

Are grasslands under threat?

Brief analysis of FAO statistical data on pasture and fodder crops

Introduction

Grasslands, including sown pasture and rangeland, are among the largest ecosystems in the world and contribute to the livelihoods of more than 800 million people. They are a source of goods and services such as food and forage, energy and wildlife habitat, and also provide carbon and water storage and watershed protection for many major river systems. Grasslands are important for *in situ* conservation of genetic resources. Of a total of 10 000 species, only 100 to 150 forage species have been cultivated, but many more hold potential for sustainable agriculture.

Estimates of the proportion of the earth's land area covered by grasslands vary between 20 and 40 percent, depending on the definition. Those differences are due to a lack of harmonization in the definition of grasslands. Using FAO's data and definition, it is possible to estimate the **world area of Pasture and Fodder Crops at 3.5 billion ha (35 000 000 sq km) in 2000**, representing 26% of the world land area and 70% of the world agricultural area (Table 1.1).

Category	World Area in million km2	% Under Pasture and Fodder Crops
Pasture and Fodder Crops	35.00	
Land Area	134.04	26.91
Agricultural Area	49.64	70.51

Table 1.1 (Source FAOSTAT)

This study is the initial part of an analysis of FAO statistical data relating to the grassland world, carried out using the FAO distinction between Pasture and Fodder Crops.

The main purpose of this research is to analyse the extent and importance of Pasture and Fodder Crops worldwide and to evaluate changes in their dimensions in the last 30 years, in different geographical zones.

This study is composed of two parts:

- An overview of the trends of land area occupied by the sum of Pasture and Fodder Crops;
- Separate analyses of the geographical location and extent over time of Pasture and Fodder Crops.

1.1 Pasture and Fodder Crop Trends



Map 1 - 1980



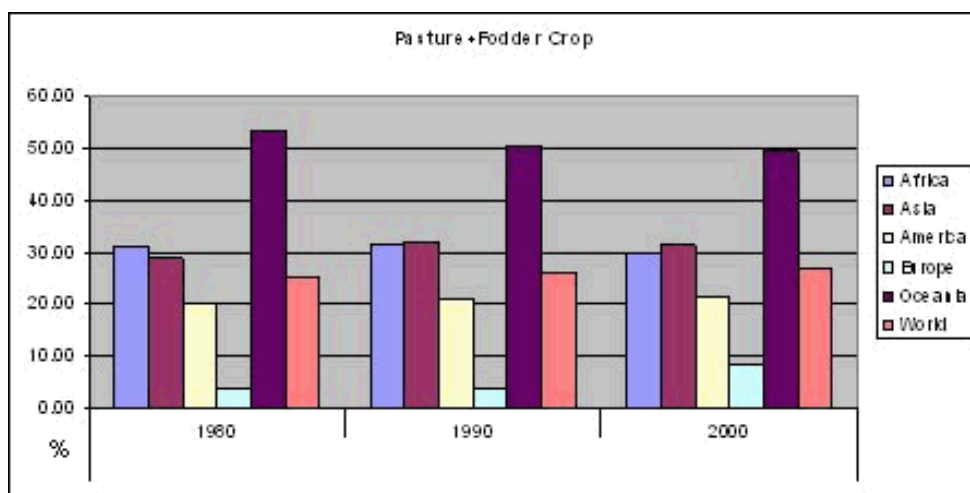
Map 2 - 1990



Map 3 - 2000

The graph below shows trends in the percentage of land area occupied by the sum of Pasture and Fodder Crops, showing that during the last 30 years, the total land area under Pasture and Fodder Crops has decreased in Africa and Oceania, while it has increased in Europe and Asia.

The reduction of African pasture can be explained essentially by a significant reduction of pasture in Eastern Africa, partially due to the fact that **large grassland areas have been destroyed or converted to agricultural land** (click here for further data).



1.2 Pasture



Map 4 - 1980



Map 5 - 1990



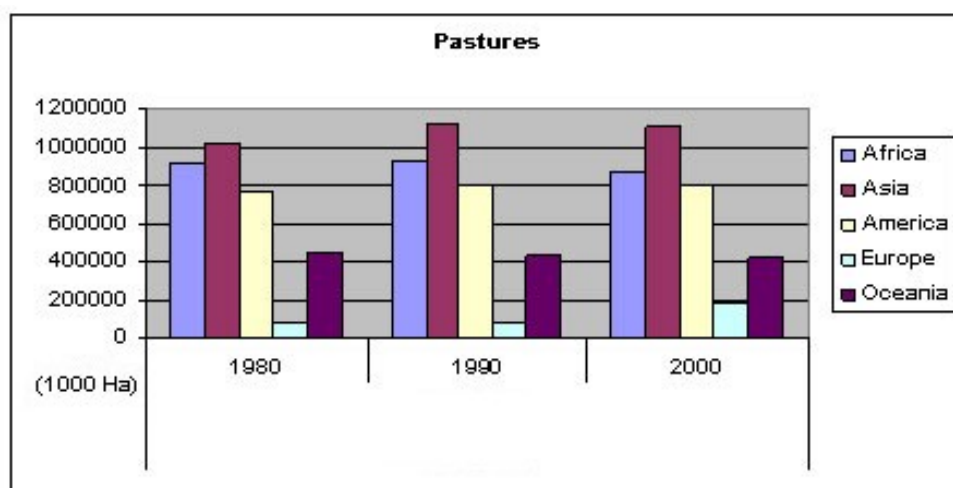
Map 6 - 2000

Table 1.2 below summarizes the collected data on Pasture, classified by continents. Two elements can be emphasized:

- **Europe:** the increase of pasture area is partly due to the fact that, since 2000, data collected for Europe include information for the Russian Federation and also because **European policies such as the "set-aside" measures**, that obliges farmers to leave a given portion of their agricultural land in fallow, as a condition for benefiting from direct payments. The obligation can be fulfilled also by cultivating non-food crops on set-aside land under the "non-food on set-aside" (NFSA) regime.
- **Africa:** the reduction of African pasture can be explained essentially by a significant reduction of pasture in Eastern Africa, partially due to the fact that **large grassland areas have been destroyed or converted to agricultural land**.

COUNTRIES	LAND AREA	PASTURES			% PASTURE		
	(1000 Ha)	(1000 Ha)					
	2000	1980	1990	2000	1980	1990	2000
Africa	2,933,450	911,110	920,374	869,878	31.06	31.38	29.65
Asia	3,508,087	1,016,148	1,126,845	1,106,060	28.97	32.12	31.53
America	3,831,866	769,041	798,909	808,920	20.07	20.85	21.11
Europe	2,208,912	85,578	82,756	182,344	3.87	3.75	8.25
Oceania	848,729	453,465	430,511	419,455	53.43	50.72	49.42
World	13,004,202	3,244,404	3,368,403	3,442,078	24.95	25.90	26.47

Table 1.2 (Source: FAOSTAT)



1.3 Fodder Crops



Map 7 - Area 1980



Map 10 - Production 1980



Map 8 - Area 1990



Map 11 - Production 1990



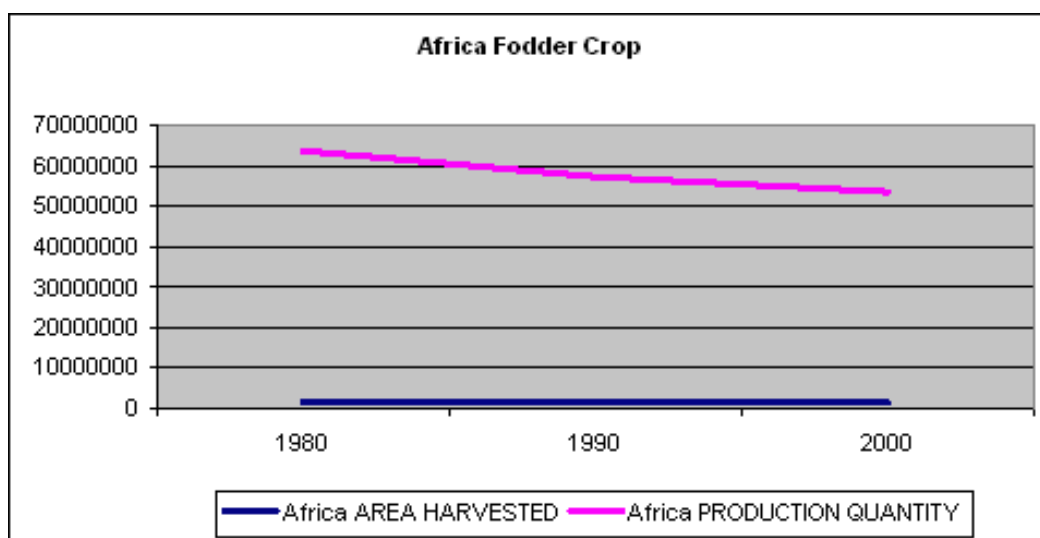
Map 9 - Area 2000



Map 12 - Production 2000

Table 1.3 below summarizes the collected data on Fodder Crops classified by macro areas. Some elements that can be emphasized are:

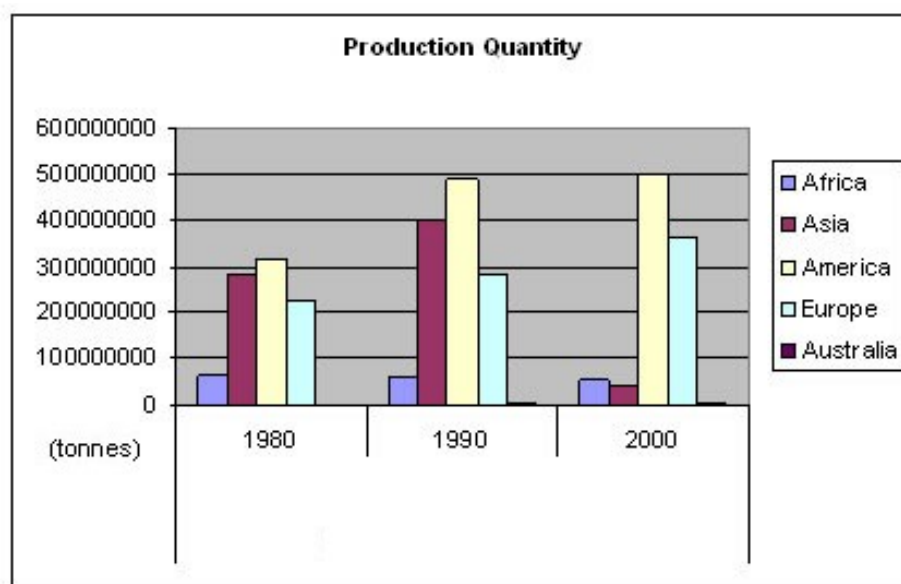
- **Africa:** in Northern Africa, even when there is an increase in the harvested area, the quantity of fodder crops produced is still decreasing due to the reduction in yield per hectare;



- **Central America:** there is an increase in the harvested area and in the absolute quantity produced, but yield per hectare is smaller than in 1980 with a low point in 1990 (click here for further data). Comparing these data with the number of livestock, it is possible to assert that an increase in the number of grazing animals saw a parallel decrease in fodder crop productivity. Further investigations are needed in order to explore the cause of fodder crop yield decrease and to achieve **sustainable fodder crop production intensification**;
- **South America:** the data show the fodder crop harvested area has fallen by half, partially due to an **increase in the area cultivated with soybeans** (click here for further data).

COUNTRIES	AREA HARVESTED			YIELD PER HECTARE			PRODUCTION QUANTITY		
	(Ha)			(Kg/Ha)			(tonnes)		
	1980	1990	2000	1980	1990	2000	1980	1990	2000
Africa Northern	1,220,947	1,112,863	1,165,600	46,471	51,206	45,163	54,000,000	50,862,000	47,417,000
Africa Southern	250,000	245,000	220,000	39,240	25,102	26,818	9,810,000	6,150,000	5,900,000
Former USSR	16,958,000	16,859,008		15,696	21,413		266,168,000	360,999,936	
Asia Eastern	149,900	171,200	121,100	55,809	64,401	64,766	7,565,700	9,238,900	6,915,000
Asia South-Central			315,361			78,713			4,688,251
Asia South East	442,000	618,033	556,000	10,611	24,626	26,374	4,690,000	15,219,977	14,664,000
Asia Western	197,697	377,102	587,090	427,855	463,601	520,245	3,683,191	11,191,551	16,332,563
America Northern	15,092,410	13,176,100	12,108,280	41,435	64,303	61,538	193,295,334	393,342,592	392,645,836
America Central	383,047	485,259	567,059	51,413	41,838	47,511	19,693,566	20,302,448	26,941,548
America Southern	6,867,670	3,803,282	3,171,030	79,035	123,925	130,934	104,619,410	77,116,606	80,738,107
Russian Federation			3,670,000			13,896			51,000,000
Europe Eastern	640,592	1,115,576	804,626	63,036	402,400	252,917	1,850,882	2,205,566	3,058,317
Europe Northern	406,643	412,610	685,201	80,164	101,704	156,256	1,972,732	14,857,519	21,013,501
Europe Southern	3,716,976	2,970,446	2,277,247	91,292	164,717	292,952	107,744,908	92,969,632	75,049,677
Europe Western	3,293,523	5,435,426	8,536,133	186,019	236,736	263,418	115,394,178	175,063,208	212,317,361
Australia	220,603	200,961	231,820	14,106	56,891	54,690	1,554,703	5,109,000	5,347,000
World	49,840,008	46,982,866	35,016,547	1,202,180	1,842,863	2,036,192	892,042,604	1,234,628,935	964,028,161

Table 1.3 (Source: FAOSTAT)



2. Conclusion

The conclusions that can be drawn from this brief analysis of FAOSTAT grasslands data are:

- *Lack of data:* further **data on rangelands** need to be included in FAOSTAT, and grasslands information needs to be divided into the main agro-ecological zones;
- *Definition harmonization:* **harmonization of grassland definitions** needs to be improved in order to increase accuracy in the analysis and in the calculation of the proportion of the Earth covered by grasslands;
- *Recommendation for the future:* further work on the **economic value of grasslands and rangeland production** and on the cause of decreasing fodder crop productivity in Africa and Central America need to be carried out.

Pasture represents basic feed resources for livestock worldwide and refers to grasses, legumes and/or other herbage used or suitable for the grazing of animals.

FAOSTAT divides the data between:

- Temporary meadows & pastures: Land cultivated for a period of less than five years for growing herbaceous forage crops for mowing or pasture. A period of less than 5 years is used to differentiate between temporary and permanent meadows;
- Permanent meadows & pastures: Land used permanently for grazing (five years or more) which includes herbaceous forage crops, either cultivated or growing wild (wild shrubs, wild prairie or grazing land).

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Fodder crops are crops cultivated primarily for animal feed. They may be classified as either temporary or permanent crops. The former are cultivated and harvested like any other crop. Permanent fodder crops relate to land used permanently (for five years or more) for herbaceous forage crops, either cultivated or growing wild (i.e. wild prairie or grazing land), and may include some parts of forest land if it is used for grazing. (Source FAO)

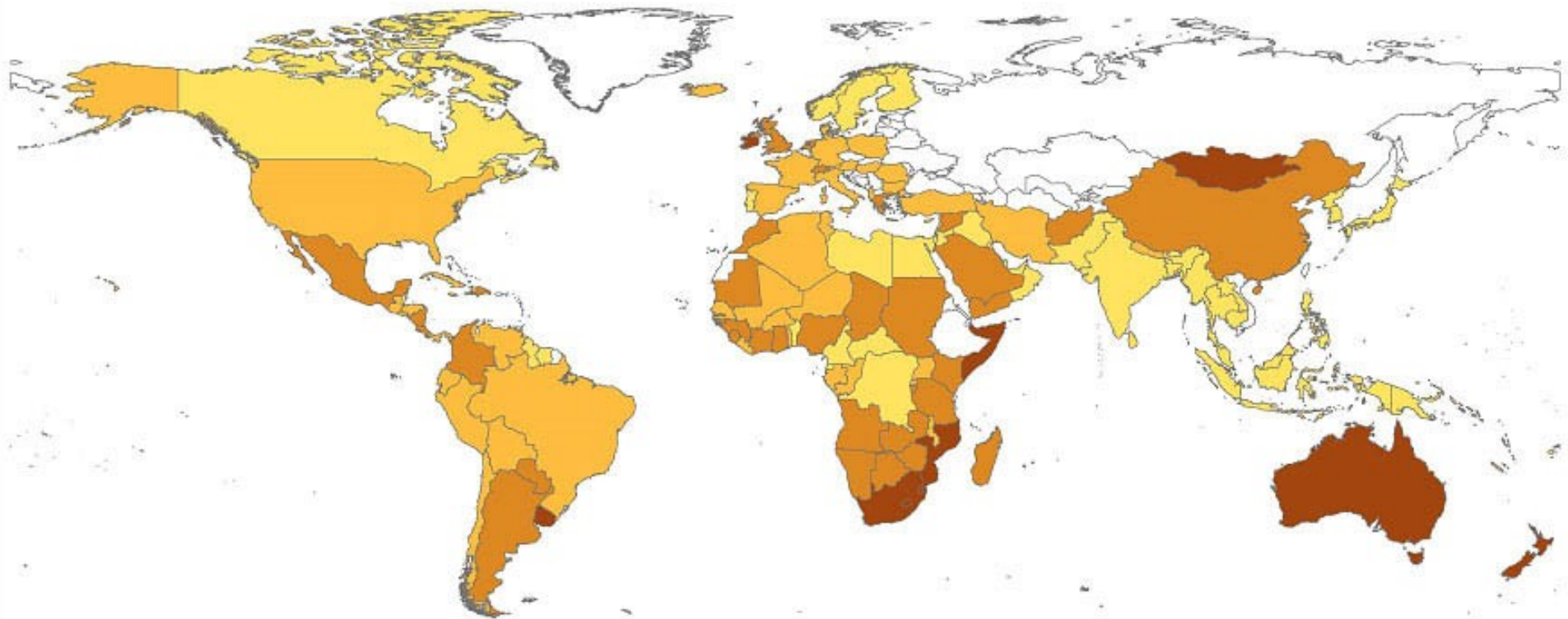
FAOSTAT provides data for "Selected Fodder Crop" that basically includes information on area harvested, yield per hectare and production quantity for the following crops:

COMMODITY	DEFINITIONS
MAIZE FOR FORAGE	Maize cut green as grass.
SORGHUM FOR FORAGE	Usually sweet sorghum, so called for the sweet juice in the stem, which is cut green as grass.
RYE GRASS FOR FORAGE Italian ryegrass (<i>Lolium multiflorum</i>); English, perennial ryegrass (<i>L. perenne</i>)	Quick-growing grasses.
CLOVER FOR FORAGE <i>Trifolium spp.</i>	Various species grown for pasture, green fodder or silage.
ALFALFA FOR FORAGE <i>Medicago sativa</i>	A deep-rooted perennial herb used for green fodder, for hay or silage, and for pasture.

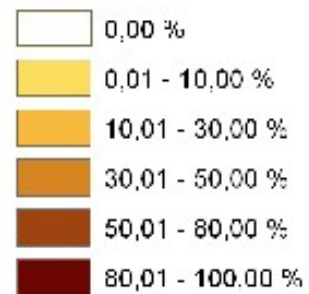
Source: FAO

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Pasture+Fodder Crop on land Area 1980



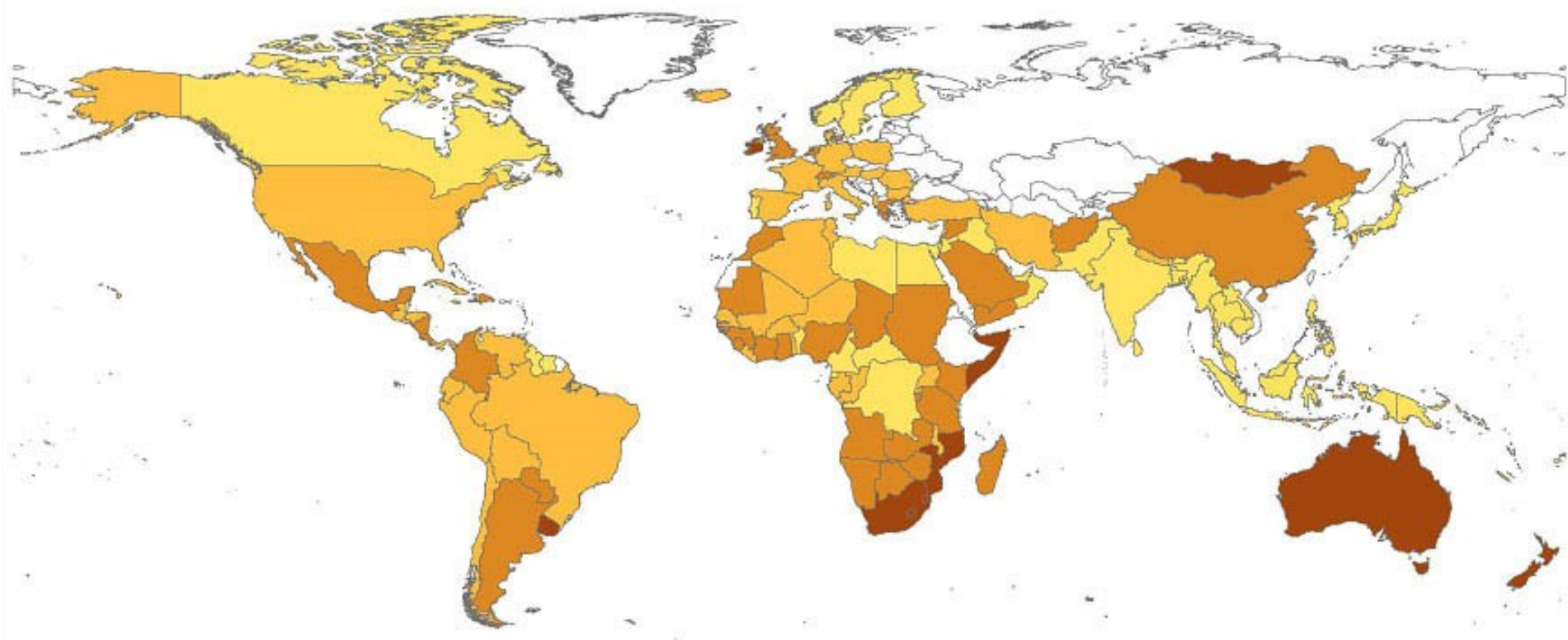
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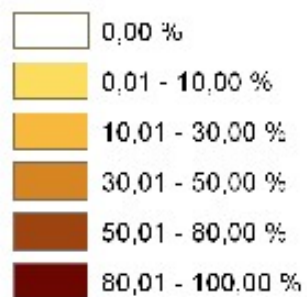
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Pasture+Fodder Crop on land Area 1990



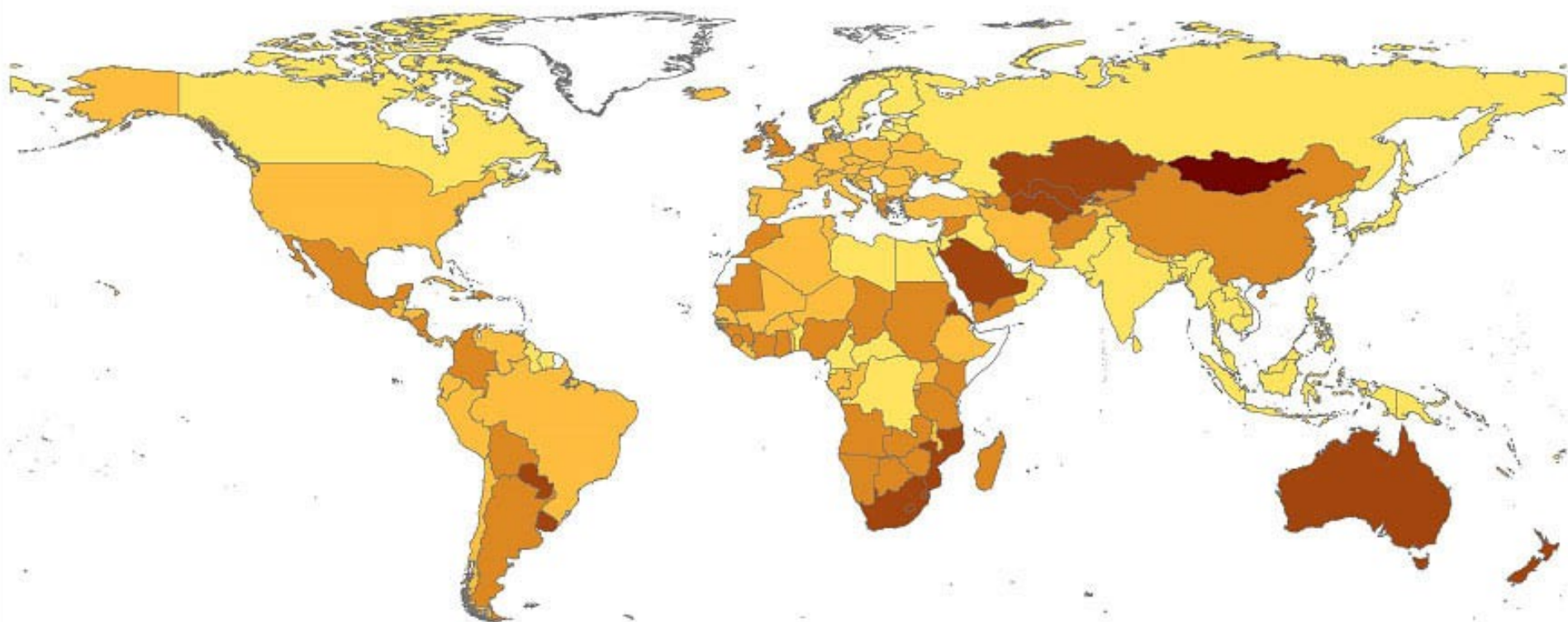
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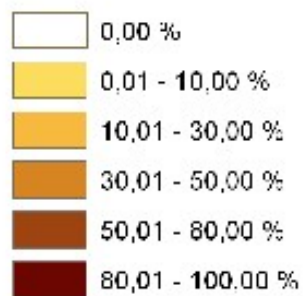
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Pasture+Fodder Crop on land Area 2000



Legend

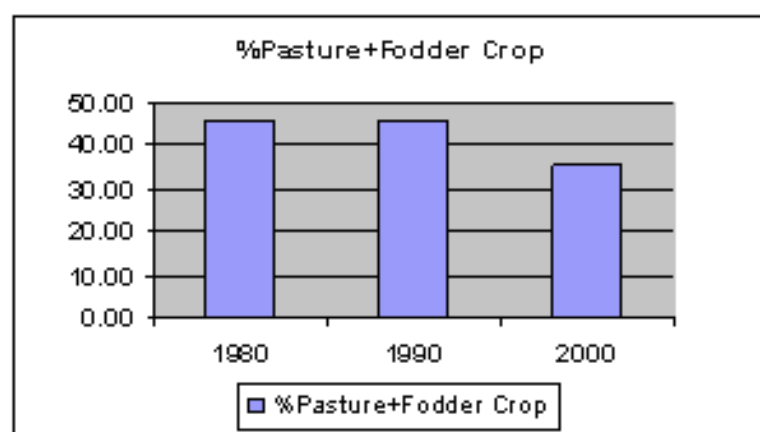
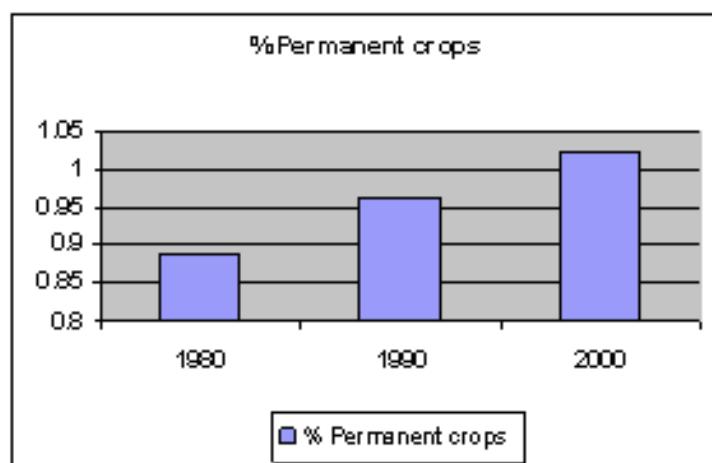
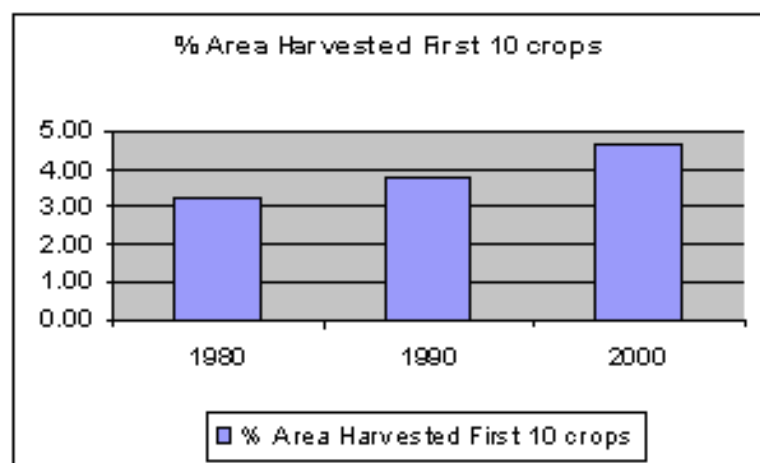


3.400 1.700 0 3.400 6.800 Miles



Africa Eastern	1980	1990	2000
Pasture+Fodder Crop (1000 Ha)	276,262.00	275,866.00	214,921.00
Area Harvested First 10 crops (1000 Ha)	19,518.74	22,635.17	28,128.39
Permanent crops (1000 Ha)	5,343.00	5,812.00	6,155.00

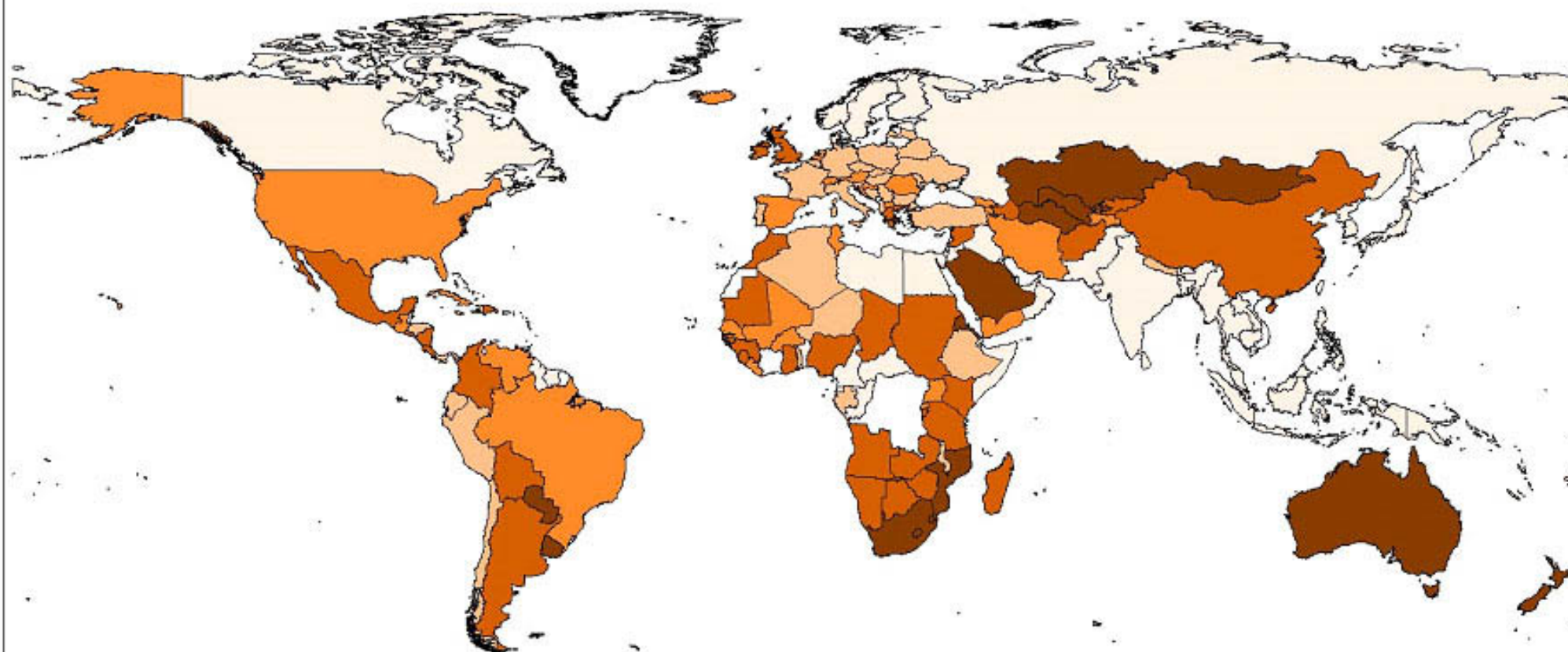
%Pasture+Fodder Crop	45.87	45.80	35.68
% Area Harvested First 10 crops	3.24	3.76	4.67
% Permanent crops	0.89	0.96	1.02



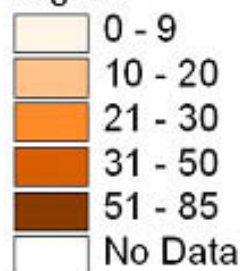
Source: FAO

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Pasture on Land Area 2000 (1000 ha)

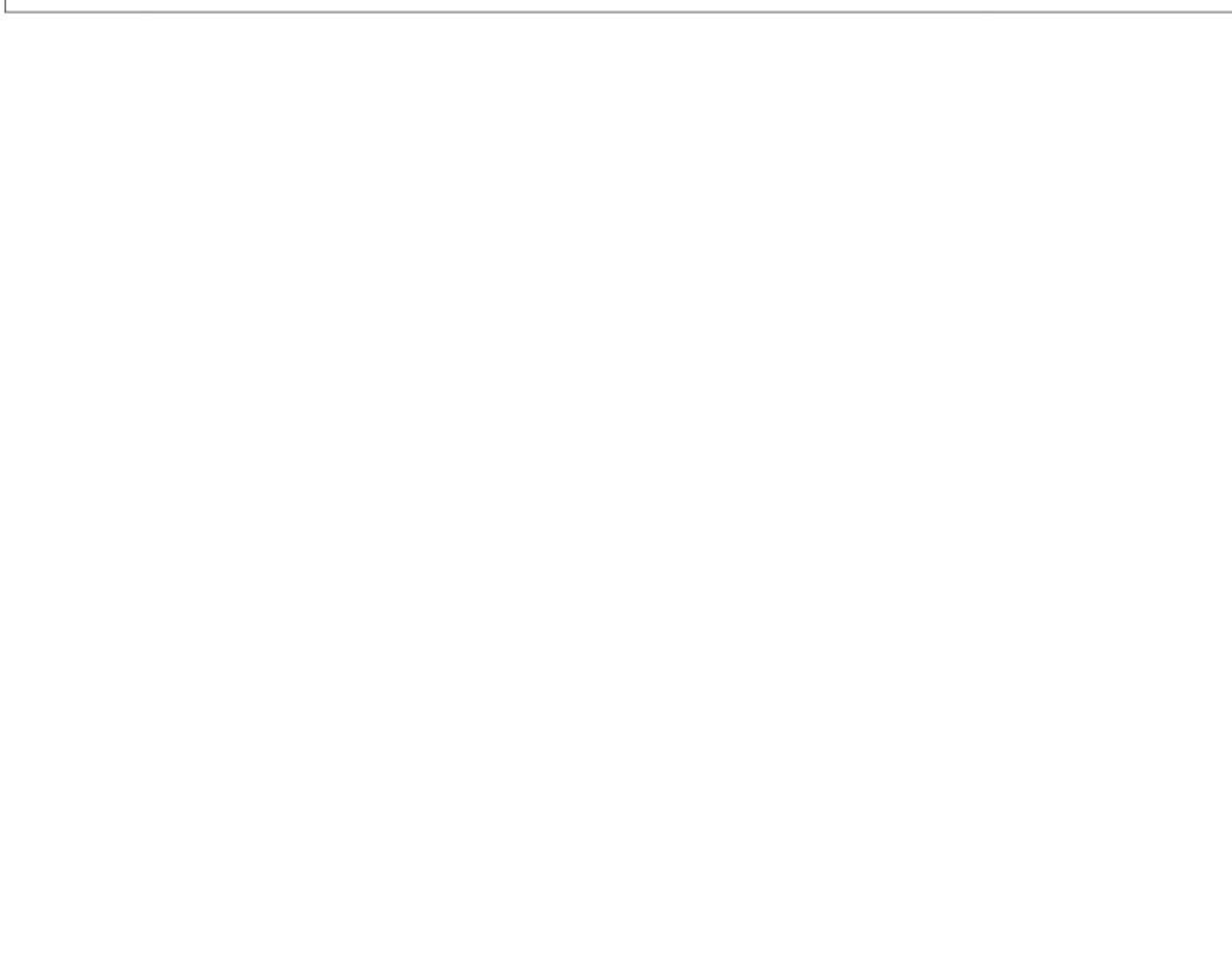


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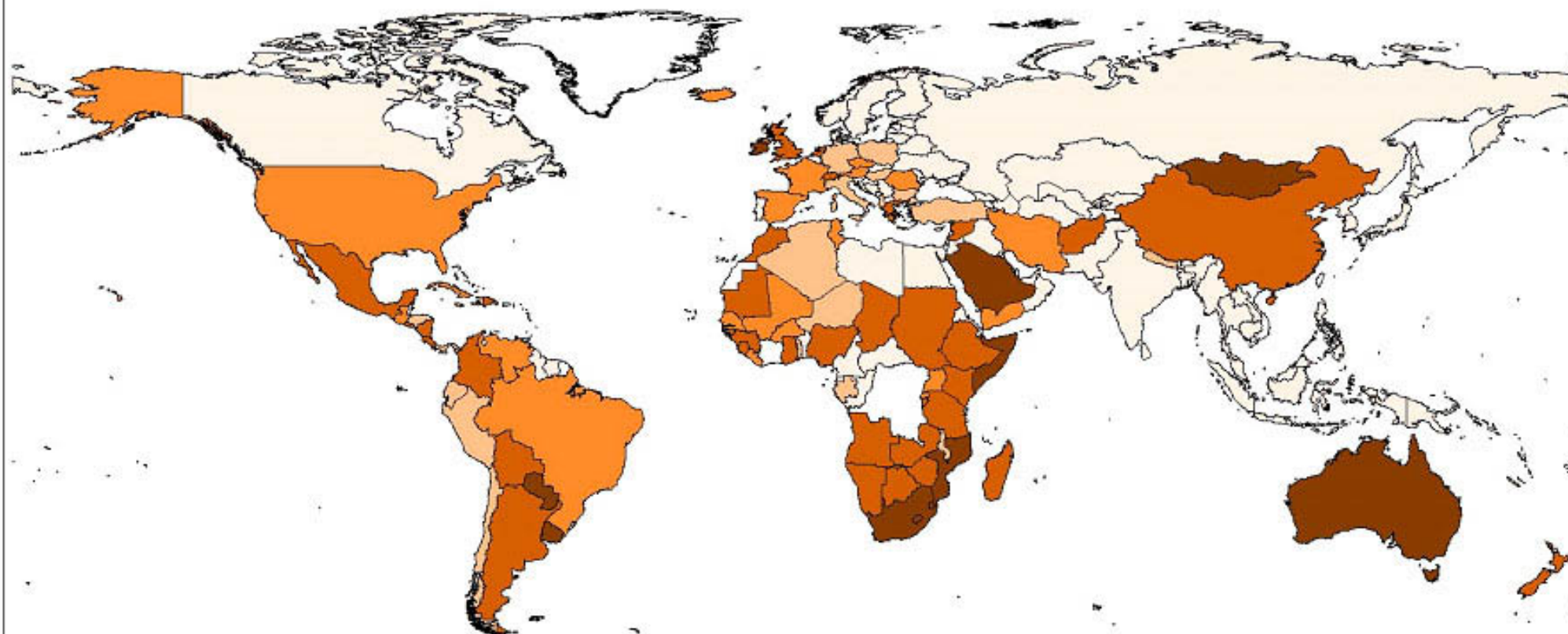


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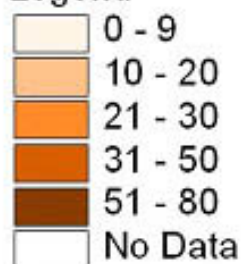




Pasture on Land Area 1990 (1000 ha)



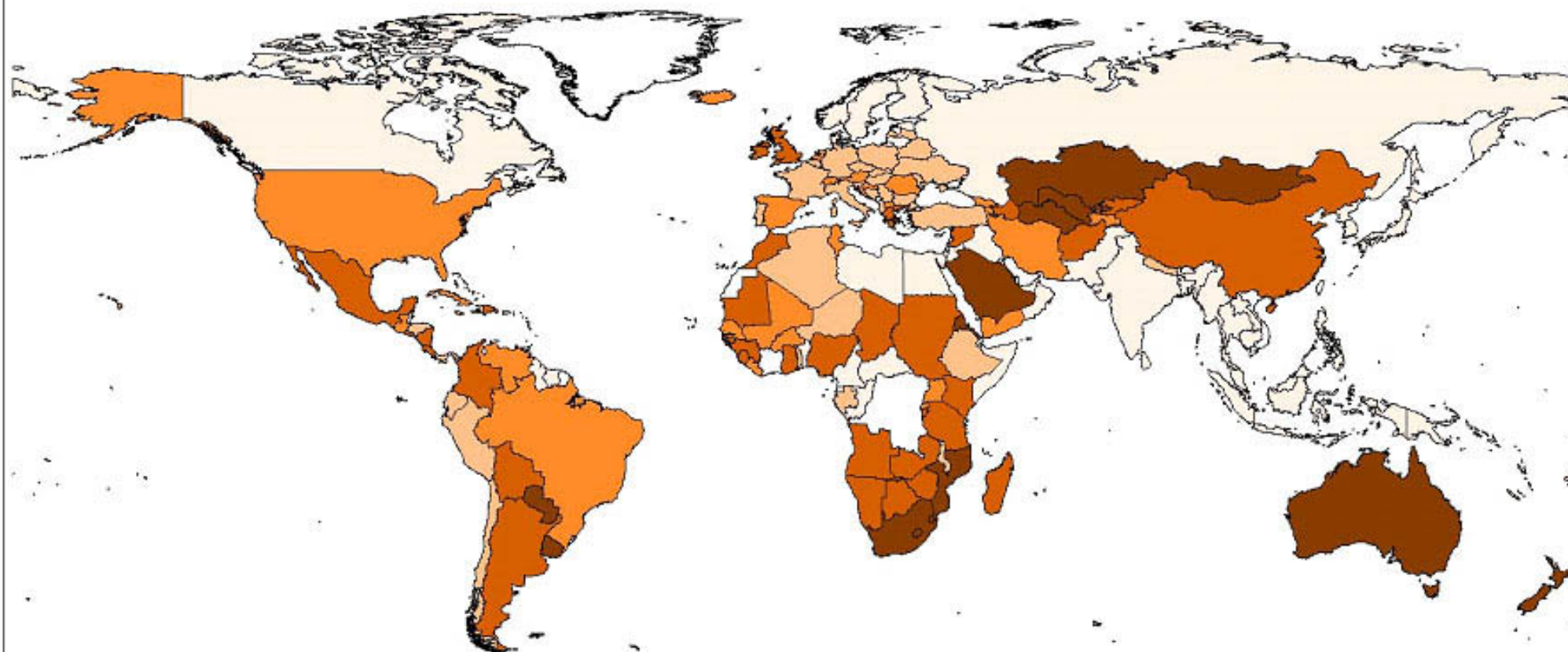
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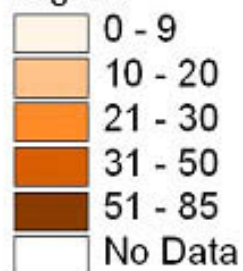
3000 0 3000 6000 Miles



Pasture on Land Area 2000 (1000 ha)

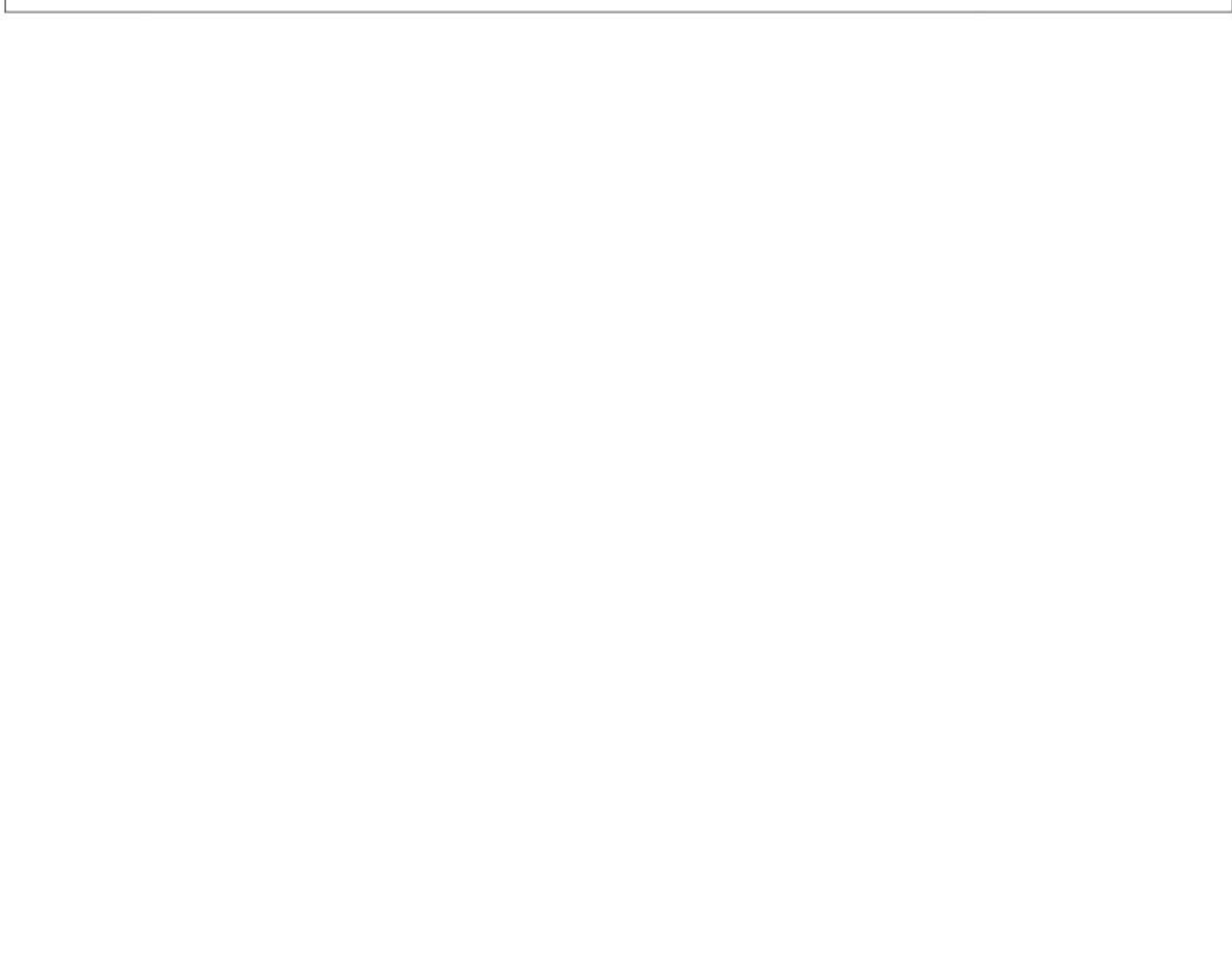


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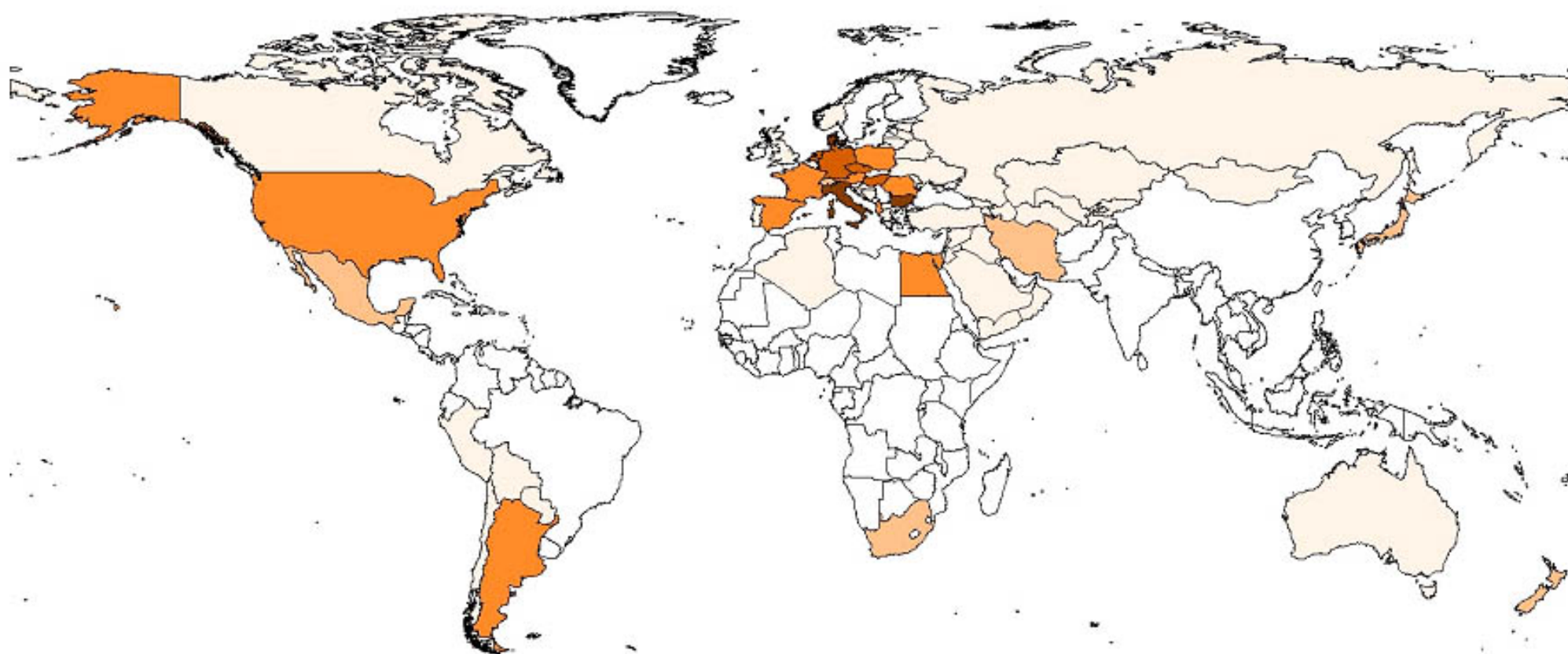


3000 0 3000 6000 Miles

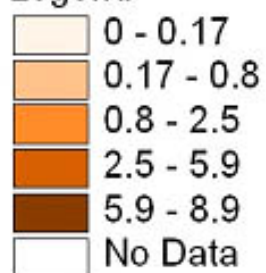




Area harvested on land Area 1980
(Quantity Ha)



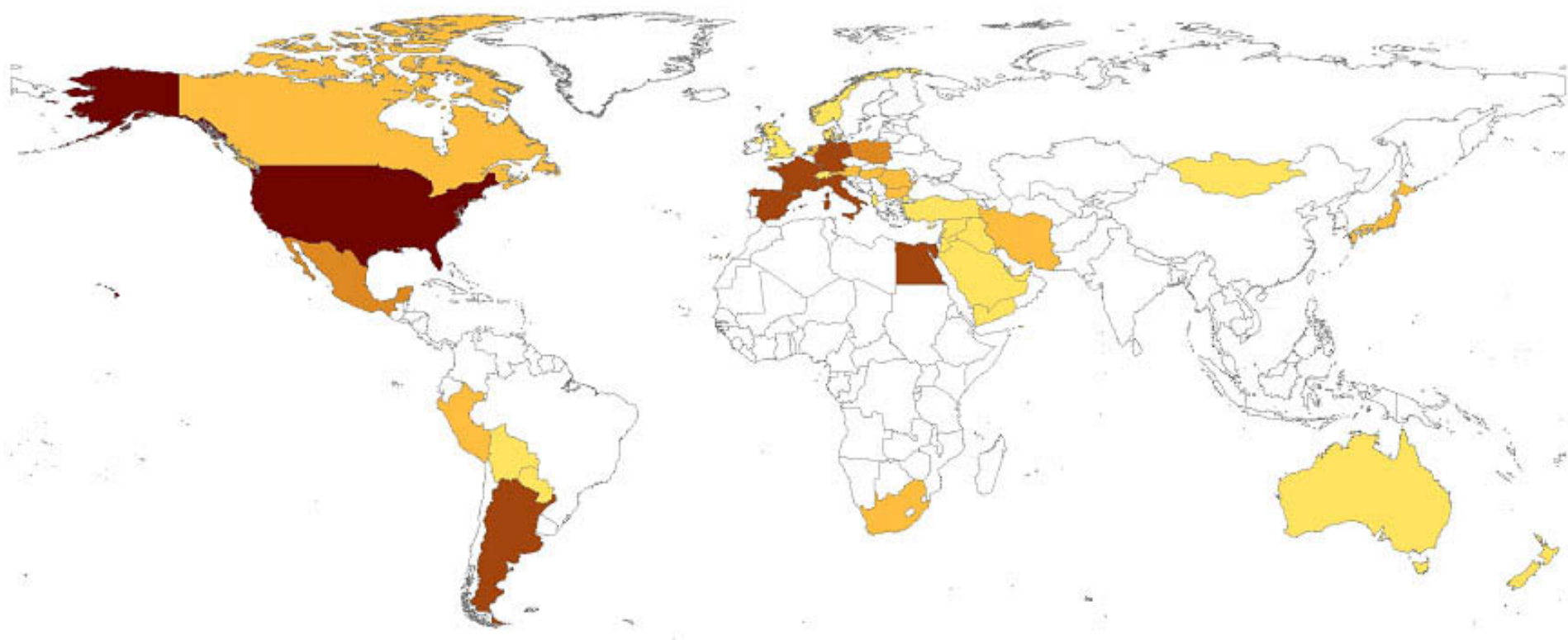
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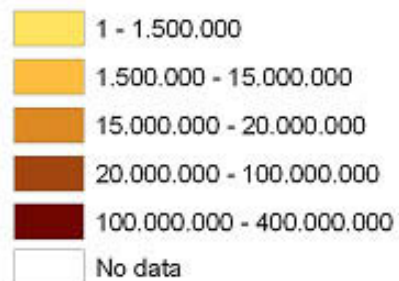
2000 0 2000 4000 6000 Miles



Fodder crop 1980 (production, tonnes)



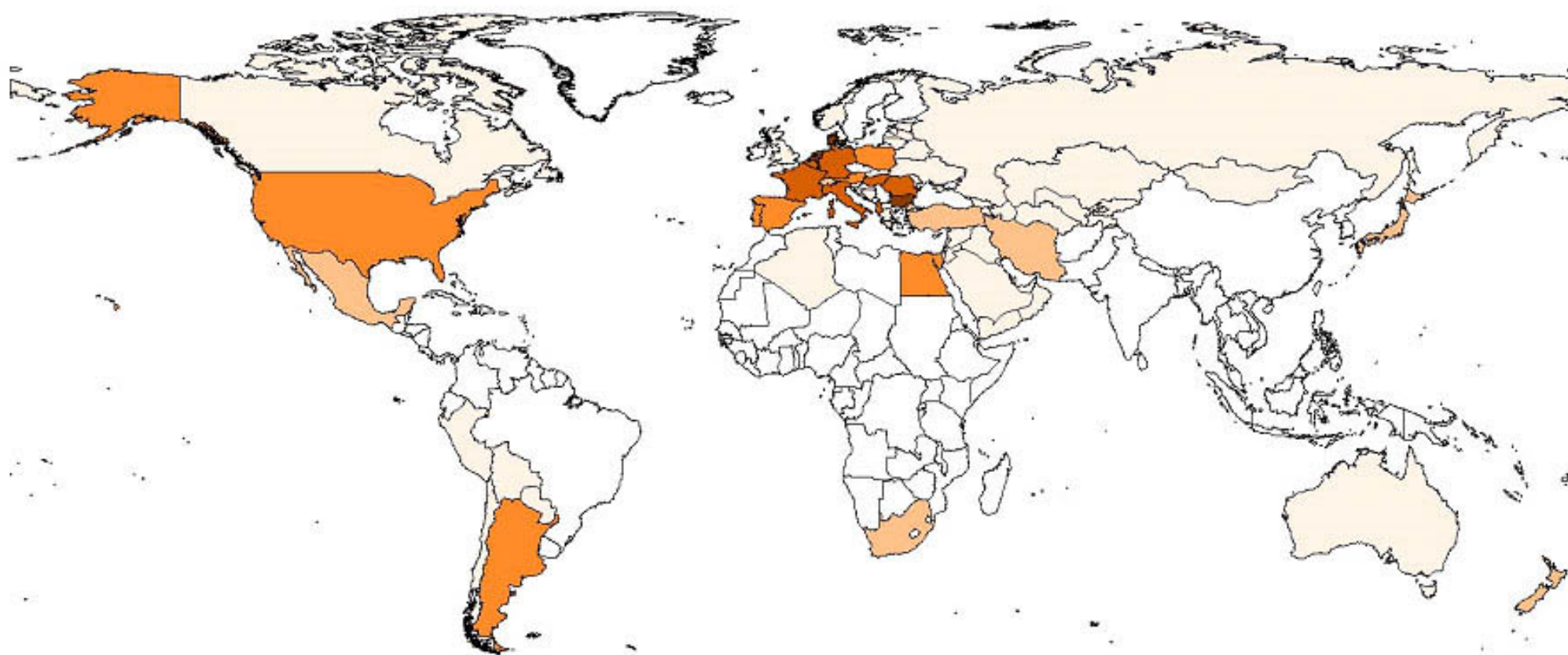
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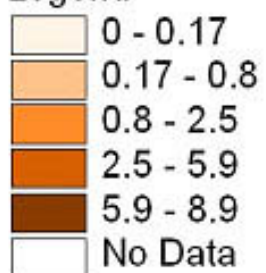
3.600 1.800 0 3.600 7.200 Miles



Area harvested on land Area 1990
(Quantity Ha)



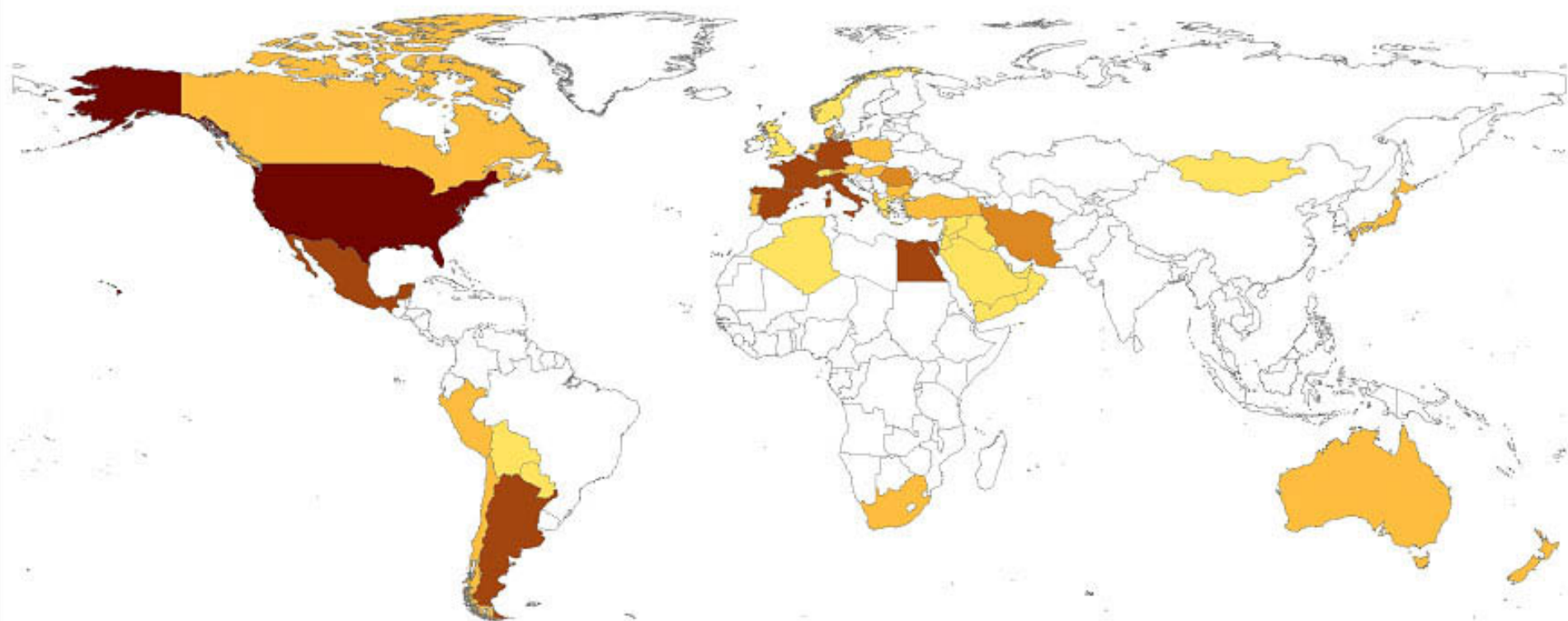
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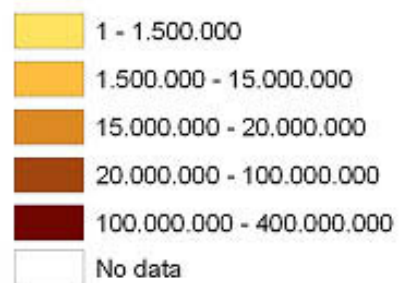
2000 0 2000 4000 6000 Miles



Fodder crop 1990 (production, tonnes)



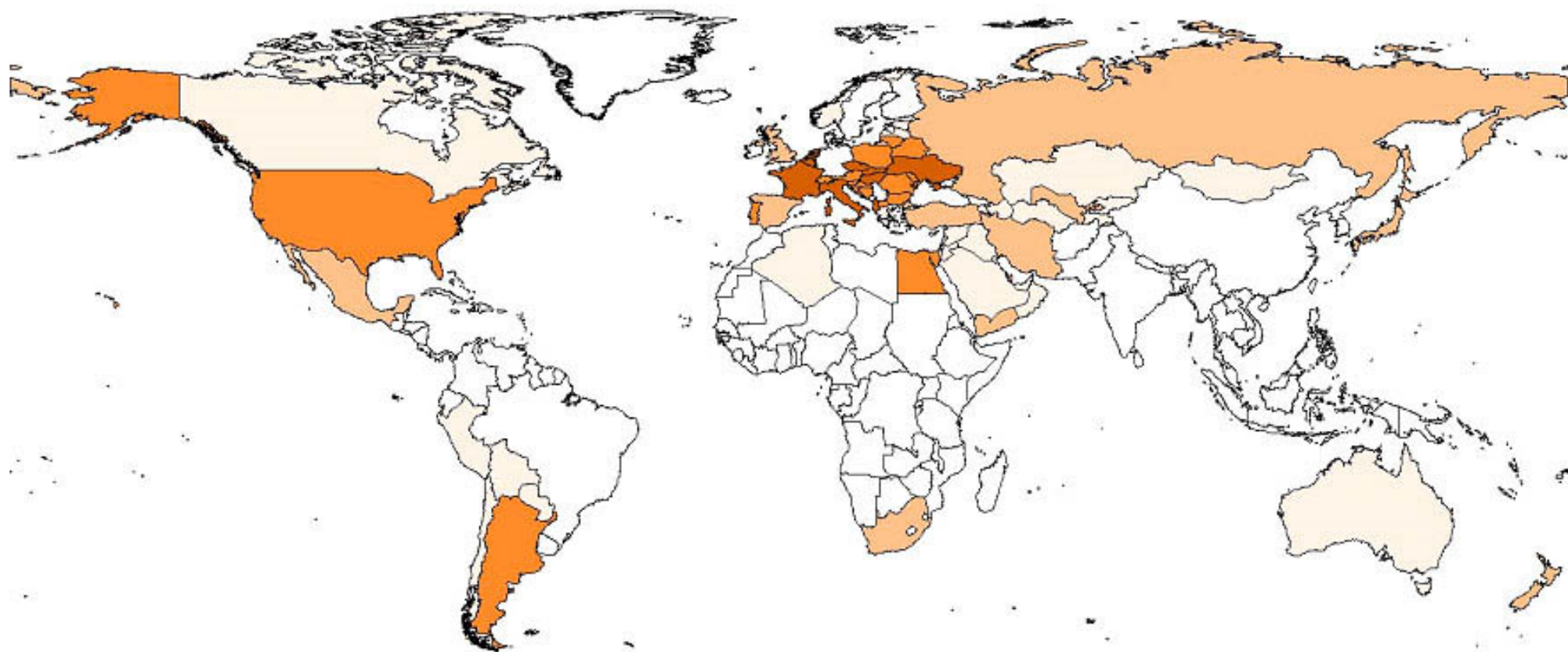
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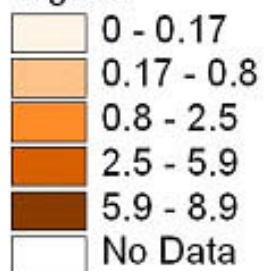
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Area harvested on land Area 2000
(Quantity Ha)



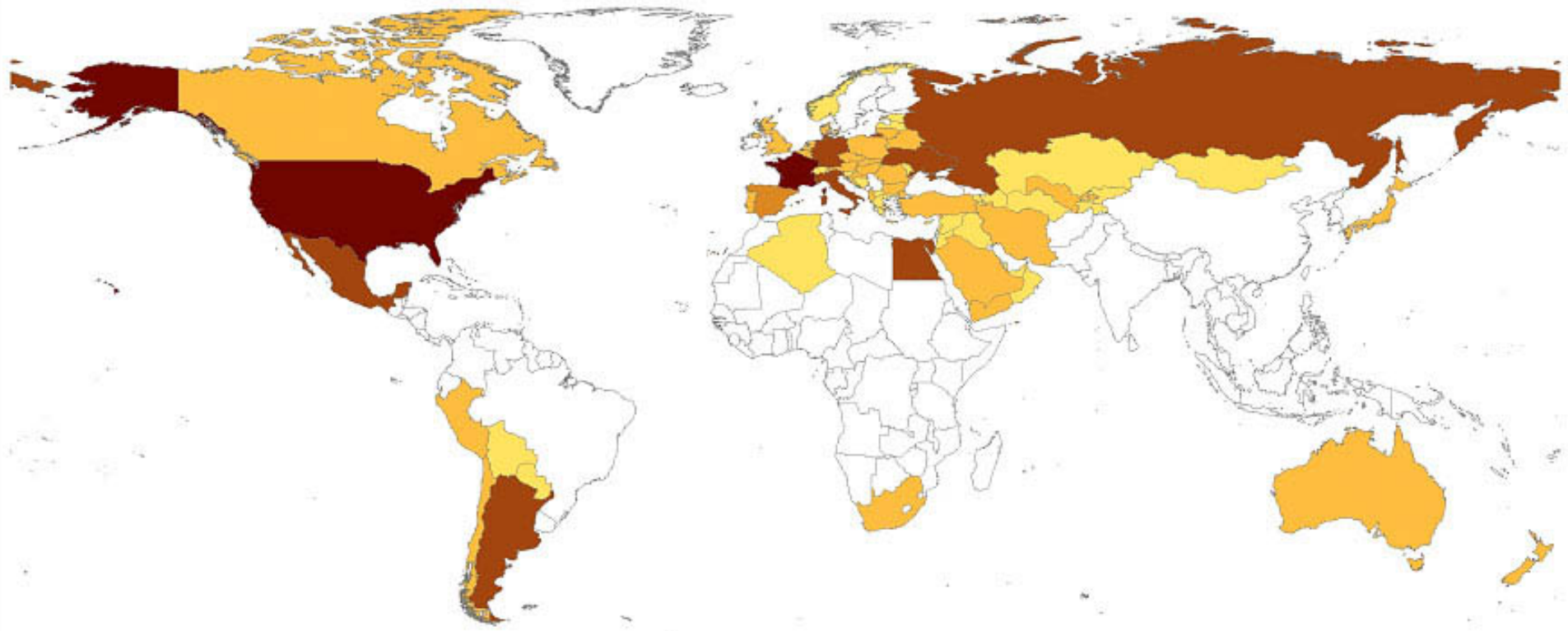
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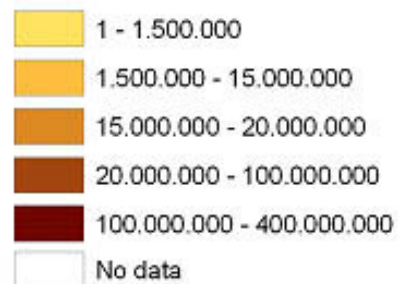
2000 0 2000 4000 6000 Miles



Fodder crop 2000 (production, tonnes)



Legend

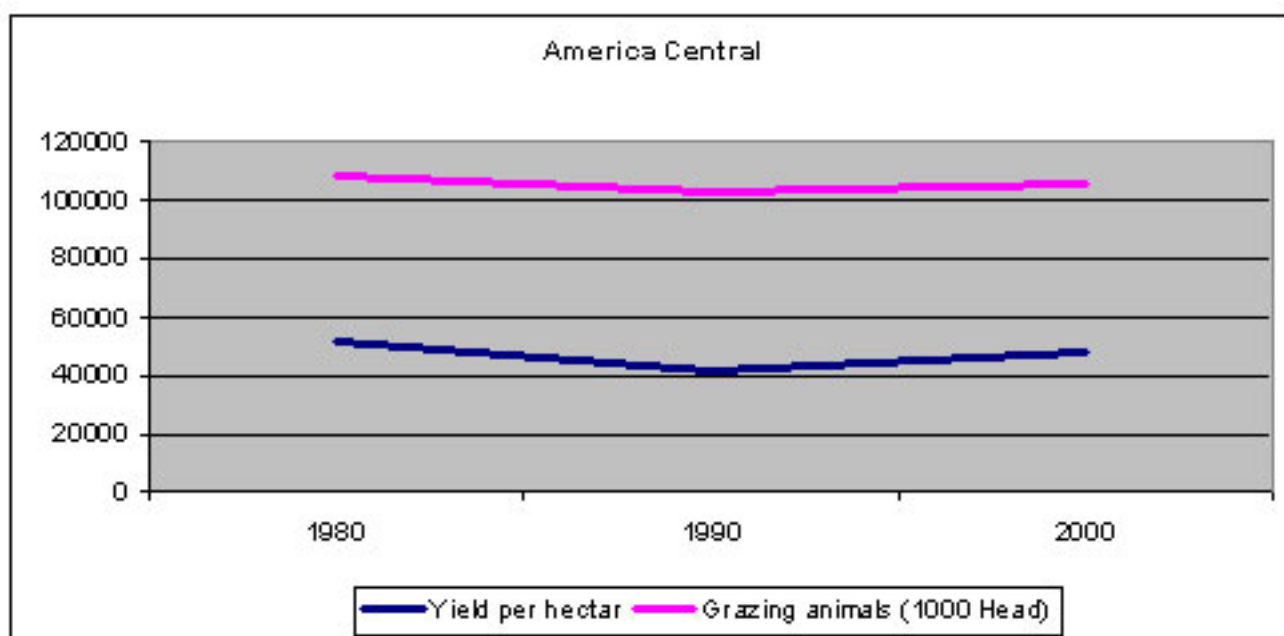


3.600 1.800 0 3.600 7.200 Miles



Mexico	Grazing animals (Head)		
	1980	1990	2000
Asses, mules or hinnies	6350400	6367000	6530000
Cattle	27742000	32054304	30523700
Goats	9638000	10439000	8704220
Horses	6205000	6170000	6250000
Sheep	6482000	5846000	6045999
Total	56417400	60876304	58053919

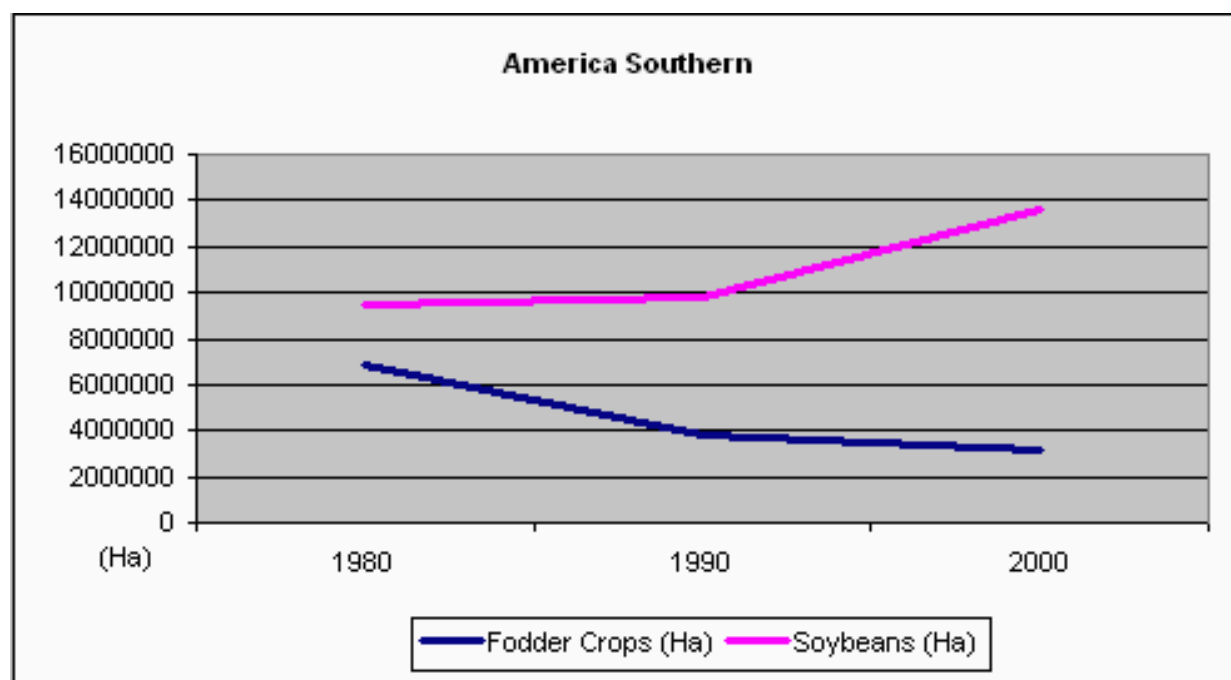
America Central		
Year	Yield per hectare	Grazing animals (1000 Head)
1980	51,412.92	56,417.40
1990	41,838.38	60,876.30
2000	47,511.01	58,053.92



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COUNTRIES	Area Harvested - Fodder Crops			Area Harvested - Soybeans		
	(Ha)			(Ha)		
	1980	1990	2000	1980	1990	2000
Argentina	6,729,100.00	3,593,000.00	2,871,000.00	2,030,000.00	4,961,600.00	8,637,503.00
Bolivia	15,330.00	24,790.00	21,550.00	37,580.00	143,372.00	580,300.00
Chile	n.d	80,330.00	111,100.00	1,200.00	0.00	n.d.
Paraguay	5,000.00	2,300.00	2,400.00	475,300.00	899,900.00	1,176,460.00
Peru	118,240.00	102,862.00	164,980.00	6,354.00	1,213.00	2,151.00
America Southern	6,867,670.00	3,803,282.00	3,171,030.00	2,550,434.00	6,006,085.00	10,396,414.00

America Southern		
Year	Fodder Crops (Ha)	Soybeans (Ha)
1980	6,867,670.00	2,550,434.00
1990	3,803,282.00	6,006,085.00
2000	3,171,030.00	10,396,414.00



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