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A Geo-Referenced Database of Global Sweetpotato Distribution

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INTERNATIONAL POTATO CENTER (CIP)

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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.

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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 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).

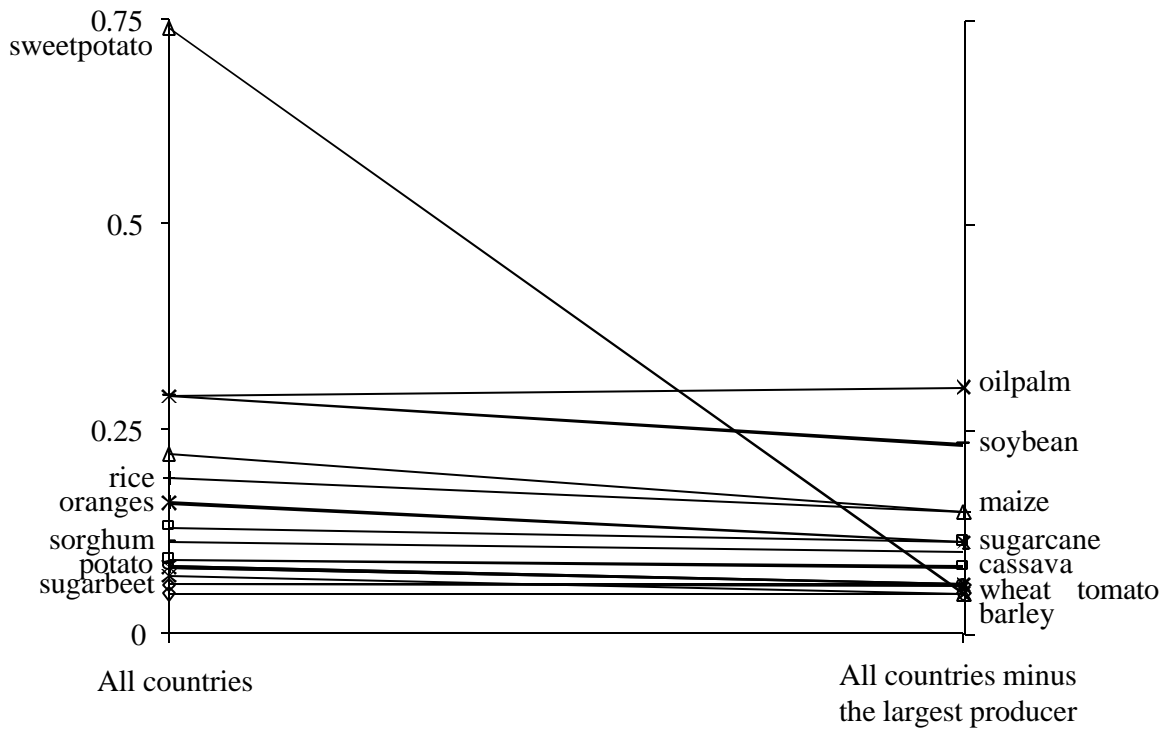


Figure 2. Concentration index of the distribution of production over countries, of the main global crops for all countries and for all countries minus the largest producer. A high value indicates a high concentration.

Calculated from FAO (1999)

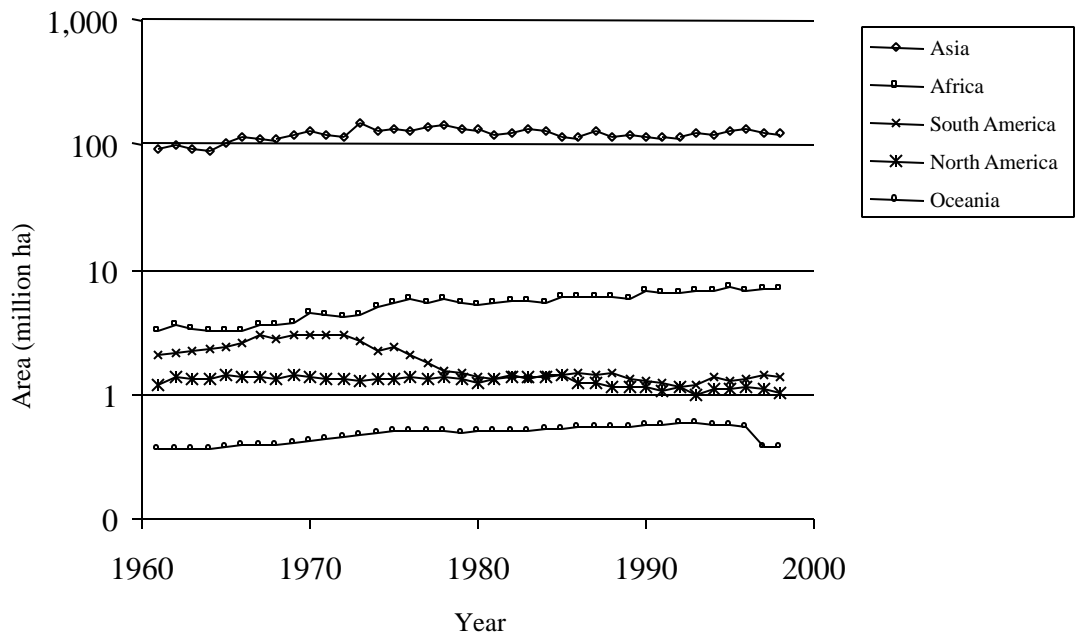


Figure 3. Sweetpotato area by continent, 1961 to 1998.

Source: FAO (1999).

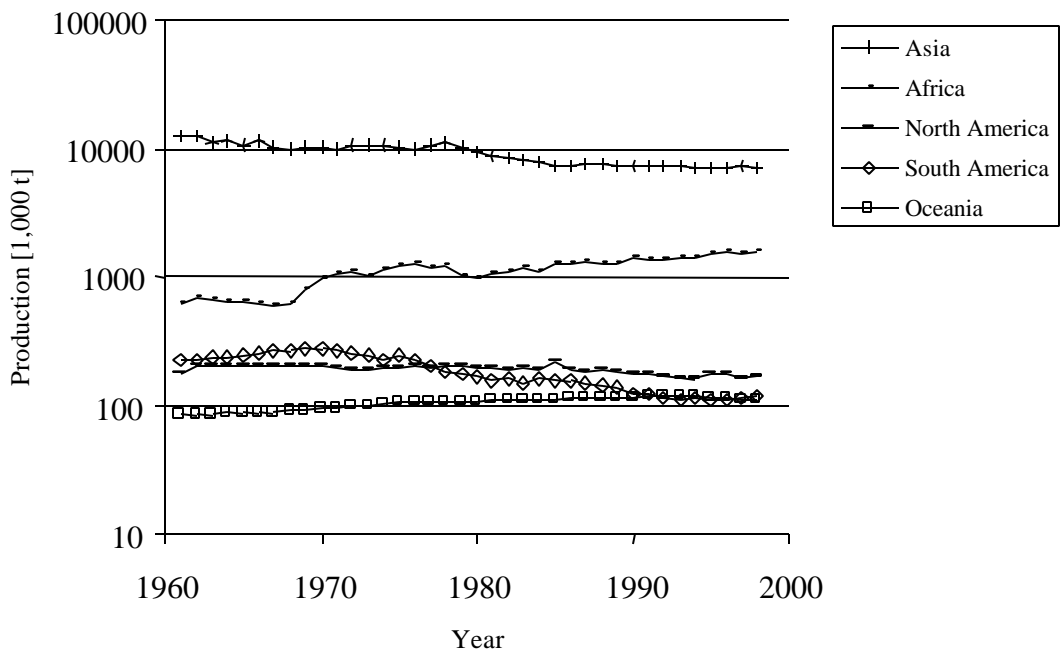


Figure 4. Sweetpotato production by continent, 1961 to 1998.

Source: FAO (1999)

2. Material and Methods

A geo-referenced database of global sweetpotato distribution was created using ArcView¹ 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-km² 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's 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.

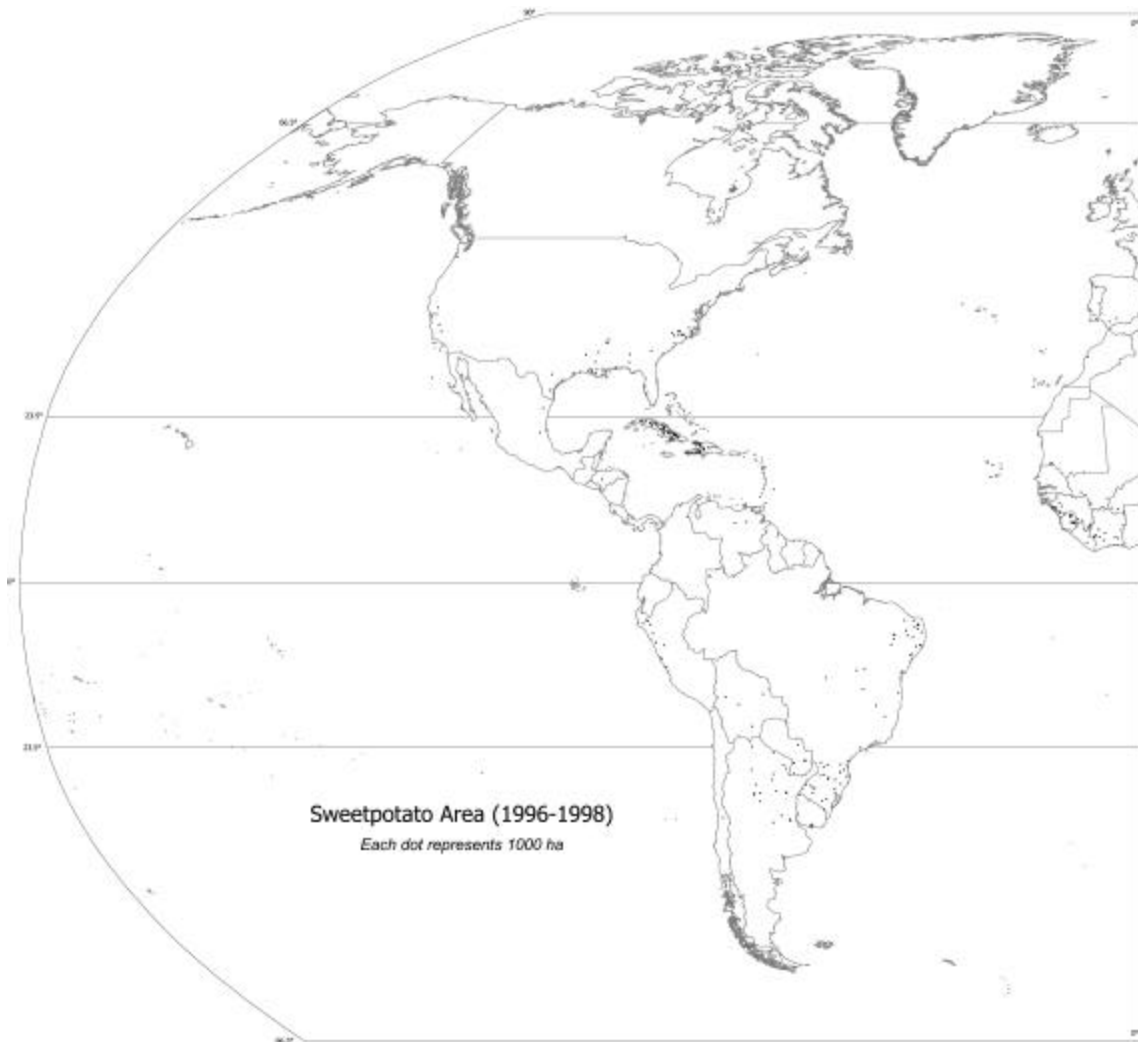
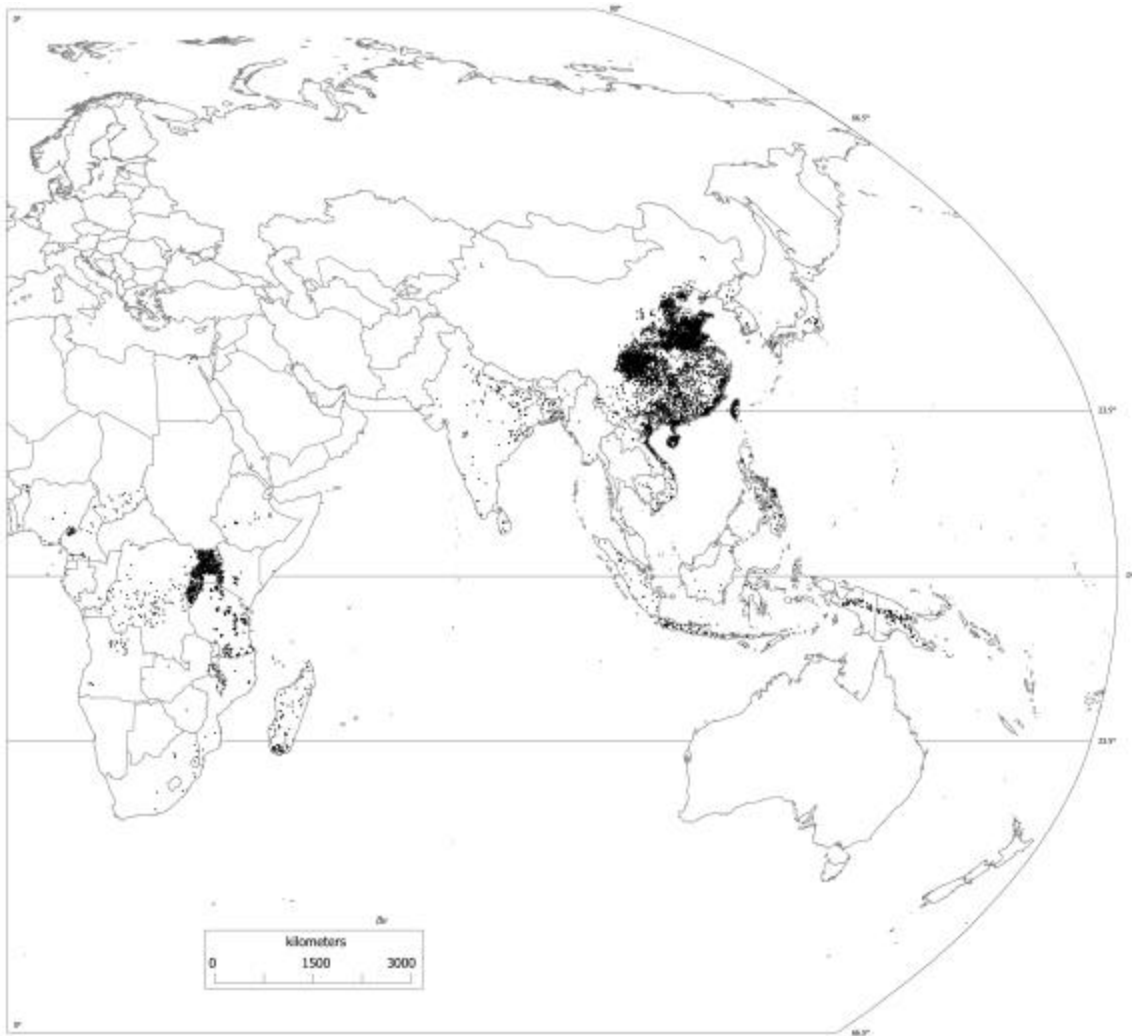


Figure 5. Global sweetpotato distribution (1996–1998).



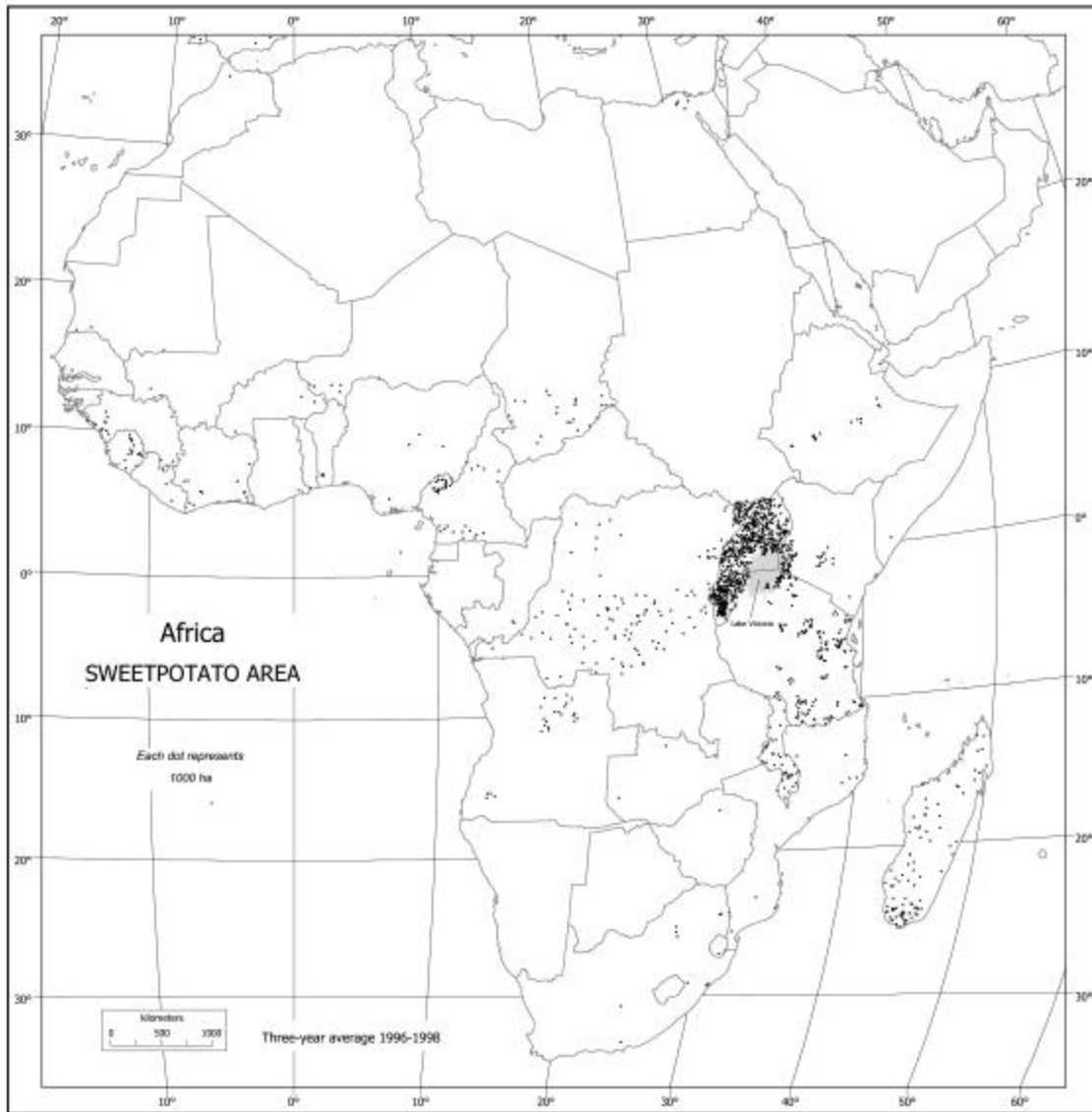


Figure 6. Sweetpotato distribution in Africa (1996–1998).

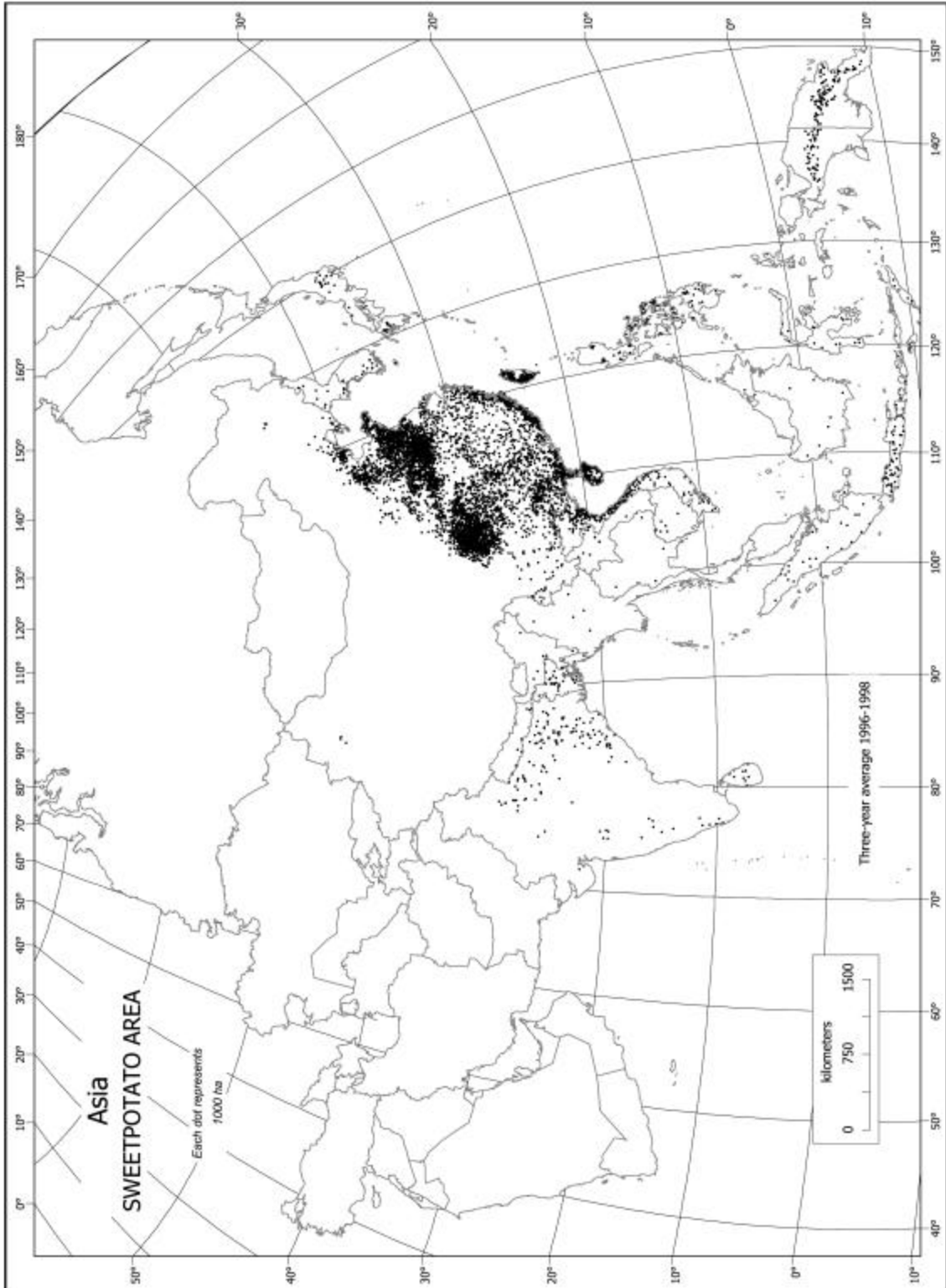


Figure 7. Sweetpotato distribution in Asia (1996–1998).

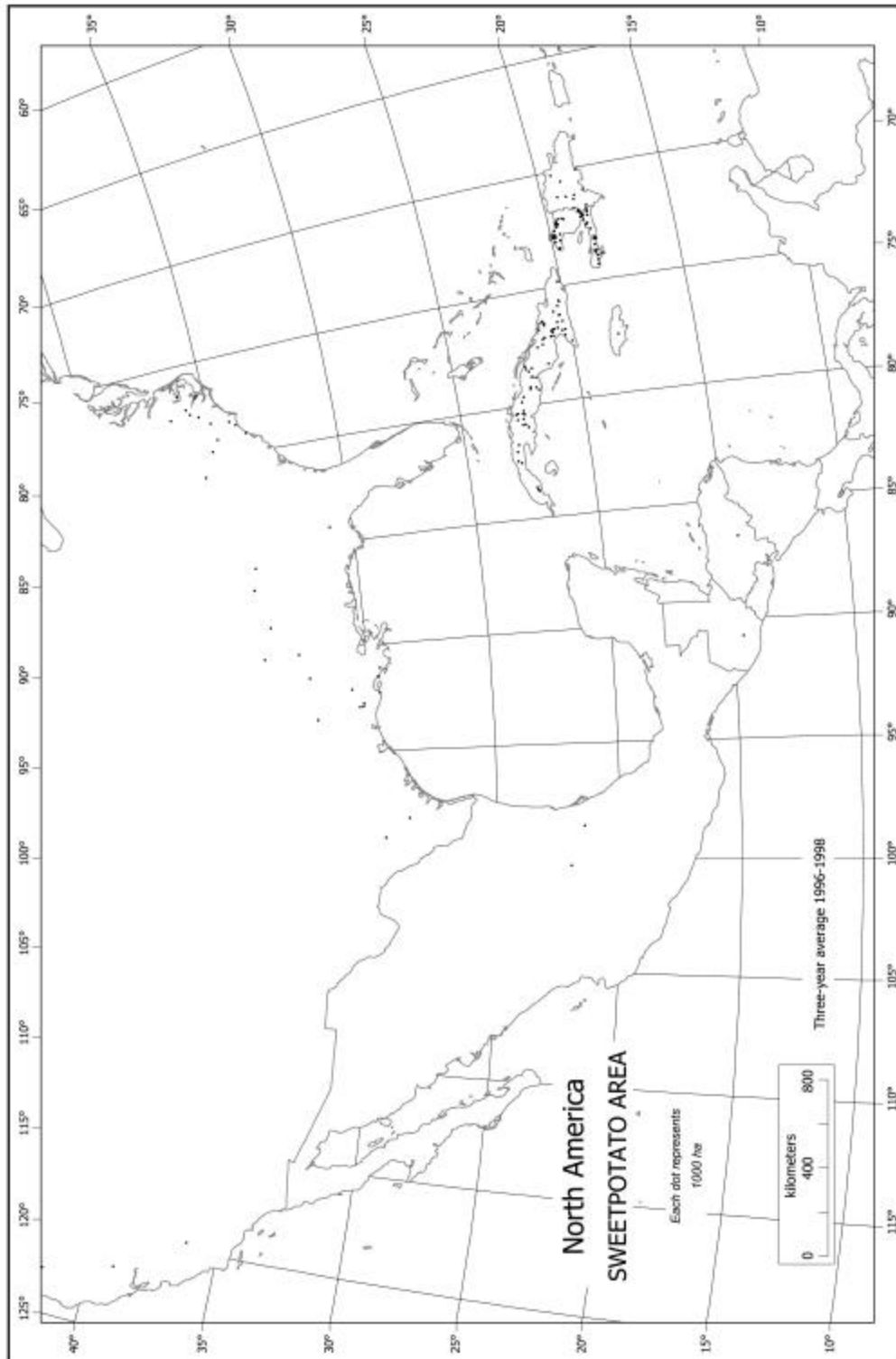


Figure 8. Sweetpotato distribution in North America (1996–1998).



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 were 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 Kondoia.

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 (Fernandez, 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 Córdoba, 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 unit²

Country and division	Area [ha]	Percentage	Country and division	Area [ha]	Percentage
Angola	23000	100	Bolivia	3017	100
<i>Province (Provincia)</i>			<i>Department (Departamento)</i>		
Bie	562	2	Chuquisaca	643	21
Huila	2564	11	Cochabamba	539	18
Lunda Norte	8931	39	La Paz	624	21
Lunda Sul	2729	12	Potosi	161	5
Malanje	7327	32	Santa Cruz	662	22
Namibe	888	4	Tarija	386	13
Antigua and Barbuda	24	100	Brazil	58333	100
Argentina	20000	100	<i>State (Estado)</i>		
<i>Province (Provincia)</i>			Alagoas	2029	3
Buenos Aires	2240	11	Amazonas	392	1
Chaco	1347	7	Bahia	4189	7
Cordoba	4007	20	Ceara	857	1
Corrientes	2928	15	Distrito Federal	44	0
Entre Rios	238	1	Espirito Santo	450	1
Formosa	2560	13	Goiás	307	1
Jujuy	65	0	Maranhao	87	0
Salta	1002	5	Mato Grosso	500	1
San Luis	354	2	Mato Grosso do Sul	124	0
Santa Fe	3624	18	Minas Gerais	2891	5
Santiago del Estero	618	3	Para	112	0
Tucuman	1007	5	Paraiba	5424	9
Australia	361	100	Parana	3905	7
Bahamas, The	89	100	Pernambuco	5980	10
Bangladesh	43400	100	Piaui	365	1
<i>Division</i>			Rio de Janeiro	1363	2
Barisal	4650	11	Rio Grande do Norte	4261	7
Chittagong	13198	30	Rio Grande do Sul	17718	30
Dhaka	17235	40	Rondonia	106	0
Khulna	1400	3	Santa Catarina	3677	6
Rajshahi	6917	16	Sao Paulo	1216	2
Barbados	601	100	Sergipe	2328	4
Belize	3	100	Brunei	28	100
Benin	10827	100	Burkina Faso	3397	100
<i>Province (Province)</i>			<i>Province (Province)</i>		
Zou	10827	100	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
<i>Region</i>		
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
<i>Province (Khet)</i>		
Batdambang	1369	16
Kampong Cham	626	7
Kampong Chhnang	394	5
Kampong Spoe	475	6
Kampong Thum	520	6
Kampot	285	3

Country and division	Area [ha]	Percentage
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
<i>Province</i>		
Adamoua	5508	13
Nord-Ouest	26043	60
Sud	11781	27
Chad	24000	100
<i>Prefecture (Prefecture)</i>		
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
<i>Región</i>		
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
<i>Province (Sheng)</i>		
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
<i>Department (Departamento)</i>		
Antioquia	144	14
Atlantico	112	11
Bolivar	145	14
Cesar	138	14
Cordoba	147	15
Magdalena	173	17
Sucre	143	14
Congo	3100	100
<i>Region</i>		
Niari	699	23
Pool	2401	77
Costa Rica	500	100
Cuba	60000	100
<i>Province (Provincia)</i>		
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
<i>Zone</i>		
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
<i>Governorate (Muhafazah)</i>		
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
<i>Administrative region (Astedader Akababi)</i>		
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
<i>Zone</i>		
Central	394	25
Eastern	394	25
Northern	394	25
Western	394	25

Country and division	Area [ha]	Percentage
Gabon	1467	100
<i>Province</i>		
Nyanga	1467	100
Ghana	10	100
Greece	100	100
Grenada	100	100
Guadeloupe	267	100
Guatemala	500	100
Guinea	22000	100
<i>Administrative Region (Region Administrative)</i>		
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
<i>Department</i>		
Nord	9210	16
Ouest	11149	19
Sud	11634	20
Honduras	600	100
India	143000	100
<i>State</i>		
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

Country and division	Area [ha]	Percentage
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
<i>Province (Propinsi)</i>		
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
<i>Department</i>		
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
Bouaflé	394	3
Bouaké	89	1
Dabakala	101	1
Daloa	25	0
Danane	205	2
Daoukro	101	1
Dimbokro	38	0
Divo	89	1
Duekoué	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
<i>Zone</i>		
Central	1032	61
Eastern	442	26
Western	218	13
Japan	46833	100
<i>Region</i>		
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
<i>Province</i>		
Central	8095	11
Coast	1356	2
Eastern	5931	8
Nyanza	42223	57
Western	17062	23
Laos	18012	100
<i>Province (Khoueng)</i>		

Country and division	Area [ha]	Percentage
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
<i>Administrative Subdivision</i>		
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
<i>Province (Faritanin')</i>		
Antananarivo	4481	5
Antsiranana	4420	5
Fianarantsoa	4513	5
Mahajanga	9298	10
Toamasina	8932	10
Toliara	58690	65
Malawi	41176	100
<i>Region</i>		
Central	20142	49
Northern	5042	12
Southern	15992	39
Malaysia	3600	100
<i>State (Negeri)</i>		
Kelantan	720	20

Country and division	Area [ha]	Percentage
Melaka	721	20
Sabah	1080	30
Sarawak	1080	30
Mali	2900	100
<i>Region</i>		
Bamako	665	23
Kayes	985	34
Segou	56	2
Sikasso	1193	41
Martinique	113	100
Mauritania	2000	100
<i>Region</i>		
Brakna	156	8
Trarza	1844	92
Mexico	1605	100
<i>State (Estado)</i>		
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
<i>Province (Provincia)</i>		
Cabo Delgado	892	10
Gaza	1345	15
Inhambane	1220	14
Maputo	1361	16
Nampula	2869	33
Niassa	1011	12
Myanmar (Burma)	5000	100
<i>State (Pyine)</i>		

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
<i>Zone (Anchal)</i>		
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
<i>County</i>		
Auckland	446	38
Bay of Plenty	47	4
Hawke's Bay	229	20
Northland	446	38
Niger	5200	100
<i>Department</i>		
Dosso	2372	46
Maradi	855	16
Niamey	1872	36
Tahoua	101	2
Nigeria	5000	100
<i>State</i>		
Cross River	1084	22
Plateau	2842	57
Rivers	1029	21
Sokoto	44	1
North Korea	13000	100
<i>Province (Do)</i>		
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
<i>Province</i>		
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
<i>Department (Departamento)</i>		
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
<i>Department (Departamento)</i>		
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
<i>Region</i>		
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
<i>District (Distrito)</i>		
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
<i>Prefecture (Prefecture(French), Prefegitura (Kinyarwanda))</i>		
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
<i>Province</i>		
Eastern	7265	42
Northern	7923	46
Southern	2012	12
Solomon Islands	4900	100
Somalia	513	100
South Africa	13000	100
<i>Zone</i>		
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
<i>Province (Do)</i>		
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
<i>Autonomous Community (Comunidad Autonoma)</i>		
Andalucia	1307	87
Canarias	10	1
Extremadura	56	4
Murcia	108	7
Valencia	21	1
Sri Lanka	8885	100
<i>Administrative subdivision</i>		

Country and division	Area [ha]	Percentage
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
<i>Region (Iqlim)</i>		
Al Wusta	92	15
Ash Shamaliyah	153	24
Kurdufan	383	61
Suriname	31	100
Swaziland	1300	100
<i>District</i>		
Hhohho	303	23
Lubombo	221	17
Manzini	433	33
Shiselweni	343	26
Taiwan	230000	100
<i>District (Okrug)</i>		
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
<i>Region</i>		
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
<i>Province (Changwat)</i>		
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
<i>Region</i>		
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
<i>State</i>		
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
<i>Department (Departamento)</i>		
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
Tacuarembó	343	6
Treinta y Tres	223	4
Venezuela	1797	100
<i>State (Estado)</i>		
Anzoategui	297	17
Apure	75	4
Barinas	96	5
Bolívar	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
<i>Region</i>		
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
<i>Region</i>		
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
<i>Province</i>		
Central	770	22
Copperbelt	407	11
Luapula	488	14
Northern	123	3
North-Western	1228	34
Western	552	15
Zimbabwe	700	100