Food and Agriculture
Organization of the
United Nations

World fertilizer trends and outlook to 2020

SUMMARY REPORT

World **fertilizer** trends and outlook to **2020**

SUMMARY REPORT

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS - Rome, 2017

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Preface

FAO, in collaboration with other members of the Fertilizer Outlook Expert Group dealing with fertilizer production, consumption and trade, annually provides five-year forecasts of world and regional nitrogen, phosphate and potassium fertilizer supply, demand and potential balance.

The Fertilizer Outlook Expert Group comprises:

- Fertiliser Association of India – FAI
- International Fertilizer Association – IFA
- International Fertilizer Development Center – IFDC
- K+S KALI GmbH – K+S
- The Fertilizer Institute – TFI
- Fertilizers Europe
- Food and Agriculture Organization of the United Nations – FAO

FAO and other members of the Fertilizer Outlook Expert Group met in June 2016 to review the medium-term supply and demand prospects for nitrogen, phosphate and potassium fertilizer, and to prepare forecasts for the period 2016-2020, the results of which are presented in this report.

The contributions made by the members of the Fertilizer Outlook Expert Group, and the preparation of the FAO baseline data by Simona Mosco, Javier Montero-Serrano and Francesco Tubiello from the FAO Statistics Division, are gratefully acknowledged. This final report was prepared by Debra Turner, Plant Nutrition Officer FAO, under the supervision of Caterina Batello, Senior Officer FAO, and overall direction of Hans Dryer, Director Plant Production and Protection Division FAO.

The forecast data presented in this report are based on the expert views of the different organizations participating in the June 2016 "FAO/Fertilizer Outlook Expert Group" meeting. They are not necessarily consistent with the FAOSTAT historical data series.

Technical notes on supply, demand and balances

All references relating to fertilizers are in terms of the three primary plant nutrients as follows:

- nitrogen (N)
- phosphorus (P), expressed as phosphate (P_2O_5)
- potassium (K), expressed as potash (K_2O)

The fertilizer demand and supply data refer to calendar years.

Definitions of the terms used are provided below:

Capacity:

nameplate capacity.

Supply:

effective capacity, representing the maximum achievable production. Supply is computed from the "nameplate capacity" (theoretical capacity), multiplied by the highest operating rate achieved in the previous 5 years. For new plants, a ramp up of the operating rates was established for the first 3 years of operation, ranging from 85 to 100 percent. Nameplate capacity operating rates and demand for fertilizers vary from year to year. In the case of phosphate, the supply data in this report are restricted to phosphoric acid (H_3PO_4).

Demand:

Fertilizer demand is the purchase of fertilizer at a given point in time. The forecast is based on the views of the Fertilizer Outlook Expert Group.

Non-fertilizer demand is consumption for non-fertilizer use and is referred to as industrial and other demand. Net non-fertilizer demand excludes the use

of nutrients (N, P_2O_5 or K_2O) that are recovered as by-product from industrial processes and then used as fertilizer.

Phosphate fertilizer consumption/demand includes H_3PO_4-based fertilizer demand and non-H_3PO_4 fertilizer demand. The non-H_3PO_4 fertilizer demand includes P_2O_5 through single super phosphate, rock phosphate, etc.

Total demand is fertilizer demand + non-fertilizer demand.

Compound annual growth rate (CAGR) is the is the mean annual growth rate and calculated with the following formula:

$$CAGR = \left(\frac{End\ value}{Start\ value}\right)^{\left(\frac{1}{number\ of\ years}\right)} - 1$$

Potential balance:

is the difference between supply and total demand (fertilizer demand + non-fertilizer demand). Regional balance is a medium-term indicator of potential changes in fertilizer nutrient demand and supply in the region. Installed supply capacity, operating rates and demand vary annually.

Summary

World consumption of the three main fertilizer nutrients, nitrogen (N), phosphorus expressed as phosphate (P_2O_5), and potassium expressed as potash (K_2O), is estimated to reach 186.67 million tonnes (N, P_2O_5 and K_2O) in 2016, up by 1.4 percent over 2015 consumption levels. The demand for N, P_2O_5, and K_2O is forecast to grow annually on average by 1.5, 2.2, and 2.4 percent respectively from 2015 to 2020. Over the next five years, the global capacity of the production of fertilizers, intermediates and raw materials is also expected to increase.

The world fertilizer **outlook**

SUPPLY

The global total nutrient capacity (N, P_2O_5 and K_2O) was 285.15 million tonnes in 2015 (Table 1), out of which the total supply was 245.77 million tonnes (Table 2). During 2016, the total capacity is expected to increase by 3.7 percent and supply to grow by 1.7 percent. Over the following four years to 2020 global capacity and production of fertilizers are expected to increase further. Table 2 shows estimated world supply of ammonia (NH_3), phosphoric acid (H_3PO_4) and potash from 2015 to 2020. Detailed regional and sub-regional information is provided in Annexes 1, 2 and 3.

Table 1. Total world nutrient capacity of ammonia, phosphoric acid and potash, 2015-2020 (thousand tonnes)

Year	2015	2016	2017	2018	2019	2020
Ammonia (NH_3) as N	174 781	181 228	185 222	186 804	186 920	188 310
Phosphoric acid (H_3PO_4) as P_2O_5	57 422	58 385	60 955	61 995	63 036	64 677
Potash as K_2O	52 942	55 974	58 111	61 576	62 136	64 486
Total (N+ P_2O_5+K_2O)	**285 145**	**295 587**	**304 287**	**310 374**	**312 092**	**317 474**

Table 2. World supply of ammonia, phosphoric acid and potash, 2015-2020 (thousand tonnes)

Year	2015	2016	2017	2018	2019	2020
Ammonia (NH_3) as N	154 773	158 850	166 402	168 987	169 693	170 761
Phosphoric acid (H_3PO_4) as P_2O_5	47 424	48 394	49 558	51 190	52 361	53 078
Potash as K_2O	43 571	42 772	44 868	47 249	48 898	49 545
Total (N+ P_2O_5+K_2O)	**245 768**	**250 016**	**260 828**	**267 426**	**270 952**	**273 384**

FERTILIZER DEMAND

Demand for non-fertilizer nutrient use

The global demand for non-fertilizer use of nutrients (N, P_2O_5 and K_2O) for 2015, and the forecast for global demand for non-fertilizer use of nutrients for 2016 to 2020 are summarized in Table 3. Total non-fertilizer nutrient use demand was estimated to be 44.93 million tonnes in 2015 and is forecast to reach 50.21 million tonnes by 2020.

The regional and sub-regional demand forecasts for nitrogen, phosphate and potash for non-fertilizer use for 2015 to 2020 are presented in Annexes 1, 2 and 3.

Table 3. World demand for non-fertilizer nutrient use, 2015-2020 (thousand tonnes)

Year	2015	2016	2017	2018	2019	2020
Nitrogen (N)	33 616	34 506	35 308	36 207	36 786	37 521
Phosphate (P_2O_5) (H_3PO_4-based)	5 684	6 038	6 209	6 528	6 692	6 803
Potash (K_2O)	5 626	5 524	5 586	5 654	5 720	5 886
Total	**44 926**	**46 067**	**47 103**	**48 388**	**49 197**	**50 210**

Demand for fertilizer nutrients

The global demand for fertilizer nutrients (N, P_2O_5 and K_2O) for 2015 and the demand forecast estimates for 2016 to 2020 are summarized in Table 4. Total fertilizer nutrient demand was estimated to be 184.02 million tonnes in 2015 and is forecast to reach 186.67 million tonnes in 2016. With an average annual growth of 1.9 percent in the following years, it is expected to reach 201.66 million tonnes by the end of 2020. The demand for N, P_2O_5, and K_2O is forecast to grow annually by 1.5, 2.2, and 2.4 percent respectively for the individual nutrients from 2015 to 2020.

The world and regional demand forecasts for the three main plant nutrients for 2015 to 2020 are presented in Annexes 1, 2 and 3, as well as in Annexes 4, 5 and 6 where compound annual growth rates (CAGR) are also provided.

Table 4. World demand for fertilizer nutrient use, 2015-2020 (thousand tonnes)

Year	2015	2016	2017	2018	2019	2020
Nitrogen (N)	110 027	111 575	113 607	115 376	117 116	118 763
Phosphate (P_2O_5)	41 151	41 945	43 195	44 120	45 013	45 858
Potash (K_2O)	32 838	33 149	34 048	34 894	35 978	37 042
Total (N+ P_2O_5+K_2O)	**184 017**	**186 668**	**190 850**	**194 390**	**198 107**	**201 663**

SUPPLY/DEMAND BALANCES

The potential balance of nitrogen, phosphate (H_3PO_4-based) and potash is derived from the maximum achievable production (supply) minus the forecasts for total demand as follows:

Potential balance = supply – (non-fertilizer demand + fertilizer demand)
where supply of each nutrient is referred to as:

- N through ammonia (NH_3)
- P_2O_5 through phosphoric acid (H_3PO_4)
- K_2O through potash (K_2O)

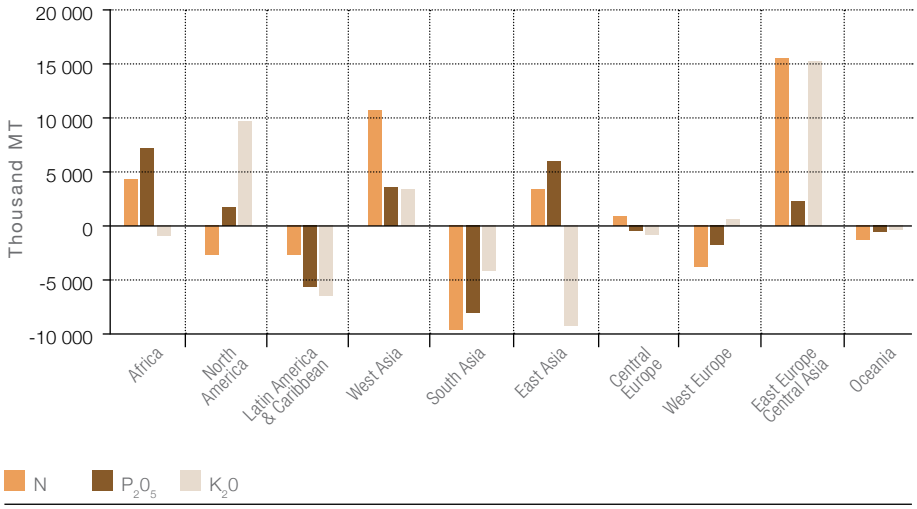
Unforeseen factors, such as feedstock and/or raw material limitations, logistical problems, unscheduled shut down due to technical reasons, natural calamities (earthquake, mine flooding, etc.) are not considered in the balance. Demand forecasts are based on agronomic considerations (e.g. cropped area and application rate of fertilizer), market feedback, estimates by industry associations, growth models, econometric models and expert advice.

The potential world balance of nitrogen, phosphate and potash for the years 2015 to 2020 is presented in Table 5. Regional estimates are presented in Annexes 1, 2 and 3. Figure 1 indicates the regional potential N, P_2O_5 and K_2O balance situation in 2020, the final year of the forecast period.

Table 5. Potential world balance of nitrogen, phosphate and potash, 2015-2020 (thousand tonnes)

Year	2015	2016	2017	2018	2019	2020
Nitrogen (N)	11 130	12 769	17 487	17 404	15 792	14 477
Phosphate (P_2O_5) (H_3PO_4-based)	4 105	3 984	3 769	4 193	4 349	4 142
Potash (K_2O)	5 107	4 100	5 233	6 701	7 200	6 617
Total (N+ P_2O_5+K_2O)	**20 342**	**20 853**	**26 490**	**28 298**	**27 341**	**25 236**

Figure 1. Anticipated nutrient balances in 2020



Annexes

Annex 1
World and regional nitrogen supply, demand and balance 2015-2020 (thousand tonnes N)

	2015	2016	2017	2018	2019	2020
WORLD						
NH_3 capacity	174 781	181 228	185 222	186 804	186 920	188 310
NH_3 supply capability	154 773	158 850	166 402	168 987	169 693	170 761
N other uses	33 616	34 506	35 308	36 207	36 786	37 521
N available for fertilizers	121 157	124 344	131 094	132 780	132 907	133 240
N fertilizer demand	110 027	111 575	113 607	115 376	117 116	118 763
Potential N balance	11 130	12 769	17 487	17 404	15 792	14 477
AFRICA						
NH_3 capacity	8 310	9 545	10 739	10 700	10 700	11 000
NH_3 supply capability	6 201	7 724	8 741	9 000	9 100	9 200
N other uses	538	556	567	576	586	594
N available for fertilizers	5 663	7 168	8 174	8 424	8 514	8 606
N fertilizer demand	3 573	3 641	3 788	3 964	4 126	4 302
Potential N balance	2 089	3 526	4 386	4 460	4 388	4 304
AMERICAS						
NH_3 capacity	24 301	27 618	28 688	29 304	29 320	29 346
NH_3 supply capability	21 533	24 039	24 827	25 913	26 096	26 250
N other uses	6 516	6 653	6 775	6 893	7 009	7 122
N available for fertilizers	15 017	17 386	18 052	19 020	19 087	19 128
N fertilizer demand	22 506	23 030	23 379	23 768	24 169	24 564
Potential N balance	-7 489	-5 644	-5 327	-4 748	-5 082	-5 435
North America						
NH_3 capacity	14 315	17 611	17 758	18 375	18 375	18 400
NH_3 supply capability	13 565	16 054	16 511	17 318	17 394	17 500
N other uses	5 127	5 209	5 286	5 368	5 450	5 532
N available for fertilizers	8 438	10 845	11 225	11 950	11 944	11 968
N fertilizer demand	14 434	14 517	14 552	14 612	14 667	14 701
Potential N balance	-5 996	-3 672	-3 326	-2 662	-2 723	-2 733

Table follows in the next page >>

	2015	2016	2017	2018	2019	2020
Latin America & Caribbean						
NH_3 capacity	9 986	10 007	10 930	10 930	10 946	10 946
NH_3 supply capability	7 968	7 985	8 316	8 595	8 701	8 750
N other uses	1 389	1 444	1 489	1 525	1 559	1 590
N available for fertilizers	6 579	6 541	6 827	7 070	7 142	7 160
N fertilizer demand	8 072	8 513	8 828	9 157	9 501	9 863
Potential N balance	-1 493	-1 972	-2 001	-2 086	-2 359	-2 702
ASIA						
NH_3 capacity	99 959	101 188	101 703	101 734	101 734	102 799
NH_3 supply capability	90 625	90 072	94 704	95 030	95 210	95 815
N other uses	17 445	17 962	18 473	19 085	19 389	19 892
N available for fertilizers	73 180	72 110	76 231	75 945	75 821	75 923
N fertilizer demand	66 294	67 082	68 446	69 493	70 525	71 476
Potential N balance	6 886	5 028	7 785	6 452	5 297	4 447
West Asia						
NH_3 capacity	14 537	15 655	16 550	16 033	16 033	16 033
NH_3 supply capability	13 529	11 153	15 117	14 776	14 809	14 809
N other uses	645	662	673	685	689	692
N available for fertilizers	12 884	10 491	14 444	14 091	14 120	14 117
N fertilizer demand	2 982	3 048	3 127	3 213	3 302	3 395
Potential N balance	9 902	7 443	11 317	10 878	10 818	10 722
South Asia						
NH_3 capacity	17 507	18 365	18 365	18 378	18 378	18 900
NH_3 supply capability	14 792	15 363	15 772	15 813	15 813	16 300
N other uses	700	700	700	800	800	800
N available for fertilizers	14 092	14 663	15 072	15 013	15 013	15 500
N fertilizer demand	22 273	22 525	23 430	24 002	24 645	25 191
Potential N balance	-8 181	-7 862	-8 358	-8 990	-9 632	-9 691
East Asia						
NH_3 capacity	67 915	67 169	66 789	67 324	67 324	67 866
NH_3 supply capability	62 304	63 556	63 815	64 442	64 589	64 706
N other uses	16 100	16 600	17 100	17 600	17 900	18 400

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	2015	2016	2017	2018	2019	2020
N available for fertilizers	46 204	46 956	46 715	46 842	46 689	46 306
N fertilizer demand	41 039	41 509	41 888	42 278	42 578	42 890
Potential N balance	5 165	5 447	4 827	4 564	4 110	3 416
EUROPE						
NH_3 capacity	40 378	41 044	42 238	43 211	43 311	43 311
NH_3 supply capability	34 824	35 425	36 522	37 436	37 679	37 888
N other uses	8 207	8 364	8 489	8 632	8 758	8 847
N available for fertilizers	26 617	27 061	28 033	28 804	28 921	29 041
N fertilizer demand	15 874	16 016	16 161	16 290	16 407	16 504
Potential N balance	10 743	11 046	11 872	12 514	12 514	12 537
Central Europe						
NH_3 capacity	6 686	6 762	6 817	6 902	6 902	6 902
NH_3 supply capability	4 935	4 966	5 015	5 058	5 102	5 110
N other uses	852	867	875	882	885	885
N available for fertilizers	4 083	4 099	4 140	4 176	4 217	4 225
N fertilizer demand	2 945	3 044	3 121	3 200	3 282	3 343
Potential N balance	1 138	1 055	1 019	976	935	882
West Europe						
NH_3 capacity	9 642	9 642	9 660	9 710	9 710	9 710
NH_3 supply capability	9 610	9 610	9 628	9 678	9 678	9 678
N other uses	5 132	5 239	5 323	5 414	5 493	5 537
N available for fertilizers	4 478	4 371	4 305	4 264	4 185	4 141
N fertilizer demand	8 448	8 370	8 315	8 236	8 139	8 038
Potential N balance	-3 970	-3 999	-4 010	-3 972	-3 954	-3 897
East Europe and Central Asia						
NH_3 capacity	24 051	24 640	25 762	26 600	26 700	26 700
NH_3 supply capability	20 279	20 850	21 879	22 700	22 900	23 100
N other uses	2 223	2 258	2 291	2 336	2 380	2 425
N available for fertilizers	18 056	18 592	19 588	20 364	20 520	20 675
N fertilizer demand	4 481	4 602	4 725	4 854	4 986	5 123
Potential N balance	13 575	13 991	14 863	15 510	15 534	15 552

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	2015	2016	2017	2018	2019	2020
OCEANIA						
NH_3 capacity	1 833	1 833	1 854	1 854	1 854	1 854
NH_3 supply capability	1 591	1 591	1 608	1 608	1 608	1 608
N other uses	910	971	1 004	1 021	1 044	1 066
N available for fertilizers	681	620	604	587	564	542
N fertilizer demand	1 779	1 806	1 833	1 861	1 888	1 917
Potential N balance	-1 099	-1 186	-1 229	-1 274	-1 324	-1 375

Annex 2
World and regional phosphate supply, demand and balance 2015-2020 (thousand tonnes P_2O_5)

	2015	2016	2017	2018	2019	2020
WORLD						
H_3PO_4 capacity	57 422	58 385	60 955	61 995	63 036	64 677
H_3PO_4 supply capability	47 424	48 394	49 558	51 190	52 361	53 078
H_3PO_4 industrial demand	5 684	6 038	6 209	6 528	6 692	6 803
H_3PO_4 available for fertilizer	41 740	42 356	43 349	44 662	45 670	46 275
P fertilizer demand	41 151	41 945	43 195	44 120	45 013	45 858
H_3PO_4 fertilizer demand	37 635	38 372	39 579	40 469	41 320	42 133
Non-H_3PO_4 fertilizer demand	3 517	3 572	3 615	3 651	3 693	3 725
Potential H_3PO_4 balance	4 105	3 984	3 769	4 193	4 349	4 142
AFRICA						
H_3PO_4 capacity	9 138	10 038	10 488	10 548	11 394	12 939
H_3PO_4 supply capability	7 141	7 220	7 933	8 567	8 955	9 402
H_3PO_4 industrial demand	501	542	564	586	587	588
H_3PO_4 available for fertilizer	6 640	6 678	7 369	7 981	8 368	8 814
P fertilizer demand	1 448	1 489	1 529	1 571	1 614	1 659
H_3PO_4 fertilizer demand	1 406	1 445	1 485	1 525	1 567	1 610
Non-H_3PO_4 fertilizer demand	42	43	45	46	47	48
Potential H_3PO_4 balance	5 234	5 233	5 884	6 456	6 802	7 204
AMERICAS						
H_3PO_4 capacity	11 729	11 741	11 741	11 941	11 941	11 941
H_3PO_4 supply capability	9 884	9 893	9 893	9 975	9 975	10 045

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	2015	2016	2017	2018	2019	2020
H_3PO_4 industrial demand	1 484	1 526	1 548	1 571	1 573	1 575
H_3PO_4 available for fertilizer	8 399	8 367	8 345	8 404	8 402	8 470
P fertilizer demand	11 454	11 690	12 060	12 380	12 700	13 009
H_3PO_4 fertilizer demand	10 970	11 190	11 533	11 832	12 130	12 418
Non-H_3PO_4 fertilizer demand	485	500	527	548	569	591
Potential H_3PO_4 balance	-2 570	-2 823	-3 189	-3 428	-3 728	-3 948
North America						
H_3PO_4 capacity	8 884	8 884	8 884	8 884	8 884	8 884
H_3PO_4 supply capability	8 013	8 013	8 013	8 013	8 013	8 013
H_3PO_4 industrial demand	983	984	984	985	986	987
H_3PO_4 available for fertilizer	7 029	7 029	7 028	7 028	7 027	7 026
P fertilizer demand	5 035	5 070	5 085	5 123	5 160	5 187
H_3PO_4 fertilizer demand	5 035	5 070	5 085	5 123	5 160	5 187
Non-H_3PO_4 fertilizer demand	-	-	-	-	-	-
Potential H_3PO_4 balance	1 995	1 958	1 943	1 905	1 866	1 839
Latin America & Caribbean						
H_3PO_4 capacity	2 845	2 857	2 857	3 057	3 057	3 057
H_3PO_4 supply capability	1 871	1 880	1 880	1 962	1 962	2 032
H_3PO_4 industrial demand	501	542	564	586	587	588
H_3PO_4 available for fertilizer	1 370	1 338	1 316	1 376	1 375	1 444
P fertilizer demand	6 420	6 620	6 975	7 257	7 539	7 822
H_3PO_4 fertilizer demand	5 935	6 120	6 448	6 709	6 970	7 232
Non-H_3PO_4 fertilizer demand	485	500	527	548	569	591
Potential H_3PO_4 balance	-4 565	-4 782	-5 132	-5 333	-5 595	-5 787
ASIA						
H_3PO_4 capacity	29 895	29 946	32 066	32 846	33 041	33 137
H_3PO_4 supply capability	25 157	26 026	26 477	27 393	28 177	28 377

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	2015	2016	2017	2018	2019	2020
H_3PO_4 industrial demand	2 741	3 003	3 099	3 341	3 501	3 609
H_3PO_4 available for fertilizer	22 415	23 023	23 379	24 052	24 676	24 769
P fertilizer demand	22 918	23 312	24 056	24 544	25 005	25 432
H_3PO_4 fertilizer demand	20 933	21 287	22 005	22 476	22 918	23 328
Non-H_3PO_4 fertilizer demand	1 985	2 025	2 051	2 069	2 087	2 104
Potential H_3PO_4 balance	1 483	1 736	1 374	1 576	1 758	1 440
West Asia						
H_3PO_4 capacity	4 096	3 927	5 427	5 427	5 427	5 427
H_3PO_4 supply capability	3 173	3 242	3 473	4 073	4 523	4 523
H_3PO_4 industrial demand	379	380	462	544	545	546
H_3PO_4 available for fertilizer	2 794	2 862	3 011	3 529	3 978	3 977
P fertilizer demand	351	367	383	400	417	436
H_3PO_4 fertilizer demand	341	356	372	388	405	423
Non-H_3PO_4 fertilizer demand	10	11	11	12	12	13
Potential H_3PO_4 balance	2 453	2 505	2 639	3 141	3 573	3 554
South Asia						
H_3PO_4 capacity	2 579	2 579	2 579	2 579	2 624	2 624
H_3PO_4 supply capability	1 906	1 914	1 914	1 914	1 948	1 948
H_3PO_4 industrial demand	248	252	263	268	273	281
H_3PO_4 available for fertilizer	1 658	1 662	1 651	1 646	1 675	1 667
P fertilizer demand	8 165	8 435	9 025	9 383	9 760	10 107
H_3PO_4 fertilizer demand	7 885	8 146	8 716	9 061	9 426	9 761
Non-H_3PO_4 fertilizer demand	280	289	310	322	335	347
Potential H_3PO_4 balance	-6 227	-6 484	-7 064	-7 415	-7 751	-8 094
East Asia						
H_3PO_4 capacity	23 220	23 440	24 060	24 840	24 990	25 086
H_3PO_4 supply capability	20 078	20 870	21 090	21 406	21 706	21 906
H_3PO_4 industrial demand	2 114	2 371	2 374	2 529	2 683	2 782

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	2015	2016	2017	2018	2019	2020
H_3PO_4 available for fertilizer	17 963	18 499	18 716	18 877	19 023	19 124
P fertilizer demand	14 401	14 510	14 648	14 761	14 827	14 889
H_3PO_4 fertilizer demand	12 706	12 785	12 918	13 026	13 087	13 145
Non-H_3PO_4 fertilizer demand	1 695	1 725	1 731	1 735	1 740	1 745
Potential H_3PO_4 balance	5 257	5 714	5 799	5 851	5 936	5 980
EUROPE						
H_3PO_4 capacity	6 060	6 060	6 060	6 060	6 060	6 060
H_3PO_4 supply capability	4 763	4 774	4 774	4 774	4 774	4 774
H_3PO_4 industrial demand	939	947	979	1 010	1 011	1 012
H_3PO_4 available for fertilizer	3 824	3 827	3 796	3 764	3 763	3 762
P fertilizer demand	4 026	4 135	4 217	4 269	4 319	4 368
H_3PO_4 fertilizer demand	3 373	3 486	3 583	3 646	3 700	3 760
Non-H_3PO_4 fertilizer demand	654	649	634	623	620	608
Potential H_3PO_4 balance	451	342	213	119	63	2
Central Europe						
H_3PO_4 capacity	704	704	704	704	704	704
H_3PO_4 supply capability	350	350	350	350	350	350
H_3PO_4 industrial demand	102	102	103	103	104	104
H_3PO_4 available for fertilizer	248	248	247	247	246	246
P fertilizer demand	756	780	807	835	864	889
H_3PO_4 fertilizer demand	643	663	686	710	735	756
Non-H_3PO_4 fertilizer demand	113	117	121	125	129	133
Potential H_3PO_4 balance	-395	-416	-439	-463	-488	-510
West Europe						
H_3PO_4 capacity	565	565	565	565	565	565
H_3PO_4 supply capability	467	478	478	478	478	478
H_3PO_4 industrial demand	522	522	552	582	582	581

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	2015	2016	2017	2018	2019	2020
H_3PO_4 available for fertilizer	-55	-44	-74	-104	-104	-103
P fertilizer demand	1 855	1 863	1 878	1 861	1 839	1 818
H_3PO_4 fertilizer demand	1 709	1 717	1 731	1 715	1 695	1 675
Non-H_3PO_4 fertilizer demand	146	146	147	146	144	143
Potential H_3PO_4 balance	-1 764	-1 760	-1 805	-1 819	-1 798	-1 778
East Europe & Central Asia						
H_3PO_4 capacity	4 791	4 791	4 791	4 791	4 791	4 791
H_3PO_4 supply capability	3 946	3 946	3 946	3 946	3 946	3 946
H_3PO_4 industrial demand	315	323	324	325	326	327
H_3PO_4 available for fertilizer	3 631	3 623	3 622	3 621	3 620	3 619
P fertilizer demand	1 415	1 492	1 532	1 573	1 616	1 661
H_3PO_4 fertilizer demand	1 020	1 105	1 166	1 221	1 270	1 329
Non-H_3PO_4 fertilizer demand	395	387	366	353	346	332
Potential H_3PO_4 balance	2 610	2 518	2 457	2 401	2 350	2 290
OCEANIA						
H_3PO_4 capacity	600	600	600	600	600	600
H_3PO_4 supply capability	480	480	480	480	480	480
H_3PO_4 industrial demand	19	19	19	20	20	20
H_3PO_4 available for fertilizer	461	461	461	460	460	460
P fertilizer demand	1 305	1 319	1 332	1 356	1 376	1 390
H_3PO_4 fertilizer demand	954	964	974	991	1 006	1 016
Non-H_3PO_4 fertilizer demand	351	355	358	365	370	374
Potential H_3PO_4 balance	-493	-503	-513	-531	-546	-556

Annex 3
World and regional potash supply, demand and balance 2015-2020 (thousand tonnes K_2O)

	2015	2016	2017	2018	2019	2020
WORLD						
K_2O capacity	52 942	55 974	58 111	61 576	62 136	64 486
K_2O supply capability	43 571	42 772	44 868	47 249	48 898	49 545
Non-fertilizer K_2O demand	5 626	5 524	5 586	5 654	5 720	5 886
K_2O available for fertilizer	37 945	37 249	39 281	41 596	43 178	43 659
K_2O fertilizer demand	32 838	33 149	34 048	34 894	35 978	37 042
Potential K_2O balance	5 107	4 100	5 233	6 701	7 200	6 617
AFRICA						
K_2O capacity	-	-	-	-	300	300
K_2O supply capability	-	-	-	-	15	-
Non-fertilizer K_2O demand	100	100	100	100	100	100
K_2O available for fertilizer	-100	-100	-100	-100	- 85	-100
K_2O fertilizer demand	647	662	708	765	838	897
Potential K_2O balance	-747	-762	-808	-865	-923	-997
AMERICAS						
K_2O capacity	22 305	25 185	25 225	25 780	25 780	25 780
K_2O supply capability	16 084	15 476	16 581	17 408	17 842	17 942
Non-fertilizer K_2O demand	1 759	1 792	1 825	1 859	1 895	1 931
K_2O available for fertilizer	14 325	13 684	14 756	15 548	15 948	16 011
K_2O fertilizer demand	11 589	11 833	11 977	12 129	12 487	12 830
Potential K_2O balance	2 736	1 851	2 779	3 419	3 461	3 181
North America						
K_2O capacity	20 180	23 060	23 100	23 655	23 655	23 655
K_2O supply capability	14 381	13 720	14 826	15 565	16 000	16 100

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	2015	2016	2017	2018	2019	2020
Non-fertilizer K_2O demand	1 159	1 192	1 225	1 259	1 295	1 331
K_2O available for fertilizer	13 222	12 528	13 600	14 306	14 705	14 769
K_2O fertilizer demand	4 856	4 916	4 929	4 951	4 978	4 989
Potential K_2O balance	8 366	7 612	8 671	9 354	9 728	9 780
Latin America & Caribbean						
K_2O capacity	2 125	2 125	2 125	2 125	2 125	2 125
K_2O supply capability	1 704	1 756	1 756	1 842	1 842	1 842
Non-fertilizer K_2O demand	600	600	600	600	600	600
K_2O available for fertilizer	1 104	1 156	1 156	1 242	1 242	1 242
K_2O fertilizer demand	6 733	6 917	7 048	7 178	7 510	7 841
Potential K_2O balance	- 5 630	- 5 761	- 5 892	- 5 935	- 6 267	- 6 599
ASIA						
K_2O capacity	10 307	10 453	11 556	11 556	11 956	12 076
K_2O supply capability	10 082	10 151	10 772	11 030	11 072	11 179
Non-fertilizer K_2O demand	3 112	2 964	2 978	2 996	3 011	3 125
K_2O available for fertilizer	6 970	7 187	7 794	8 034	8 061	8 054
K_2O fertilizer demand	16 024	16 083	16 594	17 077	17 597	18 181
Potential K_2O balance	- 9 054	- 8 896	- 8 799	- 9 042	- 9 536	-10 127
West Asia						
K_2O capacity	3 995	3 995	4 030	4 030	4 050	4 080
K_2O supply capability	3 656	3 671	3 704	3 704	3 723	3 831
Non-fertilizer K_2O demand	97	100	103	106	110	113
K_2O available for fertilizer	3 558	3 570	3 601	3 597	3 613	3 718
K_2O fertilizer demand	260	276	291	308	326	347
Potential K_2O balance	3 298	3 295	3 309	3 290	3 287	3 371
South Asia						
K_2O capacity	65	65	65	65	65	65
K_2O supply capability	16	33	49	49	49	49
Non-fertilizer K_2O demand	415	364	375	389	401	412
K_2O available for fertilizer	-399	-331	-326	-340	-353	-363

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	2015	2016	2017	2018	2019	2020
K_2O fertilizer demand	2 958	2 991	3 226	3 407	3 612	3 812
Potential K_2O balance	- 3 357	- 3 322	- 3 552	- 3 748	- 3 964	- 4 175
East Asia						
K_2O capacity	6 247	6 393	7 461	7 461	7 841	7 931
K_2O supply capability	6 410	6 448	7 020	7 278	7 300	7 300
Non-fertilizer K_2O demand	2 600	2 500	2 500	2 500	2 500	2 600
K_2O available for fertilizer	3 810	3 948	4 520	4 778	4 800	4 700
K_2O fertilizer demand	12 805	12 817	13 076	13 362	13 659	14 023
Potential K_2O balance	- 8 995	- 8 869	- 8 556	- 8 584	- 8 859	- 9 323
EUROPE						
K_2O capacity	20 330	20 336	21 330	24 240	24 100	26 330
K_2O supply capability	17 405	17 146	17 514	18 812	19 969	20 423
Non-fertilizer K_2O demand	646	660	676	691	706	722
K_2O available for fertilizer	16 758	16 485	16 838	18 121	19 263	19 701
K_2O fertilizer demand	4 187	4 193	4 390	4 539	4 669	4 741
Potential K_2O balance	12 571	12 293	12 448	13 582	14 594	14 960
Central Europe						
K_2O capacity	-	-	-	-	-	-
K_2O supply capability	-	-	-	-	-	-
Non-fertilizer K_2O demand	52	53	54	56	57	58
K_2O available for fertilizer	-52	-53	-54	-56	-57	-58
K_2O fertilizer demand	650	650	700	750	780	800
Potential K_2O balance	-702	-703	-754	-806	-837	-858
West Europe						
K_2O capacity	5 630	4 946	4 940	4 840	4 840	4 640
K_2O supply capability	4 088	3 593	3 589	3 538	3 569	3 423
Non-fertilizer K_2O demand	495	507	522	535	549	563
K_2O available for fertilizer	3 593	3 086	3 068	3 002	3 020	2 860
K_2O fertilizer demand	2 150	2 100	2 200	2 250	2 300	2 300
Potential K_2O balance	1 443	986	868	752	720	560

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	2015	2016	2017	2018	2019	2020
East Europe and Central Asia						
K_2O capacity	14 700	15 390	16 390	19 400	19 260	21 690
K_2O supply capability	13 317	13 553	13 925	15 274	16 400	17 000
Non-fertilizer K_2O demand	100	100	100	100	100	100
K_2O available for fertilizer	13 217	13 453	13 825	15 174	16 300	16 900
K_2O fertilizer demand	1 387	1 443	1 490	1 539	1 589	1 641
Potential K_2O balance	11 830	12 010	12 335	13 635	14 711	15 259
OCEANIA						
K_2O capacity	-	-	-	-	-	-
K_2O supply capability	-	-	-	-	-	-
Non-fertilizer K_2O demand	8	8	8	8	8	8
K_2O available for fertilizer	-8	-8	-8	-8	-8	-8
K_2O fertilizer demand	392	378	379	385	388	393
Potential K_2O balance	-400	-386	-387	-393	-396	-401

Annex 4
World and regional nitrogen fertilizer demand forecasts (thousand tonnes N) and compound annual growth rate (CAGR) 2015 to 2020

	2015	2016	2017	2018	2019	2020	CAGR (%)
WORLD	**110 027**	**111 575**	**113 607**	**115 376**	**117 116**	**118 763**	**1.54**
AFRICA	**3 573**	**3 641**	**3 788**	**3 964**	**4 126**	**4 302**	**3.78**
North Africa	1 835	1 870	1 929	1 984	2 042	2 102	2.75
Sub-Saharan Africa	1 738	1 772	1 860	1 980	2 084	2 201	4.83
AMERICAS	**22 506**	**23 030**	**23 379**	**23 768**	**24 169**	**24 564**	**1.77**
North America	14 434	14 517	14 552	14 612	14 667	14 701	0.37
Latin America & Caribbean	8 072	8 513	8 828	9 157	9 501	9 863	4.09
ASIA	**66 294**	**67 082**	**68 446**	**69 493**	**70 525**	**71 476**	**1.52**
West Asia	2 982	3 048	3 127	3 213	3 302	3 395	2.63
South Asia	22 273	22 525	23 430	24 002	24 645	25 191	2.49
East Asia	41 039	41 509	41 888	42 278	42 578	42 890	0.89
EUROPE	**15 874**	**16 016**	**16 161**	**16 290**	**16 407**	**16 504**	**0.78**
Central Europe	2 945	3 044	3 121	3 200	3 282	3 343	2.57
West Europe	8 448	8 370	8 315	8 236	8 139	8 038	-0.99
East Europe & Central Asia	4 481	4 602	4 725	4 854	4 986	5 123	2.71
OCEANIA	**1 779**	**1 806**	**1 833**	**1 861**	**1 888**	**1 917**	**1.50**

Annex 5
World and regional phosphate fertilizer demand forecasts (thousand tonnes P_2O_5) and compound annual growth rate (CAGR) 2015 to 2020

	2015	2016	2017	2018	2019	2020	CAGR (%)
WORLD	**41 151**	**41 945**	**43 195**	**44 120**	**45 013**	**45 858**	**2.19**
AFRICA	**1 448**	**1 489**	**1 529**	**1 571**	**1 614**	**1 659**	**2.8**
North Africa	633	642	653	664	675	686	1.6
Sub-Saharan Africa	815	847	876	907	939	973	3.6
AMERICAS	**11 454**	**11 690**	**12 060**	**12 380**	**12 700**	**13 009**	**2.6**
North America	5 035	5 070	5 085	5 123	5 160	5 187	0.6
Latin America & Caribbean	6 420	6 620	6 975	7 257	7 539	7 822	0.0
ASIA	**22 918**	**23 312**	**24 056**	**24 544**	**25 005**	**25 432**	**2.1**
West Asia	351	367	383	400	417	436	4.4
South Asia	8 165	8 435	9 025	9 383	9 760	10 107	4.4
East Asia	14 401	14 510	14 648	14 761	14 827	14 889	0.7
EUROPE	**4 026**	**4 135**	**4 217**	**4 269**	**4 319**	**4 368**	**1.6**
Central Europe	756	780	807	835	864	889	3.3
West Europe	1 855	1 863	1 878	1 861	1 839	1 818	-0.4
East Europe & Central Asia	1 415	1 492	1 532	1 573	1 616	1 661	3.3
OCEANIA	**1 305**	**1 319**	**1 332**	**1 356**	**1 376**	**1 390**	**1.3**

Annex 6
World and regional potash fertilizer demand forecasts (thousand tonnes K_2O) and compound annual growth rate (CAGR) 2015 to 2020

	2015	2016	2017	2018	2019	2020	CAGR (%)
WORLD	**32 838**	**33 149**	**34 048**	**34 894**	**35 978**	**37 042**	**2.44**
AFRICA	**647**	**662**	**708**	**765**	**838**	**897**	**6.76**
North Africa	151	157	166	175	187	198	5.56
Sub-Saharan Africa	495	505	542	590	650	698	7.11
AMERICAS	**11 589**	**11 833**	**11 977**	**12 129**	**12 487**	**12 830**	**2.05**
North America	4 856	4 916	4 929	4 951	4 978	4 989	0.54
Latin America & Caribbean	6 733	6 917	7 048	7 178	7 510	7 841	0.00
ASIA	**16 024**	**16 083**	**16 594**	**17 077**	**17 597**	**18 181**	**2.56**
West Asia	260	276	291	308	326	347	5.91
South Asia	2 958	2 991	3 226	3 407	3 612	3 812	5.20
East Asia	12 805	12 817	13 076	13 362	13 659	14 023	1.83
EUROPE	**4 187**	**4 193**	**4 390**	**4 539**	**4 669**	**4 741**	**2.52**
Central Europe	650	650	700	750	780	800	4.24
West Europe	2 150	2 100	2 200	2 250	2 300	2 300	1.36
East Europe & Central Asia	1 387	1 443	1 490	1 539	1 589	1 641	3.42
OCEANIA	**392**	**378**	**379**	**385**	**388**	**393**	**0.05**

Annex 7
Regional classification of countries and territories

AFRICA	
North Africa	Algeria Egypt Libya Morocco Sudan Tunisia
Sub-Saharan Africa	Angola Benin Botswana Burkina Faso Burundi Cameroon Capo Verde Central African Republic Comoros Congo Dem. Rep. Congo Rep. of Côte d'Ivoire Djibouti Equatorial Guinea Eritrea Ethiopia Gabon Gambia Ghana Guinea Guinea-Bissau Kenya Lesotho Liberia Madagascar Malawi Mali Mauritania Mauritius Mozambique

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	Namibia Niger Nigeria Rwanda Senegal Seychelles Sierra Leone Somalia South Africa South Sudan Swaziland Togo Uganda United Rep of Tanzania Zambia Zimbabwe
AMERICAS	
Latin America & Caribbean	Antigua and Barbuda Argentina Bahamas Barbados Belize Bolivia Brazil Chile Colombia Costa Rica Cuba Dominica Dominican Republic Ecuador El Salvador Grenada Guatemala Guyana Haiti Honduras Jamaica Mexico Nicaragua Panama

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	Paraguay Peru Saint Kitts and Nevis Saint Lucia Saint Vincent and the Grenadines Suriname Trinidad & Tobago Uruguay Venezuela
North America	Canada United States of America
ASIA	
East Asia	Brunei Darussalam Cambodia China China, Hong Kong SAR China, Macao SAR China, Taiwan Province of Indonesia Japan Korea Rep Lao People's Democratic Republic Malaysia Mongolia Myanmar Philippines Singapore Thailand Timor-Leste Viet Nam
South Asia	Bangladesh Bhutan India Maldives Nepal Pakistan Sri Lanka
West Asia	Afghanistan Bahrain Cyprus

Table follows in the next page >>

	Iran Islamic Rep of Iraq Israel Jordan Kuwait Lebanon Oman Qatar Saudi Arabia Syria Arab Rep. Turkey United Arab Emirates Yemen
EUROPE	
Central Europe	Albania Bosnia and Herzegovina Bulgaria Croatia Czech Republic Hungary Macedonia Montenegro Poland Romania Serbia Slovakia Slovenia
Eastern Europe and Central Asia	Armenia Azerbaijan Belarus Estonia Georgia Kazakhstan Kyrgyzstan Latvia Lithuania Moldova Russian Fed Tajikistan Ukraine Uzbekistan

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Western Europe	Andorra Austria Belgium Denmark Finland France Germany Greece Iceland Ireland Italy Luxembourg Malta Monaco Netherlands Norway Portugal San Marino Spain Sweden Switzerland United Kingdom
OCEANIA	
	Australia Cook Islands Fiji French Polynesia Kiribati Marshall Islands Micronesia (Federated States of) Nauru Niue New Caledonia New Zealand Palau Papua New Guinea Samoa Tonga Tuvalu Vanuatu

World fertilizer trends and outlook to 2020

SUMMARY REPORT

World **fertilizer** trends and outlook to **2020**

This report presents the world nitrogen, phosphate and potassium fertilizer medium-term supply and demand projections for the period 2016-2020. FAO, in collaboration with other members of the Fertilizer Outlook Expert Group dealing with fertilizer production, consumption and trade, annually provides five-year forecasts of world and regional fertilizer supply, demand and potential balance.

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