

Table 4.1 Total nutrient uptake* by selected crops.

| Crop*** | Region | Harvested Unit | --- lb uptake/harvested unit** --- | | | |
|---------------|-----------|----------------|------------------------------------|-------------------------------|------------------|------|
| | | | N | P ₂ O ₅ | K ₂ O | S |
| Alfalfa (DM) | Argentina | ton | 54 | 11 | 50 | 7.0 |
| Barley | Argentina | bu | 1.3 | 0.44 | 1.1 | 0.2 |
| Bermudagrass | USA | ton | 46 | 12 | 50 | |
| Canola | China | bu | 2.2 | 1.4 | 4.4 | |
| Chickpea | India | cwt | 4.6 | 0.84 | 4.9 | |
| Corn | USA | bu | 1.0 | 0.54 | 1.4 | |
| Grape | China | ton | 11 | 10 | 17 | |
| Mustard | India | cwt | 3.3 | 1.5 | 1.1 | 1.4 |
| Oranges | China | ton | 5.3 | 1.6 | 7.2 | |
| Peach | China | ton | 9.0 | 3.0 | 10 | |
| Peanut | India | ton | 126 | 23 | 74 | 7.8 |
| Pear | China | ton | 10 | 4.0 | 10 | |
| Peas, green | India | ton | 84 | 29 | 62 | 8.6 |
| Potato | Australia | cwt | 0.49 | 0.21 | 1.2 | |
| Rice | USA | bu | 0.71 | 0.38 | 1.1 | |
| Safflower | India | cwt | 3.9 | 0.84 | 2.2 | 1.3 |
| Sorghum | India | cwt | 2.2 | 1.3 | 3.4 | |
| Soybean | USA | bu | 4.9 | 1.1 | 2.3 | |
| Sugar beet | China | ton | 9.6 | 2.8 | 19 | |
| Sugarcane | China | ton | 3.6 | 0.72 | 4.2 | |
| Sunflower | Argentina | cwt | 4.0 | 2.5 | 3.5 | 0.50 |
| Tobacco | China | cwt | 3.9 | 1.2 | 7.1 | |
| Tomato | India | ton | 5.6 | 2.6 | 7.6 | |
| Wheat, spring | USA | bu | 2.2 | 0.76 | 1.5 | |
| Wheat, winter | USA | bu | 1.9 | 0.68 | 2.0 | |

* Total nutrient uptake refers to the quantity of nutrient accumulated in the above ground portion, and harvested portions, of the plant by the time of sampling, usually physiological maturity or when uptake is at its maximum.

**Reported nutrient uptake coefficients may vary regionally depending on growing conditions. Use locally available data whenever possible.

***DM = dry matter basis; otherwise moisture content is standard marketing convention or at the stated moisture content.

Last modified May, 2014.

Table 4.5 Nutrient removal* by selected crops.

| Crop*** | Unit | Removal, lb/unit** | | | |
|------------------------------------|------|--------------------|-------------------------------|------------------|------|
| | | N | P ₂ O ₅ | K ₂ O | S |
| Alfalfa (DM) | ton | 51 | 12 | 49 | 5.4 |
| Alsike Clover (DM) | ton | 41 | 11 | 54 | 3.0 |
| Bahiagrass | ton | 43 | 12 | 35 | |
| Barley grain | bu | 0.99 | 0.40 | 0.32 | 0.09 |
| Barley straw | bu | 0.40 | 0.16 | 1.2 | 0.10 |
| Barley straw | ton | 13 | 5.1 | 39 | 3.0 |
| Beans (dry) | bu | 3.0 | 0.79 | 0.92 | 0.52 |
| Bermuda grass | ton | 46 | 12 | 50 | |
| Birdsfoot trefoil (DM) | ton | 45 | 11 | 42 | |
| Bluegrass (DM) | ton | 30 | 12 | 46 | 5.0 |
| Bromegrass (DM) | ton | 32 | 10 | 46 | 5.0 |
| Buckwheat | bu | 0.83 | 0.25 | 0.22 | |
| Canola grain | bu | 1.6 | 0.80 | 0.40 | 0.25 |
| Corn grain | bu | 0.67 | 0.35 | 0.25 | 0.08 |
| Corn silage (67% water) | bu | 1.6 | 0.51 | 1.2 | 0.18 |
| Corn silage (67% water) | ton | 9.7 | 3.1 | 7.3 | 1.1 |
| Corn stover | bu | 0.45 | 0.16 | 1.1 | 0.07 |
| Corn stover | ton | 16 | 5.8 | 40 | 2.6 |
| Cotton (lint) | bale | 32 | 14 | 19 | |
| Cotton stover | ton | 19 | 6.7 | 22 | |
| Fescue (DM) | ton | 37 | 12 | 54 | 5.7 |
| Flax grain | bu | 2.5 | 0.70 | 0.60 | 0.19 |
| Flax straw | bu | 0.7 | 0.16 | 2.2 | 0.15 |
| Millet grain | bu | 1.4 | 0.40 | 0.40 | 0.08 |
| Millet straw | ton | 15 | 4.3 | 39 | |
| Mint oil | lb | 1.9 | 1.1 | 4.5 | |
| Oat grain | bu | 0.77 | 0.28 | 0.19 | 0.07 |
| Oat straw | bu | 0.31 | 0.16 | 0.94 | 0.11 |
| Oat straw | ton | 12 | 6.3 | 37 | 4.5 |
| Orchardgrass (DM) | ton | 36 | 13 | 54 | 5.8 |
| Peanut nuts | ton | 70 | 11 | 17 | |
| Peanut stover | ton | 33 | 6.8 | 24 | |
| Potato tuber | cwt | 0.30 | 0.15 | 0.65 | 0.03 |
| Potato above-ground stems & leaves | cwt | 0.19 | 0.06 | 0.53 | 0.02 |
| Red clover (DM) | ton | 45 | 12 | 42 | 3.0 |
| Reed canarygrass (DM) | ton | 31 | 13 | 25 | |
| Rice grain | bu | 0.57 | 0.30 | 0.16 | |
| Rice straw | ton | 17 | 5.5 | 41 | |
| Rye grain | bu | 1.4 | 0.46 | 0.31 | 0.10 |
| Rye straw | bu | 0.80 | 0.21 | 1.5 | 0.14 |
| Rye straw | ton | 12 | 3.0 | 22 | 2.0 |
| Ryegrass (DM) | ton | 43 | 12 | 43 | |
| Sorghum grain | bu | 0.66 | 0.39 | 0.27 | 0.06 |

| Crop*** | Unit | Removal, lb/unit** | | | |
|----------------------|------|--------------------|-------------------------------|------------------|------|
| | | N | P ₂ O ₅ | K ₂ O | S |
| Sorghum stover | bu | 0.56 | 0.16 | 0.83 | 0.12 |
| Sorghum stover | ton | 28 | 8.3 | 42 | 5.9 |
| Sorghum-sudan (DM) | ton | 30 | 9.5 | 34 | 5.8 |
| Soybean grain | bu | 3.3 | 0.73 | 1.2 | 0.18 |
| Soybean hay (DM) | ton | 45 | 11 | 25 | 5.0 |
| Soybean stover | bu | 1.1 | 0.24 | 1.0 | 0.17 |
| Soybean stover | ton | 40 | 8.8 | 37 | 6.2 |
| Sugarbeet root | ton | 3.7 | 2.2 | 7.3 | 0.45 |
| Sugarbeet top | ton | 7.4 | 4.0 | 20 | 0.40 |
| Sugarcane | ton | 2.0 | 1.2 | 3.5 | |
| Sunflower grain | cwt | 2.7 | 0.97 | 0.9 | 0.25 |
| Sunflower stover | cwt | 2.8 | 0.24 | 4.1 | 0.6 |
| Sunflower stover | ton | 23 | 2.0 | 34 | 5.0 |
| Switchgrass (DM) | ton | 22 | 12 | 58 | |
| Timothy (DM) | ton | 25 | 11 | 42 | 2.0 |
| Tomatoes | ton | 2.5 | 0.92 | 5.7 | |
| Tobacco leaves | cwt | 3.6 | 0.90 | 5.7 | 0.6 |
| Vetch (DM) | ton | 57 | 15 | 49 | |
| Wheat straw | bu | 0.7 | 0.16 | 1.2 | 0.14 |
| Wheat straw | ton | 15 | 3.7 | 29 | 5.4 |
| Wheat (spring) grain | bu | 1.5 | 0.57 | 0.33 | 0.10 |
| Wheat (winter) grain | bu | 1.2 | 0.48 | 0.29 | 0.10 |

* Nutrient removal refers to the quantity of nutrient removed from the field at crop harvest.

**Reported nutrient removal coefficients may vary regionally depending on growing conditions. Use locally available data whenever possible.

***DM = dry matter basis; otherwise moisture content is standard marketing convention or at the stated moisture content.

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Example: Using **Table 4.5**, an example of nutrient balancing would be a 200 bu/A corn crop removes 70 lb P₂O₅ from the soil (200 x 0.35=70). So, the maintenance P₂O₅ application will be 70 lb/A.
