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# A Geo-Referenced Database of Global Sweetpotato Distribution

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***Luisa Huaccho[1] and Robert J. Hijmans[1]***

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# Abstract

The present document describes a geo-referenced database of the global distribution of sweetpotato. The database was assembled from many different national-level sources that varied in accuracy and detail. First, a map of relative within-country distribution was made for all countries with sweetpotato production. Administrative boundaries were used to delimit production zones, some of which were adapted based on other information. The proportion of national sweetpotato area was estimated for each zone using within-country statistical data, where available. Then, to create a database representative for one time period, the proportion of national sweetpotato area in each zone was multiplied by total national sweetpotato area for 1996–1998, as estimated by FAO.

## Acknowledgements

We thank Berga Lemaga and Peter Ewell for providing access to national-level African data assembled by Mélance Ndikumasabo (Burundi), Phemba Phezo (Congo D.R.), Terefe Belehu (Ethiopia), J.M. Randrianaivoarivony (Madagascar), Jean Ndirigue (Rwanda), and Ali Khalafalla (Sudan). We are most grateful to Stanley Wood (IFPRI) and to Tom Walker for providing detailed data for China. Victor Suarez did the calculations for Figure 2.

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# 1. Introduction

The International Potato Center (CIP) is a research institution that, among other things, seeks to improve sweetpotato production in the developing world. In order to do so effectively, CIP needs baseline information on where that crop is produced and what the major constraints are in those areas. At present, the only readily available global statistics on crop production are at the country level, provided by the Food and Agriculture Organization of the United Nations (FAO). Given the important differences in ecological conditions and other factors that may exist within countries, more detail is sometimes needed in order to draw reasonable conclusions.

To fill this gap we developed a geo-referenced database of the world's sweetpotato production areas at a sub-national level, which is described in this document. Each country was divided into zones, and area with sweetpotato was estimated for each zone. Because the database is geo-referenced, data can be aggregated by agroecological zone, for example.

We have found only one previous map of global sweetpotato distribution for ca. 1970 by Bertin *et al.* (1971) (Figure 1). However, it did not contain enough detail to be of much use for our purposes. For other crops such as wheat, rice and potato, global crop distribution maps are more common. Huaccho and Hijmans (1999) describe a database for potato that is similar to the one described here. Hyman (1999) describes recent efforts to establish a database of the distribution of all major crops in Latin America.

The sweetpotato, *Ipomoea batatas* L. (Lam.) is a dicotyledonous plant that belongs to the *Convolvulaceae* family. It is grown for its storage roots, which are used for human consumption and animal feed, and to a lesser extent for its vines, which can be used as animal feed. The sweetpotato originated in either Central or South America, where it was widely established by the time the first Europeans arrived. The Europeans introduced the sweetpotato to Europe, Africa,

and most parts of Asia. Cultivation in Polynesia, however, pre-dates contact between America and Europe. It is not clear whether the sweetpotato was brought to Polynesia through human contact or by chance (by washing ashore, for example) (Woolfe, 1992; Yen, 1976; O'Brien, 1972).

Sweetpotato is an important global food crop in terms of both area and production (Table 1). It is grown in over 100 countries, almost entirely developing countries in Asia (78% of the global sweetpotato area) and Africa (Table 2 and 3). China has 73% of the global area and 84% of the global production. Thus, sweetpotato distribution is extremely concentrated, yet sweetpotato production is spread over many countries (Figure 2). Vietnam, Indonesia, India, and the Philippines are other important sweetpotato- producing countries in Asia. There is a conspicuous concentration of sweetpotato in the East African Highlands (Uganda, Rwanda, Burundi, Kenya). In Papua New Guinea and in other parts of sweetpotato has an especially important role in the diet, as illustrated by a high per capita production (e.g., The Cook Islands and Tonga) (Table 4).

Between the early 1960s and late 1990s, there was a global reduction in sweetpotato area of about 31%. Due to increases in yield, the associated drop in production is less, especially in China. In Asia, sweetpotato area decreased during the 1960s and was stable during the 1970s (Figure 3). Area fell again in the first part of the 1980s and has remained stable since then. Production remained nearly constant due to increased yields (Figure 4). Because most sweetpotato is grown in China, the pattern for Asia is driven by changes in China. In the 1960s Japan was a major producer of sweetpotato, but sweetpotato area there decreased strongly between the early 1960s and the early 1970s. Since then sweetpotato area has remained almost constant (Table 5). Vietnam and Bangladesh are important sweetpotato-producing countries in Asia that have witnessed an increase in area over the last 30 years.

The role of sweetpotato in China has changed from staple food crop to raw material for industrially processed food (noodles) and to feed, although it remains a staple food in poor and mountainous districts. In higher-income areas, it has become a supplementary food and snack.

Although the statistics for Africa show a somewhat irregular pattern for the 1960s and 1970s, there is a clear overall trend of a strong increase in area (an increase of 2.5 times in the past 40 years).

In the USA, there has been a constant decrease in the area with sweetpotato, as in Japan where the crop changed from staple to industrialized food.

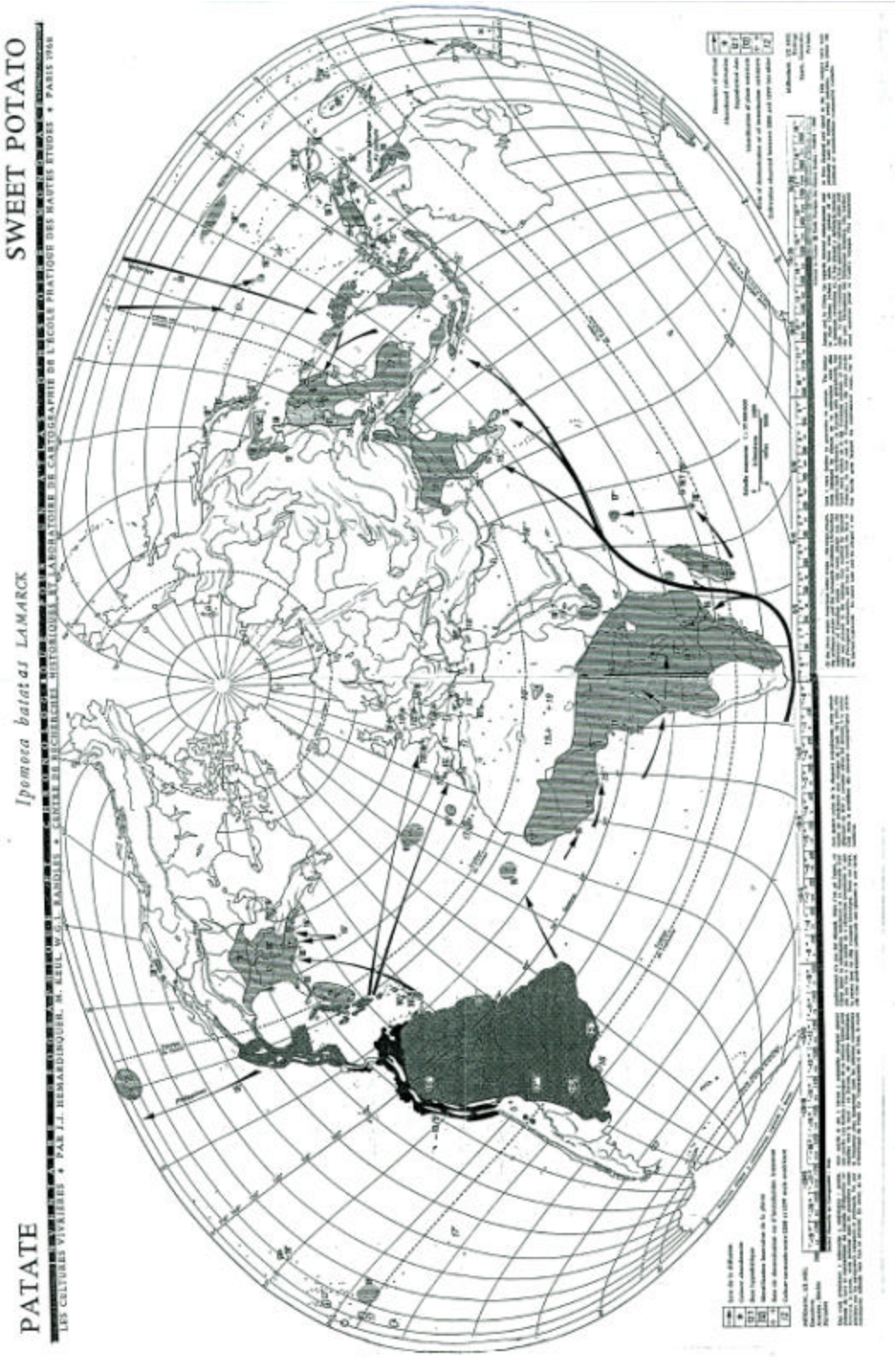


**Figure 1. Global sweetpotato distribution (ca. 1970). Map dates indicate the century when the sweetpotato was introduced to an area.**

**Source**: Bertin *et al.*, 1971. Reproduced by permission of Editions de L'École des Hautes Études en Sciences Sociales.

**Table 1. Production and area of the world's major crops, ranked by production in 1998.**

| Crop | Production [t] | Area [ha] |
|---|---|---|
| Sugar Cane | 1,252,265,900 | 19,438,105 |
| Maize | 604,012,555 | 137,429,878 |
| Wheat | 588,841,593 | 224,373,684 |
| Rice | 563,188,439 | 150,305,182 |
| Potatoes | 295,632,038 | 17,949,342 |
| Sugar Beets | 258,858,586 | 6,954,653 |
| Cassava | 158,620,197 | 16,188,299 |
| Soybeans | 158,327,376 | 70,689,591 |
| Barley | 138,819,689 | 61,699,009 |
| Sweet Potatoes | 129,164,392 | 8,867,267 |
| Oil Palm Fruit | 95,402,623 | 8,871,652 |
| Tomatoes | 89,827,949 | 3,169,326 |
| Oranges | 66,212,175 | 3,779,793 |
| Sorghum | 63,450,959 | 44,442,335 |

Source: FAO (1999).

**Table 2. Sweetpotato, area, production, and yield by continent (1996–1998).**

| Continent | Area | | Production [t] | | Yield [t/ha] |
|---|---|---|---|---|---|
| | ha | % | ha | % | |
| Africa | 1,549,002 | | 6,938,342 | | 4.5 |
| Asia | 7,061,484 | | 123,702,605 | | 17.5 |
| Europe | 5,202 | | 61,572 | | 11.8 |
| North America | 165,704 | | 1,094,840 | | 6.6 |
| Oceania | 110,855 | | 435,274 | | 3.9 |
| South America | 113,963 | | 1,370,472 | | 12.0 |
| **Total** | **9,006,210** | | **133,603,106** | | **14.8** |

Source: FAO (1999).

**Table 3. Sweetpotato area by country 1996–1998 (top 20).**

| Country | Area [ha] |
|---|---|
| China | 6,131,167 |
| Uganda | 524,667 |
| Viet Nam | 274,767 |
| Tanzania | 242,000 |
| Indonesia | 202,567 |
| Rwanda | 150,000 |
| India | 143,000 |
| Philippines | 136,552 |
| Congo, Dem. Republic of | 110,000 |
| Burundi | 106,000 |
| Papua New Guinea | 101,667 |
| Madagascar | 90,333 |
| Kenya | 74,667 |
| Cuba | 60,000 |
| Brazil | 58,333 |
| Haiti | 57,200 |
| Japan | 46,833 |
| Bangladesh | 43,400 |
| Cameroon | 43,333 |
| United States of America | 33,980 |

Source: FAO (1999).

**Table 4. Sweetpotato, production per capita by country 1996–1998 (top 20).**

| Country | Population [person] | Production per capita [kg] |
|---|---|---|
| Solomon Islands | 404,000 | 178 |
| Rwanda | 5,961,333 | 165 |
| Niue | 2,000 | 125 |
| Burundi | 6,358,667 | 102 |
| China | 1,255,698,000 | 92 |
| Uganda | 20,533,667 | 87 |
| Equatorial Guinea | 420,333 | 86 |
| Papua New Guinea | 4,500,000 | 69 |
| Cook Islands | 19,000 | 68 |
| Tonga | 98,333 | 52 |
| Madagascar | 15,418,333 | 33 |
| Kenya | 28,407,000 | 26 |
| Dominica | 71,000 | 24 |
| Fed. States of Micronesia | 123,333 | 24 |
| Haiti | 7,535,333 | 23 |
| Comoros | 647,000 | 22 |
| Viet Nam | 76,430,333 | 21 |
| Cuba | 11,067,333 | 20 |
| Barbados | 263,667 | 19 |
| Saint Vincent/Grenadines | 113,000 | 19 |

Source: FAO (1999).

**Table 5. Sweetpotato. Area for three periods and change in area between 1961/63 and 1996/98. Only includes countries with more than 1000 ha for the 1961–1963 period.**

| Country | Years | | | | Difference 1961/63 and 1996/98 | |
|---|---|---|---|---|---|---|
| | **1961–1963** | **1973–1975** | **1984–1986** | **1996–1998** | **ha** | **%** |
| Tanzania | 30,667 | 143,333 | 207,653 | 242,000 | 211,333 | 689 |
| Uganda | 157,000 | 485,333 | 384,328 | 524,667 | 367,667 | 234 |
| Kenya | 25,500 | 31,667 | 43,667 | 74,667 | 49,167 | 193 |
| Congo, Dem. Republic | 50,000 | 58,100 | 75,207 | 110,000 | 60,000 | 120 |
| Guinea | 10,000 | 9,140 | 12,000 | 22,000 | 12,000 | 120 |
| Rwanda | 74,433 | 80,763 | 128,410 | 150,000 | 75,567 | 102 |
| Ethiopia | 10,000 | 15,000 | 18,250 | 20,000 | 10,000 | 100 |
| Burundi | 60,000 | 59,333 | 87,667 | 106,000 | 46,000 | 77 |
| Haiti | 36,500 | 55,333 | 78,333 | 57,200 | 20,700 | 57 |
| Madagascar | 57,667 | 57,782 | 93,828 | 90,333 | 32,666 | 57 |
| Angola | 15,667 | 18,000 | 19,000 | 23,000 | 7,333 | 47 |
| Papua New Guinea | 73,903 | 90,000 | 98,333 | 101,667 | 27,764 | 38 |
| Cuba | 44,333 | 64,000 | 57,667 | 60,000 | 15,667 | 35 |
| Viet Nam | 236,667 | 218,400 | 325,467 | 274,767 | 38,100 | 16 |
| Bangladesh | 39,000 | 63,613 | 60,864 | 43,400 | 4,400 | 11 |
| Cameroon | 42,667 | 40,667 | 25,000 | 43,333 | 666 | 2 |
| India | 144,667 | 216,167 | 194,300 | 143,000 | –1,667 | –1 |
| Philippines | 147,553 | 173,670 | 151,675 | 136,552 | –11,001 | –7 |
| South Africa | 14,333 | 13,000 | 13,833 | 13,000 | –1,333 | –9 |
| Peru | 16,323 | 13,258 | 12,449 | 13,661 | –2,662 | –16 |
| Benin | 13,211 | 13,288 | 7,381 | 10,827 | –2,384 | –18 |
| Sri Lanka | 12,497 | 38,665 | 14,763 | 8,885 | –3,612 | –29 |
| China | 10,335,633 | 9,249,534 | 6,307,030 | 6,131,167 | –4,204,466 | –41 |
| Argentina | 36,993 | 38,517 | 31,633 | 20,000 | –16,993 | –46 |
| United States of America | 75,121 | 46,426 | 40,147 | 33,980 | –41,141 | –57 |
| Indonesia | 464,667 | 339,962 | 257,669 | 202,567 | –262,100 | –56 |
| Uruguay | 14,742 | 13,900 | 15,000 | 6,000 | –8,742 | –59 |
| Brazil | 144,905 | 153,447 | 79,762 | 58,333 | –86,572 | –60 |
| Nigeria | 13,000 | 10,000 | 9,000 | 5,000 | –8,000 | –62 |
| Thailand | 25,547 | 35,759 | 11,615 | 9,000 | –16,547 | –65 |
| Korea, Republic of | 76,205 | 90,502 | 32,624 | 15,923 | –60,282 | –79 |
| Burkina Faso | 17,675 | 7,333 | 3,347 | 3,397 | –14,278 | –81 |
| Japan | 327,833 | 70,833 | 65,200 | 46,833 | –281,000 | –86 |
| Mexico | 15,896 | 7,962 | 2,616 | 1,605 | –14,291 | –90 |
| **World** | **13,013,670** | **12,183,483** | **9,128,866** | **9,006,732** | **–4,006,938** | **–31** |

Source: FAO (1999).

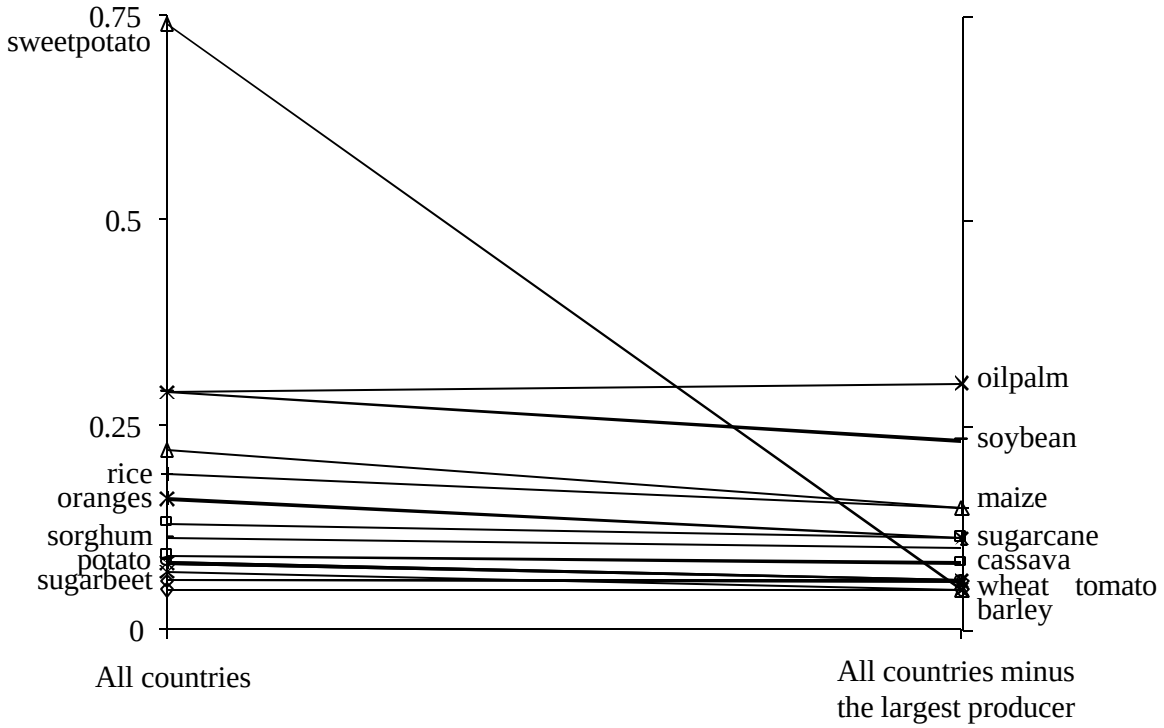


**Figure 2. Concentration index of the distribution of production over countries, of the main global crops for all countries and for all countries minus the largest producer. A high value indicates a high concentration.**

Calculated from FAO (1999)

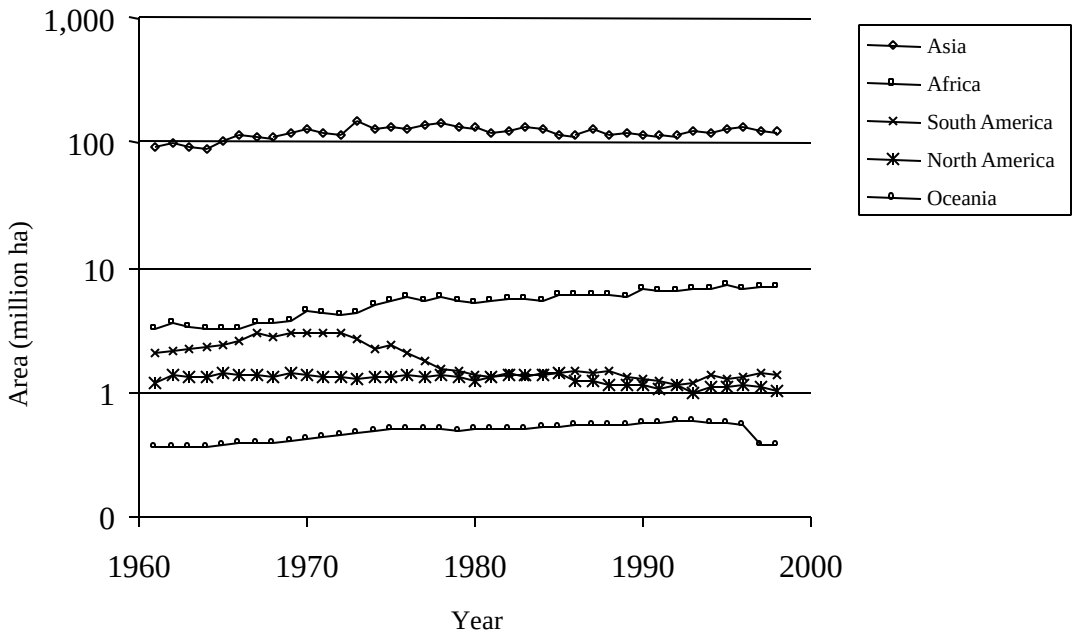


**Figure 3. Sweetpotato area by continent, 1961 to 1998.**

Source: FAO (1999).

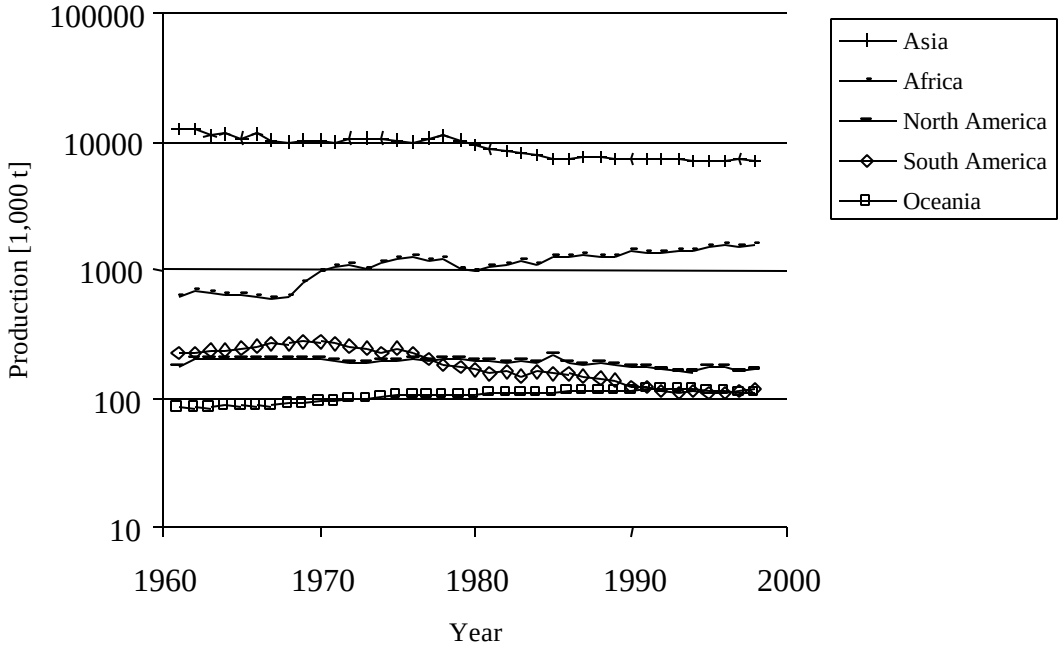


**Figure 4. Sweetpotato production by continent, 1961 to 1998.**

Source: FAO (1999)

## 2. Material and Methods

A geo-referenced database of global sweetpotato distribution was created using ArcView[1] GIS (Geographic Information System) software. The database is stored in a ‘shapefile’ format. A 'shapefile' includes a file describing the location of the spatial features, polygons in this case, and a database file (.dbf format) with the attribute data. The structure of the database is presented in Table 6.

Mostly gray literature was used to estimate the within-country distribution of sweetpotato. The sources used are listed by country in Appendix 2. Sweetpotato production zones were delineated following administrative boundaries. When units were large, or where data were scarce, the sweetpotato area was sometimes allocated in the area classified as cropland on a 1-$km^2$ global land-cover database (USGS, 1999). In some cases, specific sweetpotato production zones were taken from other maps (see Appendix 2).

The administrative boundaries were taken from the ADMIN98 global database that comes with ArcView GIS v. 3.1, a database for Africa provided by Corbett and O’Brien (1997), and some other country-level sources. In the case of Peru, administrative units (districts) were very small and had little sweetpotato area. Therefore, district-level data were aggregated by department.

To create a consistent database representative for one time period, we first estimated the percentage by zone for each country and then multiplied it by the FAO estimate for 1996–1998 (Appendix 1). The percentage by zone was estimated from national statistical data, when available (Appendix 2). FAO did not provide an estimate of sweetpotato area for Colombia, Guatemala, Nepal, Costa Rica, and Guyana. For Malawi we assumed that the 80% of the total area reported as potato by FAO was in fact sweetpotato (Peter Ewell, 1999. CIP, personal communication).

[1] Trademark of ESRI, Redlands, CA, USA

**Table 6. Structure of the database.**

| Variable name | Description |
|---|---|
| ID | Unique sequential identifier of a polygon. |
| COUNTRY | Name of the country. |
| CNTRY_ID | ID of a country (ISO-code). |
| C_SP_AREA | Sweetpotato area (in hectares) of a country. |
| ADM_NAME | Name of an administrative unit within a country. |
| TYPE_ENG | English name of the administrative division, e.g. Province |
| TYPE_LOC | Local name of the administrative division, e.g. Provincia |
| ZONE | Name of a production zone. |
| ZONE_ID | Sequential number of a production zone (unique within a country). |
| Z_SP_PERC | Percentage of the country's sweetpotato area in a production zone. |
| Z_SP_AREA | Sweetpotato area (in hectares) in a production zone. |

# 3. Results

The database has a total of 2517 units, with a mean of 3685 and a median of 1121 ha per map unit. Figures 5 to 9 show sweetpotato maps for the 1996–1998 period derived from the database. Area has been tabulated by administrative unit for all countries with more than 1000 ha (Appendix 3).

Data for China were available at the county level for 1987. The relative spatial distribution of the data seems to be quite accurate. However, the aggregated area exceeded FAO estimates by 1.5 million ha, representing about 17% of the world' sweetpotato reported by FAO for 1987. Although the Chinese estimate is probably more accurate, we have used the FAO figure for the country aggregate, and the Chinese data for the within country distribution, as we did for all other countries.

The maps illustrate that sweetpotato distribution is characterized by a pattern of both concentration and dispersion (see also Figure 2). It is highly concentrated in China and in the Lake Victoria area in Africa (Figures 5 to 9). In China, Sichuan Province has over 1 million ha; Shandong, Henan, and Anhui all have over 600,000 ha (Appendix 3). There is also a considerable concentration in Vietnam, Java, New Guinea, Cuba, and Haiti. In most other countries, sweetpotato densities are low but the crop is grown almost everywhere in the (sub)tropics. Although sweetpotato is a very important staple for small islands in Polynesia, they are not shown on the map at the 1000-ha-equals-1-dot scale used for the rest of the countries.

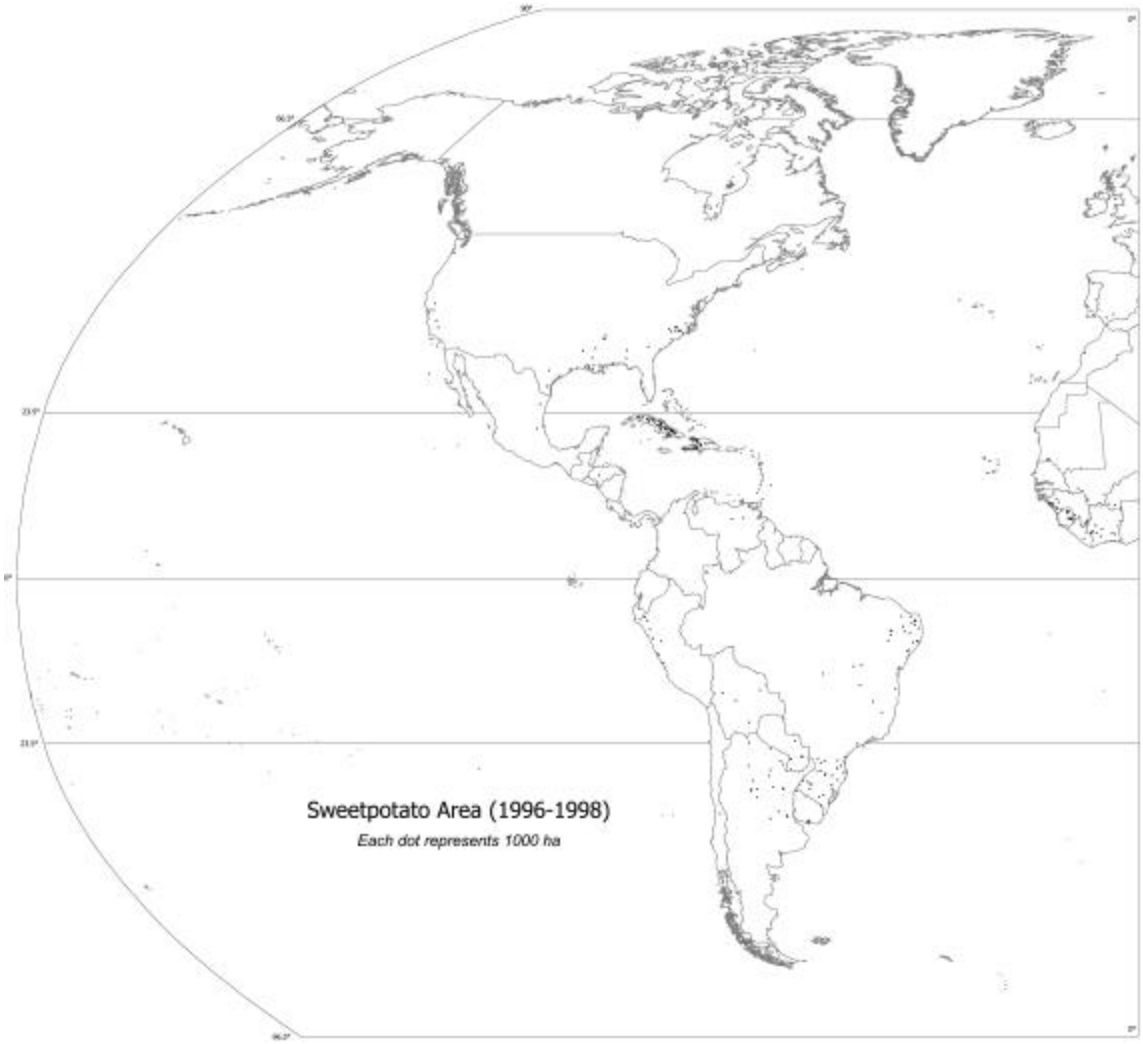


**Figure 5. Global sweetpotato distribution (1996–1998).**

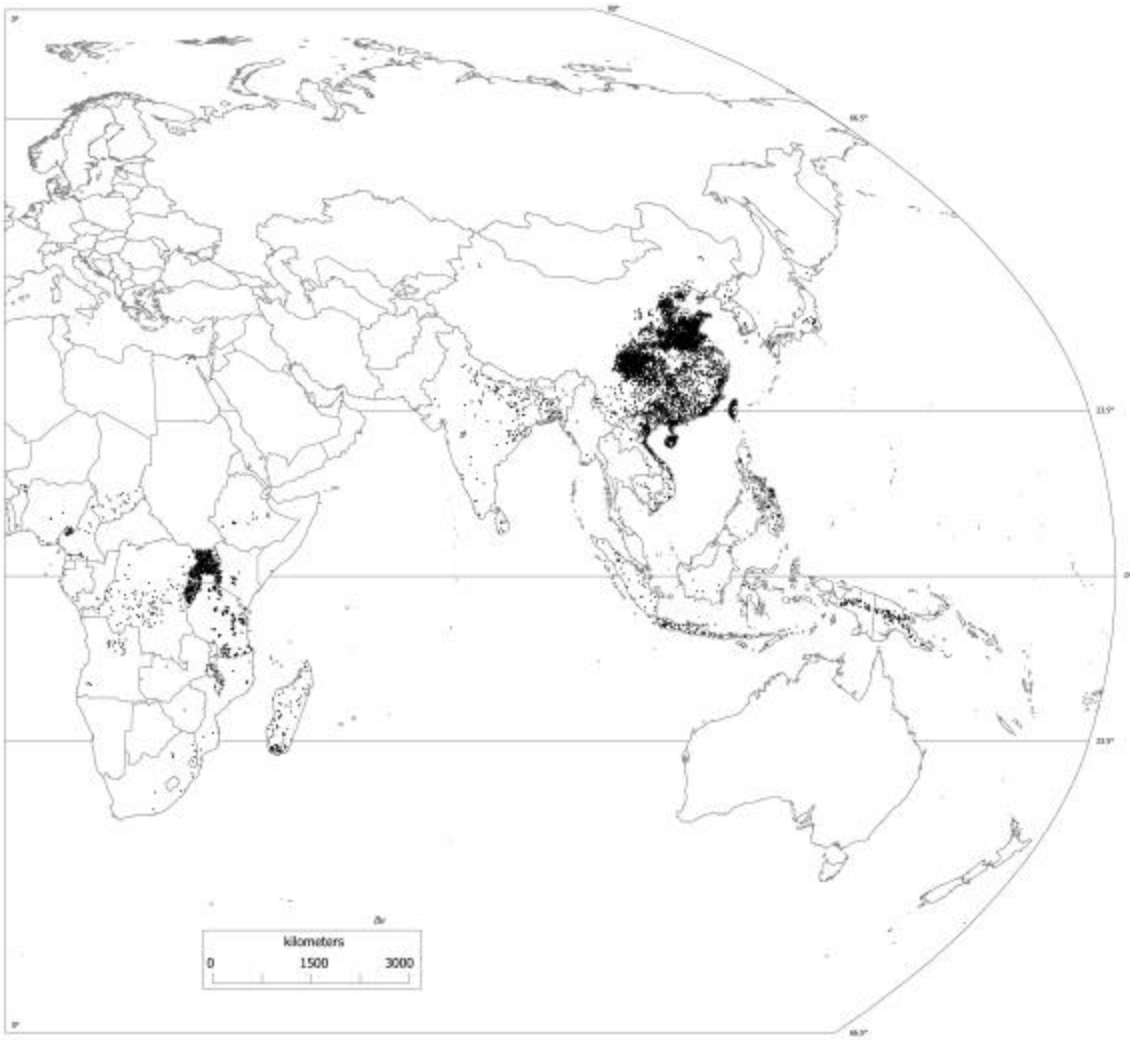
kilometers
0
1500
3000

**Figure 6. Sweetpotato distribution in Africa (1996–1998).**

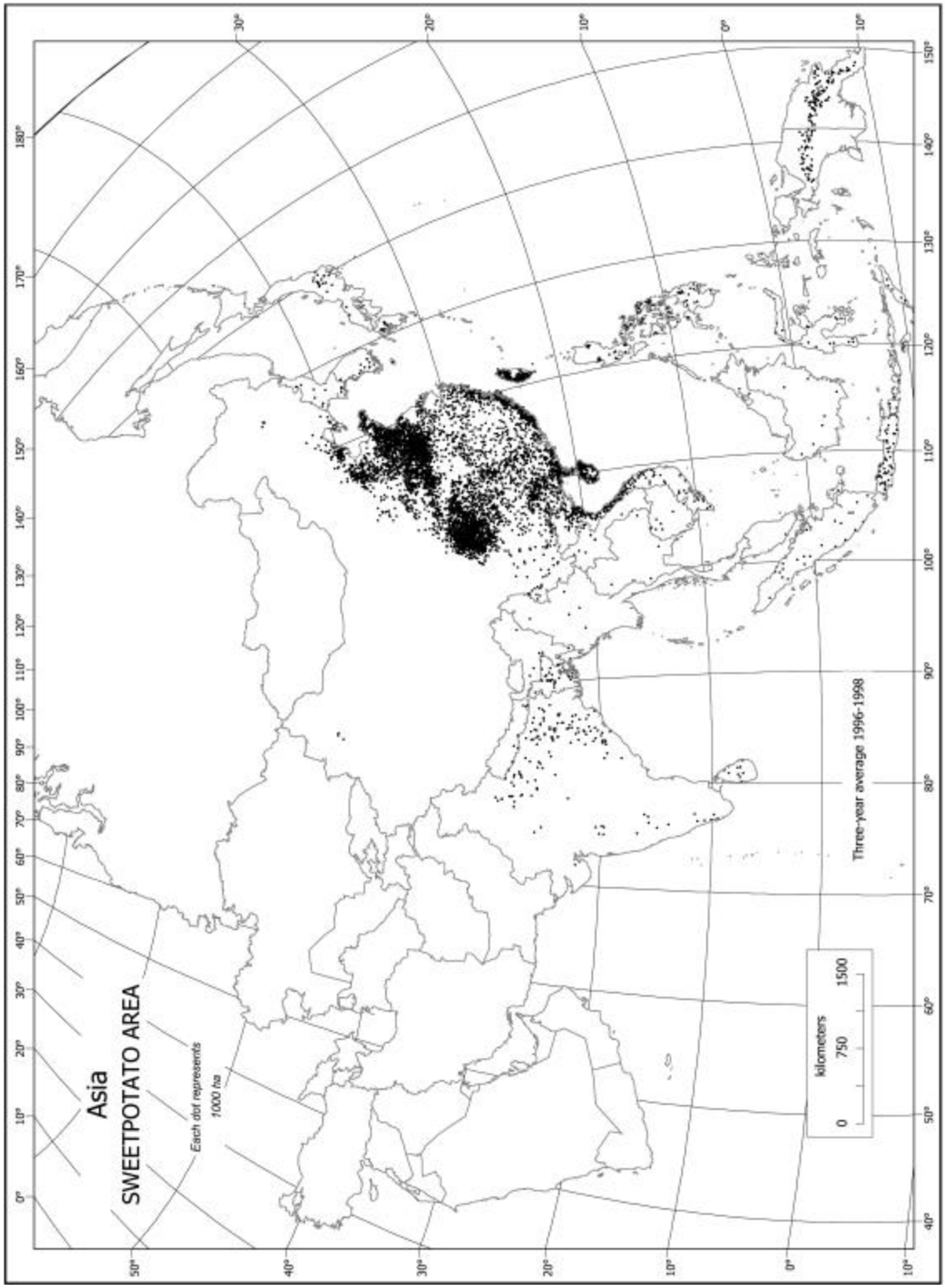


**Figure 7. Sweetpotato distribution in Asia (1996–1998).**

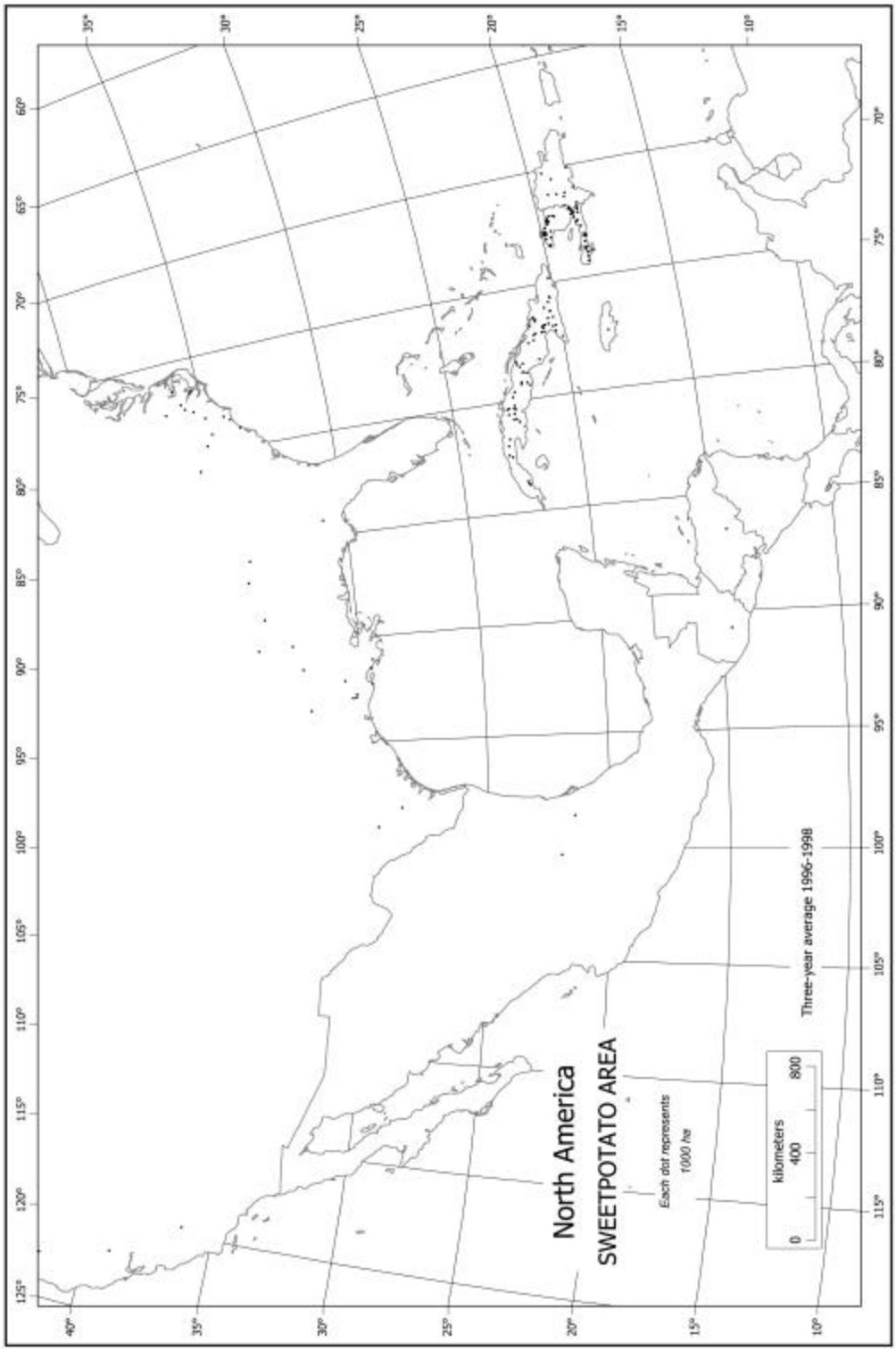


**Figure 8. Sweetpotato distribution in North America (1996–1998).**

**Figure 9. Sweetpotato distribution in South America (1996–1998).**

# 4. Discussion

The database and maps presented here are probably the first detailed description of global sweetpotato distribution. The maps provide considerably more detail than the rather general map presented almost thirty years ago by Bertin *et al.* (1971) (Figure 1).

The data sources differed greatly in detail and quality. Hence our data should always be interpreted with some caution. Fortunately, we had a high-resolution (county) database for China, which seems highly reliable albeit a little bit outdated (1987/88). Through a collaborative network of sweetpotato scientists in East Africa, we also had access to good estimates for important sweetpotato-producing countries in that part of the world. The distribution in the countries with low production of sweetpotato is, generally speaking, most uncertain. By documenting the sources we used for each country, users of the data, can quickly get an idea about the data quality and the need for updates.

Crop distribution maps are an important missing link for studies of global agriculture. Whereas there are prospects of using more remotely sensed data, we found that the current USGS (1999) data was not very useful. Much sweetpotato seems to be grown in areas where grid cells are not identified as dominantly agricultural. Detailed census type data will remain critically needed for the development of global crop distribution databases.

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## Appendix 1. Sweetpotato, area, production and yield by country (average 1996–1998). Only the countries with 50 ha or more have been included.

| Country | Area [ha] | Yield [t/ha] | Production [t] |
|---|---|---|---|
| Angola | 23,000 | 8.5 | 197,667 |
| Argentina | 20,000 | 17.0 | 340,000 |
| Australia | 361 | 17.1 | 6,208 |
| Bangladesh | 43,400 | 9.5 | 412,867 |
| Barbados | 601 | 8.5 | 5,100 |
| Benin | 10,827 | 5.4 | 60,705 |
| Bolivia | 3,017 | 4.1 | 12,523 |
| Brazil | 58,333 | 11.2 | 653,333 |
| Burkina Faso | 3,397 | 5.2 | 17,400 |
| Burundi | 106,000 | 6.0 | 647,133 |
| Cambodia | 8,633 | 3.5 | 30,811 |
| Cameroon | 43,333 | 5.5 | 240,000 |
| Cape Verde | 743 | 5.3 | 3,970 |
| Chad | 24,000 | 2.6 | 61,000 |
| Chile | 1,000 | 7.0 | 7,000 |
| China | 6,131,167 | 18.2 | 115,957,203 |
| Comoros | 2,200 | 6.5 | 13,930 |
| Congo, Dem. Republic of | 110,000 | 3.8 | 413,333 |
| Congo, Republic of | 3,100 | 7.7 | 24,000 |
| Cook Islands | 50 | 26.0 | 1,300 |
| Côte d'Ivoire | 12,000 | 3.0 | 36,000 |
| Cuba | 60,000 | 3.7 | 220,000 |
| Dominica | 433 | 4.0 | 1,733 |
| Dominican Republic | 7,400 | 5.2 | 39,018 |
| Ecuador | 393 | 2.8 | 1,203 |
| Egypt | 6,400 | 23.8 | 150,876 |
| El Salvador | 80 | 6.3 | 500 |
| Equatorial Guinea | 14,000 | 2.5 | 36,000 |
| Ethiopia | 20,000 | 8.0 | 159,333 |
| Fiji Islands | 1,576 | 6.1 | 9,530 |
| Gabon | 1,467 | 1.8 | 2,600 |
| Greece | 100 | 20.0 | 2,333 |
| Grenada | 100 | 2.7 | 270 |
| Guadeloupe | 267 | 11.4 | 3,097 |
| Guinea | 22,000 | 6.1 | 133,980 |
| Haiti | 57,200 | 3.0 | 171,183 |
| Honduras | 600 | 3.3 | 2,000 |
| India | 143,000 | 8.3 | 1,191,333 |
| Indonesia | 202,567 | 9.5 | 1,930,899 |
| Israel | 213 | 32.8 | 7,088 |
| Italy | 600 | 22.2 | 13,300 |
| Jamaica | 1,693 | 15.2 | 26,615 |
| Japan | 46,833 | 24.3 | 1,123,000 |
| Kenya | 74,667 | 9.7 | 726,667 |
| Korea, Dem. People's Rep | 13,000 | 13.5 | 174,000 |
| Korea, Republic of | 15,923 | 20.2 | 327,524 |
| Laos | 18,012 | 4.8 | 93,833 |
| Liberia | 1,700 | 10.0 | 17,000 |
| Madagascar | 90,333 | 5.5 | 506,667 |
| Malaysia | 3,600 | 11.1 | 40,000 |
| Mali | 2,900 | 5.3 | 15,971 |
| Martinique | 113 | 8.1 | 970 |
| Mauritania | 2,000 | 1.0 | 2,000 |

| Country | Area [ha] | Yield [t/ha] | Production [t] |
|---|---|---|---|
| Mexico | 1,605 | 18.8 | 30,113 |
| Micronesia, Fed States of | 510 | 5.9 | 3,000 |
| Morocco | 750 | 19.8 | 14,333 |
| Mozambique | 8,700 | 6.8 | 59,000 |
| Myanmar | 5,000 | 4.6 | 22,772 |
| New Caledonia | 700 | 4.3 | 3,000 |
| New Zealand | 1,167 | 23.3 | 27,800 |
| Niger | 5,200 | 7.0 | 36,333 |
| Nigeria | 5,000 | 8.0 | 40,000 |
| Pakistan | 820 | 10.6 | 8,668 |
| Papua New Guinea | 101,667 | 2.5 | 310,000 |
| Paraguay | 9,730 | 7.8 | 74,025 |
| Peru | 13,661 | 15.4 | 213,963 |
| Philippines | 136,552 | 4.5 | 617,920 |
| Portugal | 3,000 | 7.3 | 22,000 |
| Puerto Rico | 105 | 20.8 | 2,026 |
| Rwanda | 150,000 | 6.7 | 983,333 |
| Saint Lucia | 118 | 8.0 | 659 |
| Saint Vincent/Grenadines | 1,200 | 1.8 | 2,100 |
| Senegal | 731 | 5.4 | 3,848 |
| Sierra Leone | 17,200 | 2.9 | 49,067 |
| Solomon Islands | 4,900 | 14.6 | 72,000 |
| Somalia | 513 | 9.8 | 5,067 |
| South Africa | 13,000 | 3.7 | 47,174 |
| Spain | 1,502 | 16.0 | 23,939 |
| Sri Lanka | 8,885 | 6.1 | 55,145 |
| Sudan | 628 | 13.6 | 8,433 |
| Swaziland | 1,300 | 1.8 | 2,300 |
| Tanzania, United Rep of | 242,000 | 1.6 | 385,333 |
| Thailand | 9,000 | 10.0 | 90,000 |
| Togo | 887 | 7.5 | 5,972 |
| Tonga | 416 | 12.3 | 5,137 |
| Uganda | 524,667 | 3.6 | 1,777,333 |
| United States of America | 33,980 | 17.0 | 588,330 |
| Uruguay | 6,000 | 9.6 | 56,667 |
| Venezuela | 1,797 | 6.8 | 11,457 |
| Viet Nam | 274,767 | 6.1 | 1,618,933 |
| Zambia | 3,567 | 14.5 | 52,333 |
| Zimbabwe | 700 | 2.1 | 1,467 |
| **Total** | **9,006,735** | **15** | **133,606,406** |

Source: FAO (1999).

## Appendix 2. Principal data sources used by continent and country.

**ASIA**

**Bangladesh**

Siddique and Mamunur, 1989.

Maps the sweetpotato growing zones and provides a table with district level data. The table was not used, because it is incomplete.

**China**

County-level database for 1987 and 1988.

**India**

Vanneman and Barnes, 1991.

Provides sweetpotato data at district level 1980/1982.

**Indonesia**

Rachim, Malian, Adnyana and Dimyati, 1992.

Province level average data for the 1987–1989 period was used to estimate 1996–1998 status of sweetpotato.

**Japan**

Komaki, 1998

Provides sweetpotato data at region level.

**Laos**

Souvirnmonh and Inthisane, 1989.

Indicates the province level data for 1987.

**Malaysia**

Shukor and Khelikuzzaman, 1989.

Establishes sweetpotato zones in the States of Sabah, Sarawak (major sweetpotato producers), Kelantan and Malacca.

**Nepal**

Shah and Koirala, 1991.

Establishes the following sweetpotato growing districts of the plain ecological zone: Banke, Kapilbastu, Chitwan, Dhanusa and Morang. It mentions Palpa, Kaski, Lamjung and Dhamkutta of the Hill ecological zone. The total sweetpotato area of the country is estimated as 7000 ha (reported by the Department of Food and Marketing Services, 1986).

*FAO does not provide a country level estimate for Nepal.*

**Pakistan**

Khan, 1989.

Provides the vegetable growing zones per province for 1984/1985.

**Philippines**

Gayao, Sano and Wallace, 1987.

Sweetpotato data for all the regions with the exception of the Cordillera Administrative Region, as the average for the 1982–1985 period.

Roa, del Mundo, Garzón, Mula, 1991.

Maps the sweetpotato growing zones for the following provinces: Ilocos, Cagayan Valley, Central Luzón, Southern Talagog and Western Mindanao, Northern Mindanao.

Northern Philippines Root Crops Research and Training Center, 1987.

Provides sweetpotato-growing areas in Benguet Province per municipality.

*The table provided in Gayao et al. was used to assign the area to the polygons shown in Roa et al. and to the whole of the region in the case that no zone was provided. In addition, Benguet province (Cordillera Administrative Region) data was aggregated into province level data and taken as 4007 ha.*

**South Korea**

Ahn, Jeong and Bi Oh, 1998.

Estimates of the sweetpotato area at province level for 1977.

**Taiwan**

Wan, 1988.

Estimates the total country sweetpotato area as 230,000 ha.

Chiang, 1992.

Provides the sweetpotato area percentage by province for 1989.

*The country level data from Wan was distributed into the provinces according to Chiang. FAO does not provide a country level estimate.*

**Thailand**

Thongjiem and Thamrong, 1989.

Sweetpotato area at region level for the 1984/1986 period.

**Vietnam**

Hoa, 1998.

Province level sweetpotato data for 1993. Then it was aggregated into regions defined according to geography and climate

**AFRICA**

**Angola**

Peter Ewell (CIP, personal communication, 1999).

Sweetpotato is concentrated in the north-central part of the country and there are some other areas in the southern highlands.

**Burundi**

Mélance Ndikumasabo (Poupart, personal communication, 1999).

Sweetpotato area at province level for 1987.

**Burkina Faso**

Sweetpotato is assumed to be grown in the southern, wetter part of the country.

**Cameroon**

Gass and Lekunze, 1990.

Provides a map showing the sweetpotato growing zones in the North West province. Estimates the total province sweetpotato area for 1987/1988 as 26,069 ha.

Ngale Lyonga and Nzietchueng, 1992

Mentions the southern region as a sweetpotato growing zone, but no area is given.

Akoroda, Pfeiffer and Mbahe, 1992.

Provides an estimation of sweetpotato area in Adamaoua Province as 5,500 ha for 1986.

*The sweet potato zones and total area for the North West province were taken from Gass and Lekunze. Amadaoua province data taken from Akoroda et al. We assigned the difference between the country total and the two zones mentioned before to the Southern region.*

**Chad**

We assumed that sweetpotato is mainly produced in the southern (wetter) part of the country.

**Egypt**

Fouda, 1988.

Sweetpotato growing areas are located in the governates of: Kalubiya, Sharkiya, Monofiya, Garbiya, Dakahliya and Alexandria. Then the zones where merged into a single one because of the relative small sweetpotato area.

**Ethiopia**

Terefe Belehu (personal communication, 1999)

Names the main sweetpotato production zones for 1993/1994.

**Kenya**

Obel Gor, 1989

Sweetpotato growing areas at district level for 1985.

**Madagascar**

J.M. Randrianaivoarivony (personal communication, 1999).

Provides sweetpotato production percentage by district obtained from the. Statistic Service of Ministry of Agriculture.

Peter Ewell (CIP, personal communication, 1999).

The southern tip of the island is an area of sweetpotato growing concentration.

**Malawi**

Sauti, Mahungu, Gondwe, Ndingo, Shrestha, Chibamba, Otoo and Alvarez, 1994.

Sweetpotato growing zones are concentrated in the southern and central region.

Peter Ewell (CIP, personal communication, 1999).

Estimates that 80% of the potato area estimated by FAO in Malawi is probably sweetpotato.

*87% of the sweetpotato was assigned to the regions mentioned by Sauti et al. The remaining percentage was assigned to the northern region, as it is near the border with Tanzania where there is a high density of sweetpotato.*

**Mali**

Sweetpotato is assumed to be grown in the southern, wetter part of the country.

**Mozambique**

Jorge, and Zacarias, 1994.

Mentions the sweetpotato production zones: North and South regions.

**Niger**

Sweetpotato is assumed to be grown in the southern, wetter part of the country.

**Nigeria**

Nwinyi, 1988.

Establishes the sweetpotato growing zones in: Rivers, Cross River Kwara, Plateau, Gongola States.

**Rwanda**

Jean Ndirigue (personal communication, 1999).

Provides sweetpotato province level data.

**South Africa**

Meynhardt and Joubert, 1988.

Mentions the following sweetpotato growing zones: Pretoria, Addo and Nelspruit.

Peter Ewell (CIP, personal communication, 1999).

There is sweetpotato along the border with Mozambique.

Laurie and de Villiers, 1997.

Establish the following sweetpotato zones: Soshanguve, Winterveld, Mabaloka (Gauteng-North West Province); Wonderboom (former Lebowa), Tulamahase (near Hazyview), Hoxane (Mpumalanga), Kwazulu/Natal Province.

**Sudan**

Ali Khalafalla (personal communication, 1999).

Provides data for the sweetpotato growing regions.

**Tanzania**

Ndunguru, 1992.

Establishes the sweetpotato supplier zones for Dar es Salaam: Gairo, Bagamoyo, Kigamboni, Songea and Kondoa.

Jeremiah, 1994.

Mentions the sweetpotato growing zones near the Victoria Lake: Ukerewe, Musoma, Bunda, Serengeti and Tarime.

Kapinga, Jeremiah, Kileo and Ewell, 1988.

Maps the zones with sweetpotato that were surveyed zones all around Tanzania.

*The zones were delineated according to Ndunguru, Jeremiah and Kapinga et al. We slightly increased area in Kagera zone because of its proximity to the high sweetpotato area density in Rwanda and Burundi.*

**Uganda**

Bashaasha, Mwanga, p'Obwoya and Ewell, 1995.

Mention the major sweetpotato-producing districts. The remaining districts were assigned a small area as well.

**Zaire**

Phemba Phezo (personal communication, 1999).

Provides sweetpotato province level data from the PNUD/FAO ZAI/92/004 document for 1984.

*A part of the Haut-Zaire province near to the border with Uganda was included to create a smooth transition from the high sweetpotato density in Uganda.*

**Zambia**

Namposya, 1998.

Mentions the sweetpotato growing districts of Solwezi and Kasempa located in the North Western province.

Peter Ewell (CIP, personal communication, 1999).

About half of the sweetpotato area is located on each side of the “peduncle” of the D.R. Congo (Zaire).

## NORTH AMERICA

**Belize**

Ferguson, 1985.

Estimates the country level production as 10 tons for 1982–1983.

*Sweetpotato production was taken from Ferguson. Belize’s sweetpotato yield was assumed to be the same as in Honduras (3.3 t/ha). The sweetpotato area was calculated dividing production by yield.*

**Costa Rica**

Solis, 1992.

Establishes the following sweetpotato production zones: Parrita, Santa Clara, San Carlos.

*There is no FAO estimate of sweetpotato area for Costa Rica. We estimated it to be the same as in Nicaragua (500 ha).*

**Dominican Republic**

Guzmán Arias, 1983.

The sweetpotato area by production zone.

**Guadeloupe**

Degras, 1985.

Maps of the sweetpotato growing areas.

**Guatemala**

Soto Guevara, 1992.

Establishes the main sweetpotato production zones by department.

*Sweetpotato area was estimated as 500 ha. as in Nicaragua, because no FAO data for Guatemala was available.*

**Haiti**

Polynice, 1988.

Maps the main sweetpotato production zones.

**Jamaica**

Blake, 1988.

Provides region level sweetpotato data for 1986.

**United States**

United States Department of Agriculture (USDA), 1997.

Details sweetpotato area by county for 1996 and 1997.

## OCEANIA

**Fiji**

Iqbal, 1989.

Provides sweetpotato area at division level for 1985.

**New Zealand**

Coleman, 1978

Mentions the main sweetpotato growing zones as well as the sweetpotato area in each zone.

**Papua New Guinea**

Bourke, 1988

Sweetpotato is grown between 1200 and 2700 m.a.s.l.

## SOUTH AMERICA

**Argentina**

Bianchini and Boy, 1988

Lists the sweetpotato growing zones in Buenos Aires province: Departments of San Pedro, Baradero, and Zarate.

Italia, 1982.

Lists the sweetpotato growing zones in Cordova Province: Departments of Colon, Rio Seco, Totoral, Rio Primero, Ischilin, Tulumba, Northern part of Departament capital and Sobremonte.

Italia, 1988.

States that the contribution of Cordova Province equals to 20% of the country total.

Pletsch, 1988.

Estimates that Corrientes province represents 15% of the national production.

Villanova and Reula, 1988.

Lists the sweetpotato growing zones in Entre Rios province: Departments of Parana, Diamante, Federal, Colón, Concordia and Federación. Entre Rios province data for the last three decades.

Lenscak, 1990.

Lists the sweetpotato growing zones in Formosa province: Proximity of Pilcomayo and Bermejo rivers.

Fernandez, 1988.

Lists the sweetpotato growing zones in Santiago del Estero Province: Departments of Capital, Silipica, Loreto, Robles, Banda and San Martin.

Universidad Nacional de Santiago del Estero. Facultad de Agronomía y Agroindustrias (Argentina), 1991.

Estimates Santiago del Estero province sweetpotato data for 1988/1989 as 1141 ha.

Ávila Albornoz, 1990.

Lists the sweetpotato growing zones in Tucuman province: Departments of Cruz Alta, Burruyacu, Capital, Monteros, Simoca, Chiligasta and Graneros.

Boy, Cantos, Fano and Fernandez (eds.), 1988.

Establishes that sweetpotato is grown also in the Provinces of Jujuy, Salta, Chaco, Misiones, Santa Fe, San Luis, San Juan and Mendoza.

*Argentina is administratively divided by province each province has many departments. The provinces with main sweetpotato production are: Buenos Aires (Bianchini and Boy), Cordova (Italia), Corrientes (Pletsch), Entre Rios (Villanova and Reula), Formosa (Lenscak), Santiago del Estero (Fernande, Universidad Nacional de Santiago del Estero) and Tucumán (Ávila). The provinces with minor sweetpotato production,*

*according to Boy et al. are Jujuy, Salta, Chaco, Misiones, Santa Fe, San Luis, San Juan and Mendoza.*

**Bolivia**

Gutierrez, 1990.

Provides department level sweetpotato data.

**Brazil**

Carvalho da Silva, 1990.

Sweetpotato area at state level.

**Colombia**

Alvarez Soto, 1990.

Sweetpotato is grown in the departments of Córdova, Sucre, Bolivar, Atlántico, Magdalena, Cesar and in the zone of Urabá in Antioquía.

*FAO does not report sweetpotato area for Colombia; we estimated it as 1000 ha.*

**Chile**

Larenas de la F., López and Accatino, 1994.

Provides region level sweetpotato data, as the average between the 1990/91 and 1992/93 periods.

**Ecuador**

Nieto, 1988.

Sweetpotato area at province level data for 1985.

**Guyana**

Forde, 1985.

Maps the zones where root crops are produced.

Ferguson, 1985.

Estimates the country level production as 250 t for 1982–1983.

*The sweetpotato zones were delineated according to Forde. FAO does not provide an area or production estimate. Sweetpotato production was taken from Ferguson. Yield was assumed to be the average of Venezuela (6.8 t/ha) and Suriname (11.6 t/ha). Area was calculated dividing production by yield.*

**Paraguay**

Cardoso, 1988

Maps the sweetpotato production zones.

Burgos, 1990.

Establishes that Caaguazu is the department with most of the sweetpotato area, whereas in the Central and Ñeembucú departments the sweetpotato is grown more than other crops, but there is no sweetpotato production in Nueva Asunción department.

*The sweetpotato zones were delineated according to Cardoso. The departments of Caaguazu, Central and Ñeembucú were given more percentage than the rest, as mentioned by Burgos.*

**Peru**

INEI, 1993.

District level data, it was aggregated by department.

**Uruguay**

Picos, 1990.

Sweetpotato area at department level for 1980.

**Venezuela**

Marcano, 1988.
Maps the sweetpotato production zones.

## Appendix 3. Sweetpotato area by country and administrative unit[2]

| Country and division | Area [ha] | Percentage |
|---|---|---|
| **Angola** | **23000** | **100** |
| *Province (Provincia)* | | |
| Bie | 562 | 2 |
| Huila | 2564 | 11 |
| Lunda Norte | 8931 | 39 |
| Lunda Sul | 2729 | 12 |
| Malanje | 7327 | 32 |
| Namibe | 888 | 4 |
| **Antigua and Barbuda** | **24** | **100** |
| **Argentina** | **20000** | **100** |
| *Province (Provincia)* | | |
| Buenos Aires | 2240 | 11 |
| Chaco | 1347 | 7 |
| Cordoba | 4007 | 20 |
| Corrientes | 2928 | 15 |
| Entre Rios | 238 | 1 |
| Formosa | 2560 | 13 |
| Jujuy | 65 | 0 |
| Salta | 1002 | 5 |
| San Luis | 354 | 2 |
| Santa Fe | 3624 | 18 |
| Santiago del Estero | 618 | 3 |
| Tucuman | 1007 | 5 |
| **Australia** | **361** | **100** |
| **Bahamas, The** | **89** | **100** |
| **Bangladesh** | **43400** | **100** |
| *Division* | | |
| Barisal | 4650 | 11 |
| Chittagong | 13198 | 30 |
| Dhaka | 17235 | 40 |
| Khulna | 1400 | 3 |
| Rajshahi | 6917 | 16 |
| **Barbados** | **601** | **100** |
| **Belize** | **3** | **100** |
| **Benin** | **10827** | **100** |
| *Province (Province)* | | |
| Zou | 10827 | 100 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| **Bolivia** | **3017** | **100** |
| *Department (Departamento)* | | |
| Chuquisaca | 643 | 21 |
| Cochabamba | 539 | 18 |
| La Paz | 624 | 21 |
| Potosi | 161 | 5 |
| Santa Cruz | 662 | 22 |
| Tarija | 386 | 13 |
| **Brazil** | **58333** | **100** |
| *State (Estado)* | | |
| Alagoas | 2029 | 3 |
| Amazonas | 392 | 1 |
| Bahia | 4189 | 7 |
| Ceara | 857 | 1 |
| Distrito Federal | 44 | 0 |
| Espirito Santo | 450 | 1 |
| Goias | 307 | 1 |
| Maranhao | 87 | 0 |
| Mato Grosso | 500 | 1 |
| Mato Grosso do Sul | 124 | 0 |
| Minas Gerais | 2891 | 5 |
| Para | 112 | 0 |
| Paraiba | 5424 | 9 |
| Parana | 3905 | 7 |
| Pernambuco | 5980 | 10 |
| Piaui | 365 | 1 |
| Rio de Janeiro | 1363 | 2 |
| Rio Grande do Norte | 4261 | 7 |
| Rio Grande do Sul | 17718 | 30 |
| Rondonia | 106 | 0 |
| Santa Catarina | 3677 | 6 |
| Sao Paulo | 1216 | 2 |
| Sergipe | 2328 | 4 |
| **Brunei** | **28** | **100** |
| **Burkina Faso** | **3397** | **100** |
| *Province (Province)* | | |
| Bazega | 78 | 2 |
| Bougouriba | 121 | 4 |
| Boulgou | 166 | 5 |

[2] Units with less than 10 ha of sweetpotato were not included.The type of administrative unit is indicated in English and in a local language in brackets. However, there may be exceptions within countries. E.g., in China "Provinces" includes "Autonomous Regions" and "Municipalities".

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Boulkiemde | 80 | 2 |
| Comoe | 310 | 9 |
| Ganzourgou | 72 | 2 |
| Gnagna | 107 | 3 |
| Gourma | 456 | 13 |
| Houet | 282 | 8 |
| Kadiogo | 32 | 1 |
| Kenedougou | 143 | 4 |
| Kossi | 146 | 4 |
| Kouritenga | 29 | 1 |
| Mouhoun | 186 | 5 |
| Nahouri | 63 | 2 |
| Namentenga | 65 | 2 |
| Oubritenga | 78 | 2 |
| Passore | 52 | 2 |
| Poni | 169 | 5 |
| Sanguie | 86 | 3 |
| Sanmatenga | 50 | 1 |
| Seno | 39 | 1 |
| Sissili | 230 | 7 |
| Sourou | 50 | 1 |
| Tapoa | 257 | 8 |
| Zoundweogo | 50 | 1 |
| **Burundi** | **106000** | **100** |
| *Region* | | |
| Bubanza | 969 | 1 |
| Bujumbura | 3033 | 3 |
| Bururi | 3271 | 3 |
| Cankuzo | 1564 | 1 |
| Cibitoke | 1156 | 1 |
| Gitega | 24430 | 23 |
| Karuzi | 9950 | 9 |
| Kayanza | 19587 | 18 |
| Kirundo | 3539 | 3 |
| Makamba | 742 | 1 |
| Muramvya | 12453 | 12 |
| Muyinga | 2042 | 2 |
| Ngozi | 19534 | 18 |
| Rutana | 1958 | 2 |
| Ruyigi | 1773 | 2 |
| **Cambodia** | **8633** | **100** |
| *Province (Khet)* | | |
| Batdambang | 1369 | 16 |
| Kampong Cham | 626 | 7 |
| Kampong Chhnang | 394 | 5 |
| Kampong Spoe | 475 | 6 |
| Kampong Thum | 520 | 6 |
| Kampot | 285 | 3 |
| Kandal | 275 | 3 |
| Kaoh Kong | 155 | 2 |
| Kracheh | 474 | 5 |
| Mondol Kiri | 447 | 5 |
| Phnum Penh | 11 | 0 |
| Pouthisat | 675 | 8 |
| Preah Vihear | 458 | 5 |
| Prey Veng | 348 | 4 |
| Rotanokiri | 112 | 1 |
| Siemreab-Otdar Meanchey | 1320 | 15 |
| Stoeng Treng | 219 | 3 |
| Svay Rieng | 217 | 3 |
| Takev | 253 | 3 |
| **Cameroon** | **43333** | **100** |
| *Province* | | |
| Adamoua | 5508 | 13 |
| Nord-Ouest | 26043 | 60 |
| Sud | 11781 | 27 |
| **Chad** | **24000** | **100** |
| *Prefecture (Prefecture)* | | |
| Batha | 405 | 2 |
| Chari-Baguirmi | 3296 | 14 |
| Guera | 3534 | 15 |
| Logone Occidental | 611 | 3 |
| Logone Oriental | 1559 | 6 |
| Mayo Kebi | 2129 | 9 |
| Moyen-Chari | 4031 | 17 |
| Ouaddai | 2410 | 10 |
| Salamat | 4831 | 20 |
| Tandjile | 1192 | 5 |
| **Chile** | **1000** | **100** |
| *Región* | | |
| Coquimbo | 64 | 6 |
| Libertador Gral. O'Higgins | 36 | 4 |
| Maule | 91 | 9 |
| Region Metropolitana | 591 | 59 |
| Tarapaca | 36 | 4 |
| Valparaiso | 182 | 18 |
| **China** | **6131167** | **100** |
| *Province (Sheng)* | | |
| Anhui | 632368 | 10 |
| Beijing | 7541 | 0 |
| Chongqing | 327274 | 5 |
| Fujian | 246902 | 4 |
| Guangdong | 448556 | 7 |
| Guangxi | 335007 | 5 |
| Guizhou | 157878 | 3 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Hainan | 173941 | 3 |
| Hebei | 277068 | 5 |
| Heilongjiang | 3250 | 0 |
| Henan | 632859 | 10 |
| Hubei | 161066 | 3 |
| Hunan | 271856 | 4 |
| Jiangsu | 230041 | 4 |
| Jiangxi | 94420 | 2 |
| Jilin | 4782 | 0 |
| Liaoning | 37094 | 1 |
| Nei Mongol | 429 | 0 |
| Shaanxi | 113120 | 2 |
| Shandong | 667561 | 11 |
| Shanxi | 43960 | 1 |
| Sichuan | 1036687 | 17 |
| Tianjin | 4966 | 0 |
| Xinjiang | 3617 | 0 |
| Yunnan | 84242 | 1 |
| Zhejiang | 134579 | 2 |
| **Colombia** | **1000** | **100** |
| *Department (Departamento)* | | |
| Antioquia | 144 | 14 |
| Atlantico | 112 | 11 |
| Bolivar | 145 | 14 |
| Cesar | 138 | 14 |
| Cordoba | 147 | 15 |
| Magdalena | 173 | 17 |
| Sucre | 143 | 14 |
| **Congo** | **3100** | **100** |
| *Region* | | |
| Niari | 699 | 23 |
| Pool | 2401 | 77 |
| **Costa Rica** | **500** | **100** |
| **Cuba** | **60000** | **100** |
| *Province (Provincia)* | | |
| Camaguey | 8495 | 14 |
| Ciego de Avila | 6891 | 11 |
| Cienfuegos | 3197 | 5 |
| Ciudad de la Habana | 227 | 0 |
| Granma | 6820 | 11 |
| Guantanamo | 1108 | 2 |
| Holguin | 6664 | 11 |
| Isla de la Juventud | 128 | 0 |
| La Habana | 2188 | 4 |
| Las Tunas | 6436 | 11 |
| Matanzas | 4447 | 7 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Pinar del Rio | 2118 | 4 |
| Sancti Spiritus | 5186 | 9 |
| Santiago de Cuba | 2160 | 4 |
| Villa Clara | 3935 | 7 |
| **Dominica** | **433** | **100** |
| **Dominican Republic** | **7400** | **100** |
| *Zone* | | |
| Central y este | 1153 | 16 |
| Nordeste y Noroeste | 958 | 13 |
| Norte y Norcentral | 2141 | 29 |
| Sur | 622 | 8 |
| Suroeste | 2525 | 34 |
| **Ecuador** | **393** | **100** |
| **Egypt** | **6400** | **100** |
| *Governorate (Muhafazah))* | | |
| Ad Daqahliyah | 1426 | 22 |
| Al Buhayrah | 88 | 1 |
| Al Gharbiyah | 677 | 11 |
| Al Iskandariyah | 911 | 14 |
| Al Isma'iliyah | 114 | 2 |
| Al Jizah | 44 | 1 |
| Al Minufiyah | 603 | 9 |
| Al Qahirah | 36 | 1 |
| Al Qalyubiyah | 405 | 6 |
| Ash Sharqiyah | 2042 | 32 |
| Bur Sa'id | 22 | 0 |
| Marsa Matruh | 22 | 0 |
| **El Salvador** | **80** | **100** |
| **Ethiopia** | **20000** | **100** |
| *Administrative region (Astedader Akababi)* | | |
| Arsi | 624 | 3 |
| Bale | 70 | 0 |
| Hararge | 5966 | 30 |
| Illubabor | 146 | 1 |
| Kefa | 11502 | 58 |
| Kembata & Hadiya | 745 | 4 |
| Omo Sheleko | 288 | 1 |
| Sidamo | 197 | 1 |
| Welega | 461 | 2 |
| **Federated States of Micronesia** | **510** | **100** |
| **Fiji** | **1576** | **100** |
| *Zone* | | |
| Central | 394 | 25 |
| Eastern | 394 | 25 |
| Northern | 394 | 25 |
| Western | 394 | 25 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| **Gabon** | **1467** | **100** |
| *Province* | | |
| Nyanga | 1467 | 100 |
| **Ghana** | **10** | **100** |
| **Greece** | **100** | **100** |
| **Grenada** | **100** | **100** |
| **Guadeloupe** | **267** | **100** |
| **Guatemala** | **500** | **100** |
| **Guinea** | **22000** | **100** |
| *Administrative Region (Region Administrative)* | | |
| Boffa | 5007 | 23 |
| Boke | 1772 | 8 |
| Conakry | 28 | 0 |
| Coyah | 2391 | 11 |
| Forecariah | 1322 | 6 |
| Fria | 647 | 3 |
| Gueckedou | 1069 | 5 |
| Kindia | 1604 | 7 |
| Kissidougou | 141 | 1 |
| Lola | 1828 | 8 |
| Macenta | 675 | 3 |
| Mamou | 366 | 2 |
| Nzerekore | 535 | 2 |
| Telimele | 3967 | 18 |
| Yomou | 647 | 3 |
| **Guyana** | **31** | **100** |
| **Haiti** | **57200** | **100** |
| *Department* | | |
| Nord | 9210 | 16 |
| Ouest | 11149 | 19 |
| Sud | 11634 | 20 |
| **Honduras** | **600** | **100** |
| **India** | **143000** | **100** |
| *State* | | |
| Andaman & Nicobar | 156 | 0 |
| Andhra Pradesh | 50 | 0 |
| Arunachal Pradesh | 113 | 0 |
| Assam | 2638 | 2 |
| Bihar | 45952 | 32 |
| Delhi | 20 | 0 |
| Gujarat | 725 | 1 |
| Haryana | 744 | 1 |
| Karnataka | 7199 | 5 |
| Kerala | 5400 | 4 |
| Madhya Pradesh | 7835 | 5 |
| Maharashtra | 76 | 0 |
| Meghalaya | 1856 | 1 |
| Mizoram | 528 | 0 |
| Nagaland | 11 | 0 |
| Orissa | 30426 | 21 |
| Pondicherry | 182 | 0 |
| Punjab | 89 | 0 |
| Rajasthan | 2201 | 2 |
| Tamil Nadu | 144 | 0 |
| Tripura | 1803 | 1 |
| Uttar Pradesh | 34846 | 24 |
| **Indonesia** | **202567** | **100** |
| *Province (Propinsi)* | | |
| Aceh | 1614 | 1 |
| Bali | 6438 | 3 |
| Bengkulu | 2986 | 1 |
| Irian Jaya | 51877 | 26 |
| Jakarta Raya | 14 | 0 |
| Jambi | 2325 | 1 |
| Jawa Barat | 32168 | 16 |
| Jawa Tengah | 17437 | 9 |
| Jawa Timur | 17729 | 9 |
| Kalimantan Barat | 2038 | 1 |
| Kalimantan Selatan | 1614 | 1 |
| Kalimantan Tengah | 1858 | 1 |
| Kalimantan Timur | 1752 | 1 |
| Lampung | 1839 | 1 |
| Maluku | 1985 | 1 |
| Nusa Tenggara Barat | 5787 | 3 |
| Nusa Tenggara Timur | 10266 | 5 |
| Riau | 1683 | 1 |
| Sulawesi Selatan | 6032 | 3 |
| Sulawesi Tengah | 7825 | 4 |
| Sulawesi Tenggara | 2712 | 1 |
| Sulawesi Utara | 3166 | 2 |
| Sumatera Barat | 2822 | 1 |
| Sumatera Selatan | 4586 | 2 |
| Sumatera Utara | 11338 | 6 |
| Timor Timur | 1770 | 1 |
| Yogyakarta | 903 | 0 |
| **Israel** | **213** | **100** |
| **Italy** | **600** | **100** |
| **Ivory Coast** | **12000** | **100** |
| *Department* | | |
| Abengourou | 1273 | 11 |
| Abidjan | 522 | 4 |
| Aboisso | 394 | 3 |
| Adzope | 1730 | 14 |
| Agnibilekrou | 101 | 1 |
| Bondoukou | 457 | 4 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Bongouanou | 585 | 5 |
| Bouafle | 394 | 3 |
| Bouake | 89 | 1 |
| Dabakala | 101 | 1 |
| Daloa | 25 | 0 |
| Danane | 205 | 2 |
| Daoukro | 101 | 1 |
| Dimbokro | 38 | 0 |
| Divo | 89 | 1 |
| Duekoue | 700 | 6 |
| Gagnoa | 101 | 1 |
| Guiglo | 1436 | 12 |
| Issia | 687 | 6 |
| Lakota | 13 | 0 |
| Man | 305 | 3 |
| Sakassou | 13 | 0 |
| San-Pedro | 139 | 1 |
| Soubre | 749 | 6 |
| Tabou | 380 | 3 |
| Tanda | 850 | 7 |
| Tiassale | 101 | 1 |
| Toumodi | 13 | 0 |
| Vavoua | 406 | 3 |
| **Jamaica** | **1693** | **100** |
| *Zone* | | |
| Central | 1032 | 61 |
| Eastern | 442 | 26 |
| Western | 218 | 13 |
| **Japan** | **46833** | **100** |
| *Region* | | |
| Chubu | 1709 | 4 |
| Chugoku | 1283 | 3 |
| Hokkaido | 956 | 2 |
| Kanto | 17069 | 36 |
| Kinki | 1230 | 3 |
| Kyushu | 21233 | 45 |
| Shikoku | 2901 | 6 |
| Tohoku | 451 | 1 |
| **Kenya** | **74667** | **100** |
| *Province* | | |
| Central | 8095 | 11 |
| Coast | 1356 | 2 |
| Eastern | 5931 | 8 |
| Nyanza | 42223 | 57 |
| Western | 17062 | 23 |
| **Laos** | **18012** | **100** |
| *Province (Khoueng)* | | |
| Attapeu | 215 | 1 |
| Bokeo | 162 | 1 |
| Borikhamxai | 281 | 2 |
| Champasak | 66 | 0 |
| Houaphan | 4161 | 23 |
| Khammouan | 356 | 2 |
| Louang Namtha | 242 | 1 |
| Louangphrabang | 296 | 2 |
| Oudomxai | 1619 | 9 |
| Phongsali | 739 | 4 |
| Saravan | 1318 | 7 |
| Savannakhet | 1403 | 8 |
| Viangchan | 177 | 1 |
| Vientiane | 448 | 2 |
| Xaignabouri | 318 | 2 |
| Xekong | 1917 | 11 |
| Xiangkhoang | 4293 | 24 |
| **Liberia** | **1700** | **100** |
| *Administrative Subdivision* | | |
| Bomi | 59 | 3 |
| Bong | 111 | 7 |
| Grand Bassa | 208 | 12 |
| Grand Cape Mount | 33 | 2 |
| Grand Jide | 333 | 20 |
| Grand Kru | 35 | 2 |
| Lofa | 236 | 14 |
| Margibi | 28 | 2 |
| Montserrado | 50 | 3 |
| Nimba | 103 | 6 |
| Rivercess | 133 | 8 |
| Sino | 361 | 21 |
| **Madagascar** | **90333** | **100** |
| *Province (Faritanin')* | | |
| Antananarivo | 4481 | 5 |
| Antsiranana | 4420 | 5 |
| Fianarantsoa | 4513 | 5 |
| Mahajanga | 9298 | 10 |
| Toamasina | 8932 | 10 |
| Toliara | 58690 | 65 |
| **Malawi** | **41176** | **100** |
| *Region* | | |
| Central | 20142 | 49 |
| Northern | 5042 | 12 |
| Southern | 15992 | 39 |
| **Malaysia** | **3600** | **100** |
| *State (Negeri)* | | |
| Kelantan | 720 | 20 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Melaka | 721 | 20 |
| Sabah | 1080 | 30 |
| Sarawak | 1080 | 30 |
| **Mali** | **2900** | **100** |
| *Region* | | |
| Bamako | 665 | 23 |
| Kayes | 985 | 34 |
| Segou | 56 | 2 |
| Sikasso | 1193 | 41 |
| **Martinique** | **113** | **100** |
| **Mauritania** | **2000** | **100** |
| *Region* | | |
| Brakna | 156 | 8 |
| Trarza | 1844 | 92 |
| **Mexico** | **1605** | **100** |
| *State (Estado)* | | |
| Campeche | 67 | 4 |
| Chiapas | 131 | 8 |
| Coahuila | 125 | 8 |
| Guerrero | 20 | 1 |
| Hidalgo | 23 | 1 |
| Jalisco | 16 | 1 |
| Nayarit | 27 | 2 |
| Nuevo Leon | 45 | 3 |
| Oaxaca | 143 | 9 |
| Puebla | 21 | 1 |
| Quintana Roo | 31 | 2 |
| San Luis Potosi | 101 | 6 |
| Sinaloa | 42 | 3 |
| Sonora | 23 | 1 |
| Tabasco | 140 | 9 |
| Tamaulipas | 245 | 15 |
| Veracruz | 317 | 20 |
| Yucatan | 29 | 2 |
| Zacatecas | 29 | 2 |
| **Montserrat** | **10** | **100** |
| **Morocco** | **750** | **100** |
| **Mozambique** | **8700** | **100** |
| *Province (Provincia)* | | |
| Cabo Delgado | 892 | 10 |
| Gaza | 1345 | 15 |
| Inhambane | 1220 | 14 |
| Maputo | 1361 | 16 |
| Nampula | 2869 | 33 |
| Niassa | 1011 | 12 |
| **Myanmar (Burma)** | **5000** | **100** |
| *State (Pyine)* | | |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Arakan State | 128 | 3 |
| Chin State | 32 | 1 |
| Irrawaddy | 830 | 17 |
| Kachin State | 246 | 5 |
| Karen State | 201 | 4 |
| Kayah State | 17 | 0 |
| Magwe | 674 | 13 |
| Mandalay | 720 | 14 |
| Mon State | 152 | 3 |
| Pegu | 582 | 12 |
| Rangoon | 258 | 5 |
| Sagaing | 857 | 17 |
| Shan State | 202 | 4 |
| Tenasserim | 101 | 2 |
| **Nepal** | **7000** | **100** |
| *Zone (Anchal)* | | |
| Bheri | 823 | 12 |
| Gandaki | 209 | 3 |
| Janakpur | 361 | 5 |
| Kosi | 3283 | 47 |
| Lumbini | 1774 | 25 |
| Narayani | 551 | 8 |
| **New Caledonia** | **700** | **100** |
| **New Zealand** | **1167** | **100** |
| *County* | | |
| Auckland | 446 | 38 |
| Bay of Plenty | 47 | 4 |
| Hawke's Bay | 229 | 20 |
| Northland | 446 | 38 |
| **Niger** | **5200** | **100** |
| *Department* | | |
| Dosso | 2372 | 46 |
| Maradi | 855 | 16 |
| Niamey | 1872 | 36 |
| Tahoua | 101 | 2 |
| **Nigeria** | **5000** | **100** |
| *State* | | |
| Cross River | 1084 | 22 |
| Plateau | 2842 | 57 |
| Rivers | 1029 | 21 |
| Sokoto | 44 | 1 |
| **North Korea** | **13000** | **100** |
| *Province (Do)* | | |
| Chagang-do | 2078 | 16 |
| Hamgyong-bukto | 530 | 4 |
| Hamgyong-namdo | 2101 | 16 |
| Hwanghae-bukto | 1174 | 9 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Hwanghae-namdo | 1195 | 9 |
| Kaesong-si | 205 | 2 |
| Kangwon-do | 553 | 4 |
| P'yongan-bukto | 1960 | 15 |
| P'yongan-namdo | 1887 | 15 |
| P'yongyang-si | 445 | 3 |
| Yanggang-do | 873 | 7 |
| **Pakistan** | **820** | **100** |
| **Papua New Guinea** | **101667** | **100** |
| *Province* | | |
| Central Papua New Guinea | 7945 | 8 |
| Chimbu | 4847 | 5 |
| East New Britain | 2129 | 2 |
| East Sepik | 1360 | 1 |
| Eastern Highlands | 10339 | 10 |
| Enga | 10942 | 11 |
| Gulf | 3551 | 3 |
| Madang | 4319 | 4 |
| Milne Bay | 1536 | 2 |
| Morobe | 16332 | 16 |
| New Ireland | 605 | 1 |
| Northern Papua New Guinea | 3727 | 4 |
| Southern Highlands | 17401 | 17 |
| West New Britain | 214 | 0 |
| West Sepik | 5086 | 5 |
| Western Highlands | 6825 | 7 |
| Western Papua New Guinea | 4508 | 4 |
| **Paraguay** | **9730** | **100** |
| *Department (Departamento)* | | |
| Alto | 487 | 5 |
| Alto Parana | 487 | 5 |
| Amambay | 486 | 5 |
| Boqueron | 487 | 5 |
| Caaguazu | 1556 | 16 |
| Caazapa | 487 | 5 |
| Canindeyu | 487 | 5 |
| Central Paraguay | 585 | 6 |
| Concepcion | 681 | 7 |
| Cordillera | 487 | 5 |
| Guaira | 486 | 5 |
| Itapua | 487 | 5 |
| Misiones Paraguay | 487 | 5 |
| Neembucu | 584 | 6 |
| Paraguari | 487 | 5 |
| Presidente Hayes | 487 | 5 |
| San Pedro | 487 | 5 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| **Peru** | **13661** | **100** |
| *Department (Departamento)* | | |
| Amazonas | 203 | 1 |
| Ancash | 1056 | 8 |
| Apurimac | 70 | 1 |
| Arequipa | 400 | 3 |
| Ayacucho | 86 | 1 |
| Cajamarca | 1967 | 14 |
| Cusco | 54 | 0 |
| Huancavelica | 71 | 1 |
| Huanuco | 623 | 5 |
| Ica | 236 | 2 |
| Junin | 53 | 0 |
| La Libertad | 911 | 7 |
| Lambayeque | 892 | 7 |
| Lima | 4175 | 31 |
| Loreto | 212 | 2 |
| Madre de Dios | 16 | 0 |
| Pasco | 24 | 0 |
| Piura | 2202 | 16 |
| Callao | 87 | 1 |
| Puno | 10 | 0 |
| San Martin | 65 | 0 |
| Tacna | 78 | 1 |
| Tumbes | 143 | 1 |
| Ucayali | 23 | 0 |
| **Philippines** | **136552** | **100** |
| *Region* | | |
| Bicol | 25871 | 19 |
| Cagayan Valley | 6458 | 5 |
| Central Luzon | 5133 | 4 |
| Central Mindanao | 3311 | 2 |
| Central Visayas | 16722 | 12 |
| Cordillera Administrative *Region* | 2990 | 2 |
| Eastern Visayas | 31186 | 23 |
| Ilocos | 7506 | 5 |
| Northern Mindanao | 10782 | 8 |
| Southern Mindanao | 7482 | 5 |
| Southern Tagalog | 5974 | 4 |
| Western Mindanao | 5450 | 4 |
| Western Visayas | 7687 | 6 |
| **Portugal** | **3000** | **100** |
| *District (Distrito)* | | |
| Beja | 1483 | 49 |
| Faro | 813 | 27 |
| Madeira | 42 | 1 |
| Setubal | 662 | 22 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| **Puerto Rico** | **105** | **100** |
| **Rwanda** | **150000** | **100** |
| *Prefecture (Prefecture(French), Prefegitura (Kinyarwanda))* | | |
| Butare | 15840 | 11 |
| Byumba | 20009 | 13 |
| Cyangugu | 16578 | 11 |
| Gikongoro | 17879 | 12 |
| Gisenyi | 8235 | 5 |
| Gitarama | 25538 | 17 |
| Kibungo | 8691 | 6 |
| Kibuye | 14022 | 9 |
| Kigali | 16475 | 11 |
| Ruhengeri | 6735 | 4 |
| **Senegal** | **731** | **100** |
| **Sierra Leone** | **17200** | **100** |
| *Province* | | |
| Eastern | 7265 | 42 |
| Northern | 7923 | 46 |
| Southern | 2012 | 12 |
| **Solomon Islands** | **4900** | **100** |
| **Somalia** | **513** | **100** |
| **South Africa** | **13000** | **100** |
| *Zone* | | |
| Addo (Kirkwood) | 650 | 5 |
| Border with Mozambique | 3900 | 30 |
| Kwazulu | 5200 | 40 |
| Nelspruit (Colesberg) | 1300 | 10 |
| Pretoria | 650 | 5 |
| Soshanguve | 650 | 5 |
| Winterveld | 650 | 5 |
| **South Korea** | **15923** | **100** |
| *Province (Do)* | | |
| Cheju-do | 1098 | 7 |
| Cholla-bukto | 2136 | 13 |
| Cholla-namdo | 5798 | 36 |
| Ch'ungch'ong-namdo | 2204 | 14 |
| Kyonggi-do | 2237 | 14 |
| Kyongsang-namdo | 2450 | 15 |
| **Spain** | **1502** | **100** |
| *Autonomous Community (Comunidad Autonoma)* | | |
| Andalucia | 1307 | 87 |
| Canarias | 10 | 1 |
| Extremadura | 56 | 4 |
| Murcia | 108 | 7 |
| Valencia | 21 | 1 |
| **Sri Lanka** | **8885** | **100** |
| *Administrative subdivision* | | |
| Central | 866 | 10 |
| Eastern | 1132 | 13 |
| North Central | 1478 | 17 |
| North Western | 1117 | 13 |
| Northern | 1047 | 12 |
| Sabaragamuwa | 765 | 9 |
| Southern | 706 | 8 |
| Uva | 1278 | 14 |
| Western | 497 | 6 |
| **St. Kitts and Nevis** | **30** | **100** |
| **St. Vincent & the Grenadines** | **1200** | **100** |
| **Sudan** | **628** | **100** |
| *Region (Iqlim)* | | |
| Al Wusta | 92 | 15 |
| Ash Shamaliyah | 153 | 24 |
| Kurdufan | 383 | 61 |
| **Suriname** | **31** | **100** |
| **Swaziland** | **1300** | **100** |
| *District* | | |
| Hhohho | 303 | 23 |
| Lubombo | 221 | 17 |
| Manzini | 433 | 33 |
| Shiselweni | 343 | 26 |
| **Taiwan** | **230000** | **100** |
| *District (Okrug)* | | |
| Chang-hua | 16137 | 7 |
| Chia-i | 8289 | 4 |
| Hsin-chu | 5502 | 2 |
| Hua-lien | 2295 | 1 |
| I-lan | 6886 | 3 |
| Kao-hsiung | 11507 | 5 |
| Miao-li | 12374 | 5 |
| Nan-t'ou | 3445 | 1 |
| P'eng-hu | 5173 | 2 |
| P'ing-tung | 13793 | 6 |
| T'ai-chung | 37168 | 16 |
| T'ai-nan | 40450 | 18 |
| T'ai-pei | 11712 | 5 |
| T'ai-tung | 5750 | 3 |
| T'ao-yuan | 2063 | 1 |
| Yun-lin | 47456 | 21 |
| **Tanzania** | **242000** | **100** |
| *Region* | | |
| Arusha | 5726 | 2 |
| Dar-Es-Salaam | 1750 | 1 |
| Dodoma | 17651 | 7 |
| Iringa | 3812 | 2 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Kagera | 50556 | 21 |
| Kilimanjaro | 3352 | 1 |
| Lindi | 5164 | 2 |
| Mara | 30216 | 12 |
| Mbeya | 6372 | 3 |
| Morogoro | 24398 | 10 |
| Mtwara | 6081 | 3 |
| Mwanza | 9036 | 4 |
| Pwani | 20597 | 9 |
| Ruvuma | 35882 | 15 |
| Shinyanga | 5810 | 2 |
| Singida | 7892 | 3 |
| Tanga | 7705 | 3 |
| **Thailand** | **9000** | **100** |
| *Province (Changwat)* | | |
| Buriram | 356 | 4 |
| Chiang Mai | 727 | 8 |
| Kanchanaburi | 1189 | 13 |
| Nakhon Pathom | 128 | 1 |
| Nakhon Si Thammarat | 1248 | 14 |
| Pattani | 239 | 3 |
| Phatthalung | 382 | 4 |
| Phichit | 133 | 1 |
| Phitsanulok | 331 | 4 |
| Phra Nakhon Si Ayutthaya | 152 | 2 |
| Prachin Buri | 732 | 8 |
| Ratchaburi | 327 | 4 |
| Rayong | 226 | 3 |
| Sisaket | 305 | 3 |
| Songkhla | 847 | 9 |
| Sukhothai | 229 | 3 |
| Suphan Buri | 330 | 4 |
| Surin | 298 | 3 |
| Trat | 169 | 2 |
| Ubon Ratchathani | 652 | 7 |
| **Togo** | **887** | **100** |
| **Trinidad and Tobago** | **45** | **100** |
| **Turkey** | **15** | **100** |
| **Uganda** | **524667** | **100** |
| *Region* | | |
| Busoga | 32283 | 6 |
| Eastern | 45945 | 9 |
| Karamoja | 16181 | 3 |
| Nile | 61014 | 12 |
| North Buganda | 102210 | 19 |
| Northern | 101759 | 19 |
| South Buganda | 18993 | 4 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| Southern | 43731 | 8 |
| Western | 102551 | 20 |
| **United States** | **33980** | **100** |
| *State* | | |
| Alabama | 1695 | 5 |
| California | 3050 | 9 |
| Georgia | 775 | 2 |
| Louisiana | 8582 | 25 |
| Mississippi | 3310 | 10 |
| New Jersey | 480 | 1 |
| North Carolina | 12933 | 38 |
| South Carolina | 620 | 2 |
| Texas | 2327 | 7 |
| Virginia | 207 | 1 |
| **Uruguay** | **6000** | **100** |
| *Department (Departamento)* | | |
| Artigas | 93 | 2 |
| Canelones | 2661 | 44 |
| Cerro Largo | 240 | 4 |
| Colonia | 187 | 3 |
| Durazno | 212 | 4 |
| Flores | 29 | 0 |
| Florida | 130 | 2 |
| Lavalleja | 166 | 3 |
| Maldonado | 153 | 3 |
| Montevideo | 125 | 2 |
| Paysandu | 211 | 4 |
| Rio Negro | 199 | 3 |
| Rivera | 461 | 8 |
| Rocha | 114 | 2 |
| Salto | 200 | 3 |
| San Jose | 143 | 2 |
| Soriano | 111 | 2 |
| Tacuarembo | 343 | 6 |
| Treinta y Tres | 223 | 4 |
| **Venezuela** | **1797** | **100** |
| *State (Estado)* | | |
| Anzoategui | 297 | 17 |
| Apure | 75 | 4 |
| Barinas | 96 | 5 |
| Bolivar | 359 | 20 |
| Cojedes | 113 | 6 |
| Delta Amacuro | 39 | 2 |
| Guarico | 485 | 27 |
| Monagas | 146 | 8 |
| Portuguesa | 138 | 8 |
| Zulia | 34 | 2 |

| Country and division | Area [ha] | Percentage |
|---|---|---|
| **Viet Nam** | **274767** | **100** |
| *Region* | | |
| Central highlands | 10285 | 4 |
| Mekong river delta | 11348 | 4 |
| North central coast | 94484 | 34 |
| North East South | 4328 | 2 |
| North mountain and midland | 60638 | 22 |
| Red river delta | 64298 | 23 |
| South central coast | 29386 | 11 |
| **Yemen** | **30** | **100** |
| **Zaire** | **110000** | **100** |
| *Region* | | |
| Bandundu | 19800 | 18 |
| Bas-Zaire | 3300 | 3 |
| Equateur | 10119 | 9 |
| Haut-Zaire | 5622 | 5 |
| Kasai-Occidental | 17602 | 16 |
| Kasai-Oriental | 28598 | 26 |
| Kinshasa | 759 | 1 |
| Kivu intensive | 11000 | 10 |
| Kivu moderate | 13200 | 12 |
| **Zambia** | **3567** | **100** |
| *Province* | | |
| Central | 770 | 22 |
| Copperbelt | 407 | 11 |
| Luapula | 488 | 14 |
| Northern | 123 | 3 |
| North-Western | 1228 | 34 |
| Western | 552 | 15 |
| **Zimbabwe** | **700** | **100** |