124	132	135	138	107
Irrigated rice area harvested (10,000 ha)	160	185	183	203	221	233	212	235	257	644	642	644	
Index (%) of irrigated area (100 for mean of 1971-1980)	83.2	95.9	94.7	105	115	121	110	122	133	334	333	334	
Percent of Irrigated rice area harvested (%)	25.3	26.6	24.5	23.2	23.5	24.8	23.4	24.3	25.6	60.3	58.8	57.5	
Paddy production (10,000 ton)	1127	1287	1395	1592	1887	1927	2038	2379	2935	3202	3252	3466	2527
Index (%) of paddy production (100 for mean of 1971-1980)	75.5	86.2	93.4	107	126	129	136	159	197	214	218	232	169
Production (10,000 ton, milled rice)	704	805	872	995	1180	1204	1274	1487	1835	2001	2032	2166	1579
Paddy yield (ton/ha)	1.77	1.85	1.87	1.82	2.00	2.05	2.25	2.45	2.93	3.00	2.98	3.09	2.91
Index (%) of paddy yield (100 for mean of 1971-1980)	96.2	100	101	98.7	108	111	122	133	159	162	161	167	158
Yield (ton/ha, milled rice)	1.11	1.16	1.17	1.14	1.25	1.28	1.41	1.53	1.83	1.87	1.86	1.93	1.82
Imported quantity (1,000 ton, milled rice)	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.66	2.50	13.6	8.90	18.3	14.6
Self-Sufficiency ratio (%)	100	100	100	100	100	100	100	100	100	99.9	100	99.9	99.9
Imported rice price (\$/ton, milled rice)	-	-	-	-	-	-	411	635	427	772	787	698	657
Consumption per capita (kg/person, milled rice)	235	231	217	219	235	220	218	241	284	301	306	318	230

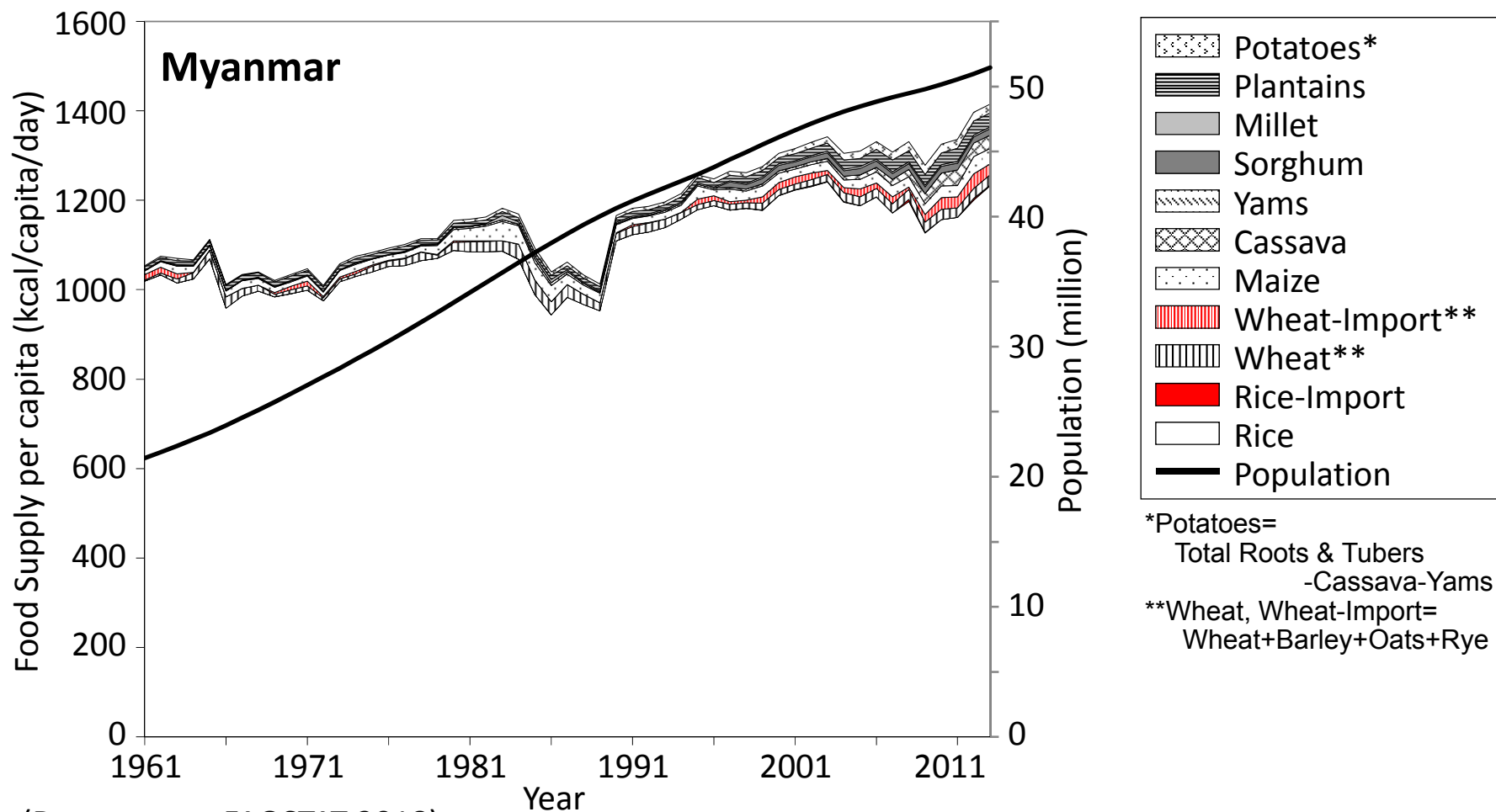


(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Myanmar (No.7 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

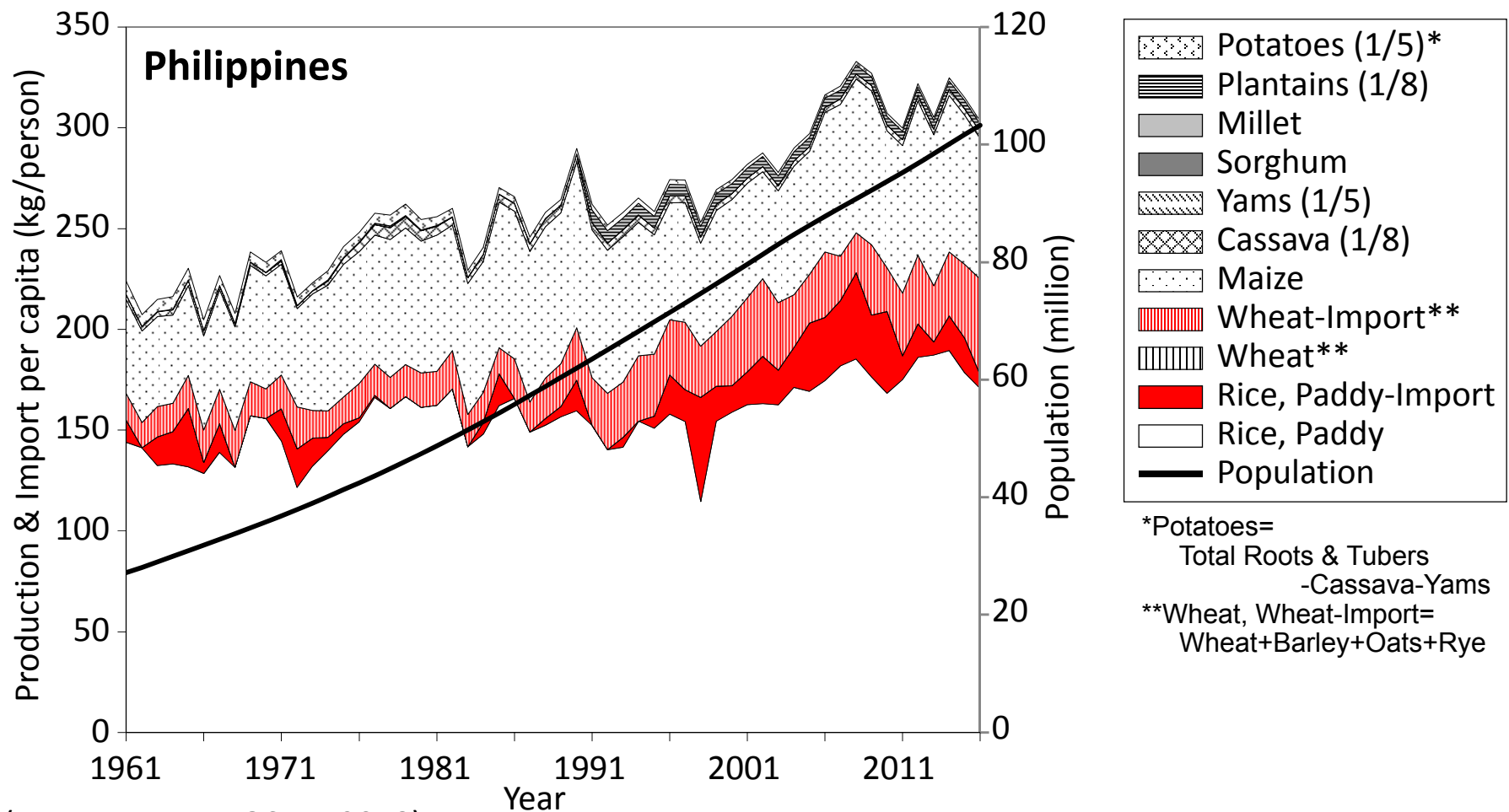
Per Capita rice production of Myanmar are 400-500kg. This means Myanmar has enough rice to export.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Myanmar (No.7 rice producing country in Asia) during 1961-2013.

We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.



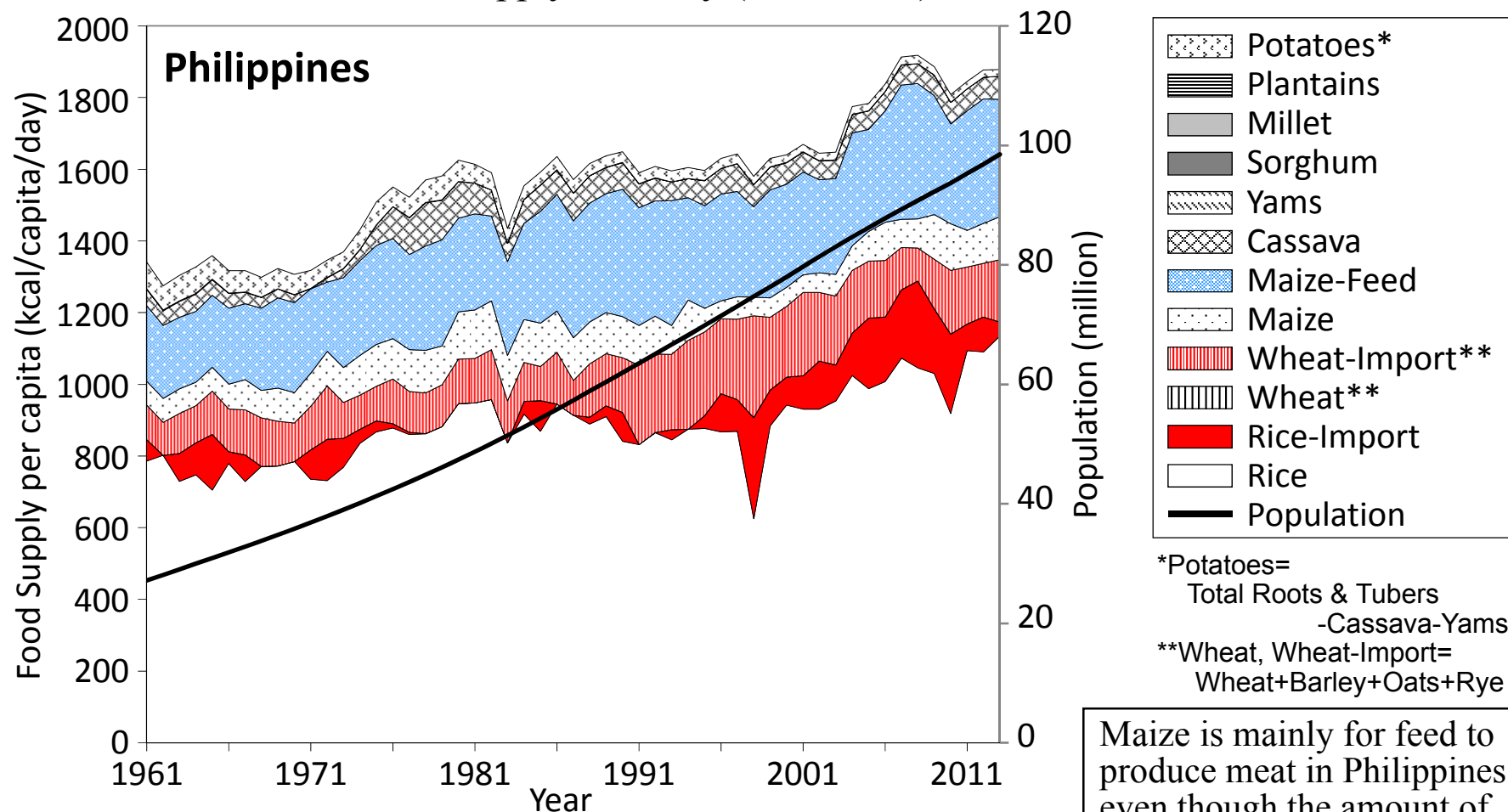
(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Philippines (No.8 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

Per Capita rice production has been stagnating during 1961-2013. That why rice importation is visible. This is somewhat strange among other major Asian countries.

Feed = Production - Food Supply Quantity (FAOSTAT)



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Philippines (No.8 rice producing country in Asia) during 1961-2013.

Maize is mainly for feed to produce meat in Philippines, even though the amount of importation of rice and wheat are considerable. This is also strange if compare to other Asian countries.

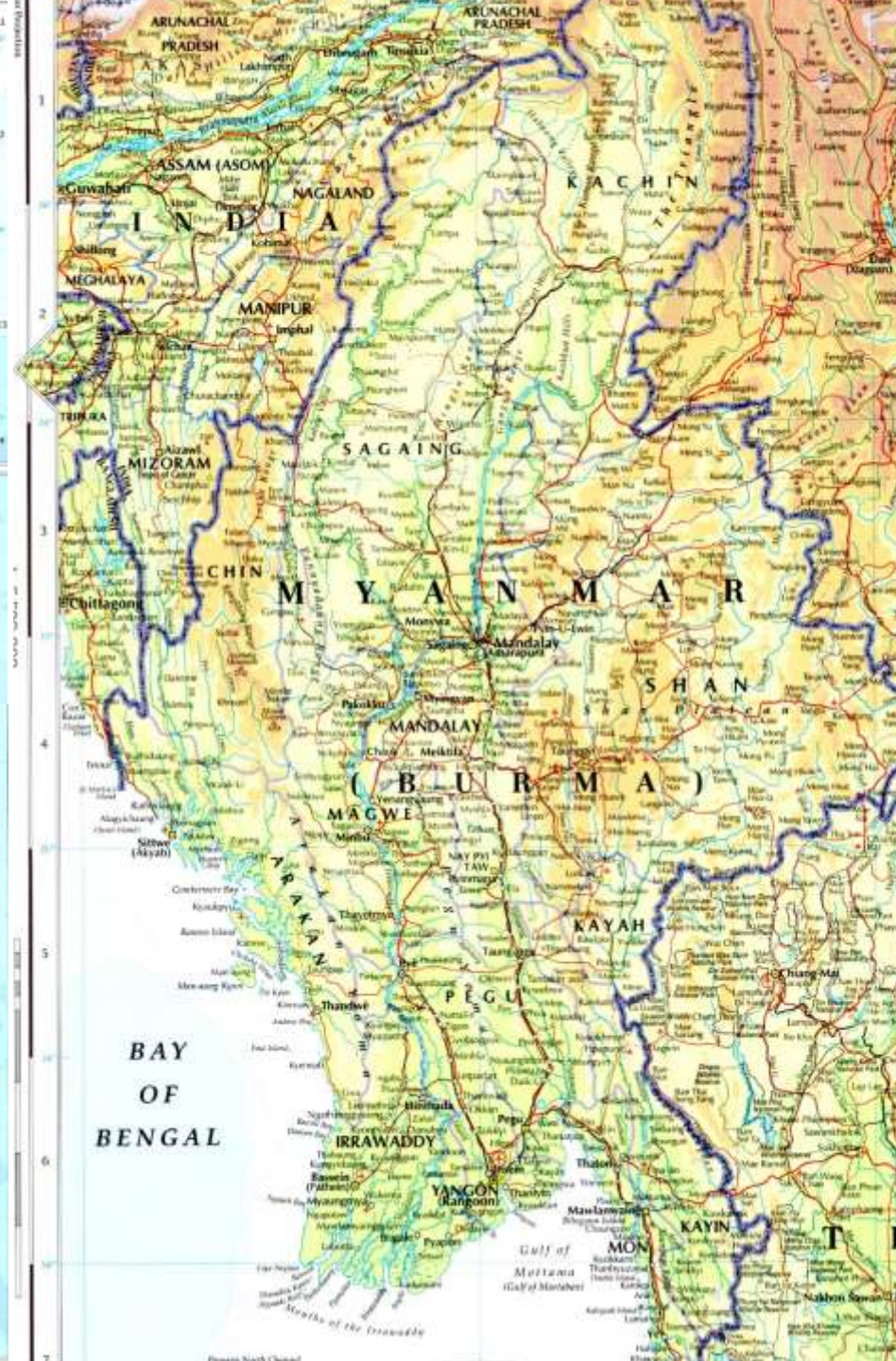
We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

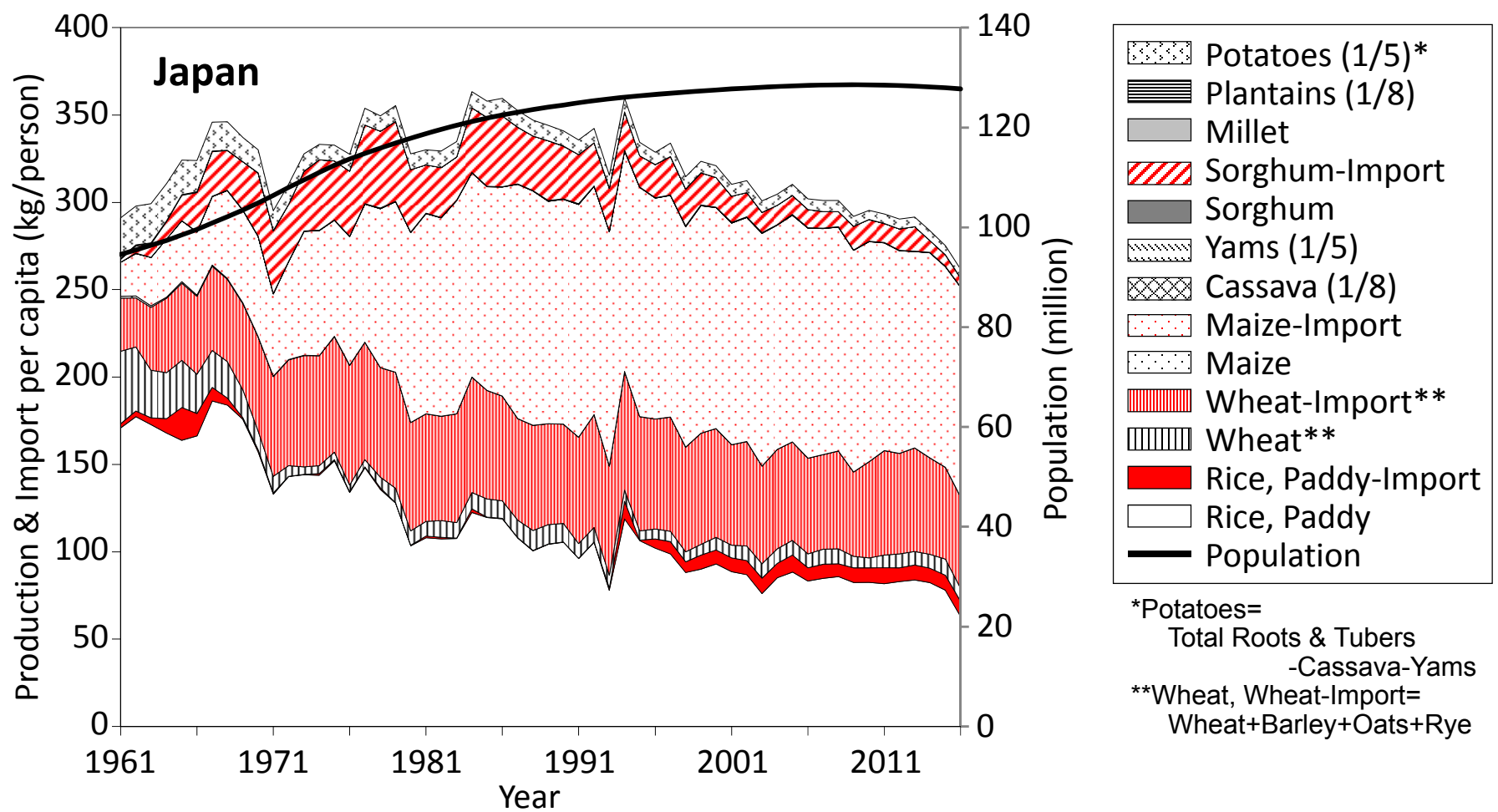
Table. Rice Value Trends in Myanmar (No.7 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	22.4	25.1	28.4	31.9	35.7	39.3	42.2	45.0	47.6	49.5	49.5	51.5	52.9
Area harvested (10,000 ha)	472	469	482	481	466	463	538	583	670	808	805	703	672
Index (%) of area harvested (100 for mean of 1971-1980)	98.1	97.5	100	99.9	96.8	96.3	112	121	139	168	167	146	140
Irrigated rice area harvested (10,000 ha)	59.0	70.7	81.2	104	84.5	84.0	121	134	166	184	185	141	
Index (%) of irrigated area (100 for mean of 1971-1980)	63.9	76.6	87.9	112	91.5	91.0	131	145	179	199	200	152	
Percent of Irrigated rice area harvested (%)	12.5	15.1	16.8	21.5	18.1	18.1	22.5	23.0	24.7	22.8	23.0	20.0	
Paddy production (10,000 ton)	777	772	838	1061	1428	1374	1593	1834	2348	3206	3154	2675	2567
Index (%) of paddy production (100 for mean of 1971-1980)	81.8	81.2	88.3	112	150	145	168	193	247	337	332	282	270
Production (10,000 ton, milled rice)	486	482	524	663	892	859	996	1146	1468	2004	1971	1672	1605
Paddy yield (ton/ha)	1.64	1.64	1.74	2.21	3.07	2.97	2.96	3.14	3.50	3.97	3.92	3.81	3.82
Index (%) of paddy yield (100 for mean of 1971-1980)	83.2	83.1	88.0	112	155	150	150	159	177	201	198	193	193
Yield (ton/ha, milled rice)	1.03	1.03	1.09	1.38	1.92	1.85	1.85	1.96	2.19	2.48	2.45	2.38	2.39
Imported quantity (1,000 ton, milled rice)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	4.0	11.6	81.0	23.8	16.3	33.3
Self-Sufficiency ratio (%)	100	100	100	100	100	100	100	100	99.9	99.6	99.9	99.9	99.8
Imported rice price (\$/ton, milled rice)	-	178	143	-	-	-	-	343	187	494	439	627	423
Consumption per capita (kg/person, milled rice)	217	192	185	207	250	219	236	255	308	407	399	325	304

Table. Rice Value Trends in Philippines (No.8 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	29.0	33.8	39.0	44.9	51.5	58.9	66.7	74.7	83.0	90.8	90.8	98.5	103
Area harvested (10,000 ha)	315	322	347	358	329	337	346	380	406	446	436	467	456
Index (%) of area harvested (100 for mean of 1971-1980)	89.3	91.5	98.5	102	93.3	95.7	98.2	108	115	126	124	133	129
Irrigated rice area harvested (10,000 ha)	97.7	131	143	155	174	200	198	260	279	280	275	307	
Index (%) of irrigated area (100 for mean of 1971-1980)	65.7	88.2	96.0	104	117	135	133	175	187	188	185	206	
Percent of Irrigated rice area harvested (%)	31.0	40.7	41.2	43.2	52.8	59.4	57.0	68.4	68.6	62.8	63.2	65.6	
Paddy production (10,000 ton)	396	483	536	727	807	922	986	1106	1377	1682	1608	1805	1763
Index (%) of paddy production (100 for mean of 1971-1980)	62.6	76.4	84.9	115	128	146	156	175	218	266	255	286	279
Production (10,000 ton, milled rice)	247	302	335	454	505	576	616	691	860	1051	1005	1128	1102
Paddy yield (ton/ha)	1.26	1.50	1.54	2.03	2.45	2.73	2.85	2.90	3.39	3.77	3.69	3.86	3.87
Index (%) of paddy yield (100 for mean of 1971-1980)	70.4	83.8	86.3	114	137	153	159	162	190	211	207	216	216
Yield (ton/ha, milled rice)	0.79	0.94	0.96	1.27	1.53	1.71	1.78	1.81	2.12	2.36	2.31	2.41	2.42
Imported quantity (1,000 ton, milled rice)	260	79.7	293	17.3	146	182	93.4	1096	1153	2432	2021	857	446
Self-Sufficiency ratio (%)	90.9	97.3	91.8	99.6	97.5	97.2	98.6	86.2	88.4	81.2	83.3	93.0	96.1
Imported rice price (\$/ton, milled rice)	198	262	176	609	1523	305	510	283	221	805	537	446	472
Consumption per capita (kg/person, milled rice)	94.1	91.4	93.4	102	101	101	93.8	107	117	143	133	123	111





(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Japan (No.9 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

In 1971 Japan started the strong policy to discourage rice production, which continued by 2016. That why rice production rapidly decreased. So Japanese agriculture has been damaged last 40 years.

Feed = Production + Import - Food Supply Quantity (FAOSTAT)

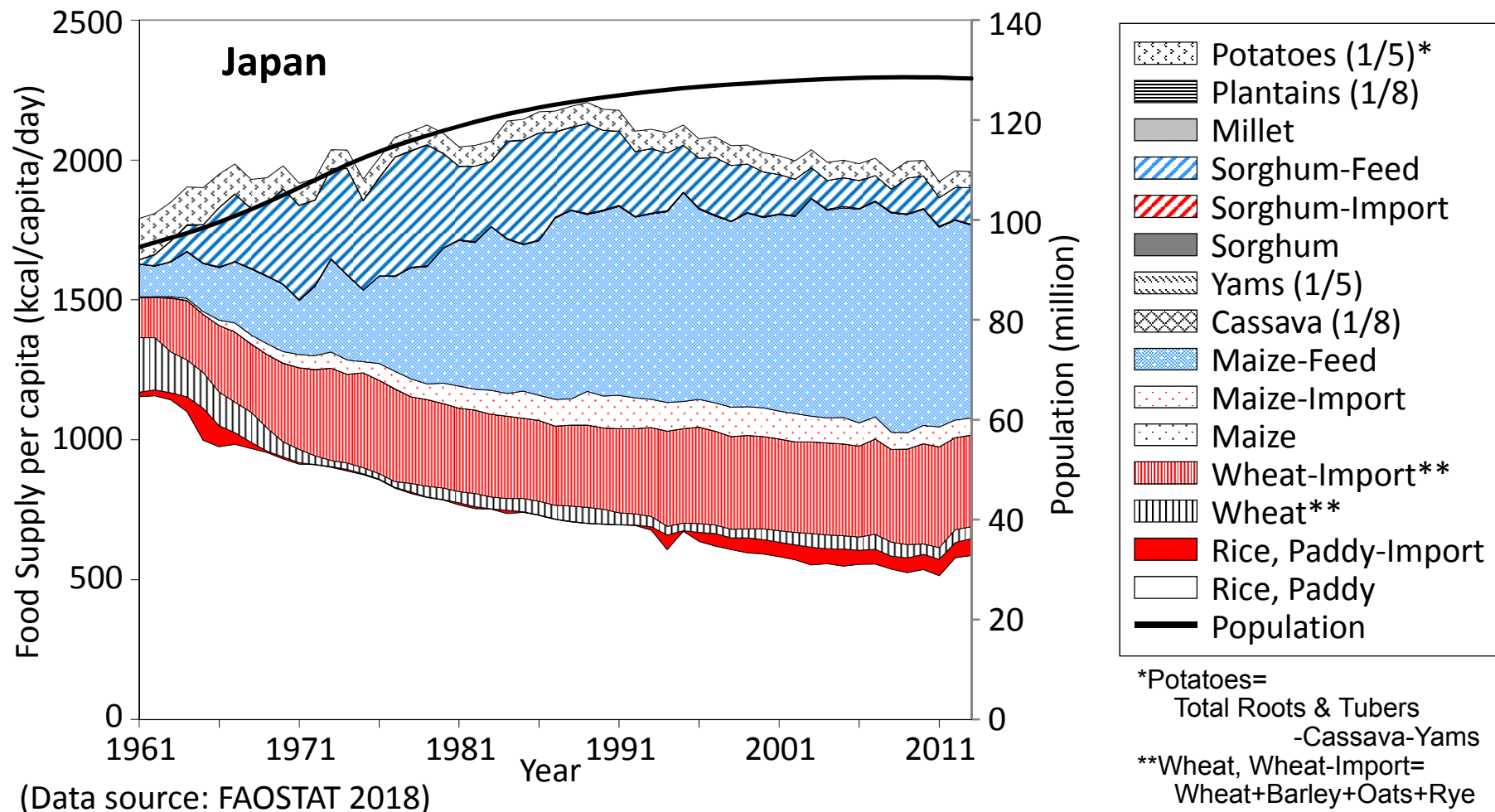
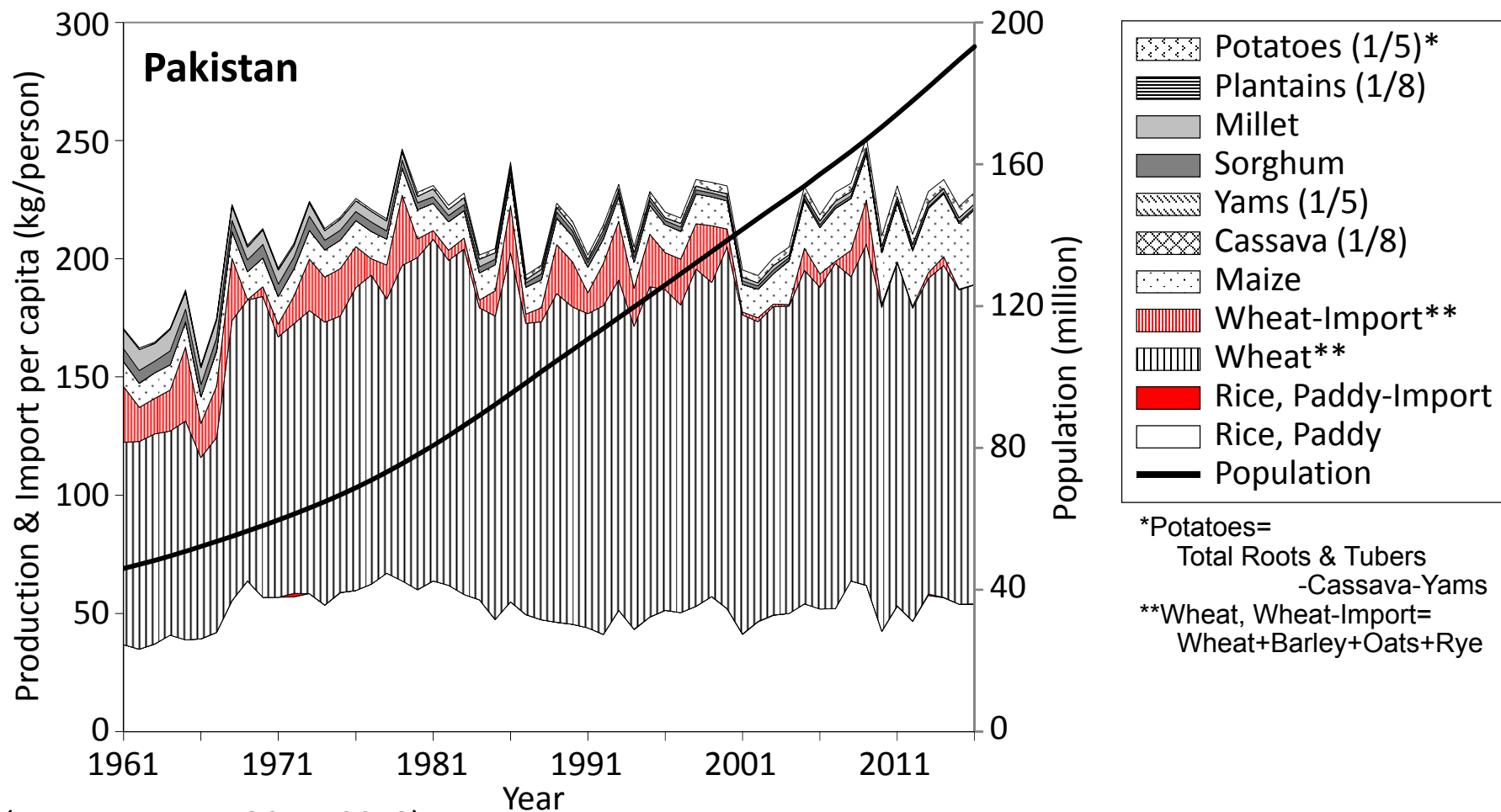


Fig. Various Food Supply (kcal/capita/day) in Japan (No.9 rice producing country in Asia) during 1961-2013.

In 1971 Imported maize and sorghum have been used for animal feed to produce meat.

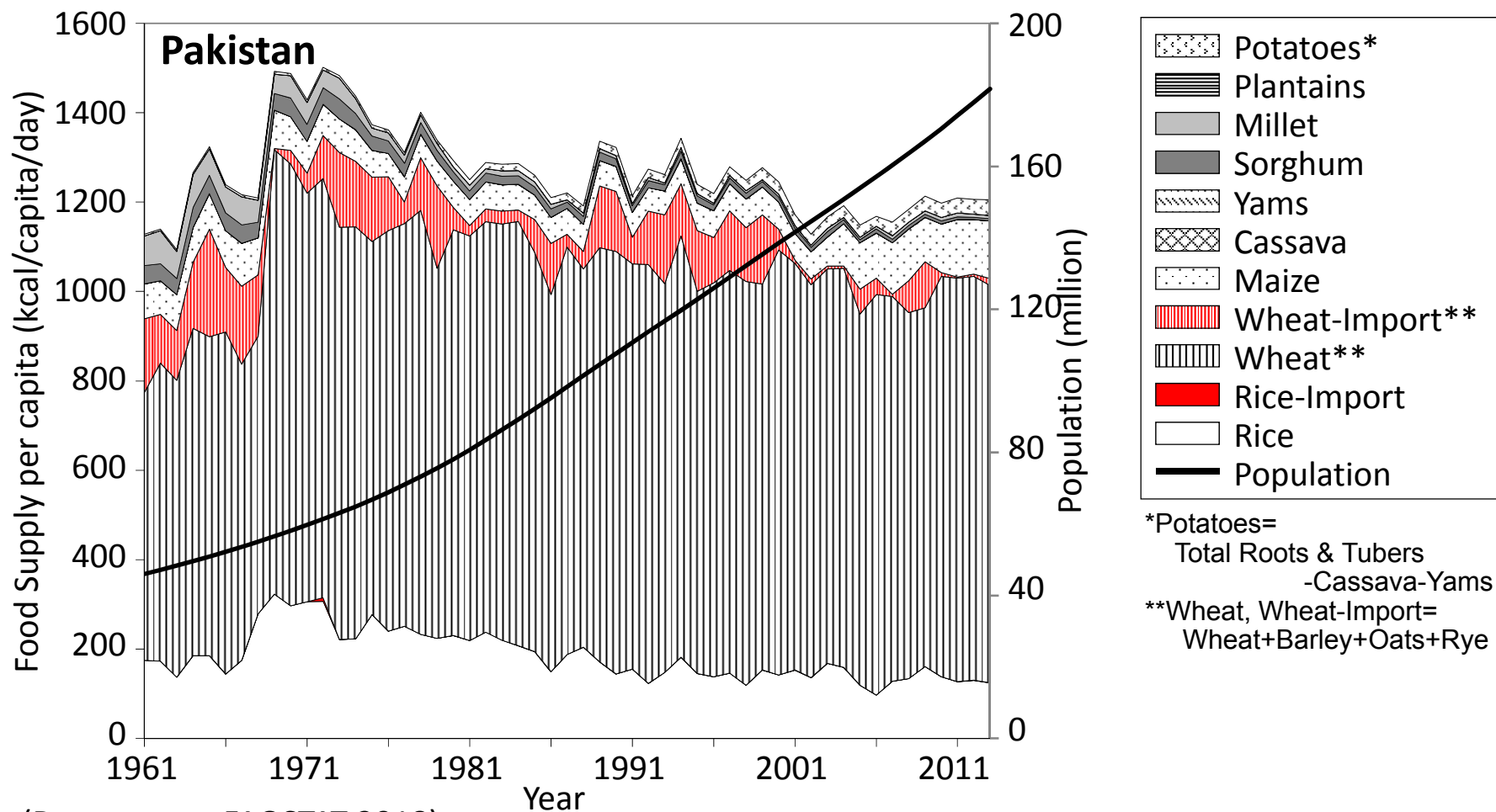
We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.



(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Pakistan (No.10 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Pakistan (No.10 rice producing country in Asia) during 1961-2013.

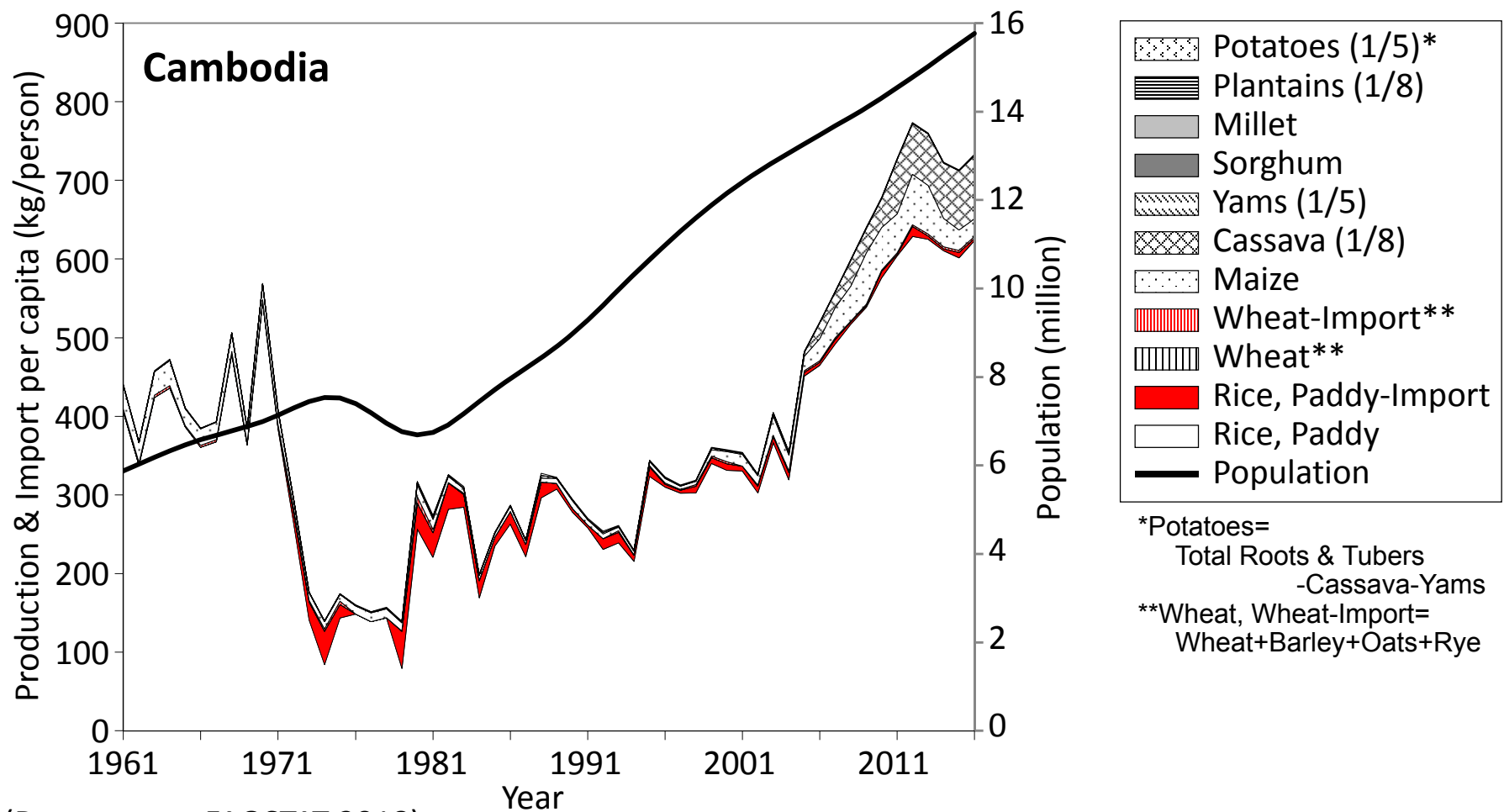
We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

Table. Rice Value Trends in Japan (No.9 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	96.4	102	109	116	120	124	126	127	128	129	129	128	128
Area harvested (10,000 ha)	328	320	269	259	229	215	212	186	169	163	165	157	148
Index (%) of area harvested (100 for mean of 1971-1980)	124	121	102	98.1	86.8	81.3	80.5	70.3	64.1	61.6	62.4	59.4	56.0
Irrigated rice area harvested (10,000 ha)	313	309	263	258	227	212	212	186	169	163	165	157	
Index (%) of irrigated area (100 for mean of 1971-1980)	120	119	101	98.9	87.0	81.6	81.2	71.3	65.0	62.5	63.3	60.2	
Percent of Irrigated rice area harvested (%)	95.4	96.5	97.9	99.4	98.9	99.0	99.6	100	100	100	100	100	
Paddy production (10,000 ton)	1644	1776	1569	1502	1361	1326	1269	1200	1089	1103	1076	1049	804
Index (%) of paddy production (100 for mean of 1971-1980)	107	116	102	97.8	88.6	86.4	82.6	78.1	70.9	71.8	70.1	68.3	52.4
Production (10,000 ton, milled rice)	1028	1110	980	939	851	829	793	750	680	689	673	656	503
Paddy yield (ton/ha)	5.01	5.55	5.83	5.79	5.93	6.18	5.97	6.46	6.43	6.78	6.53	6.69	5.44
Index (%) of paddy yield (100 for mean of 1971-1980)	86.3	95.5	100	99.6	102	106	103	111	111	117	112	115	93.6
Yield (ton/ha, milled rice)	3.13	3.47	3.64	3.62	3.71	3.86	3.73	4.04	4.02	4.24	4.08	4.18	3.40
Imported quantity (1,000 ton, milled rice)	446	338	35.0	31.0	65.0	17.6	193	547	687	596	636	683	686
Self-Sufficiency ratio (%)	95.9	97.1	99.6	99.7	99.3	99.8	97.9	93.2	90.8	92.0	91.4	90.6	88.0
Imported rice price (\$/ton, milled rice)	137	145	275	356	384	250	474	541	384	700	696	728	641
Consumption per capita (kg/person, milled rice)	111	112	89.8	81.4	71.2	67.3	64.6	63.3	58.5	58.3	57.3	56.4	44.7

Table. Rice Value Trends in Pakistan (No.10 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	48.4	55.1	63.1	73.3	86.4	101	117	132	148	164	164	182	193
Area harvested (10,000 ha)	129	150	155	193	196	206	211	238	239	296	266	266	277
Index (%) of area harvested (100 for mean of 1971-1980)	74.0	86.3	89.2	111	113	118	121	137	137	170	153	153	159
Irrigated rice area harvested (10,000 ha)	129	150	155	193	196	206	211	238	239	268	266	264	
Index (%) of irrigated area (100 for mean of 1971-1980)	74.0	86.3	89.2	111	113	118	121	137	137	154	153	152	
Percent of Irrigated rice area harvested (%)	100	100	100	100	100	100	100	100	100	90.5	100	99.3	
Paddy production (10,000 ton)	182	285	359	459	493	492	533	698	713	1043	890	974	1041
Index (%) of paddy production (100 for mean of 1971-1980)	44.6	69.6	87.8	112	121	120	130	171	174	255	217	238	254
Production (10,000 ton, milled rice)	114	178	225	287	308	308	333	436	446	652	556	609	651
Paddy yield (ton/ha)	1.42	1.88	2.32	2.38	2.51	2.39	2.52	2.93	2.98	3.52	3.33	3.66	3.76
Index (%) of paddy yield (100 for mean of 1971-1980)	60.3	80.2	98.7	101	107	102	107	125	127	150	142	156	160
Yield (ton/ha, milled rice)	0.88	1.18	1.45	1.49	1.57	1.50	1.58	1.83	1.86	2.20	2.08	2.29	2.35
Imported quantity (1,000 ton, milled rice)	0.36	0.04	12.03	0.01	0.01	0.26	2.56	0.93	6.50	3.54	2.97	24.3	12.0
Self-Sufficiency ratio (%)	100	100	99.5	100	100	100	99.9	100	99.8	99.9	99.9	99.6	99.8
Imported rice price (\$/ton, milled rice)	219	189	165	629	1039	723	362	499	472	346	1422	2319	2795
Consumption per capita (kg/person, milled rice)	23.6	32.1	35.8	39.1	35.9	30.4	28.5	33.0	30.2	39.8	34.0	33.6	33.7

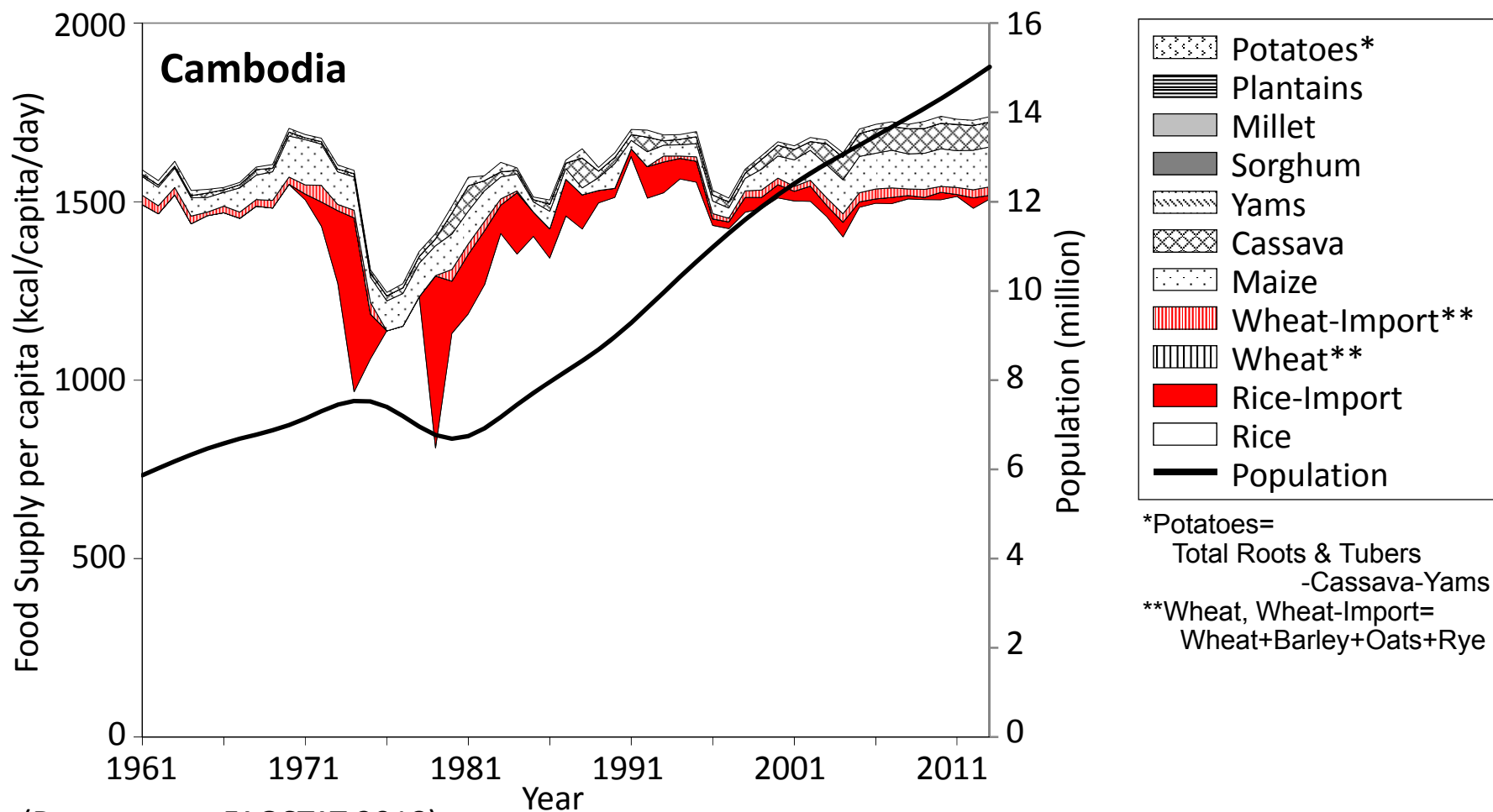


(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Cambodia (No.11 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

Long very sever civil war continued during 1970s-1990s, which made devastating decrease of paddy production and population as well.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Cambodia (No.11 rice producing country in Asia) during 1961-2013.

We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

Table. Rice Value Trends in Cambodia (No.11 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	6.18	6.78	7.39	7.00	7.20	8.45	9.97	11.6	12.8	13.9	13.9	15.0	15.8
Area harvested (10,000 ha)	228	217	111	104	139	169	173	195	215	261	263	292	287
Index (%) of area harvested (100 for mean of 1971-1980)	212	202	103	96.9	130	157	161	181	200	243	244	271	266
Irrigated rice area harvested (10,000 ha)	4.97	6.59	6.14	7.45	14.1	27.0	28.7	27.3	31.1	51.0	51.0	51.0	
Index (%) of irrigated area (100 for mean of 1971-1980)	73.1	97.1	90.4	110	207	397	423	402	458	751	750	751	
Percent of Irrigated rice area harvested (%)	2.17	3.03	5.53	7.14	10.1	16.0	16.6	14.0	14.5	19.5	19.4	17.5	
Paddy production (10,000 ton)	246	288	148	107	171	232	254	368	456	718	720	922	983
Index (%) of paddy production (100 for mean of 1971-1980)	193	225	116	83.8	134	181	198	288	357	562	563	722	769
Production (10,000 ton, milled rice)	154	180	92.8	66.9	107	145	158	230	285	448	450	576	614
Paddy yield (ton/ha)	1.08	1.32	1.29	1.00	1.23	1.37	1.46	1.89	2.11	2.75	2.73	3.16	3.43
Index (%) of paddy yield (100 for mean of 1971-1980)	94.0	115	113	87.1	107	120	127	165	184	240	239	276	299
Yield (ton/ha, milled rice)	0.67	0.82	0.81	0.62	0.77	0.86	0.91	1.18	1.32	1.72	1.71	1.98	2.14
Imported quantity (1,000 ton, milled rice)	0.00	0.21	92.2	67.7	101	65.8	63.4	46.4	58.5	27.6	40.0	53.5	26.6
Self-Sufficiency ratio (%)	100	100	87.3	90.3	91.1	95.5	96.1	98.1	97.9	99.4	99.1	99.1	99.6
Imported rice price (\$/ton, milled rice)	-	92.1	266	315	305	290	294	199	153	279	389	237	364
Consumption per capita (kg/person, milled rice)	249	265	139	106	163	179	165	202	226	325	326	387	391

Table. Rice Value Trends in Republic of Korea (No.12 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	27.5	30.9	34.1	37.0	39.7	42.1	44.3	46.6	48.2	49.2	49.2	50.2	50.8
Area harvested (10,000 ha)	117	121	120	123	122	125	113	106	103	93.6	93.2	83.0	77.9
Index (%) of area harvested (100 for mean of 1971-1980)	96.4	99.6	98.7	101	101	103	93.3	87.4	84.7	77.2	76.8	68.5	64.2
Irrigated rice area harvested (10,000 ha)	68.4	93.0	104	109	92.7	112	87.3	89.9	83.8	74.6	74.1	68.7	
Index (%) of irrigated area (100 for mean of 1971-1980)	64.2	87.4	97.9	102	87.2	105	82.0	84.5	78.8	70.1	69.6	64.6	
Percent of Irrigated rice area harvested (%)	58.5	77.0	87.0	88.5	75.9	89.1	77.1	84.8	81.6	79.7	79.6	82.8	
Paddy production (10,000 ton)	481	521	591	746	758	791	683	710	668	647	621	561	562
Index (%) of paddy production (100 for mean of 1971-1980)	71.9	77.9	88.4	112	113	118	102	106	99.9	96.7	92.8	83.9	84.1
Production (10,000 ton, milled rice)	301	326	370	467	474	494	427	444	418	404	388	351	352
Paddy yield (ton/ha)	4.11	4.31	4.94	6.08	6.20	6.32	6.04	6.70	6.51	6.91	6.67	6.77	7.22
Index (%) of paddy yield (100 for mean of 1971-1980)	74.7	78.3	89.6	110	113	115	110	122	118	126	121	123	131
Yield (ton/ha, milled rice)	2.57	2.69	3.09	3.80	3.88	3.95	3.77	4.19	4.07	4.32	4.17	4.23	4.51
Imported quantity (1,000 ton, milled rice)	23.5	337	533	251	574	1.14	1.15	96.4	132	283	265	420	313
Self-Sufficiency ratio (%)	99.3	91.3	87.5	94.3	91.0	100	100	97.9	96.9	93.5	93.6	89.4	91.8
Imported rice price (\$/ton, milled rice)	141	208	298	316	390	358	409	401	377	690	714	796	847
Consumption per capita (kg/person, milled rice)	110	116	124	133	134	117	96.4	97.3	89.4	87.9	84.2	78.3	75.4

Table. Rice Value Trends in Nepal (No.13 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	10.6	11.5	12.8	14.3	16.0	17.9	20.3	22.8	24.9	26.5	26.5	28.0	29.0
Area harvested (10,000 ha)	110	115	121	126	133	142	140	153	154	155	152	147	136
Index (%) of area harvested (100 for mean of 1971-1980)	88.5	93.2	97.9	102	108	115	113	123	124	125	122	119	110
Irrigated rice area harvested (10,000 ha)	5.1	7.3	9.9	20.3	24.0	32.4	32.2	32.1	49.3	68.1	68.1	74.0	
Index (%) of irrigated area (100 for mean of 1971-1980)	33.6	48.0	65.7	134	159	214	213	212	326	450	450	489	
Percent of Irrigated rice area harvested (%)	4.63	6.29	8.20	16.1	18.0	22.8	23.0	21.0	32.0	43.9	44.9	50.2	
Paddy production (10,000 ton)	215	217	237	231	253	311	316	382	424	430	415	477	430
Index (%) of paddy production (100 for mean of 1971-1980)	91.9	92.9	101	98.7	108	133	135	164	181	184	178	204	184
Production (10,000 ton, milled rice)	134	136	148	144	158	194	197	239	265	269	259	298	269
Paddy yield (ton/ha)	1.96	1.88	1.95	1.82	1.89	2.18	2.25	2.50	2.75	2.78	2.73	3.24	3.15
Index (%) of paddy yield (100 for mean of 1971-1980)	104	99.6	103	96.8	100	116	119	132	146	147	145	172	167
Yield (ton/ha, milled rice)	1.22	1.17	1.22	1.14	1.18	1.36	1.41	1.56	1.72	1.73	1.71	2.03	1.97
Imported quantity (1,000 ton, milled rice)	0.00	0.00	0.00	0.00	20.6	14.9	33.6	68.0	39.9	92.4	135	382	538
Self-Sufficiency ratio (%)	100	100	100	100	98.6	99.2	98.3	97.4	98.5	96.7	95.0	88.9	83.3
Imported rice price (\$/ton, milled rice)	-	-	-	-	335	170	188	229	209	244	280	359	431
Consumption per capita (kg/person, milled rice)	127	117	116	101	100	109	98.7	107	108	105	103	120	111

Table. Rice Value Trends in Sri Lanka (No.14 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	10.6	11.9	13.3	14.5	15.7	16.9	17.9	18.6	19.2	19.9	19.9	20.5	20.8
Area harvested (10,000 ha)	50.5	58.0	68.0	77.4	82.3	77.0	83.3	76.4	82.6	105	95.7	105	105
Index (%) of area harvested (100 for mean of 1971-1980)	69.5	79.8	93.5	106	113	106	115	105	114	145	132	144	145
Irrigated rice area harvested (10,000 ha)	36.8	38.0	43.8	47.4	56.6	55.7	59.3	55.8	64.0	72.2	72.2	76.0	
Index (%) of irrigated area (100 for mean of 1971-1980)	80.6	83.4	96.1	104	124	122	130	122	140	158	158	167	
Percent of Irrigated rice area harvested (%)	72.7	65.6	64.5	61.2	68.8	72.3	71.2	73.0	77.4	68.5	75.4	72.5	
Paddy production (10,000 ton)	96.7	130	136	177	239	236	256	254	290	388	366	393	412
Index (%) of paddy production (100 for mean of 1971-1980)	61.8	83.0	86.6	113	153	151	164	162	185	248	234	251	263
Production (10,000 ton, milled rice)	60.5	81.1	84.7	111	149	147	160	159	181	242	229	246	257
Paddy yield (ton/ha)	1.91	2.23	1.99	2.28	2.91	3.06	3.07	3.32	3.52	3.68	3.82	3.76	3.92
Index (%) of paddy yield (100 for mean of 1971-1980)	89.3	105	93.3	107	136	144	144	155	165	172	179	176	183
Yield (ton/ha, milled rice)	1.19	1.40	1.25	1.42	1.82	1.91	1.92	2.07	2.20	2.30	2.39	2.35	2.45
Imported quantity (1,000 ton, milled rice)	517	402	342	297	125	174	118	196	94.7	99.2	93.9	199	29.5
Self-Sufficiency ratio (%)	54.2	66.9	71.2	78.7	92.4	89.5	93.1	88.7	95.0	96.1	96.1	92.6	98.9
Imported rice price (\$/ton, milled rice)	101	128	203	235	257	254	259	240	244	564	445	607	435
Consumption per capita (kg/person, milled rice)	106	101	89.8	96.7	103	97.7	95.9	96.1	99.2	126	119	129	125

Table. Rice Value Trends in Lao People's Democratic Republic (No.15 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	2.27	2.56	2.91	3.17	3.50	4.02	4.62	5.15	5.58	6.05	6.05	6.50	6.76
Area harvested (10,000 ha)	72.8	77.5	67.2	61.7	69.9	59.1	56.9	64.2	75.0	78.6	78.6	91.3	97.3
Index (%) of area harvested (100 for mean of 1971-1980)	113	120	104	95.7	108	91.7	88.3	100	116	122	122	142	151
Irrigated rice area harvested (10,000 ha)	0.09	0.11	0.20	0.54	1.01	1.16	1.34	9.14	8.08	9.51	9.51	11.7	
Index (%) of irrigated area (100 for mean of 1971-1980)	23.0	29.6	54.4	146	273	313	362	2471	2185	2570	2570	3162	
Percent of Irrigated rice area harvested (%)	0.12	0.14	0.30	0.87	1.44	1.96	2.35	14.2	10.8	12.1	12.1	12.8	
Paddy production (10,000 ton)	60.9	82.7	86.5	79.9	121	131	139	181	244	297	291	361	415
Index (%) of paddy production (100 for mean of 1971-1980)	73.2	99.3	104	96.0	146	158	168	218	294	357	350	434	498
Production (10,000 ton, milled rice)	38.1	51.7	54.1	50.0	75.8	81.9	87.1	113	153	186	182	226	259
Paddy yield (ton/ha)	0.84	1.11	1.29	1.29	1.75	2.21	2.45	2.80	3.26	3.78	3.70	3.95	4.26
Index (%) of paddy yield (100 for mean of 1971-1980)	65	86	100	100	136	172	190	218	253	293	288	307	331
Yield (ton/ha, milled rice)	0.53	0.69	0.80	0.81	1.09	1.38	1.53	1.75	2.04	2.36	2.31	2.47	2.66
Imported quantity (1,000 ton, milled rice)	109	66.9	57.7	79.2	27.9	3.95	14.2	21.1	25.4	23.7	30.3	55.1	228
Self-Sufficiency ratio (%)	77.4	88.5	90.4	86.2	96.4	100	98.4	98.0	98.4	98.7	98.4	97.9	91.9
Imported rice price (\$/ton, milled rice)	100	106	184	335	328	222	356	320	187	337	337	492	374
Consumption per capita (kg/person, milled rice)	215	228	206	182	224	205	192	223	278	311	306	356	417

Table. Rice Value Trends in Democratic People's Republic of Korea (No.16 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

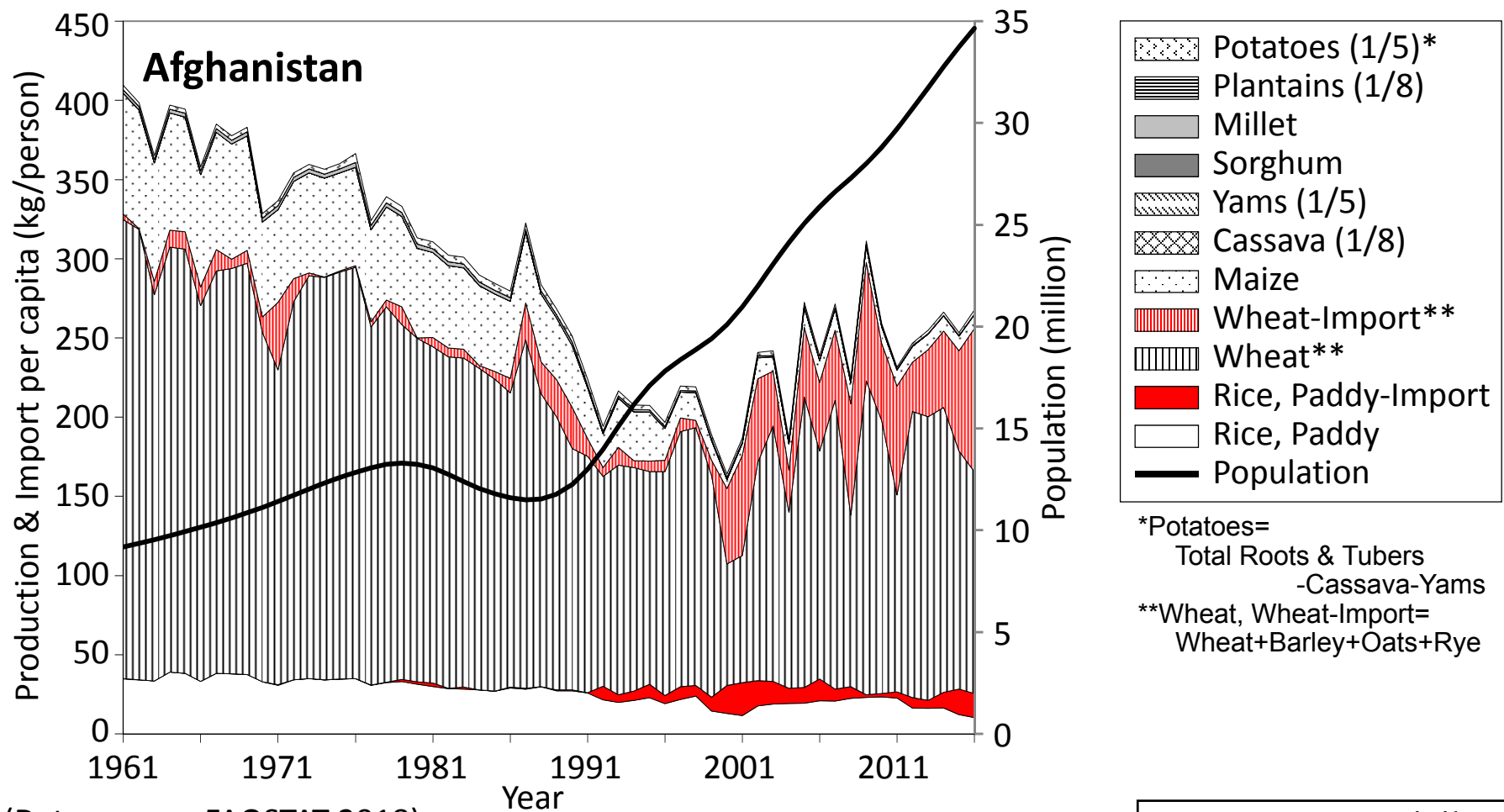
	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	12.1	13.6	15.6	17.0	18.3	19.7	21.3	22.5	23.5	24.3	24.3	25.0	25.4
Area harvested (10,000 ha)	45.4	51.2	57.1	64.9	64.9	63.3	58.7	57.7	58.1	57.0	57.5	53.4	46.9
Index (%) of area harvested (100 for mean of 1971-1980)	74.4	83.9	93.6	106	106	104	96.2	94.6	95.2	93.5	94.3	87.6	76.8
Irrigated rice area harvested (10,000 ha)	20.4	20.4	28.6	43.3	43.5	42.4	42.0	43.9	47.8	51.7	51.7	51.7	
Index (%) of irrigated area (100 for mean of 1971-1980)	56.8	56.8	79.5	120	121	118	117	122	133	144	144	144	
Percent of Irrigated rice area harvested (%)	45.0	39.9	50.1	66.7	67.1	67.0	71.6	76.0	82.2	90.6	89.9	96.8	
Paddy production (10,000 ton)	197	214	257	292	228	214	372	186	229	286	239	276	254
Index (%) of paddy production (100 for mean of 1971-1980)	71.9	78.0	93.7	106	83.3	77.9	136	67.8	83.5	104	87.3	101	92.5
Production (10,000 ton, milled rice)	123	134	161	182	143	133	233	116	143	179	150	173	159
Paddy yield (ton/ha)	4.35	4.17	4.50	4.49	3.51	3.37	6.33	3.23	3.94	5.02	4.17	5.21	5.41
Index (%) of paddy yield (100 for mean of 1971-1980)	96.7	92.8	100	99.9	78.2	75.0	141	71.8	87.6	112	92.7	116	120
Yield (ton/ha, milled rice)	2.72	2.61	2.81	2.81	2.20	2.11	3.96	2.02	2.46	3.14	2.60	3.26	3.38
Imported quantity (1,000 ton, milled rice)	0.00	0.00	0.00	8.00	0.00	29.2	261	442	775	66.9	243	91.1	41.9
Self-Sufficiency ratio (%)	100	100	100	99.6	100	97.9	88.8	72.7	64.8	96.4	86.8	95.0	97.4
Imported rice price (\$/ton, milled rice)	-	-	-	350	-	205	243	289	234	299	361	660	665
Consumption per capita (kg/person, milled rice)	102	98.0	103	108	78.3	69.3	122	71.1	93.7	76.3	71.5	72.8	64.1

Table. Rice Value Trends in Islamic Republic of Iran (No.17 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	23.7	27.1	31.0	36.1	43.7	52.9	59.0	63.9	68.8	72.8	72.9	77.4	80.3
Area harvested (10,000 ha)	31.2	37.4	41.0	40.9	45.8	50.2	57.9	58.0	59.6	52.7	57.5	54.7	55.7
Index (%) of area harvested (100 for mean of 1971-1980)	76.2	91.3	100	99.9	112	122	141	142	145	129	140	133	136
Irrigated rice area harvested (10,000 ha)	31.2	37.4	41.0	40.9	45.8	50.2	57.9	58.0	59.6	52.7	57.5	54.7	
Index (%) of irrigated area (100 for mean of 1971-1980)	76.2	91.3	100	99.9	112	122	141	142	145	129	140	133	
Percent of Irrigated rice area harvested (%)	100	100	100	100	100	100	100	100	100	100	100	100	
Paddy production (10,000 ton)	85.1	102	126	141	154	177	231	243	262	207	239	228	239
Index (%) of paddy production (100 for mean of 1971-1980)	63.7	76.5	94.5	105	115	132	173	181	196	155	179	170	178
Production (10,000 ton, milled rice)	53.2	63.9	79.0	88.2	96.3	111	144	152	164	129	150	142	149
Paddy yield (ton/ha)	2.7	2.7	3.1	3.5	3.4	3.5	4.0	4.2	4.4	3.9	4.2	4.2	4.3
Index (%) of paddy yield (100 for mean of 1971-1980)	82.8	83.7	94.2	106	102	108	122	127	134	120	127	127	131
Yield (ton/ha, milled rice)	1.7	1.7	1.9	2.2	2.1	2.2	2.5	2.6	2.7	2.5	2.6	2.6	2.7
Imported quantity (1,000 ton, milled rice)	16.3	14.1	128	364	504	540	874	792	933	1199	1079	1355	1058
Self-Sufficiency ratio (%)	97.2	97.9	87.2	71.1	65.5	68.7	63.8	65.9	63.7	51.9	58.2	52.1	58.5
Imported rice price (\$/ton, milled rice)	141	163	383	492	468	398	442	384	301	455	626	1108	961
Consumption per capita (kg/person, milled rice)	23.0	24.2	29.5	34.7	33.6	31.1	39.3	36.2	37.3	34.2	35.4	35.9	31.8

Table. Rice Value Trends in Malaysia (No.18 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	8.97	10.3	11.6	13.1	14.8	17.0	19.5	22.1	24.7	27.1	27.1	29.7	31.2
Area harvested (10,000 ha)	55.0	64.4	74.9	69.9	66.8	66.5	68.4	68.8	67.6	65.7	66.6	65.5	70.8
Index (%) of area harvested (100 for mean of 1971-1980)	76.0	89.0	103	96.6	92.3	91.9	94.6	95.1	93.4	90.7	92.0	90.5	97.9
Irrigated rice area harvested (10,000 ha)	40.8	41.9	50.2	46.5	43.7	39.9	44.2	42.7	40.2	37.5	37.5	37.6	
Index (%) of irrigated area (100 for mean of 1971-1980)	84.4	86.6	103.8	96.2	90.5	82.6	91.4	88.3	83.1	77.6	77.5	77.8	
Percent of Irrigated rice area harvested (%)	74.1	65.0	67.0	66.6	65.5	60.0	64.5	62.0	59.4	57.1	56.3	57.4	
Paddy production (10,000 ton)	115	143	195	191	179	173	206	209	223	235	238	227	225
Index (%) of paddy production (100 for mean of 1971-1980)	59.9	74.1	101	99.0	93.0	90.0	107	109	116	122	123	118	117
Production (10,000 ton, milled rice)	72.1	89.2	122	119	112	108	129	131	139	147	149	142	141
Paddy yield (ton/ha)	2.10	2.21	2.60	2.72	2.68	2.61	3.01	3.04	3.29	3.58	3.57	3.45	3.18
Index (%) of paddy yield (100 for mean of 1971-1980)	78.8	83.0	97.7	102	101	97.9	113	114	124	135	134	130	120
Yield (ton/ha, milled rice)	1.31	1.38	1.62	1.70	1.67	1.63	1.88	1.90	2.06	2.24	2.23	2.16	1.99
Imported quantity (1,000 ton, milled rice)	440	333	245	261	388	274	400	615	499	1107	945	984	822
Self-Sufficiency ratio (%)	62.2	72.6	83.4	81.8	74.1	80.1	76.3	68.0	73.7	57.1	61.3	58.7	63.1
Imported rice price (\$/ton, milled rice)	129	153	278	313	311	276	314	342	284	735	506	558	459
Consumption per capita (kg/person, milled rice)	130	119	126	111	102	79.6	86.6	87.1	76.6	95.1	89.6	81.2	71.5



(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Afghanistan (No.21 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.

Long very severe civil and international wars has been continued since at the end of 170 to date, which made devastating decrease of population during 1980 to 1990. Wheat, paddy and maize production never became to the level of 1960s

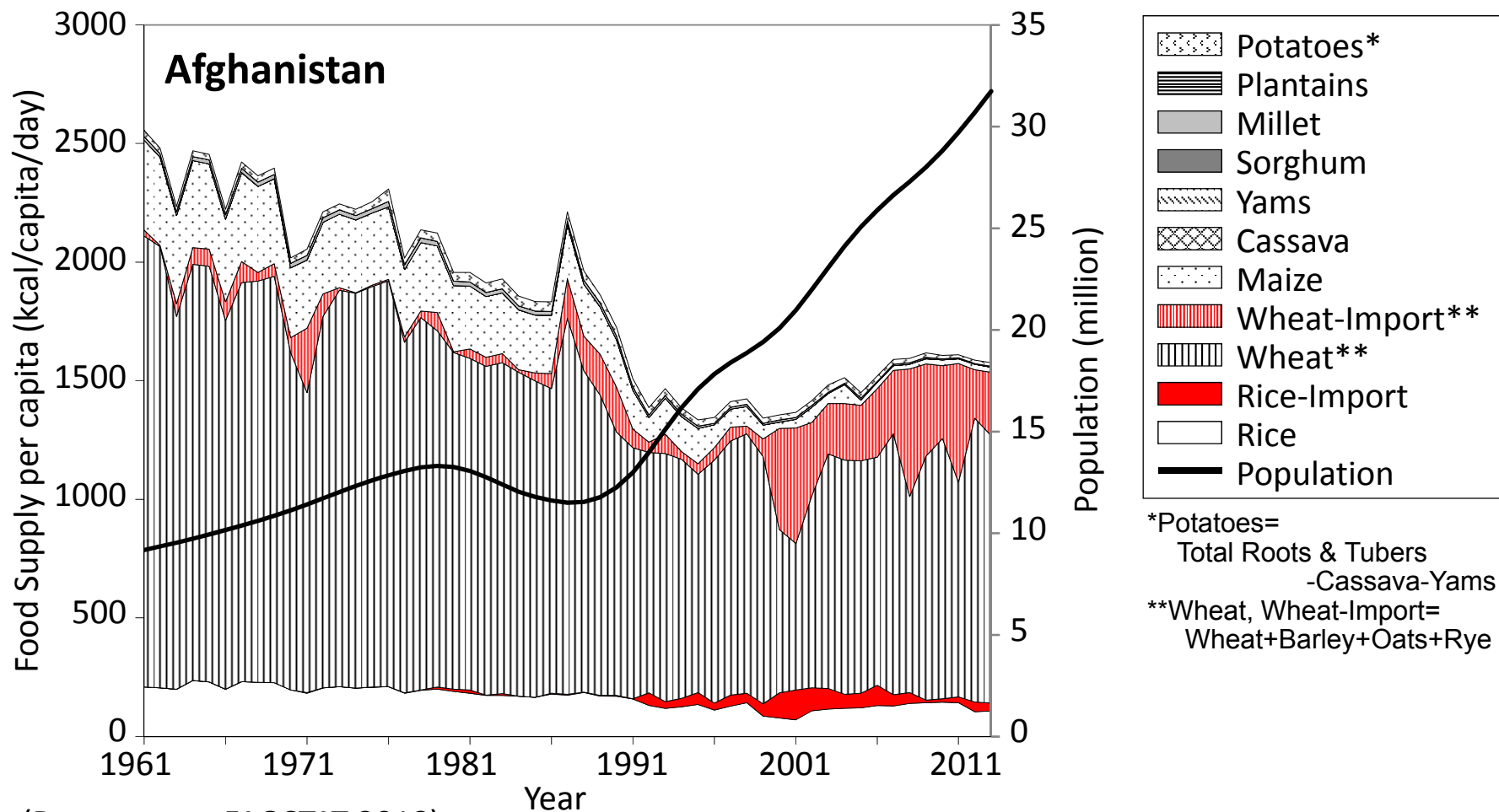
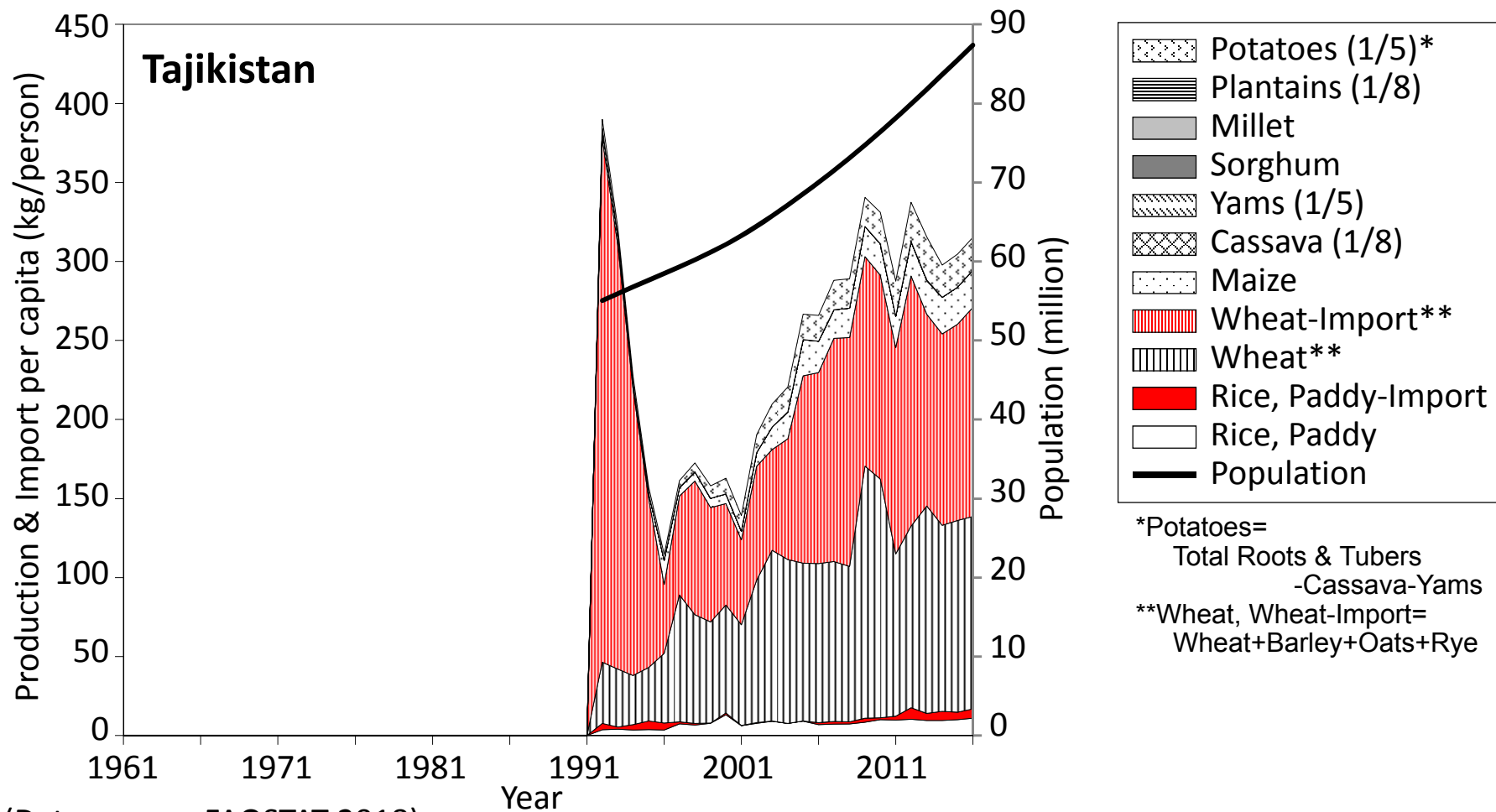


Fig. Various Food Supply (kcal/capita/day) in Afghanistan (No.21 rice producing country in Asia) during 1961-2013.

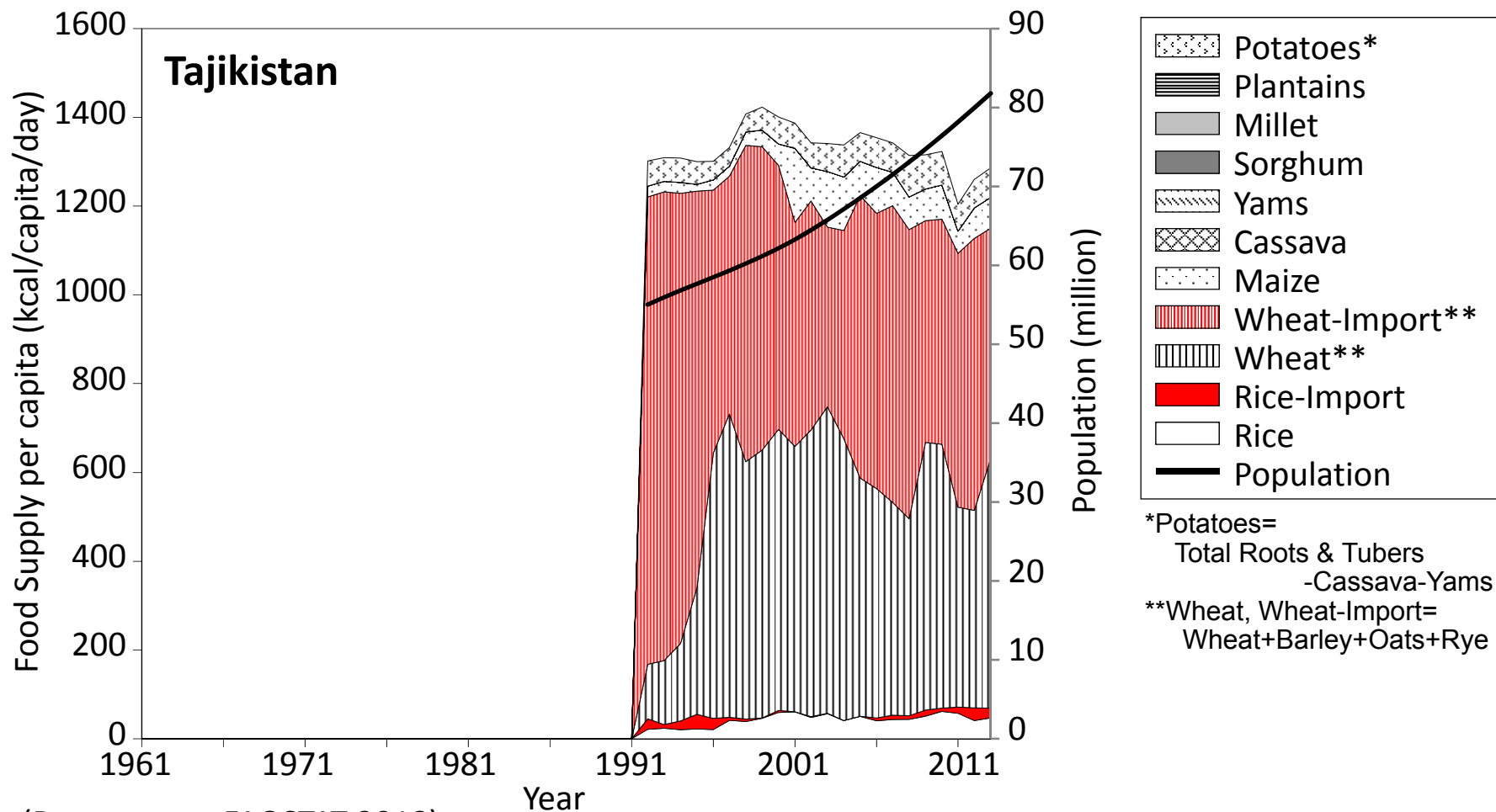
We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.



(Data source: FAOSTAT 2018)

Fig. Various Food Production & Import (kg/person) in Tajikistan (No.27 rice producing country in Asia) during 1961-2016.

Cereal equivalent amounts of calories per kg are one fifth for Potato & plantain, one fourth for Yam and cassava (FAO Food composition data). In addition to these, postharvest and storage losses are estimated 2 times bigger than cereals for Cassava, 1.6 times for plantain, 1.3 times for Yam, and 1.0 for potatoes. Thus the cereals conversion ratios of potatoes and Yams are 1/5 and 1/8 for Plantains and Cassava.



(Data source: FAOSTAT 2018)

Fig. Various Food Supply (kcal/capita/day) in Tajikistan (No.27 rice producing country in Asia) during 1961-2013.

We used that the cereals' equivalent coefficients of 1/8 for Cassava and Plantains as well as 1/5 for Yam and Potatoes. These conversion factors can be tentatively verified if we compare figure on per capita production and importation amounts in kg and per capita consumption in kcal.

Table. Rice Value Trends in Afghanistan (No.21 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	9.54	10.6	12.0	13.1	12.4	11.7	15.1	18.9	23.0	27.3	27.3	31.7	34.7
Area harvested (10,000 ha)	21.4	20.8	20.8	20.5	15.7	16.7	17.5	16.1	15.1	19.0	18.6	20.1	11.9
Index (%) of area harvested (100 for mean of 1971-1980)	104	101	101	99.4	75.9	81.0	84.5	77.9	73.1	91.9	89.8	97.1	57.6
Irrigated rice area harvested (10,000 ha)	21.4	20.8	20.8	20.5	15.7	16.7	17.5	16.1	15.1	19.0	18.6	19.9	
Index (%) of irrigated area (100 for mean of 1971-1980)	104	101	101	99.4	75.9	81.0	84.5	77.9	73.1	91.9	89.8	96.2	
Percent of Irrigated rice area harvested (%)	100	100	100	100	100	100	100	100	100	100	100	99.0	
Paddy production (10,000 ton)	34.3	38.2	40.5	42.6	35.1	33.1	33.3	34.6	40.2	61.2	60.4	52.6	35.7
Index (%) of paddy production (100 for mean of 1971-1980)	82.6	91.8	97.5	103	84.5	79.7	80.2	83.3	96.8	147	145	127	85.8
Production (10,000 ton, milled rice)	21.5	23.9	25.3	26.6	21.9	20.7	20.8	21.6	25.2	38.3	37.8	32.9	22.3
Paddy yield (ton/ha)	1.60	1.84	1.95	2.08	2.24	1.99	1.91	2.13	2.65	3.22	3.26	2.62	3.00
Index (%) of paddy yield (100 for mean of 1971-1980)	79.7	91.3	96.7	103	111	98.8	95.1	106	132	160	162	130	149
Yield (ton/ha, milled rice)	1.00	1.15	1.22	1.30	1.40	1.24	1.19	1.33	1.66	2.01	2.04	1.63	1.87
Imported quantity (1,000 ton, milled rice)	0.00	0.00	0.60	5.90	6.00	3.73	54.4	110	199	125	109	168	331
Self-Sufficiency ratio (%)	100	100	99.7	97.9	97.6	98.2	80.5	67.1	55.6	75.4	78.7	67.7	40.2
Imported rice price (\$/ton, milled rice)	-	-	186	286	336	513	241	165	184	421	434	648	523
Consumption per capita (kg/person, milled rice)	22.5	22.5	21.1	20.7	18.1	18.0	17.4	17.2	19.6	18.6	17.9	15.6	16.0

Table. Rice Value Trends in Tajikistan (No.27 rice producing country in Asia during 2011-2015) during 1961-2016. Data source: FAOSTAT 2018; Conversion ratio: Paddy x 0.625 = Milled rice amount; All data are mean of five years except for 2008 and 2016 as well as missing annual data.

	1961 -1965	1966 -1970	1971 -1975	1976 -1980	1981 -1985	1986 -1990	1991 -1995	1996 -2000	2001 -2005	2008	2006 -2010	2011 -2015	2016
Population (million)	-	-	-	-	-	-	5.64	6.03	6.58	7.31	7.32	8.18	8.73
Area harvested (10,000 ha)	-	-	-	-	-	-	1.19	1.71	1.66	1.03	1.44	1.22	1.37
Index (%) of area harvested (100 for mean of 1991-2000)	-	-	-	-	-	-	82.0	118	115	71.0	99.7	84.4	94.6
Irrigated rice area harvested (10,000 ha)	-	-	-	-	-	-	0.09	0.11	0.12	0.14	0.14	0.15	
Index (%) of irrigated area (100 for mean of 1991-2000)	-	-	-	-	-	-	92.4	108	123	142	141	148	
Percent of Irrigated rice area harvested (%)	-	-	-	-	-	-	7.79	6.30	7.40	13.8	9.80	12.1	
Paddy production (10,000 ton)	-	-	-	-	-	-	2.11	4.69	5.26	5.40	5.90	8.06	9.65
Index (%) of paddy production (100 for mean of 1991-2000)	-	-	-	-	-	-	62.1	138	155	159	173	237	284
Production (10,000 ton, milled rice)	-	-	-	-	-	-	1.32	2.93	3.29	3.37	3.69	5.04	6.03
Paddy yield (ton/ha)	-	-	-	-	-	-	1.80	2.63	3.17	5.26	4.20	6.64	7.05
Index (%) of paddy yield (100 for mean of 1991-2000)	-	-	-	-	-	-	81.1	119	143	237	190	300	318
Yield (ton/ha, milled rice)	-	-	-	-	-	-	1.12	1.65	1.98	3.29	2.63	4.15	4.41
Imported quantity (1,000 ton, milled rice)	-	-	-	-	-	-	12.8	5.69	0.45	6.47	7.07	25.2	32.3
Self-Sufficiency ratio (%)	-	-	-	-	-	-	53.2	82.0	98.7	83.9	83.9	67.6	65.1
Imported rice price (\$/ton, milled rice)	-	-	-	-	-	-	280	387	274	507	508	639	312
Consumption per capita (kg/person, milled rice)	-	-	-	-	-	-	4.60	5.78	5.05	5.50	5.98	9.23	10.6

