



Food and Agriculture
Organization of the
United Nations

ISSN 2709-006X [Print]
ISSN 2709-0078 [Online]



FAOSTAT ANALYTICAL BRIEF 71

Land statistics and indicators 2000–2021

Global, regional and country trends

HIGHLIGHTS

- In 2021, world total agricultural land was 4.8 billion hectares, one-third of the global land area. Cropland covered 1.6 billion hectares, permanent meadows and pastures 3.2 billion hectares.
- Over the last two decades since 2000, cropland area grew by 6 percent, while permanent meadows and pastures decreased by 5 percent. As a result, total agricultural land area declined only marginally.
- Within cropland, arable land covered 1.4 billion hectares in 2021 – of which 1.1 billion hectares were temporary crops such as wheat, rice and maize – and 183 million hectares were permanent crops.
- The area of permanent crops grew by 40 percent since 2000. The area of temporary crops grew by 12 percent over the same period, largely at the expense of the area used for fallow land and temporary meadows and pastures, thus documenting a global intensification trend of crop production systems within arable land over the past two decades.
- In 2021, the world average cropland area per person was 0.2 hectares per capita, a decrease of 18 percent since 2000.

LAND STATISTICS AND INDICATORS

BACKGROUND

Land use statistics describe the ways in which land is utilized and managed by humans and allocated for different purposes, including through administrative arrangements. The Food and Agriculture Organization of the United Nations (FAO) collects annual land use data from countries via a standard [land use, irrigation and agricultural practices questionnaire](#), covering the full land use matrix in countries using international definitions first developed by the World Census of Agriculture. The resulting [land use statistics and indicators](#) are disseminated annually in FAOSTAT, and complemented by [land cover statistics](#) independently compiled by FAO from available land cover maps.

This analytical brief reports the main results and changes over time in land statistics and indicators with details at the global, regional and country levels during the past two decades (2000–2021), with a focus on agriculture (Figure 1). The 2023 update of land cover statistics includes data from the WorldCover high-resolution maps produced by the European Space Agency, in addition to maps from the Copernicus programme of the European Union and the National Aeronautics and Space Administration (NASA).

GLOBAL

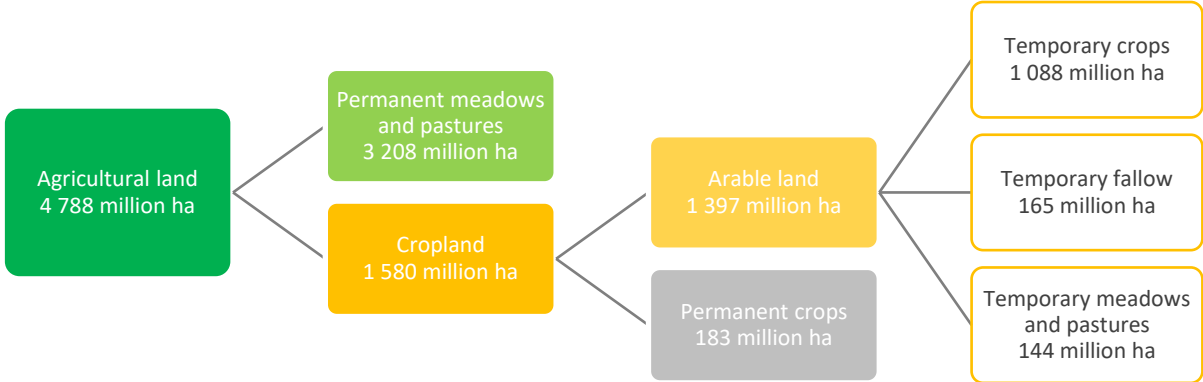
The world total land area is about 13 billion hectares (ha), excluding Antarctica and inland waters. Out of the world total land area, agricultural land, forest land and other land (barren and desert areas, urban land and infrastructure) occupy about one-third each. In 2021, the area of agricultural land was 4.8 billion ha while forest land and other land area covered 4.1 billion ha each.

Within agricultural land, cropland occupied in 2021 1.6 billion ha (12 percent of world total land area), while the area of permanent meadows and pastures was 3.2 billion ha (25 percent of world total land area) (Figure 1). Within cropland, arable land occupied 1.4 billion ha (88 percent of the total), and permanent crops 183 million ha (12 percent). In turn, arable land was mainly used for temporary crops (1 090 million ha, 80 percent of the total), with the remainder 300 million ha used either as temporary meadows and pastures or fallow land, i.e. within cropping systems rotation cycles of up to five years.

Between 2000 and 2021, the area of cropland increased by 6 percent. This reflected a 38 percent increase in permanent crops and a 12 percent increase in temporary crops. The data also show that the increase in temporary crops came largely from a concomitant decrease in the area used for fallow land and temporary meadows and pastures (-78 million ha), documenting a global intensification trend of crop production systems within arable land over the past two decades.

Over the same period, the area of permanent meadows and pastures decreased by 5 percent, while the area of cultivated pastures increased. Although insufficient coverage in cultivated pastures prevented a conclusive global assessment, this trend too was consistent with the intensification of production practices related to feed and livestock rearing of the past two decades.

Figure 1: World total agricultural land in 2021

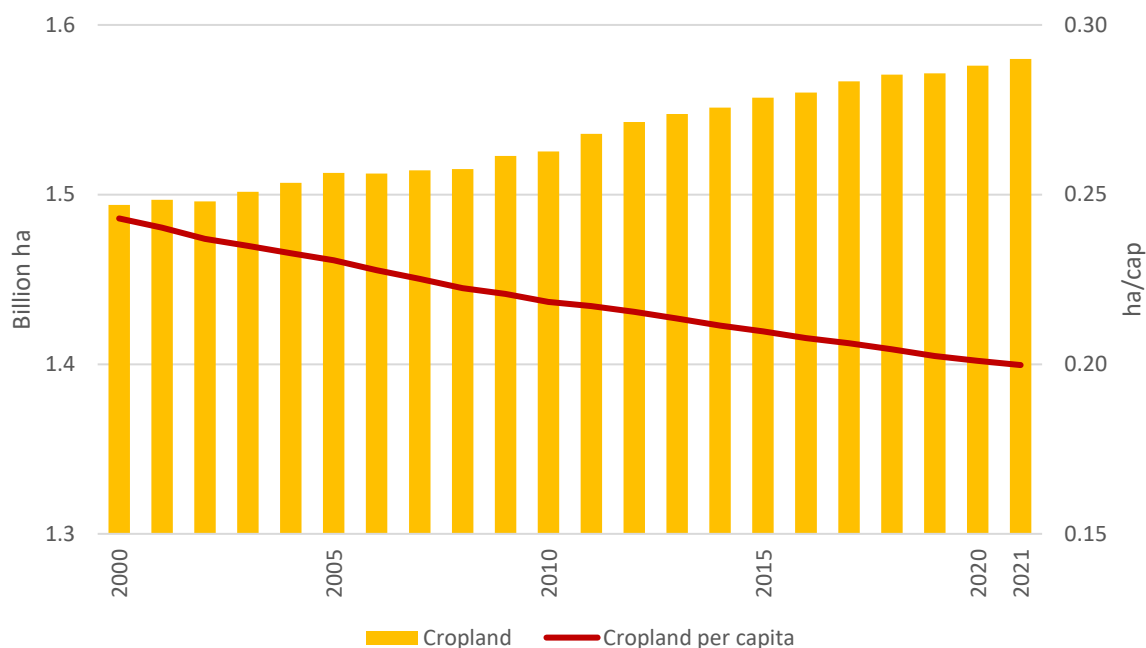


Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023]. <http://www.fao.org/faostat/en/#data/RL>

In 2021, world total cropland area per person was 0.2 ha per capita (ha/cap). Compared with 2000, cropland area per person decreased by 18 percent (Figure 2).



Figure 2: World cropland area trends



Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023].
<http://www.fao.org/faostat/en/#data/RL>

Irrigation and agricultural practices

World total land area equipped for irrigation in 2021 was 352 million ha, or 22 percent of total cropland area. It grew by 20 percent since 2000, faster than the observed increase in cropland area, underscoring yet another dimension of agricultural practice intensification over the past two decades. While information on area actually irrigated would be more conclusive, the underlying statistics had insufficient temporal and geographical coverage to allow for trend analysis.

By 2021, the global agricultural area under organic agriculture was 77 million ha, accounting just above 5 percent of total cropland area. Trends show a significant expansion, as it more than tripled since 2004, when it covered only 22 million ha.

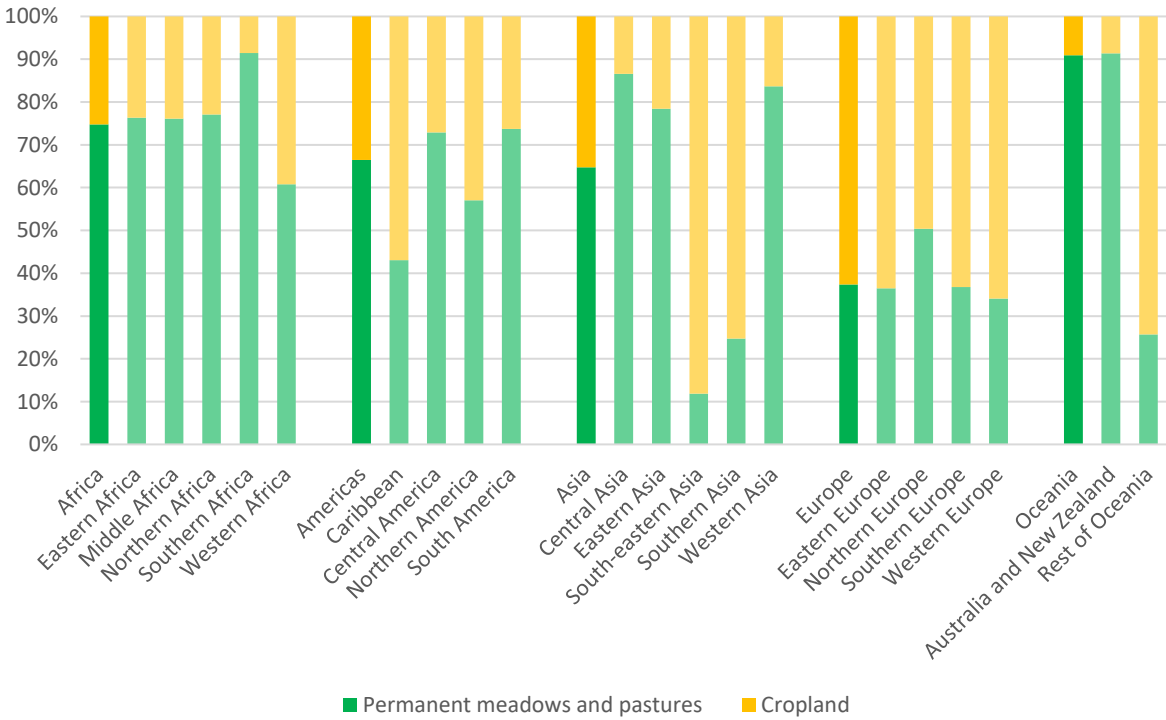
REGIONAL

With almost 1.7 billion ha in 2021, Asia was the region with the largest agricultural land area, one-third of which was in China. Africa and the Americas followed with 1.2 billion ha and 1.1 billion ha, respectively. Europe had 460 million ha of agricultural land area and Oceania 380 million ha.

Significant variations in the relative contribution of cropland and permanent meadows and pastures to agricultural land could be observed across and within regions (Figure 3). In Africa, the share of permanent meadows and pastures in agricultural land was larger than the world average in all subregions except Western Africa, which had a large cropland area in both absolute and relative terms (112 million ha, or 39 percent of total agricultural land). The share of permanent meadows and pastures was likewise larger than the world average in South America and Central America. Northern America had more balanced shares of cropland (43 percent, 199 million ha) and pastures (57 percent, 264 million ha). In Asia, the Southern and South-eastern subregions showed a large contrast compared

to the rest of the region and the global average: cropland accounted for 240 million ha, or 75 percent of the total agricultural land in Southern Asia, while South-eastern Asia had an even larger proportion, with cropland occupying 126 million ha or 88 percent of the total agricultural land. Throughout Europe, cropland exceeded the area of pastures, except in Northern Europe where they had the same extent (19 million ha each). In Oceania, Australia and New Zealand had the largest share (91 percent) of permanent meadows and pastures among all subregions, totalling over 341 million ha; conversely, the insular subregions of Oceania (comprising Melanesia, Micronesia and Polynesia) only allocated one-fourth of their agricultural land to permanent meadows and pastures.

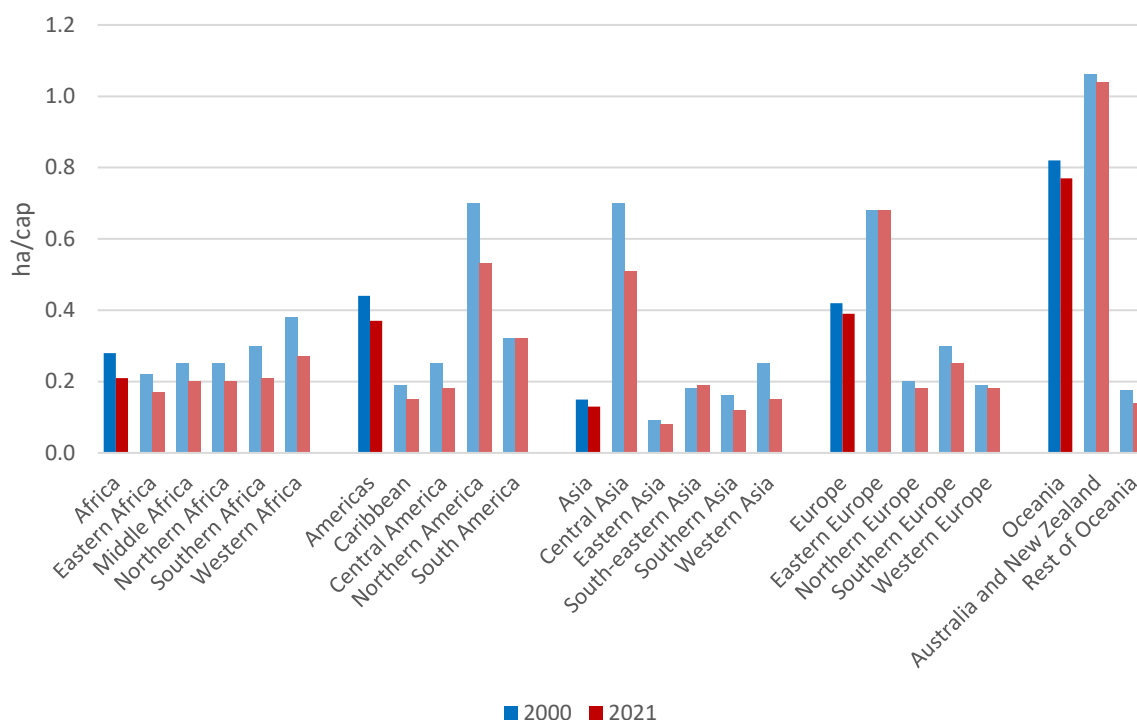
Figure 3: Agricultural land by region, subregion and component (2021)



Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023]. <http://www.fao.org/faostat/en/#data/RL>

In 2021, Oceania had the largest cropland area per capita (0.8 ha/cap), followed by the Americas and Europe (both at 0.4 ha/cap), Africa (0.2 ha/cap) and Asia (0.1 ha/cap). The indicator declined in all regions since 2000, by 25 percent in Africa, 16 percent in the Americas and 13 percent in Asia compared to 6–7 percent in Europe and Oceania. A more detailed subregional analysis revealed significant variability within the regions. In 2021, Central Asia, for example, exhibited an area of cropland per capita (0.5 ha/cap) that was five times larger than the regional average. Similarly, Eastern Europe stood out with a value (0.7 ha/cap) three times larger than the other subregions in Europe (Figure 4).

Figure 4: Cropland area per capita by region and subregion



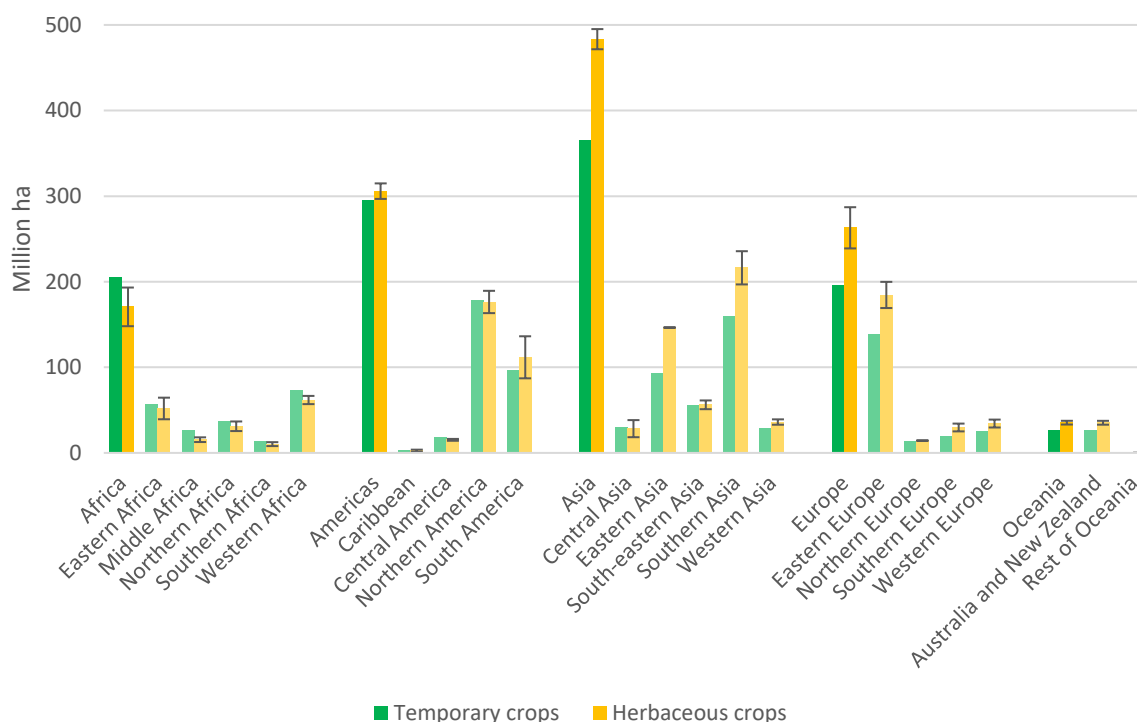
Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023].

<http://www.fao.org/faostat/en/#data/RL>

Temporary crops

In 2021, the area of temporary crops – crops having a growing cycle of less than one year – was the largest in Asia (365 million ha), followed by the Americas (295 million ha), Africa (205 million ha) and Europe (196 million ha). Oceania had the smallest extent (26 million ha). Northern America, Southern Asia and Eastern Europe had the largest areas among the subregions. Figure 5 compares the subregional extents of temporary crops with values of the land cover category ‘herbaceous crops’ as derived from the MODIS and WorldCover information (FAO, 2023b), showing a good correspondence between land use and land cover.

Figure 5: Area of temporary and herbaceous crops by region and subregion (2021)



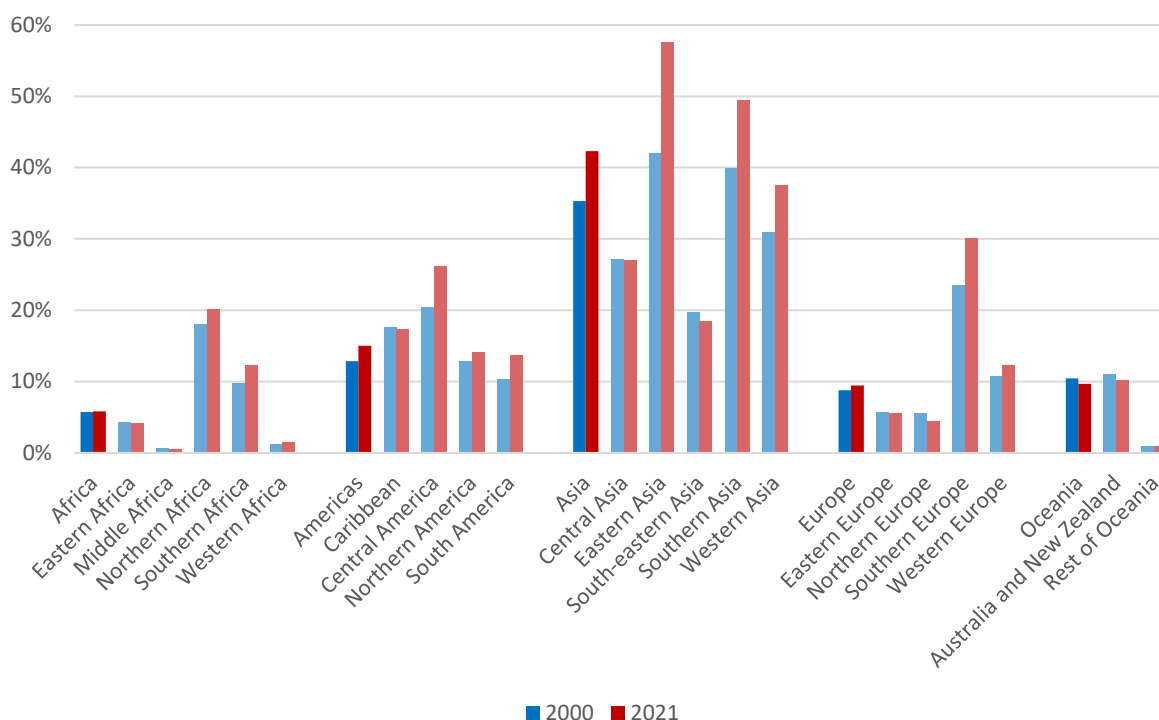
Note: Half the range in the land cover estimates provides a simple approximation of the uncertainty in land cover data.

Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023]. <http://www.fao.org/faostat/en/#data/RL> and FAO. 2023. Land Cover. In: *FAOSTAT*. Rome. [Cited July 2023]. <http://www.fao.org/faostat/en/#data/LC>

Irrigation and agricultural practices

There was significant variability among regions and subregions in terms of area equipped for irrigation (Figure 6). Asia had the largest absolute value, with nearly 250 million hectares of cropland equipped for irrigation, accounting for 42 percent of its cropland and 70 percent of the global cropland equipped for irrigation. In contrast, Africa had the lowest share, with only 6 percent (about 17 million hectares) of its cropland area that was equipped for irrigation. Europe and Oceania both had close to 10 percent of their cropland area equipped for irrigation, corresponding to 27 million hectares and 3 million hectares, respectively. The Americas recorded a 15 percent share, which amounted to 57 million hectares. The significant variability within regions likely reflects different agro-climatic conditions as well as the variety within agricultural systems. Most regions and subregions have shown an increase in the area equipped for irrigation since 2000, indicating a trend towards greater utilization of water resources in agriculture over the past decades. However, the area equipped for irrigation does not necessarily reflect the actual area that is being irrigated. Information on the actual irrigated area is still limited, but recent advancements in remote sensing technology (e.g. See *et al.*, 2023) hold great potential for improving country reporting and enhancing quality assurance and quality control processes in this regard.

Figure 6: Share of cropland area equipped for irrigation by region and subregion



Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023].
<http://www.fao.org/faostat/en/#data/RL>

In 2021, about half of the global agricultural land under organic agriculture was in Oceania (36 million ha). Nearly one-fourth was in Europe (18 million ha) and one-fifth was in the Americas (14 million ha). All the regions experienced a significant increase in the cropland area under organic agriculture since the beginning of reporting in 2004.

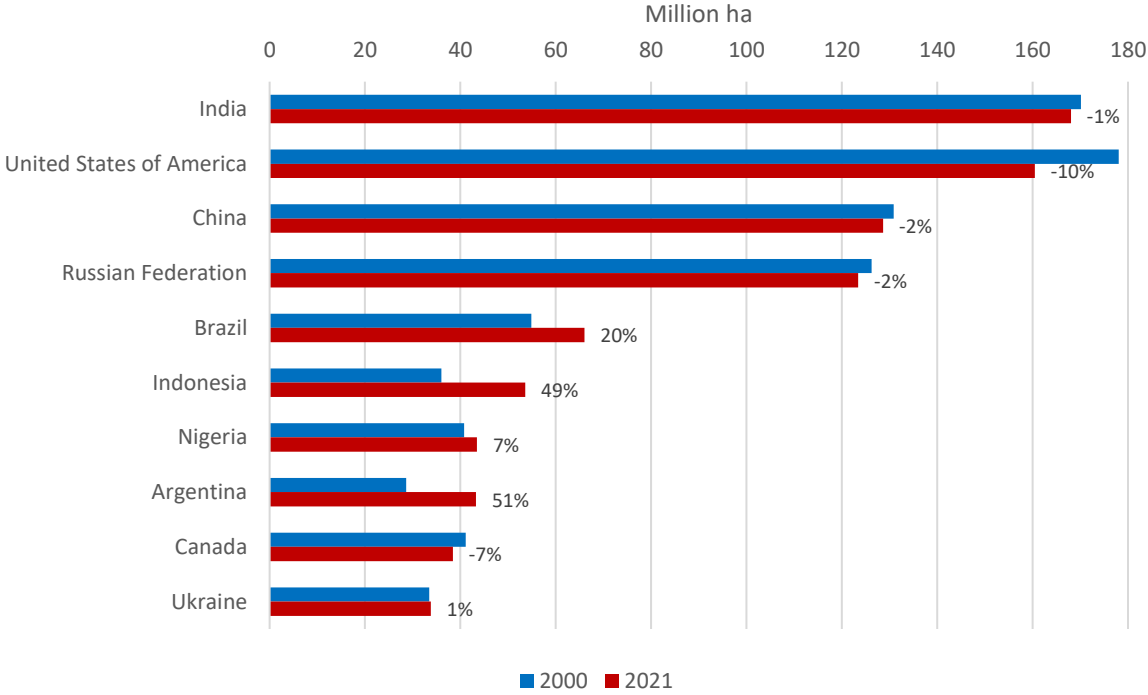
COUNTRY

In 2021, India had the largest total cropland area, with 168 million ha. It was closely followed by the United States of America (160 million ha), China (128 million ha), the Russian Federation (123 million ha) and Brazil (66 million ha). The remaining highest-ranking countries (Indonesia, Nigeria, Argentina, Canada and Ukraine) had values between 30 and 60 million ha (Figure 7).

The top ten countries with the largest extent of cropland exhibited diverse trends between 2000 and 2021. In India, China, the Russian Federation and Ukraine, the cropland area remained relatively stable with little variation. The United States of America experienced a 10 percent decrease in cropland area. Canada saw a 7 percent decline in cropland area, while Nigeria witnessed a similar percentage increase. On the other hand, significant increases in cropland area were observed in Argentina (+51 percent), Indonesia (+49 percent) and Brazil (+20 percent). In Argentina and Brazil, these substantial increases were mainly driven by the expansion of temporary crops, whereas the area of permanent crops exhibited more limited growth (+7 percent in Argentina) or even a decrease (-18 percent in Brazil). The opposite occurred in Indonesia, where the significant expansion of permanent crops (with the area dedicated to them increasing by 76 percent to 27 million hectares)

played a crucial role in driving the changes in land use. The expansion of oil palm plantations has been a major contributing factor to this growth.

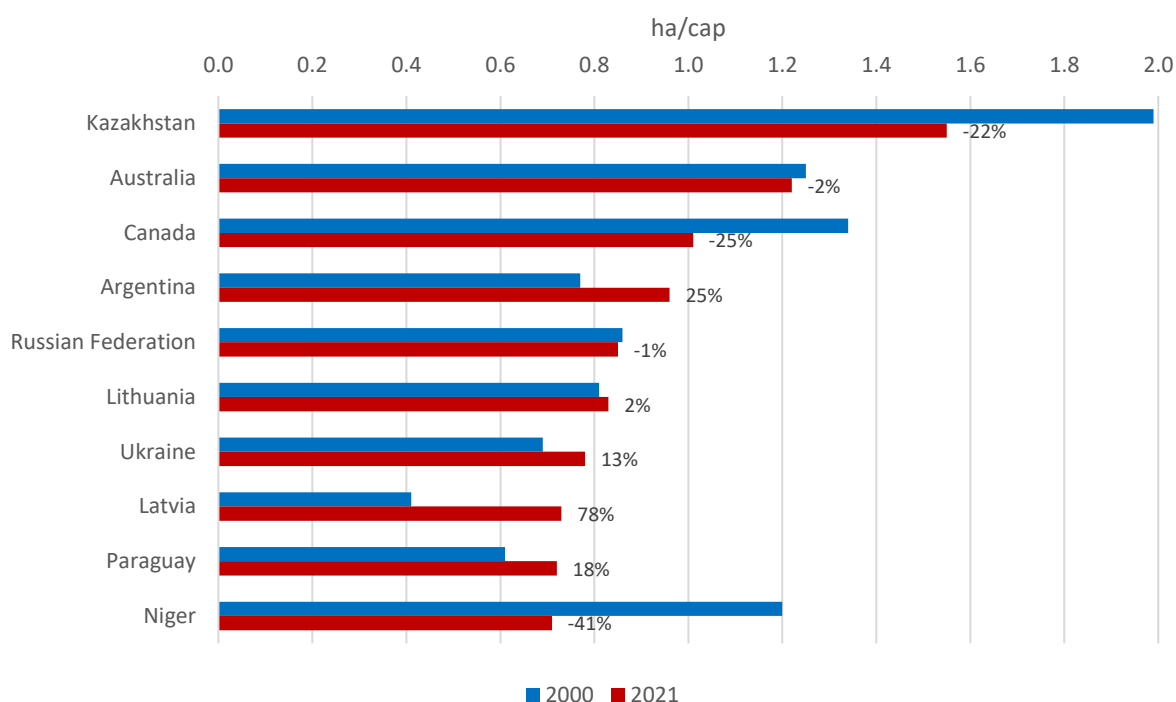
Figure 7: Cropland area and change between 2000 and 2021, top countries



Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023]. <http://www.fao.org/faostat/en/#data/RL>

Additional insights can be gained when examining the per capita values of cropland, as shown in Figure 8. In 2021, only four countries had approximately 1 hectare or more of cropland per capita. Kazakhstan stood out with a value of 1.6 ha/cap, which was eight times the global average of 0.2 ha/cap. Australia followed closely with 1.2 ha/cap, while Canada and Argentina had approximately 1.0 ha/cap. The other top-ranking countries had values ranging from 0.7 to 0.9 ha/cap. Since 2000, Kazakhstan and the Niger have witnessed a significant reduction in cropland area per capita (-22 percent and -41 percent, respectively) due to larger increases in their respective populations. On the other hand, Latvia witnessed a noteworthy increase in cropland area per person in 2021, with a value of 0.7 ha/cap, compared to 0.4 ha/cap in 2000. This shift can be attributed to a combination of factors including a decrease in the national population and an expansion of the cropland area. The decrease in population has led to a relatively higher availability of cropland per person, while the expansion of cropland area has further contributed to the increase in the indicator.

Figure 8: Cropland area per capita, top countries (2021)



Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023].
<http://www.fao.org/faostat/en/#data/RL>

EXPLANATORY NOTES

The FAOSTAT domains [Land Use](#) and [Land Cover](#) are available for 198 countries and 42 territories over 1961–2021. The update consolidates the indicators of land use within the main FAOSTAT domain. Methodological and country notes are available as supplementary information in each FAOSTAT domain.

FAO annually collects from countries land use information via a standard questionnaire on [land use, irrigation and agricultural practices](#). The Land Use dataset implements the FAO Land Use classification disseminating data on 21 land-use categories and 23 categories of irrigation and agricultural practices. Definitions for all land-use categories are available within the FAO questionnaire. A full mapping of the corresponding FAO land use matrix is provided below (Table 1).

The FAO Land Use classification is used by the United Nations (UN) System of Environmental and Economic Accounting (SEEA); the UN Framework for the Development of Environmental Statistics (FDES); and the World Census of Agriculture. It is furthermore consistent with the land use classes of the Intergovernmental Panel on Climate Change (IPCC), used for country reporting to the United Nations Framework Convention on Climate Change (UNFCCC).

FAO also collects forest data from countries via the Global Forest Resources Assessment (FRA) (FAO, 2020) in five-year cycles. Data include detail on the forest categories ‘Naturally regenerating forest’ and

'Planted forest'. These data are disseminated in the FAOSTAT Land Use domain, with values in between FRA years (1990, 2000, 2010, 2015) linearly interpolated. Annual data for the period 2016–2020 are taken directly from the FRA. The 2021 forest estimates are linear extrapolation of the last five years of FRA data.

Land use data provided by countries to FAO are typically sourced from national agricultural censuses or agricultural surveys, conducted at regular intervals, usually of 5–10 years. The rationale for sending annual FAO Land Use Questionnaires is because such cycles are not synchronized among countries. Changes in national definitions and data practices that may occur between collection cycles may cause breaks in time series. Intensive work is carried out with countries to reconcile this information against the background of the FAO [land use definitions](#). When reconciliation is not possible, the nature of the time series break is documented in the [FAOSTAT country notes](#), with information of the possible implications of such changes on relevant national and regional land use trends.

The FAOSTAT Land Cover domain contains statistics of land cover area, aggregated at national level and by land cover category following the international land cover classification of the SEEA Central Framework (UN SEEA 2012). Land cover statistics are used as supplementary information for the land use statistics. The FAOSTAT land cover data are compiled by national aggregation of geospatial information, which is distributed via publicly available global land cover mapping products as described in the methodological note of the domain. Official country documents including agricultural surveys and censuses, government websites and regional assessments but also sectoral studies are routinely used to fill missing information. Increasingly, land cover data derived from remote sensing products are also used to complement the FAOSTAT analysis.

In this update, 2021 values of SEEA land cover statistics were updated from one medium resolution global land cover product:

a) MODIS-LCCS. NASA MODIS Land Cover Collection 6.1 (MCD12Q1), available for 2001–2021 (Sulla-Menashe et al., 2019; Sulla-Menashe and Friedl, 2022). MODIS Land Cover Classification System (LCCS) types at 500m resolution are used to compute the SEEA-MODIS land cover data in FAOSTAT.

New land cover data for 2020 and 2021 were also added from a high-resolution global land cover product:

b) WorldCover. Produced by the European Space Agency (ESA) at 10m resolution. Specifically, the WorldCover 2020 was produced using v100 of the algorithm while WorldCover 2021 was produced using v200 of the algorithm (Zanaga *et al.*, 2021; Zanaga *et al.*, 2022).

The land use data disseminated in FAOSTAT are relevant to monitor sustainable and productive agriculture, forestry and fisheries activities at the national, regional and global level. In particular, agricultural land statistics serve as a denominator to compute Sustainable Development Goal (SDG) indicator 2.4.1.



Table 1: FAO land use matrix

Country area	Land area	Agriculture	Agricultural land	Cropland	Arable land	Temporary crops
	<i>Equipped for irrigation</i>	<i>Actually irrigated</i>		<i>Actually irrigated</i>		Temporary meadows & pastures
	<i>Actually irrigated</i>	<i>Organic</i>		<i>Organic</i>		Temporary fallow
				<i>Tillage</i>		Permanent crops
				<i>Under protective cover</i>		Cultivated
				Permanent meadows & pastures		Naturally growing
				<i>Actually irrigated</i>		
				<i>Organic</i>		
				Farm buildings and farmyards		
				Forest land		
		<i>Forestry</i>				
		<i>Forestry actually irrigated</i>				
		Other land				
	Inland waters					
	<i>Aquaculture</i>					
	<i>Capture fisheries</i>					
	Coastal waters					
	<i>Aquaculture</i>					
	<i>Capture fisheries</i>					
Exclusive Economic Zone						
<i>Aquaculture</i>						
<i>Capture fisheries</i>						

Note: Categories of the Land use domain are represented in bold. The additional categories in italics represent those under "Irrigation and agricultural practices" and "Aquaculture and fisheries", mapping them onto the main categories of the Land use domain.

Source: FAO. 2023. Land Use. In: *FAOSTAT*. Rome. [Cited July 2023].
<http://www.fao.org/faostat/en/#data/RL>

REFERENCES

- FAO.** 2020. Global Forest Resources Assessment. In: *FAO*. Rome. Cited June 2023. <http://www.fao.org/forestry/fra/fra2020/en/>
- FAO.** 2023a. Land Use. In: *FAOSTAT*. Rome. [Cited June 2023]. <http://www.fao.org/faostat/en/#data/RL>
- FAO.** 2023b. Land Cover. In: *FAOSTAT*. Rome. [Cited June 2023]. <http://www.fao.org/faostat/en/#data/LC>
- FAO & UNSD.** 2020. *System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries*: SEEA AFF. FAO. Rome. <https://doi.org/10.4060/ca7735en>
- See, L., Sven, G., Conchedda, G., Degerick, J., Van Tricht, K., Fritz, S., Lesiv, M., Laso Bayas, J.C, Rosero, J., Tubiello, F.N. & Szantoi, Z.** 2023 (submitted). Realizing a vision for dynamic global-scale crop and irrigation monitoring. *Nature Food*.
- Sulla-Menashe, D., Gray, J.M., Abercrombie, S.P. & Friedl, M.A.** 2019. Hierarchical mapping of annual global land cover 2001 to present: The MODIS Collection 6 Land Cover product. *Remote Sensing of Environment* 222, 183–194. <https://doi.org/10.1016/j.rse.2018.12.013>
- Sulla-Menashe, D. & Friedl, M.A.** 2022. User Guide to Collection 6 MODIS Land Cover (MCD12Q1 and MCD12C1) Product. https://lpdaac.usgs.gov/documents/1409/MCD12_User_Guide_V61.pdf
- Tubiello, F.N., Conchedda, G., Casse, L., Pengyu, H., Zhongxin, C., De Santis, G., Fritz, S. & Muchoney, D.** 2023. Measuring the world's cropland area. *Nature Food*, 1–3, 2023. <https://doi.org/10.1038/s43016-022-00667-9>
- Tubiello, F.N., Conchedda, G., Casse, L., Hao, P., De Santis, G. & Chen, Z.** 2023 (in review). A new cropland area database by country circa 2020. *Earth Syst. Sci. Data Discuss.* [preprint], <https://doi.org/10.5194/essd-2023-211>
- Zanaga, D., Van De Kerchove, R., De Keersmaecker, W., Souverijns, N., Brockmann, C., Quast, R., Wevers, J., Grosu, A., Paccini, A., Vergnaud, S., Cartus, O., Santoro, M., Fritz, S., Georgieva, I., Lesiv, M., Carter, S., Herold, M., Li, Linlin, Tsendbazar, N.E., Ramoino, F. & Arino, O.** 2021. ESA WorldCover 10 m 2020 v100. <https://doi.org/10.5281/zenodo.5571936>
- Zanaga, D., Van De Kerchove, R., Daems, D., De Keersmaecker, W., Brockmann, C., Kirches, G., Wevers, J., Cartus, O., Santoro, M., Fritz, S., Lesiv, M., Herold, M., Tsendbazar, N.E., Xu, P., Ramoino, F. & Arino, O.** 2022. ESA WorldCover 10 m 2021 v200. <https://doi.org/10.5281/zenodo.7254221>

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Required citation: FAO. 2023. *Land use statistics and indicators 2000–2021. Global, regional and country trends.* FAOSTAT Analytical Briefs Series No. 71. Rome. <https://doi.org/10.4060/cc6907en>

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