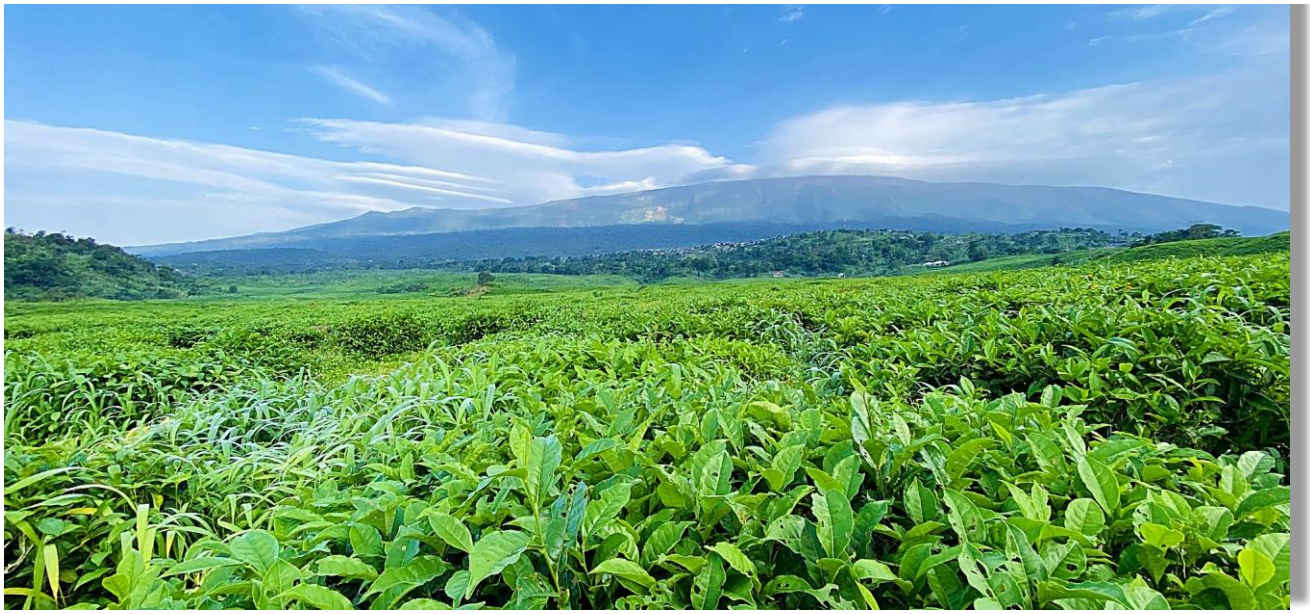


COUNTRY DOSSIER

Cameroon

Water, climate, fertilisers and crops: National study and a study of each region, potential benefits of our products, external trade

Green Solutions · contact@green-solutions-group.com · green-solutions-group.com



The Tole tea estate, below Mount Cameroon (South-West).

Foreword

This dossier describes Cameroon from the angle of water, climate, fertilisers and crops. It is written for the ministries in charge of agriculture, water and trade, the regional directorates of agriculture, cooperatives and producer organisations. It answers three questions: Where is water in short supply? For which crops? In which regions? It then examines what difference our products can make, in rainfed as well as irrigated farming, and what that can mean for the country's external trade.

Reading the sources. Every figure refers to a source, named in the text and detailed in Annex A. Each source carries a confidence level:

How to read this document

- **A**: Official statistics or international database (World Bank, FAO, CEMAC, ECCAS, Cameroonian administration).
- **B**: Research institute, laboratory, United Nations agency or recognised climate model.
- **C**: Manufacturer statement, website, press or estimate.
- "M" means million; "Mm³" means million cubic metres; "t" means tonnes; "I$" means constant 2014-2016 international dollars.
- A "scenario" is a calculation based on the trials cited. It is not a measurement made in Cameroon.

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Summary

The points below summarise the dossier. The figures come from public sources: The World Bank, FAO (FAOSTAT, AQUASTAT), CEMAC, ECCAS, Cameroonian administration, PVGIS and ERA5. The production gains and water savings are scenarios, described in Annex B.

29.88 M Inhabitants in 2025 (World Bank)	**1.20 M ha** Of maize (corn) harvested in 2024, the main crop	**28,700 ha** Equipped for irrigation (2024)
+1,568 t Of maize per 10,000 ha treated, central scenario	**160 Mm³** Of irrigation water saved a year, central scenario	**2,059 M$** Of agricultural exports in 2024 (FAOSTAT)

Key points

• **Predominantly rainfed farming.** 28,700 ha equipped for irrigation in 2024, out of 7.97 million hectares of cropland: Almost every harvest depends on rain.

• **Maize (corn): The main crop.** 1,200,000 ha harvested in 2024, for 2.20 million tonnes, or 1.83 t/ha.

• **Water is not scarce over the year as a whole; it is scarce between rainfall events.** National water stress is only 1.6%, but at Maroua, atmospheric water demand exceeds rainfall by 1,671 mm.

• **In rainfed farming, the gain is counted in tonnes.** In the central scenario, 1,568 t of maize, an additional 991 t of soybean and 16,669 t of potato per 10,000 ha treated.

• **In irrigated farming, the water saved could allow irrigation schemes to be expanded.** 160.5 Mm³ a year in the central scenario, enough to irrigate about 6,249 more ha, or 21.8% of the equipped area.

• **An organic supply chain.** 2,820 ha of certified organic cropland in 2024: ECOFERT® is EU Bio certified.

• **All nitrogen is imported.** 52,002 t of nitrogen used in 2024, 52,526 t imported, no national production.

• **Farm trade.** $2,059 million of exports and $1,816 million of imports in 2024. Leading export: Cocoa beans ($1,170 million). Rice imports amount to $545 million.

Key figures

Key indicators for Cameroon

Indicator	Value	Year	Source (level)
Population	29.88 M	2025	World Bank (A1)
GDP per capita	1,972 $	2025	World Bank (A1)
Agriculture's share of GDP	16.8%	2025	World Bank (A1)
Agricultural employment	41.9%	2025	World Bank (A1)
Cropland	7,967,020 ha	2024	FAOSTAT (A6)
Area equipped for irrigation	28,700 ha	2024	FAOSTAT (A6)
Harvested area: Maize (corn)	1,200,000 ha	2024	FAOSTAT (A2)
Certified organic cropland	2,820 ha	2024	FAOSTAT (A6)
Agricultural exports	2,059 M$	2024	FAOSTAT (A4)
Agricultural imports	1,816 M$	2024	FAOSTAT (A4)

Indicator	Value	Year	Source (level)
Mineral nitrogen, agricultural use	52,002 t	2024	FAOSTAT (A5)

Source: Table based on the sources indicated.

1. Green Solutions and our products

Green Solutions develops products for water, fertilisation and crop protection. Four families are of interest to this dossier. The yields cited are those published by the manufacturer or reported in the trials, with their confidence level.

Products covered by this dossier

Product	Claimed use	Published evidence (level)
EVERGREEN® (water-retention polymer)	Holds rain or irrigation water as a gel, near the roots.	Trials on maize, potato, watermelon, date palm and soybean. Level B to C.
ECOSORB® (water-retention polymer based on corn starch)	Same use; action lasting 2 to 3 years according to the website.	Soybean trial (China); laboratory acrylamide analysis. Level B to C.
ECOFERT® (fertiliser)	Fertiliser certified by SOHISCERT and EU Bio, usable in organic farming.	Published certificate; potato trial combined with EVERGREEN®. Level A (certificate), C (results).
Paulownia ALTIFOLIA®	Fast-growing tree for agroforestry.	Website figures; no trial in Cameroon. Level C.
Water Vital®, NAPEMA®	Outside the scope of this dossier.	No independent source in the documents consulted.

Source: Green Solutions website (product sheets and published trials), Annex A.

The indicative dose published on the website is 30 to 75 kg/ha.



A rainy-season sorghum field at Kousseri, in the Far North.

2. Cameroon in figures

Cameroon had 29.88 million inhabitants in 2025, 44% of them in rural areas. Agriculture accounts for 16.8% of gross domestic product and employs 42% of the labour force. The country covers 472.7 thousand km², of which 21% is agricultural land. Undernourishment affects 4.9% of the population.

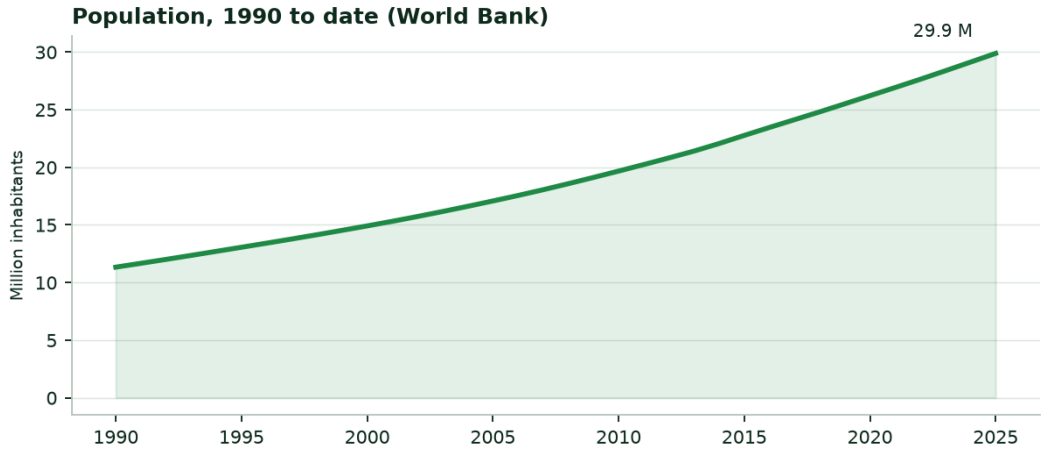


Figure 1. Population of Cameroon, 1990 to date. Source: World Bank (A1)

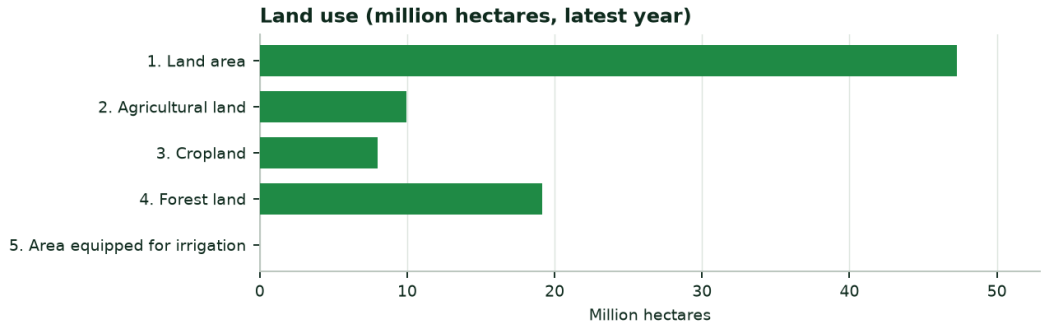


Figure 2. Land use, latest year published. Source: FAOSTAT (A6)

Agricultural and water indicators, latest year published

Indicator	Value	Year	Source
Cropland certified organic	2,820 ha	2024	FAOSTAT (A6)
Average cereal yield	1,770 kg/ha	2024	World Bank (A1)
Fertiliser use per hectare of arable land	16.3 kg/ha	2024	World Bank (A1)
Water withdrawals, agricultural share	67.7%	2022	World Bank (A1)
Internal freshwater resources	273.0 km³	2022	World Bank (A1)
Internal resources per inhabitant	9,880 m³	2022	World Bank (A1)



Rice harvest on a trial field at Waza (Far North).

3. Sunshine, rainfall and climate change

3.1 Sunshine

Global solar radiation reaches 1,604 to 2,251 kWh/m² a year depending on the region. Energy is not the limiting factor: Water available at the right time determines the harvest.

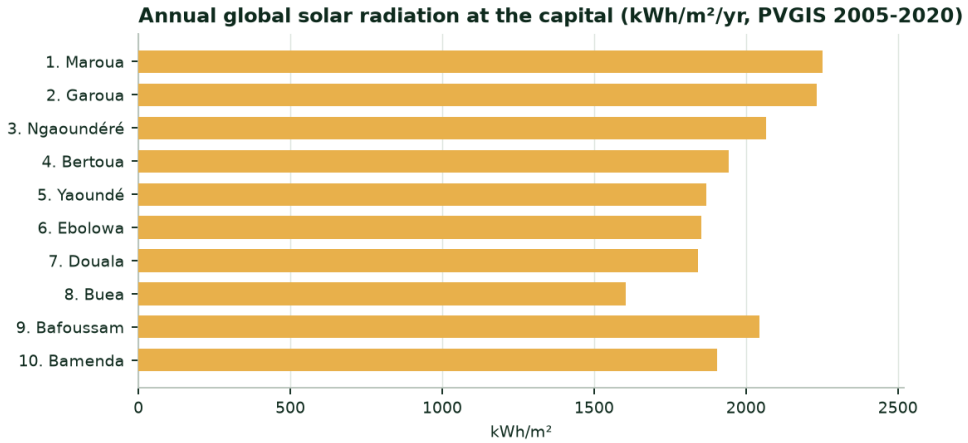


Figure 3. Annual global solar radiation at each region's capital. Source: PVGIS (A8)

3.2 Rainfall and evapotranspiration

Annual rainfall is 4,057 mm at Buea, but only 569 mm at Maroua, where reference evapotranspiration reaches 2,240 mm. In the forested South, rain is spread over two seasons; in the North and the Far North, it falls in a single season of four to six months, followed by long dry months.

Mean monthly rainfall, 1991-2020 (mm per month)

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maroua	0	0	0	9	36	67	124	192	112	29	1	0
Garoua	0	0	1	16	59	74	126	184	126	54	1	0

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ngaoundéré	0	2	26	165	280	324	354	386	346	202	18	0
Bertoua	13	26	104	160	141	117	134	151	173	220	130	25
Yaoundé	40	57	128	172	178	161	133	129	190	248	174	54
Ebolowa	70	91	181	204	200	187	165	156	242	284	203	90
Douala	64	92	209	272	286	305	345	340	340	343	244	91
Buea	95	130	240	270	295	434	616	637	570	447	222	101
Bafoussam	2	8	41	115	145	155	238	263	233	179	47	3
Bamenda	7	26	124	274	290	324	351	340	379	294	78	7

Source: ERA5 via Open-Meteo (A9); author's calculation.

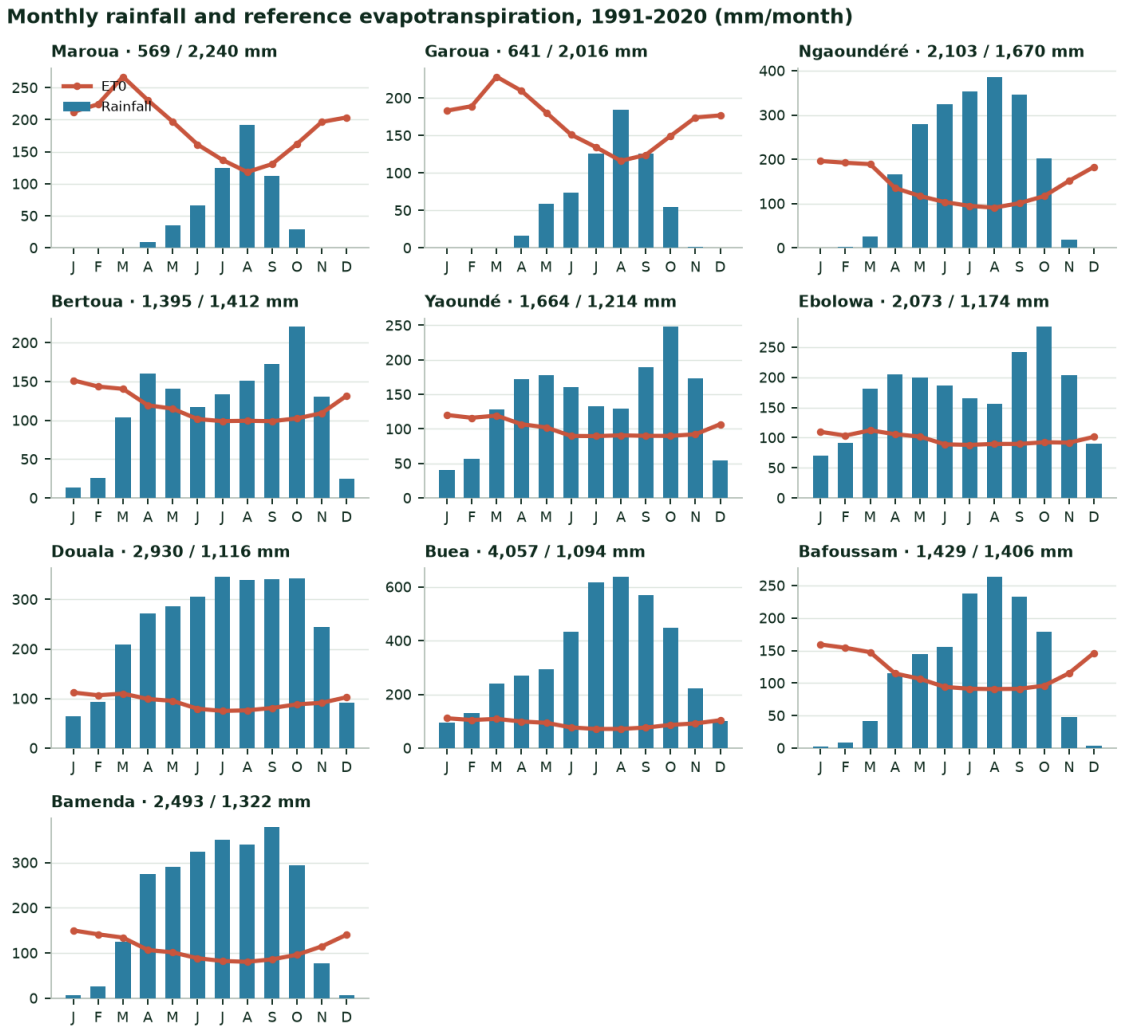


Figure 4. Monthly rainfall and reference evapotranspiration by city, 1991-2020. Source: ERA5 via Open-Meteo (A9)

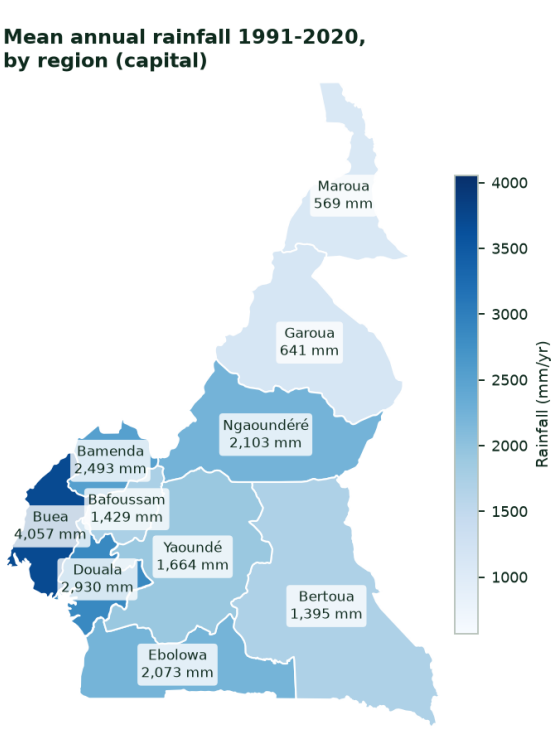
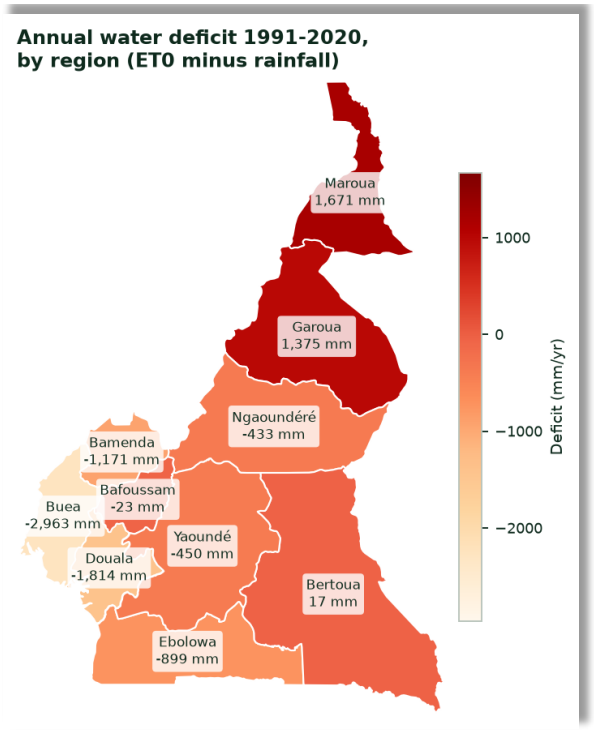


Figure 5. Mean annual rainfall 1991-2020, by region. Source: ERA5 (A9), Natural Earth (A10).



Annual water deficit, by region. Source: ERA5 (A9), Natural Earth (A10).

3.3 Climate change

Mean annual temperature is rising. At Douala it went from 25.0 °C in 1981 to 26.7 °C in 2024, a trend of 0.26 °C per decade. At Maroua the trend is 0.14 °C per decade, from 27.1 °C to 27.9 °C. Warmer air dries the soil faster between rainfall events.

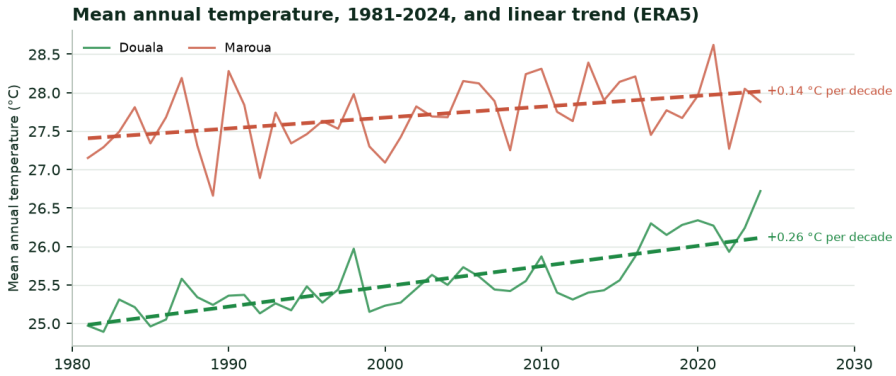


Figure 6. Mean annual temperature, 1981-2024, and linear trend. Source: ERA5 (A9)



Rhumsiki and Kapsiki peak, in the Mandara mountains (Far North).

4. Water: Resources, irrigated areas, withdrawals

4.1 Resources and withdrawals

Total freshwater withdrawals are 1,088 million m³ a year (2022). Agriculture accounts for 67.7% of these withdrawals, that is 737 Mm³. Internal resources are 273.0 km³ a year and water stress is 1.6%: The country has water, but little of it is mobilised for crops.

Freshwater: Withdrawals and resources

Indicator	Value	Year	Source
Total withdrawals	1,088 Mm³	2022	World Bank (A1)
Agricultural share	67.7%	2022	World Bank (A1)
Agricultural withdrawals	737.0 Mm³	2022	Calculated from A1
Area equipped for irrigation	28,700 ha	2024	FAOSTAT (A6)
Agricultural withdrawals per equipped hectare	25,679 m³/ha	—	Calculation (Annex B)
Water stress	1.6%	2022	World Bank (A1)

4.2 Irrigated areas

FAOSTAT counts 28,700 hectares equipped for irrigation in 2024. FAO estimates the country's irrigation potential at 290,000 ha (A11). Irrigation mostly serves rice in the large schemes of the Far North (SEMRY) and the Ndop plain, market gardening and sugar cane.



Mangroves along the Atlantic, at the foot of Mount Cameroon.

4.3 What the water saving represents

In the central scenario, the saving is 160.5 million m³ a year, or 21.8% of agricultural withdrawals. At 25,679 m³ per equipped hectare, this water would irrigate about 6,249 more hectares, or 21.8% of today's equipped area.

5. Fertilisers: Quantities, purchases, spending

5.1 Quantities used

In 2024, agricultural use reaches 52,002 tonnes of nitrogen, 13,782 tonnes of phosphate (P2O5) and 35,288 tonnes of potash (K2O). The country produces no nitrogen fertiliser: It imported 52,526 tonnes of nitrogen in the same year. Per hectare of arable land, use is 16.3 kg per hectare.

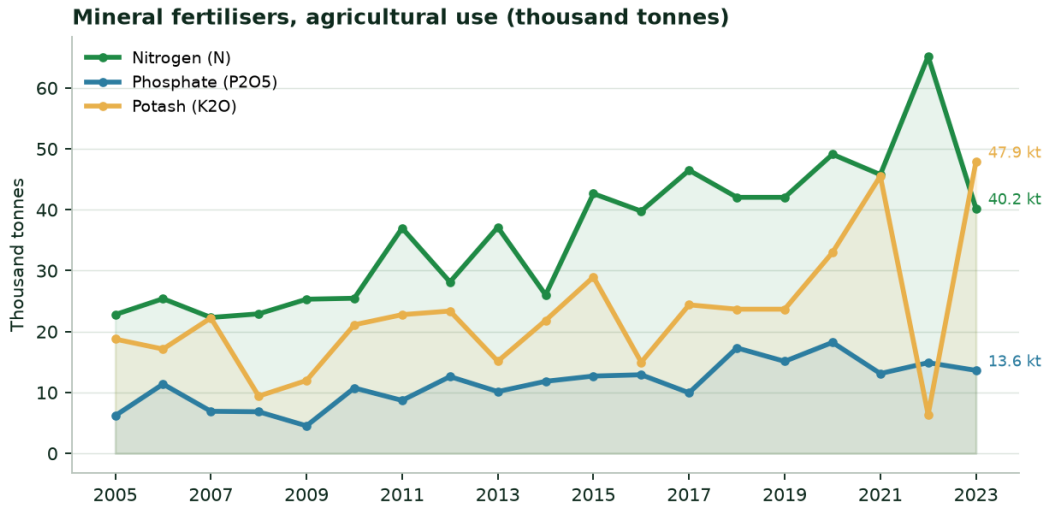


Figure 7. Mineral fertilisers, agricultural use, 2005-2023. Source: FAOSTAT (A5)

5.2 Regulatory framework

Law No. 2003/007 of 10 July 2003 governs the fertiliser sub-sector in Cameroon. A joint order of the Ministry of Agriculture (MINADER) makes fertilisers subject to a marketing authorisation before they are imported, produced or distributed (A13).



Preparing the soil with compost, near Buea (South-West).

5.3 Indicative spending

In 2024, the indicative minimum spending on mineral fertilisers reaches $70 million, at international fertiliser prices (calculation in Annex B, lower bound).

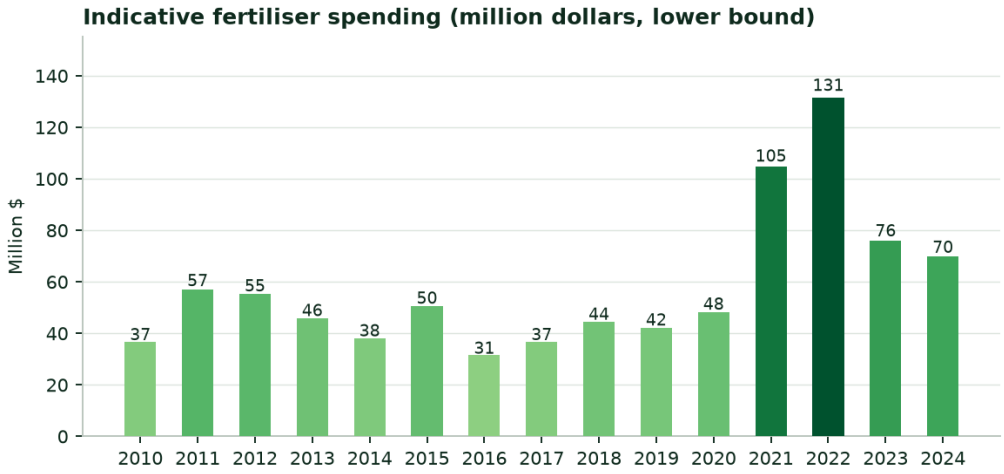


Figure 8. Indicative fertiliser spending, lower bound. Source: Author's calculation from A5 and A7

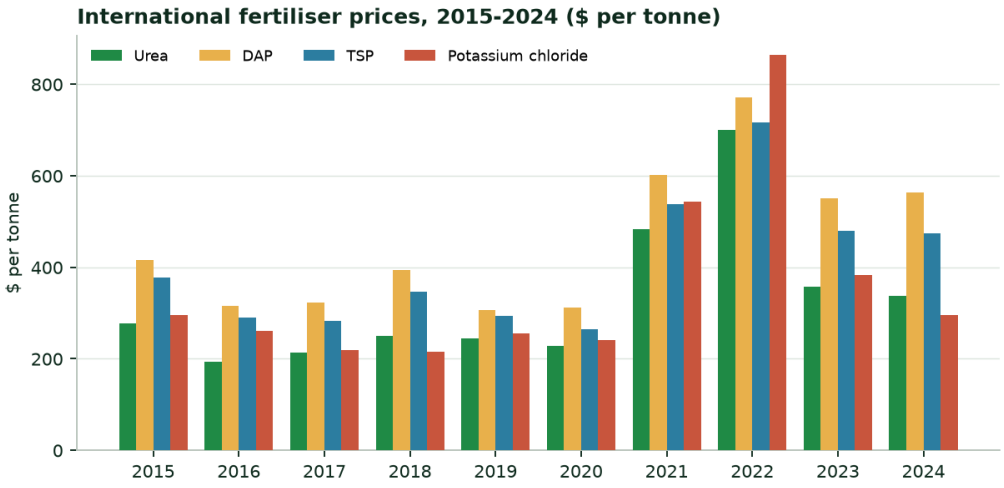


Figure 9. International prices of urea, DAP, TSP and potassium chloride. Source: World Bank, Pink Sheet (A7)

6. The regions at a glance

The table compares the country's ten regions using each region's capital. Climate figures are 1991-2020 averages, except radiation (2005-2020).

Climate of the capitals, 1991-2020 means

Region (city)	Rainfall (mm/yr)	ET0 (mm/yr)	Deficit (mm/yr)	Radiation (kWh/m²/yr)	Temperature (°C)
Far North (Maroua)	569	2,240	1,671	2,251	27.8
North (Garoua)	641	2,016	1,375	2,233	28.8
Adamawa (Ngaoundéré)	2,103	1,670	-433	2,066	22.4
East (Bertoua)	1,395	1,412	17	1,942	24.4
Centre (Yaoundé)	1,664	1,214	-450	1,869	23.1
South (Ebolowa)	2,073	1,174	-899	1,852	23.2
Littoral (Douala)	2,930	1,116	-1,814	1,842	25.6
South-West (Buea)	4,057	1,094	-2,963	1,604	22.4
West (Bafoussam)	1,429	1,406	-23	2,045	20.3
North-West (Bamenda)	2,493	1,322	-1,171	1,905	20.7

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

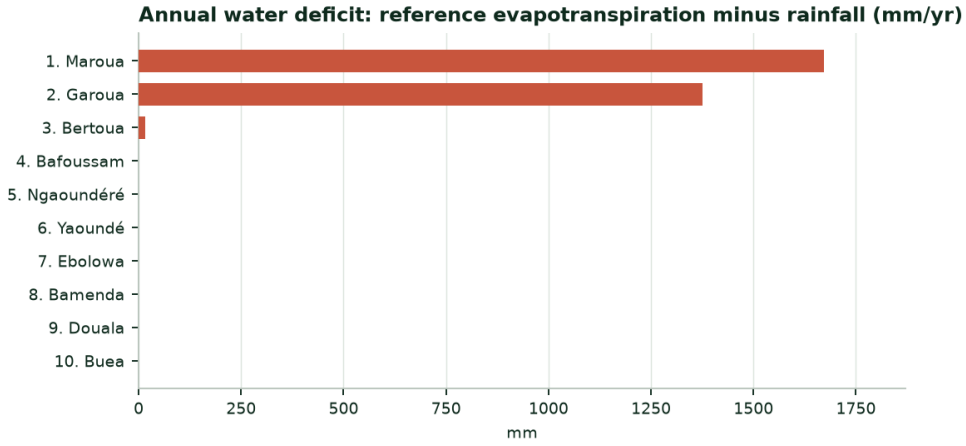


Figure 10. Annual water deficit: Reference evapotranspiration minus rainfall. Source: ERA5 (A9)



Green hills in Cameroon.

7. The twenty main crops: Three rankings

7.1 By harvested area

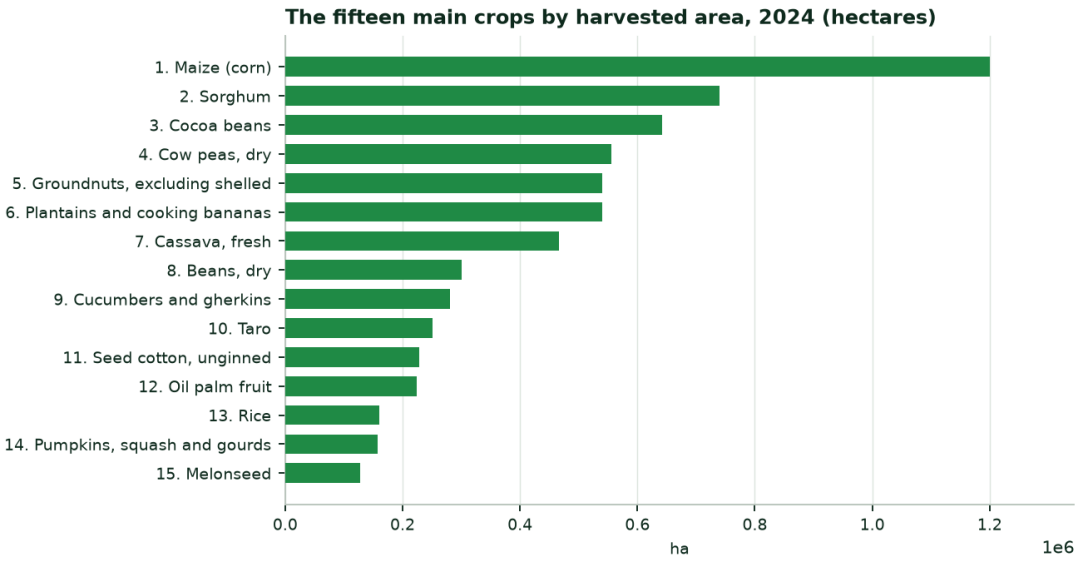


Figure 11. The fifteen main crops by harvested area, 2024 (hectares). Source: FAOSTAT (A2)

The ten main crops by area, 2024

Crop	Harvested area (ha)	Production (t)	Yield (t/ha)
Maize (corn)	1,200,000	2,200,000	1.83
Sorghum	740,000	1,200,000	1.62
Cocoa beans	642,244	320,000	0.50
Cow peas, dry	555,235	250,312	0.45
Groundnuts in shell	540,000	540,000	1.00
Plantains and cooking bananas	539,375	4,663,350	8.65
Cassava, fresh	466,886	6,658,483	14.26
Beans, dry	300,202	388,217	1.29
Cucumbers and gherkins	280,269	265,462	0.95
Taro	250,535	1,946,970	7.77

Source: FAOSTAT (A2).

7.2 By production

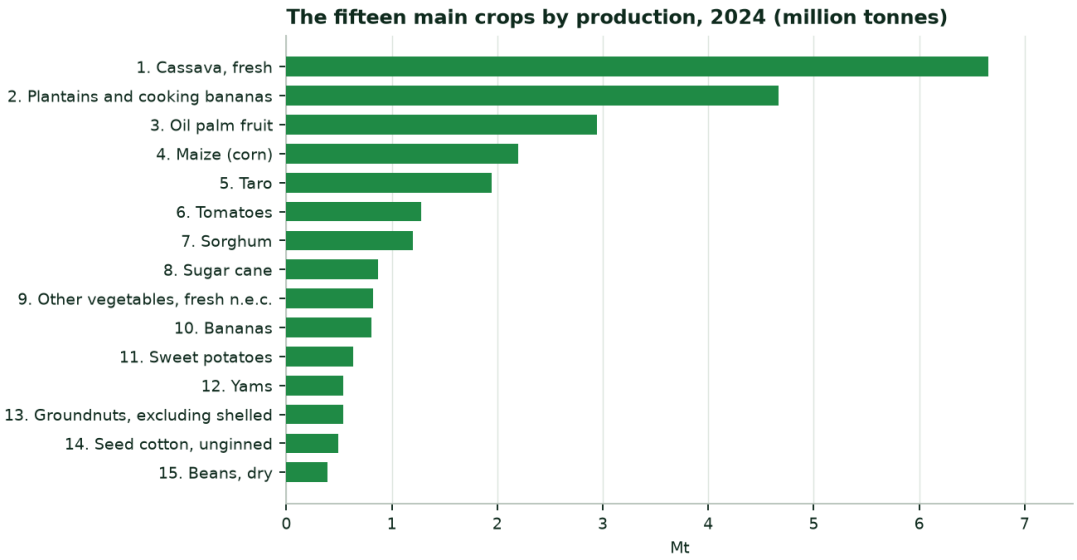


Figure 12. The fifteen main crops by production, 2024 (million tonnes). Source: FAOSTAT (A2)

7.3 By production value

By production value, the three main crops are: Plantains and cooking bananas, cassava, fresh and taro (FAOSTAT, 2023, constant international dollars).

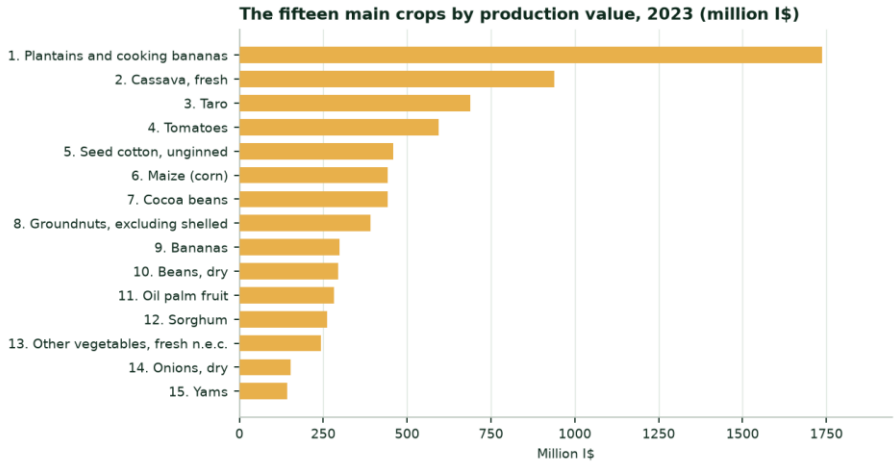


Figure 13. The fifteen main crops by production value, 2023 (million I$). Source: FAOSTAT (A3)



A cocoa tree (Theobroma cacao).

8. Extrapolation by crop: Irrigation and rainfed crops

8.1 Method

Method in brief

• **Irrigation.** National agricultural water is shared between irrigated crops (rice, vegetables and sugar cane), in proportion to their harvested areas; the equipped area is shared the same way.

• **Rainfed crops.** For crops that have a trial (maize, soybean and potato), the production gain is calculated per 10,000 ha treated, at the national average 2024 yield.

• Each calculation applies the effect of the trial cited: A quarter (cautious), half (central) or the full effect (high). Without a trial: 5, 10 and 20% of water, with no yield gain.

8.2 Trials used as analogues

Trials cited and their use in the calculation

Trial	Crop	Water	Yield	Use in the calculation
Maize, Türkiye (TIGEM, Konya, 2025)	Maize	-38.9%	+17.1%	Maize: Yield
Soybean, China	Soybean	Assumption	+11.3%	Soybean: Yield
Watermelon, Mexico (2023)	Watermelon	-60.5%	+30.0%	Vegetables: Water and yield
Potato, South Africa (2025)	Potato	-52.0%	+31.4%	Potato: Yield
Date palm, UAE (ICBA, 2021)	Palm	-82.0%	+20.0%	Not used; cited for reference

Source: A14 to A18 (published trials and manufacturer's website, levels B and C).

No trial has yet been conducted in Cameroon: The figures below apply the results of the cited trials to the country's average yields.

8.3 Rainfed crops: Maize, Soybean and Potato

Average 2024 yields (FAOSTAT): Maize 1.83 t/ha, soybean 1.75 t/ha and potato 10.62 t/ha. A water-retention polymer retains water from each rainfall event near the roots and helps the crop through dry days during the season.

Extra production per 10,000 ha treated (tonnes a year)

Crop	Average yield (t/ha)	Cautious	Central	High
Maize	1.83	784	1,568	3,135
Soybean	1.75	495	991	1,981
Potato	10.62	8,334	16,669	33,338

Source: FAOSTAT (A2); trials A14 to A18; author's calculation (Annex B).

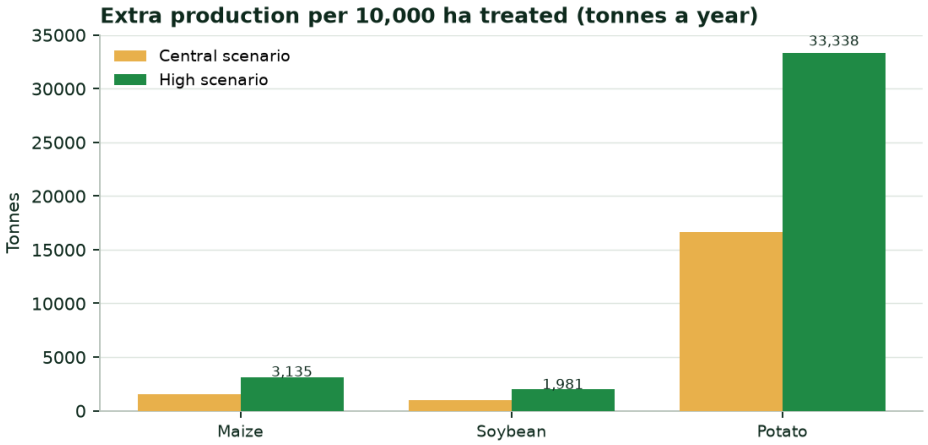


Figure 14. Extra production per 10,000 ha treated, central and high scenarios. Source: Author's calculation

8.4 Irrigation: Rice, Vegetables and Sugar cane

Equipped area assigned, trial used and water saved (central scenario)

Crop group	Equipped area (ha)	Share	Trial or assumption	Water saved (Mm³/yr)
Rice (paddy)	11,040	38.5%	Generic assumption, no trial on rice	28.4
Vegetables (tomato, onion, okra, chilli, others)	16,684	58.1%	Watermelon, Mexico (2023)	129.6
Sugar cane	976	3.4%	Generic assumption, no trial	2.5

Source: Author's calculation (Annex B).

Water saved, extra irrigable hectares and production gain, by scenario

Scenario	Water (Mm³/yr)	Extra hectares	Production (t/yr)
Cautious	80.2	3,124	13,812
Central	160.5	6,249	27,624
High	320.9	12,497	55,249

Source: Author's calculation (Annex B).

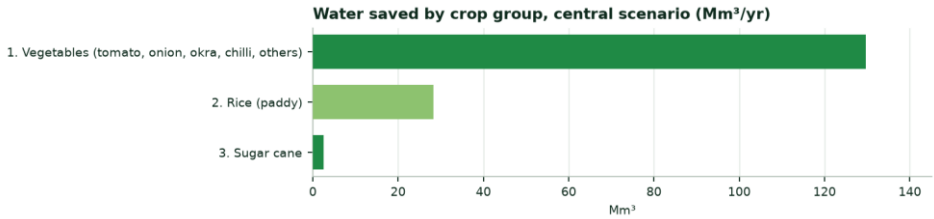


Figure 15. Water saved by crop group, central scenario. Source: Author's calculation

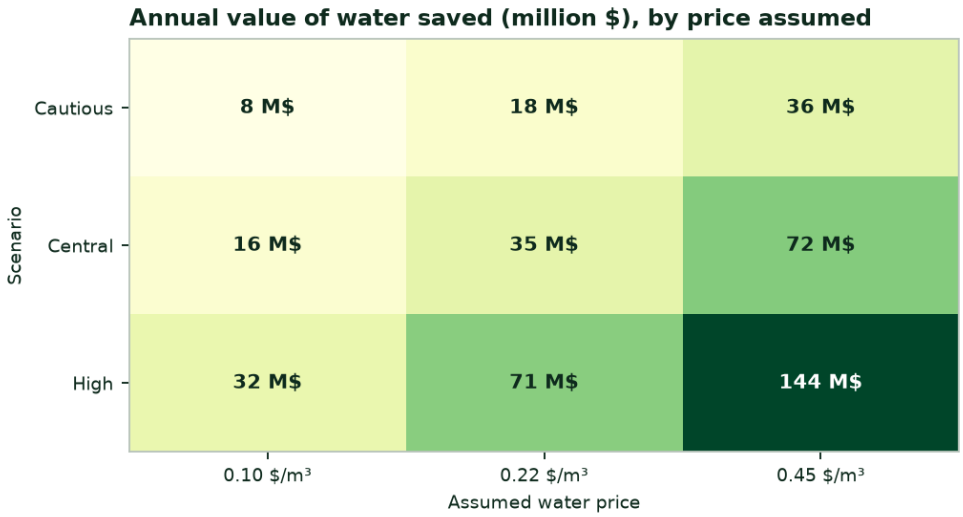


Figure 16. Annual value of the water saved, by price assumed per cubic metre. Source: Author's calculation; prices assumed, no national tariff

8.5 Reading the results

Key points

• In Cameroon, the main challenge is rainfed farming: Only 28,700 ha are equipped for irrigation, out of 7,967,020 ha of cropland.

• The "vegetables" group gives 81% of the irrigation water saving (watermelon, Mexico (2023)).

• The gains are counted by scenario and, in rainfed farming, per 10,000 ha treated: A cooperative or a public programme can scale them to its own area.

9. Potential benefits of our products

The table lists what the products may bring according to the documents available, with the confidence level and limitations of each.

Potential benefits, by situation

Benefit	Published figures	Source (level)	Limit
Irrigation water saving	Date palm −82%; watermelon −60.5%; potato −52%; maize −38.9%	A14 to A18 (B, C)	One trial per crop; none in Cameroon
Yield	Maize +17.1%; potato +31.4%; watermelon +30%; date palm +20%; soybean +11.2 to +11.4%	A14 to A18 (B, C)	Trials conducted under irrigation or in other climates
Organic farming (ECOFERT®)	Certified by SOHISCERT and EU Bio	A21 (A)	Valid for the certified product

Benefit	Published figures	Source (level)	Limit
Safety: Acrylamide (ECOSORB®)	Below 3.0 µg/g	A19 (B)	One laboratory, one date
REACH compliance (EVERGREEN®)	≤ 0.1% of substances of very high concern in 233 substances tested	A20 (B)	Screening, not an approval
Agroforestry (Paulownia ALTIFOLIA®)	13 to 15 m in 6 to 8 years (website)	A22 (C)	No trial in Cameroon

Source: Annex A.



A banana plantation on a riverbank.

10. External trade: Exports, imports, importing

10.1 Overview, 2023 and 2024

Agricultural products and total merchandise trade (million $)

Indicator	2023	2024
Agricultural exports (crops and livestock)	1,430	2,059
Agricultural imports (crops and livestock)	1,498	1,816
Exports, all merchandise	4,400	6,000
Imports, all merchandise	9,000	8,500

Source: FAOSTAT (A4).

10.2 Exports

The three main farm products exported in 2024 are: Cocoa beans ($1,170 million), cocoa butter, fat and oil ($296 million) and cocoa paste not defatted ($173 million).

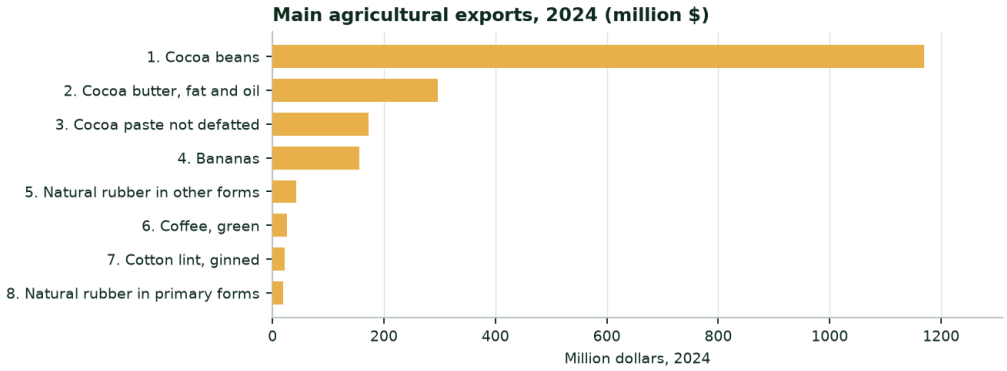


Figure 17. Main agricultural exports, 2024. Source: FAOSTAT (A4)

10.3 Imports

The main farm purchases are: Wheat ($288 million), refined sugar ($265 million) and malt, whether or not roasted ($81 million). Rice imports amount to $545 million (husked, broken and milled rice): Every tonne grown locally reduces this bill.

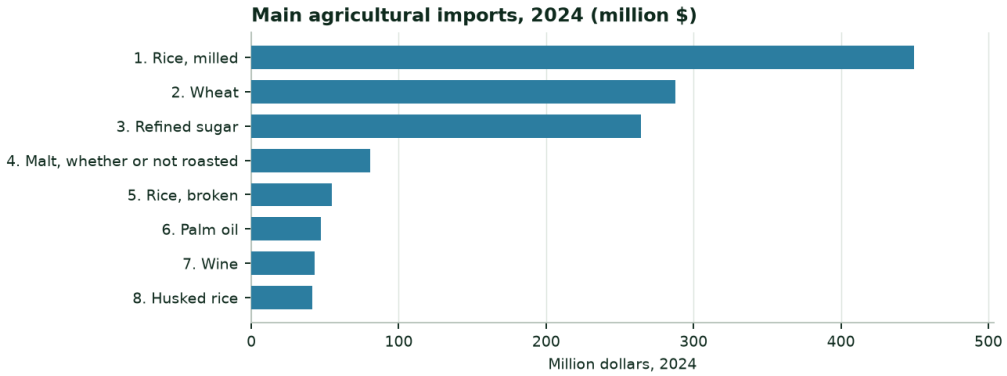


Figure 18. Main agricultural imports, 2024. Source: FAOSTAT (A4)



Figure 19. Drying cocoa during the season.



Fresh vegetables at the market.

10.4 Importing water-retention polymers into Cameroon

What to know

• **Customs duty (code 3906.90, acrylic polymers in primary forms):** ECCAS-CEMAC common external tariff, applied in Cameroon since 1 January 2026, with rates from 0 to 40% (A12). The rate of line 3906.90 is to be confirmed with the Directorate General of Customs.

• **Community levies:** 1% CEMAC community integration tax and 0.05% OHADA contribution (A12).

• **VAT:** 19.25%, that is 17.5% plus 10% of municipal surcharges (A12).

• **Approval and authorisation:** Importing and selling a fertiliser requires an approval and a marketing authorisation issued by the Ministry of Agriculture, MINADER (A13).

• **Classification:** Code 3906.90 is an inference for our products; Cameroonian customs settle it.

11. A study of each region

Each region is described through the city that represents it. The figures describe the climate; the water deficit (evapotranspiration minus rainfall) shows where water is scarcest. The description of crops is qualitative.



Daybreak at Dschang, in the West region.

Far North (Maroua)

The driest region: Sorghum, millet, cotton, onion and livestock, with the irrigated rice of the SEMRY schemes along the Logone.

Indicator	Value
Annual rainfall, 1991-2020	569 mm
Reference evapotranspiration	2,240 mm
Annual water deficit	1,671 mm
Months with less than 50 mm of rain	8
Global solar radiation	2,251 kWh/m²
Mean temperature	27.8 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

North (Garoua)

Benue valley: Cotton, maize, sorghum and groundnuts; rain falls in a single season.

Indicator	Value
Annual rainfall, 1991-2020	641 mm
Reference evapotranspiration	2,016 mm
Annual water deficit	1,375 mm
Months with less than 50 mm of rain	6
Global solar radiation	2,233 kWh/m²
Mean temperature	28.8 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

Adamawa (Ngaoundéré)

A high plateau and cattle country: Maize, yam, cassava and potato.

Indicator	Value
Annual rainfall, 1991-2020	2,103 mm
Reference evapotranspiration	1,670 mm
Annual water deficit	-433 mm
Months with less than 50 mm of rain	5
Global solar radiation	2,066 kWh/m²
Mean temperature	22.4 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

East (Bertoua)

A thinly populated forest region: Cassava, plantain, maize, cocoa and robusta coffee.

Indicator	Value
Annual rainfall, 1991-2020	1,395 mm
Reference evapotranspiration	1,412 mm
Annual water deficit	17 mm
Months with less than 50 mm of rain	3
Global solar radiation	1,942 kWh/m²
Mean temperature	24.4 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

Centre (Yaoundé)

With the South, the main cocoa basin: Cassava, plantain, groundnuts and market gardening around the capital.

Indicator	Value
Annual rainfall, 1991-2020	1,664 mm
Reference evapotranspiration	1,214 mm
Annual water deficit	-450 mm
Months with less than 50 mm of rain	1
Global solar radiation	1,869 kWh/m²
Mean temperature	23.1 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

South (Ebolowa)

Dense forest: Cocoa, oil palm, rubber, cassava and plantain.

Indicator	Value
Annual rainfall, 1991-2020	2,073 mm
Reference evapotranspiration	1,174 mm
Annual water deficit	-899 mm
Months with less than 50 mm of rain	0
Global solar radiation	1,852 kWh/m²
Mean temperature	23.2 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

Littoral (Douala)

Export bananas and oil palm in the Moungo, market gardening around Douala, under very heavy rainfall.

Indicator	Value
Annual rainfall, 1991-2020	2,930 mm
Reference evapotranspiration	1,116 mm
Annual water deficit	-1,814 mm
Months with less than 50 mm of rain	0
Global solar radiation	1,842 kWh/m²
Mean temperature	25.6 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

South-West (Buea)

Volcanic soils of Mount Cameroon: Tea, bananas, oil palm, rubber, cocoa and coffee.

Indicator	Value
Annual rainfall, 1991-2020	4,057 mm
Reference evapotranspiration	1,094 mm
Annual water deficit	-2,963 mm
Months with less than 50 mm of rain	0
Global solar radiation	1,604 kWh/m²
Mean temperature	22.4 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

West (Bafoussam)

Intensively farmed highlands: Maize, beans, potato, market gardening and arabica coffee.

Indicator	Value
Annual rainfall, 1991-2020	1,429 mm
Reference evapotranspiration	1,406 mm
Annual water deficit	-23 mm
Months with less than 50 mm of rain	5
Global solar radiation	2,045 kWh/m²
Mean temperature	20.3 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

North-West (Bamenda)

North-West highlands: Maize, beans, potato, arabica coffee and rice from the Ndop plain.

Indicator	Value
Annual rainfall, 1991-2020	2,493 mm
Reference evapotranspiration	1,322 mm
Annual water deficit	-1,171 mm
Months with less than 50 mm of rain	3
Global solar radiation	1,905 kWh/m²
Mean temperature	20.7 °C

Source: ERA5 via Open-Meteo (A9); PVGIS (A8); author's calculation.

Annex A. Sources and confidence levels

Ref.	Source	Level
A1	World Bank, World Development Indicators (WDI), Cameroon	A
A2	FAOSTAT, crops and livestock (QCL), areas, production, 2014-2024	A
A3	FAOSTAT, value of production (QV), constant 2014-2016 I$, 2019-2024	A
A4	FAOSTAT, trade in crops and livestock products, 2018-2024	A
A5	FAOSTAT, mineral fertilisers, agricultural use, production and imports, 2005-2023	A
A6	FAOSTAT, land use, areas equipped for irrigation, organic farming	A
A7	World Bank, Pink Sheet (world prices of urea, DAP, TSP and potassium chloride)	A
A8	PVGIS (European Commission Joint Research Centre), radiation, 2005-2020	B
A9	ERA5 (Copernicus), via Open-Meteo: Rainfall, reference evapotranspiration, temperature, 1981-2024	B
A10	Natural Earth, first-level administrative boundaries and country outline	B
A11	FAO, AQUASTAT, Cameroon country profile ("Irrigation in Africa in figures", 2005 survey): Irrigation potential	A
A12	ECCAS-CEMAC common external tariff, applied in Cameroon since 1 January 2026 (Directorate General of Customs, reported by Agence Ecofin); CEMAC levies (TCI, OHADA); Cameroon general tax code (VAT)	A
A13	Law No. 2003/007 of 10 July 2003 governing the fertiliser sub-sector; joint order No. 00115 of MINADER (marketing authorisation for fertilisers)	A
A14	Soybean trial, China (yield), manufacturer's website	C
A15	Date palm trial, UAE (ICBA, 2021), manufacturer's website	B
A16	Watermelon trial, Mexico (2023), manufacturer's website	C
A17	Potato trial, South Africa (2025), manufacturer's website	C
A18	Maize trial, Türkiye (TIGEM, Konya, 2025), manufacturer's website	B
A19	ECOSORB® acrylamide analysis (Polymex laboratory, 2024)	B
A20	EVERGREEN® REACH / SVHC screening (SGS, 2023)	B
A21	ECOFERT® certificate (SOHISCERT, EU Bio)	A
A22	Paulownia ALTIFOLIA® sheet figures (website)	C

Annex B. Calculation method

1. Agricultural water. Total withdrawals (1,088 Mm³, 2022) × agricultural share (67.71%) = 737.0 Mm³.

2. Irrigation. The equipped area (28,700 ha) and agricultural water are shared between irrigated groups (rice, vegetables and sugar cane) in proportion to their harvested areas (415,929 ha), without exceeding each group's harvested area. Our sources provide no irrigation statistics by crop. Other crops are treated as rainfed and receive no irrigation water in the calculation. Cocoa, coffee, bananas and oil palm are treated as rainfed.

3. Scenarios. Water saved = group water × trial effect: A quarter (cautious), half (central) or the full effect (high). Without a trial: 5, 10 and 20%.

4. Extra hectares. Water saved ÷ water per equipped hectare (25,679 m³/ha).

5. Rainfed crops. Gain per 10,000 ha = 10,000 × average 2024 yield (production ÷ harvested area, FAOSTAT) × trial effect on yield (maize 17.1%, soybean 11.3% and potato 31.4%), using the same quarter, half and full trial effect.

6. Value of water. Three assumed prices (0.10; 0.22 and 0.45 $/m³); no national tariff was adopted.

7. Fertilisers. Minimum spending = nitrogen ÷ 0.46 × urea price + phosphate ÷ 0.46 × TSP price + potash ÷ 0.60 × potassium chloride price (A7).

8. Climate. Rainfall, reference evapotranspiration (FAO-56) and temperature: 1991-2020 means of the ERA5 grid cell containing each city; radiation: PVGIS, 2005-2020. Temperature trends are linear regressions over 1981-2024. ERA5 is a reanalysis: Its rainfall can differ from local station records. On the maps, each region takes the value of its capital.

9. Trade. Totals are those of the FAOSTAT crops and livestock line; products are listed one by one, without aggregates. Rice amounts add husked rice, broken rice and milled rice.

Annex C. Photo credits

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Champ de sorgho de saison pluvieuse à Kousseri au Cameroun 03.jpg	HAMIDOU KAOU 6767	CC0
Rhumsiki with Kapsiki Peak (after sunrise), Far North Province of Came	Alfred Weidinger	CC BY 2.0
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Mount Cameroon seen from Buea.

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