

COUNTRY DOSSIER

Togo

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

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The savanna seen from Lotogou canton.

Foreword

This dossier describes Togo 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 short, for which crops, and in which regions? It then examines what our products can change, 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, ECOWAS, Togolese 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 Togo.

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Summary

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

8.59 M
Inhabitants in 2025 (World Bank)

804 000 ha
Of maize harvested in 2024, the main crop

7,860 ha
Only equipped for irrigation (2024)

+1,074 t
Of maize per 10,000 ha treated, central scenario

226 000 ha
Of certified organic cropland (2025)

466 M$
Of agricultural exports in 2024 (FAOSTAT)

Eight key points

• **A rain-fed agriculture.** 7,860 ha equipped for irrigation in 2024, for 2.76 million hectares of cropland: Almost every harvest depends on rain.

• **Maize dominates.** 804 000 ha harvested in 2024, for 1.01 million tonnes, or 1.26 t/ha.

• **Water is not short over the year, it is short between two rains.** National water stress is only 3.4%, but at Dapaong, the air demands 1,272 mm more than it rains.

• **In rainfed farming, the gain is counted in tonnes.** In the central scenario, 1,074 t of maize and 570 t of soybean more per 10,000 ha treated.

• **In irrigation, the water saved enlarges the schemes.** 11.7 Mm³ a year in the central scenario, enough to irrigate about 1,214 more ha, or 15% of the equipped area.

• **An organic farming country.** 225,720 ha of certified organic cropland in 2025, mostly for soybean: ECOFERT® is EU Bio certified.

• **All nitrogen is imported.** 33,664 t of nitrogen used in 2024, 33,769 t imported, no national production.

• **Balanced trade.** $466 million of agricultural exports and $467 million of imports in 2024; cocoa leads sales ($88 million), rice weighs $74 million of purchases.

Key figures

Key indicators for Togo

Indicator	Value	Year	Source (level)
Population	8.59 M	2025	World Bank (A1)
GDP per capita	1,384 $	2025	World Bank (A1)
Agriculture share of GDP	20.3%	2025	World Bank (A1)
Agricultural employment	37.6%	2025	World Bank (A1)
Cropland	2,757,060 ha	2024	FAOSTAT (A6)
Area equipped for irrigation	7,860 ha	2024	FAOSTAT (A6)
Maize harvested	804,000 ha	2024	FAOSTAT (A2)
Certified organic cropland	225,720 ha	2025	FAOSTAT (A6)
Agricultural exports	466 M$	2024	FAOSTAT (A4)
Agricultural imports	467 M$	2024	FAOSTAT (A4)

Indicator	Value	Year	Source (level)
Mineral nitrogen, agricultural use	33,664 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 by 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 Togo. 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.



Maize and lowland crops in Togo.

2. Togo in figures

Togo had 8.59 million inhabitants in 2025, 56% of them in rural areas. Agriculture accounts for 20.3% of gross domestic product and employs 38% of the labour force. The country covers 54.4 thousand km², of which 69% is agricultural land. Undernourishment affects 10.2% of the population.

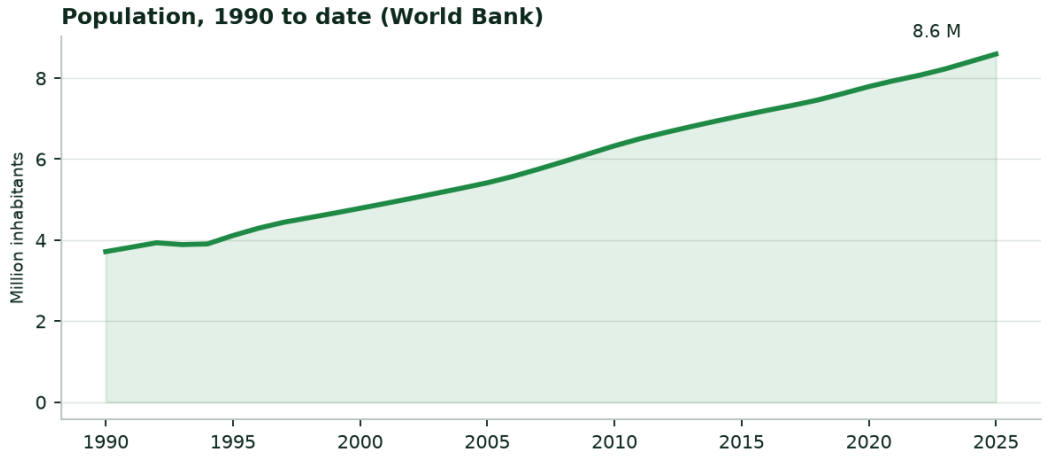


Figure 1. Population of Togo, 1990 to date. Source: World Bank (A1)

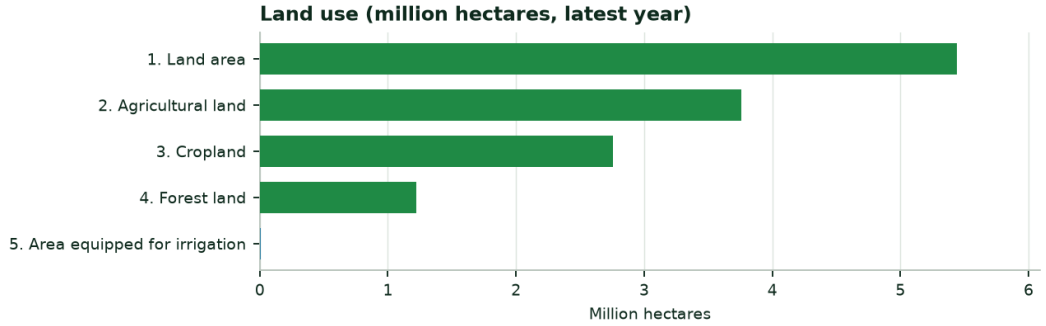


Figure 2. Land use, latest year published. Source: FAOSTAT (A6)

Agricultural and water indicators, latest year published

Indicator	Value	Year	Source
Cropland certified organic	225,720 ha	2025	FAOSTAT (A6)
Average cereal yield	1,198 kg/ha	2024	World Bank (A1)
Fertiliser use per hectare of arable land	15.7 kg/ha	2024	World Bank (A1)
Water withdrawals, agricultural share	34.1%	2022	World Bank (A1)
Internal freshwater resources	11.5 km³	2022	World Bank (A1)
Internal resources per inhabitant	1,425 m³	2022	World Bank (A1)



Maize fields at Agou Carrefour, Plateaux region.

3. Sunshine, rainfall and climate change

3.1 Sunshine

Global solar radiation reaches 2,044 to 2,186 kWh/m² a year depending on the region. It is high everywhere: Energy is not the limit, water available at the right time makes the harvest.

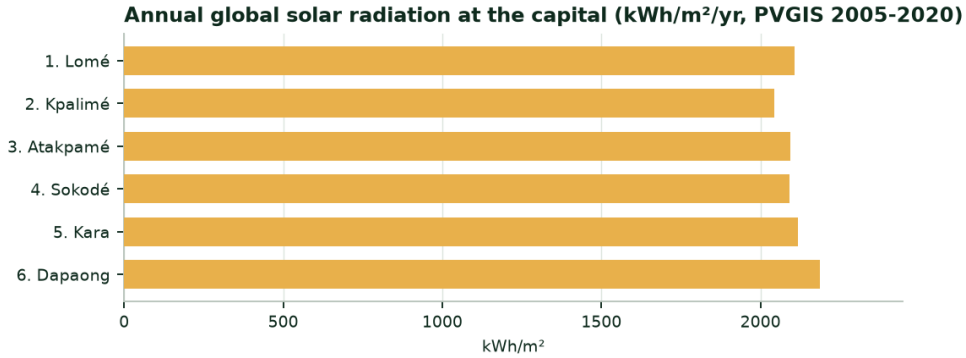


Figure 3. Annual global solar radiation at each region's capital. Source: PVGIS (A8)

3.2 Rainfall and evapotranspiration

It rains 1,517 mm a year at Kpalimé, in the western mountains, but only 738 mm at Dapaong, in the Savanes, where reference evapotranspiration reaches 2,010 mm. In the south, rain falls in two seasons separated by a short dry spell; in the north, in a single season, followed by six almost rainless months.

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

Month	Lomé	Kpalimé	Atakpamé	Sokodé	Kara	Dapaong
January	24	21	4	3	2	0
February	36	39	13	13	9	2

Month	Lomé	Kpalimé	Atakpamé	Sokodé	Kara	Dapaong
March	54	93	45	44	31	11
April	76	121	82	112	87	39
May	155	176	120	163	141	57
June	175	197	162	188	157	64
July	97	204	196	259	223	143
August	64	204	200	310	294	217
September	115	231	189	266	263	149
October	119	156	108	139	135	53
November	65	53	16	14	13	3
December	30	21	5	3	1	0

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

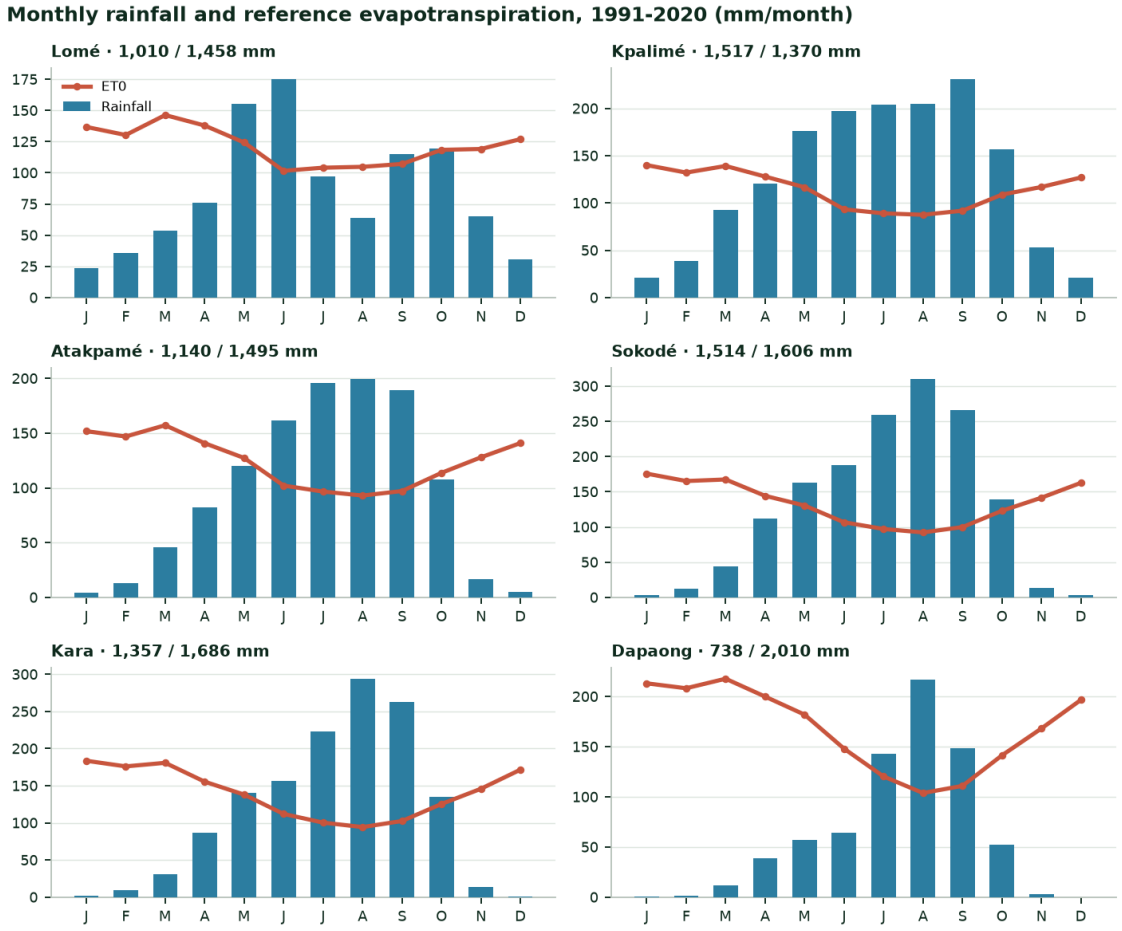


Figure 4. Monthly rainfall and reference evapotranspiration by city, 1991-2020. Source: ERA5 via Open-Meteo (A9)

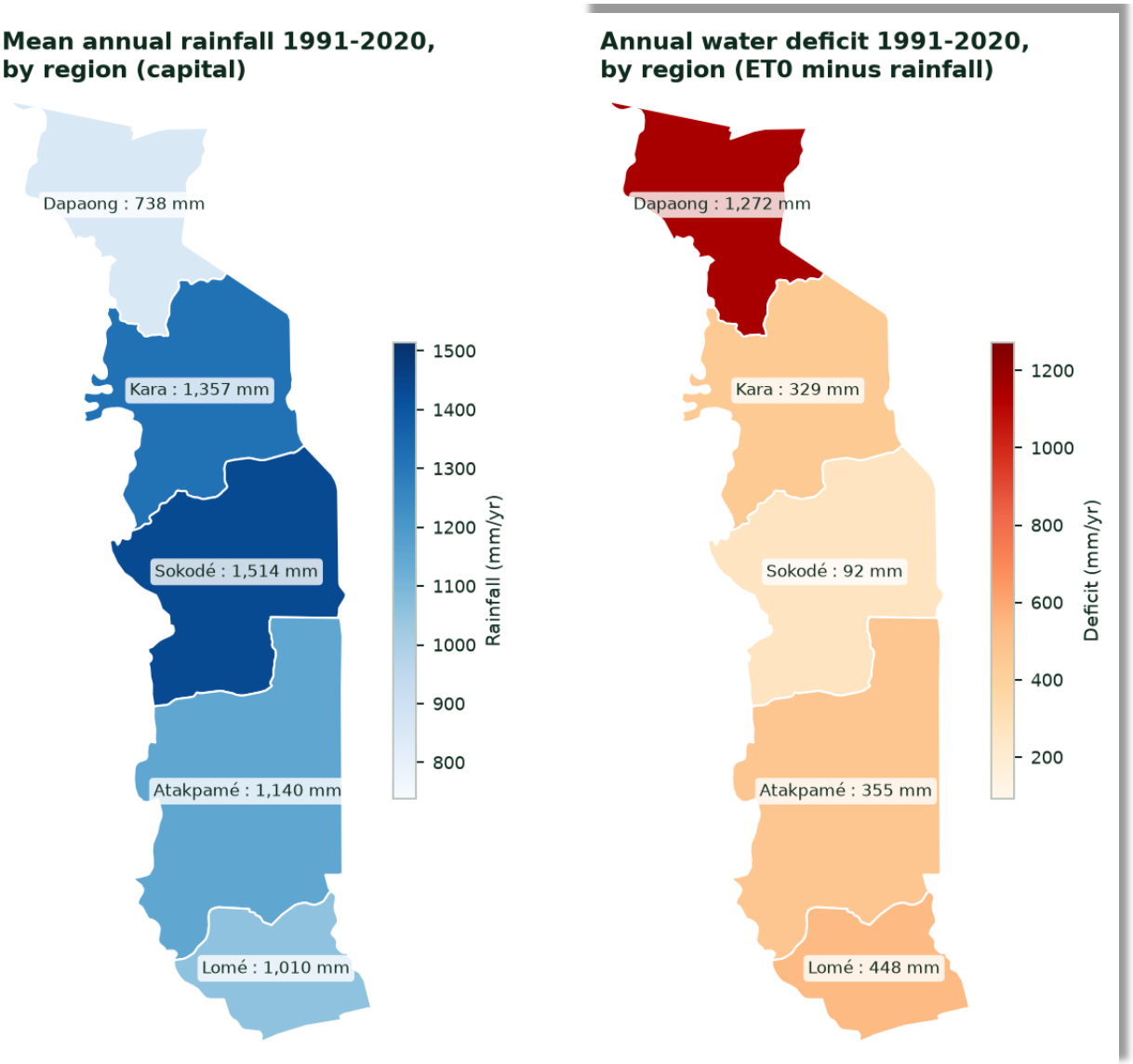


Figure 5. Mean annual rainfall 1991-2020, by region. Source: ERA5 Annual water deficit, by region. Source: ERA5 (A9), Natural Earth (A10). (A9), Natural Earth (A10).

3.3 Climate change

Mean annual temperature is rising. At Lomé it went from 26.3 °C in 1981 to 27.2 °C in 2024, a trend of 0.12 °C per decade. At Dapaong the trend is 0.17 °C per decade, from 27.3 °C to 28.2 °C. Warmer air dries the soil faster between two rains.

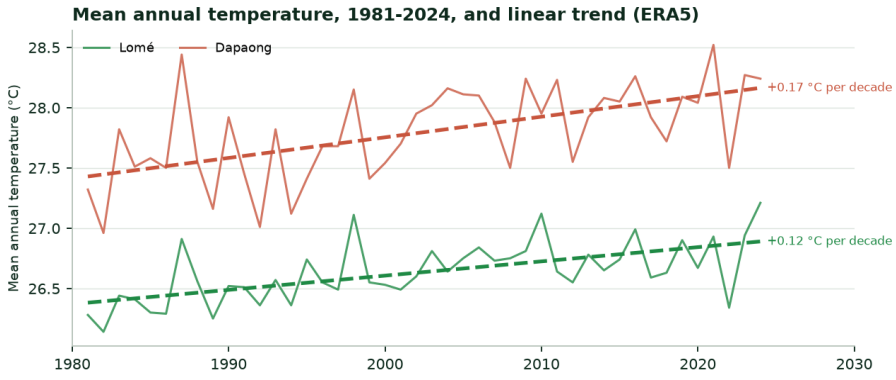


Figure 6. Mean annual temperature, 1981-2024, and linear trend. Source: ERA5 (A9)



The Bombouaka cuesta, in the Savanes region.

4. Water: Resources, irrigated areas, withdrawals

4.1 Resources and withdrawals

Total freshwater withdrawals are 223 million m³ a year (2022). Agriculture withdraws 34.1% of it, that is 76 Mm³; towns and households take most of the rest. Internal resources are 11.5 km³ a year and water stress is only 3.4%: The country has water, but it is hardly mobilised for crops.

Freshwater: Withdrawals and resources

Indicator	Value	Year	Source
Total withdrawals	223 Mm³	2022	World Bank (A1)
Agricultural share	34.1%	2022	World Bank (A1)
Agricultural withdrawals	76.0 Mm³	2022	Calculated from A1
Area equipped for irrigation	7,860 ha	2024	FAOSTAT (A6)
Agricultural withdrawals per equipped hectare	9,669 m³/ha	—	Calculation (Annex B)
Water stress	3.4%	2022	World Bank (A1)

4.2 Irrigated areas

FAOSTAT counts 7,860 hectares equipped for irrigation in 2024. FAO estimated at 86,000 ha the land suitable for full-control irrigation, given the water resources that can be mobilised (A11). Irrigation mostly serves rice and market gardening, in developed schemes and lowlands.



Market garden on the bank of the Kara river.

4.3 What the water saving represents

In the central scenario, the saving is 11.7 million m³ a year, or 15.4% of agricultural withdrawals. At 9,669 m³ per equipped hectare, this water would irrigate about 1,214 more hectares, or 15% of today's equipped area.

5. Fertilisers: Quantities, purchases, spending

5.1 Quantities used

In 2024, agricultural use reaches 33,664 tonnes of nitrogen, 3,067 tonnes of phosphate (P2O5) and 4,880 tonnes of potash (K2O). The country produces no nitrogen fertiliser: It imported 33,769 tonnes of nitrogen in the same year. Per hectare of arable land, use remains low: 15.7 kg per hectare.

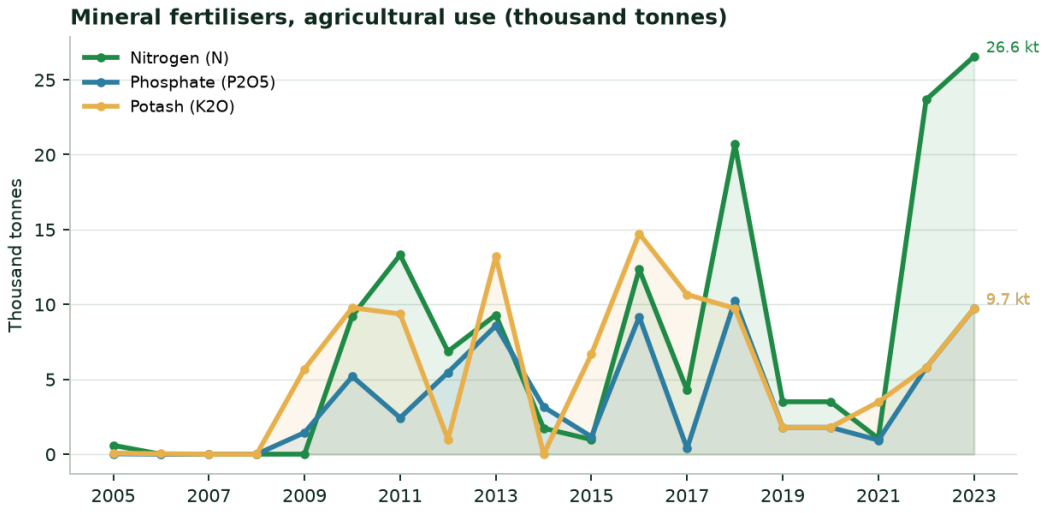


Figure 7. Mineral fertilisers, agricultural use, 2005-2023. Source: FAOSTAT (A5)

5.2 Regulatory framework

ECOWAS Regulation C/REG.13/12/12 governs fertiliser quality control in the West African area: Registration before sale, labelling, control. Togo is one of the countries that have published it (A13).



Yellow maize harvest.

5.3 Indicative spending

In 2024, the indicative minimum spending on mineral fertilisers reaches $30 million, at international fertiliser prices (calculation in Annex B, lower bound).

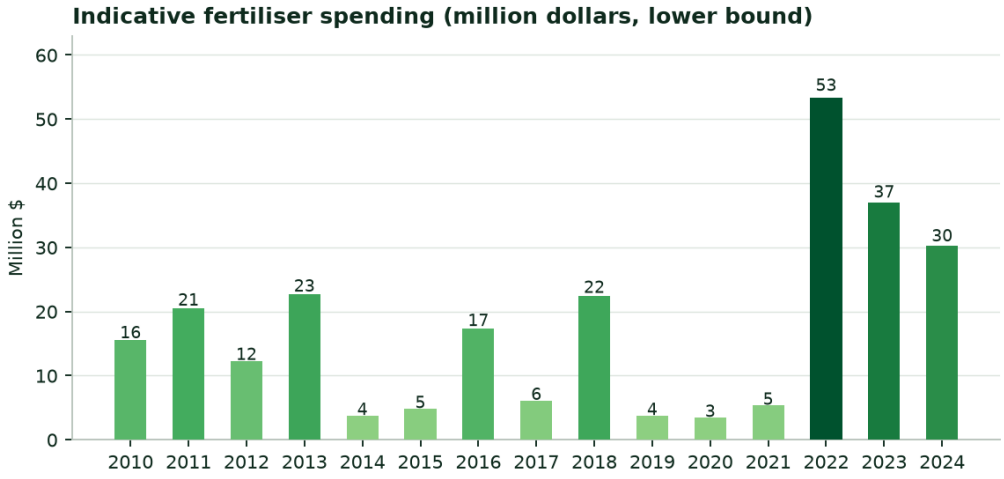


Figure 8. Indicative fertiliser spending, lower bound. Source: Author's calculation from A5 and A7

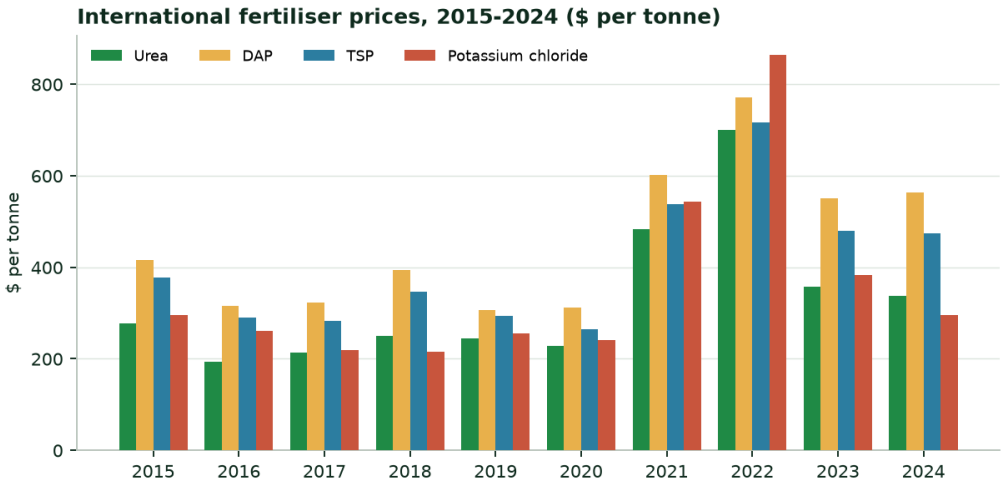


Figure 9. International prices of urea, DAP, TSP and potassium chloride. Source: World Bank, Pink Sheet (A7)

6. The regions at a glance

The table compares the country's five regions using their capital; the Plateaux region is described by two cities, Kpalimé in the west and Atakpamé in the east. 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)
Maritime (Lomé)	1,010	1,458	448	2,106	26.7
Plateaux, west (Kpalimé)	1,517	1,370	-147	2,044	26.1
Plateaux, east (Atakpamé)	1,140	1,495	355	2,094	25.9
Centrale (Sokodé)	1,514	1,606	92	2,090	26.1
Kara (Kara)	1,357	1,686	329	2,119	26.7
Savanes (Dapaong)	738	2,010	1,272	2,186	27.8

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

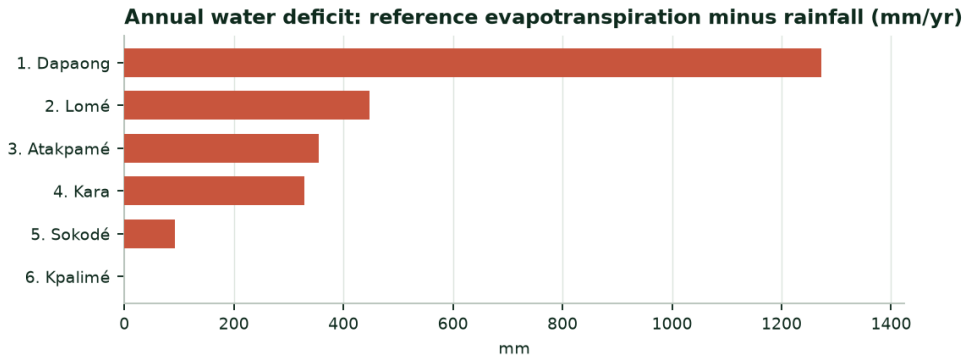


Figure 10. Annual water deficit: Reference evapotranspiration minus rainfall. Source: ERA5 (A9)



Landscape of the Fazao-Malfakassa wildlife reserve.

7. The twenty main crops: Three rankings

7.1 By harvested area

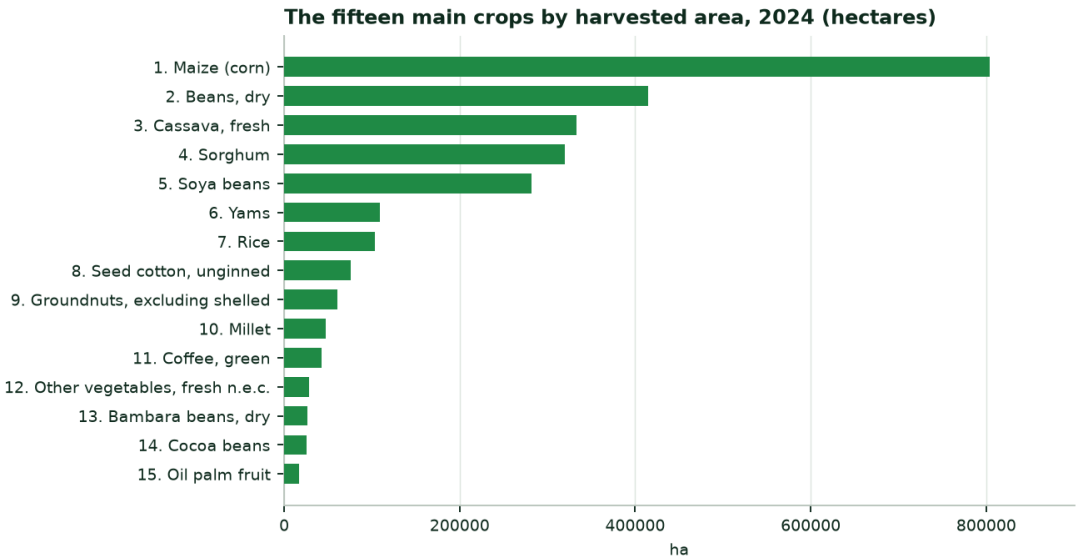


Figure 11. The fifteen main crops by harvested area, 2024 (hectares). Source: FAOSTAT (A2)

The ten main crops by area, 2024

Crop	Harvested area (ha)	Production (t)	Yield (t/ha)
Maize (corn)	804,000	1,010,000	1.26

Crop	Harvested area (ha)	Production (t)	Yield (t/ha)
Beans, dry	414,768	238,135	0.57
Cassava, fresh	333,367	1,267,066	3.80
Sorghum	320,000	310,000	0.97
Soya beans	281,684	284,342	1.01
Yams	109,444	982,384	8.98
Rice	103,600	180,200	1.74
Seed cotton, unginned	76,000	51,437	0.68
Groundnuts, excluding shelled	61,000	46,000	0.75
Millet	47,000	28,000	0.60

Source: FAOSTAT (A2).

7.2 By production

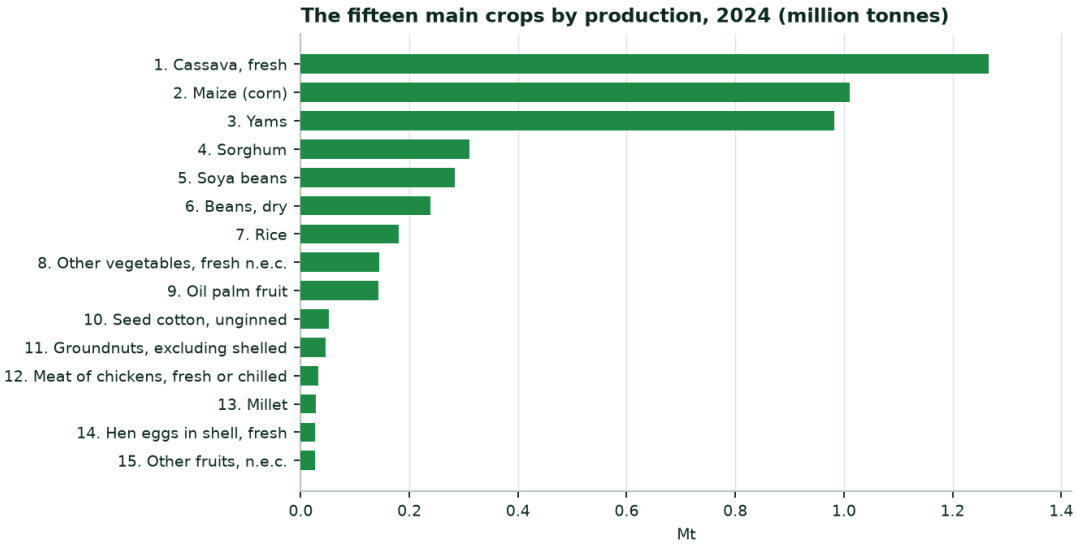


Figure 12. The fifteen main crops by production, 2024 (million tonnes). Source: FAOSTAT (A2)

7.3 By production value

Yam, maize and cassava are the three main crops by value: They are food crops first.

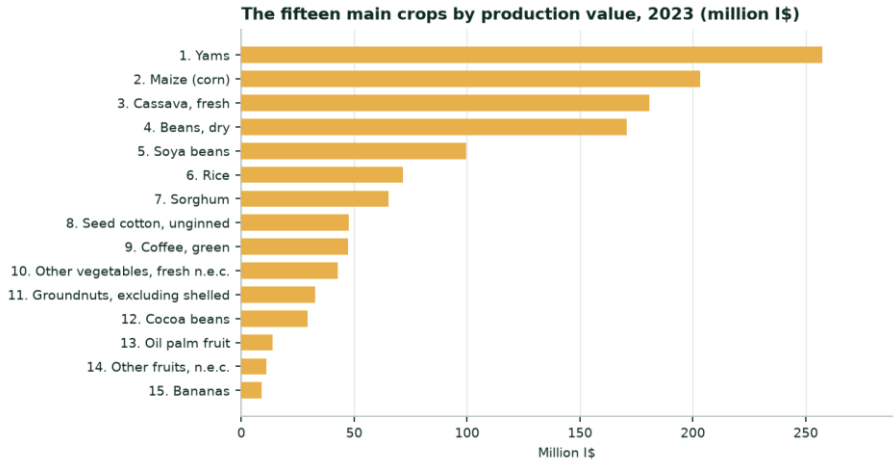


Figure 13. The fifteen main crops by production value, 2023 (million I$). Source: FAOSTAT (A3)



Pineapple in bloom in Togo.

8. Extrapolation by crop: Irrigation and rainfed crops

8.1 Method

Method in brief

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

• **Rainfed crops.** For maize and soybean, which have a trial, the production gain is calculated per 10,000 ha treated, at Togo's average 2024 yield.

• Each calculation applies the effect of the trial cited: A quarter (cautious), half (central), all of it (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%	Rainfed maize (yield)
Soybean, China	Soybean	Assumption	+11.3%	Rainfed soybean (yield)
Watermelon, Mexico (2023)	Watermelon	-60.5%	+30.0%	Irrigated vegetables
Potato, South Africa (2025)	Potato	-52.0%	+31.4%	Not used (no potato); cited for reference
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).

The maize trial was conducted under irrigation, in Türkiye. No trial has yet been conducted in Togo: The figures below apply the trials cited to Togo's average yields.

8.3 Rainfed crops: Maize and soybean

Maize yields 1.26 t/ha on average and soybean 1.01 t/ha (FAOSTAT, 2024). A water-retention polymer keeps the water of each rain 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	1.26	537	1,074	2,148
Soybean	1.01	285	570	1,141

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

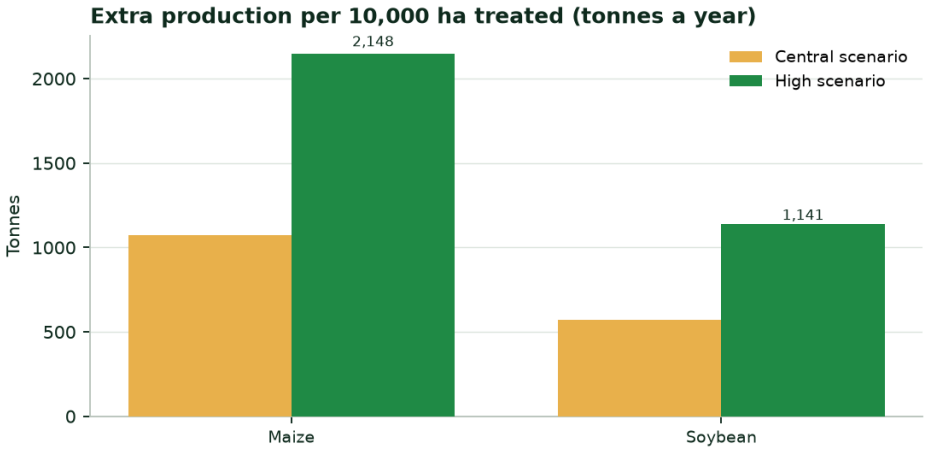


Figure 14. Extra production per 10,000 ha treated, central and high scenarios. Source: Author's calculation

8.4 Irrigation: Rice and vegetables

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)	5,746	73.1%	Generic assumption, no trial on rice	5.6
Vegetables (chilli, tomato, cabbage, others)	2,114	26.9%	Watermelon, Mexico (2023)	6.2

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	5.9	607	642
Central	11.7	1,214	1,285
High	23.5	2,428	2,569

Source: Author's calculation (Annex B).

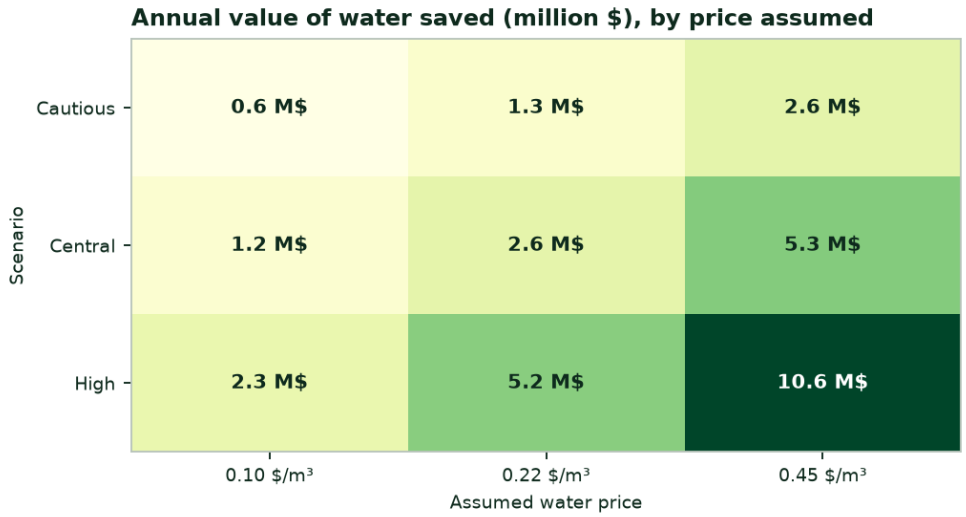


Figure 15. Annual value of the water saved, by price assumed per cubic metre. Source: Author's calculation; prices assumed, no national tariff

8.5 Reading the results

Key points

• In Togo, the main stake is rainfed farming: 804 000 ha of maize and 282 000 ha of soybean, against 7,860 ha equipped for irrigation.

• Rice gives 47% of the irrigation water saving, on a generic assumption: No trial is cited for rice.

• The gains are counted 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 their confidence level and their limit.

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 Togo
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
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 Togo

Source: Annex A.



Pineapple trader at Gbatopé.

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)	448	466
Agricultural imports (crops and livestock)	539	467
Exports, all merchandise	1,434	1,510
Imports, all merchandise	3,204	3,472

Source: FAOSTAT (A4).

The port of Lomé is also a gateway for neighbouring countries: Part of the trade, such as palm oil, may correspond to re-exports.

10.2 Exports

Cocoa beans are the first farm product exported ($88 million in 2024), ahead of soybean cake ($67 million) and cotton lint ($50 million). The soybean chain, largely organic, processes part of its harvest before exporting it.

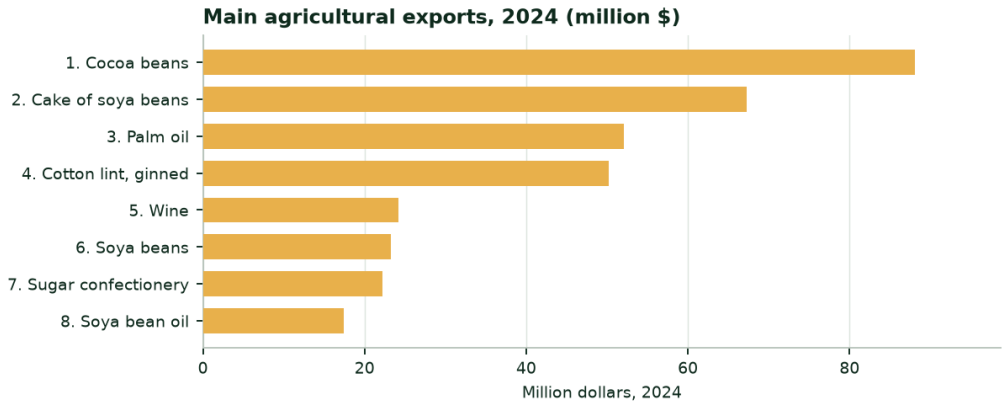


Figure 16. Main agricultural exports, 2024. Source: FAOSTAT (A4)

10.3 Imports

The country imports palm oil ($91 million), rice ($74 million as husked rice, broken and milled rice), refined sugar and wheat. Every tonne of rice grown locally reduces this bill.

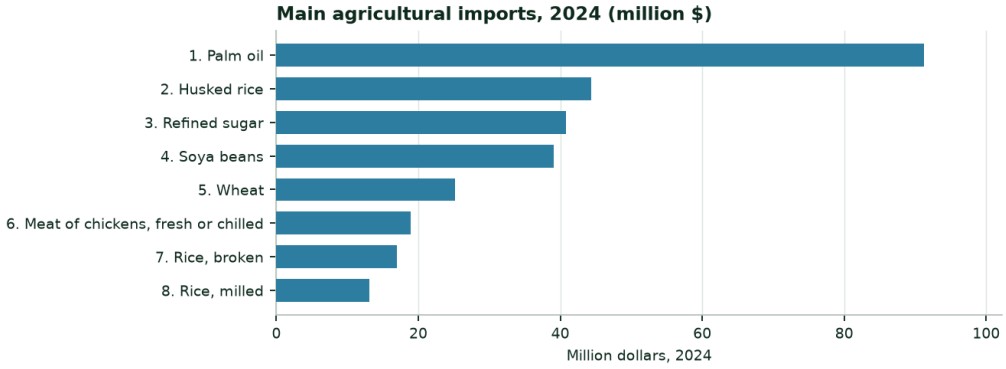


Figure 17. Main agricultural imports, 2024. Source: FAOSTAT (A4)



Figure 18. Cocoa pod in the Agou classified forest.



Onions at the market, in Togo.

10.4 Importing water-retention polymers into Togo

What to know

• **Customs duty (code 3906.90.00.00, acrylic polymers in primary forms):** 5% under the ECOWAS common external tariff (A12).

• **Levies:** 1% statistical fee, 1% WAEMU community solidarity levy and 0.5% ECOWAS community levy (A12).

• **VAT:** 18% (A12).
• **Registration:** A fertiliser must be registered before sale, under ECOWAS Regulation C/REG.13/12/12 (A13).
• **Classification:** Code 3906.90 is an inference for our products; Togolese 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 most short. The description of crops is qualitative.



Fazao mountain, in the Centrale region.

Maritime (Lomé)

The most populated region: Maize, cassava and market gardening around Lomé and Tsévié, on sandy soils that hold water poorly.

Indicator	Value
Annual rainfall, 1991-2020	1,010 mm
Reference evapotranspiration	1,458 mm
Annual water deficit	448 mm
Months with less than 50 mm of rain	3
Global solar radiation	2,106 kWh/m²
Mean temperature	26.7 °C

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

Plateaux, west (Kpalimé)

Kloto and Agou mountains: Coffee, cocoa, fruit and food crops, under the country's heaviest rainfall.

Indicator	Value

Indicator	Value
Annual rainfall, 1991-2020	1,517 mm
Reference evapotranspiration	1,370 mm
Annual water deficit	-147 mm
Months with less than 50 mm of rain	3
Global solar radiation	2,044 kWh/m²
Mean temperature	26.1 °C

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

Plateaux, east (Atakpamé)

A large maize, soybean and yam basin, and a cotton area.

Indicator	Value
Annual rainfall, 1991-2020	1,140 mm
Reference evapotranspiration	1,495 mm
Annual water deficit	355 mm
Months with less than 50 mm of rain	5
Global solar radiation	2,094 kWh/m²
Mean temperature	25.9 °C

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

Centrale (Sokodé)

Yam, maize, soybean and cotton; rain falls in a single season.

Indicator	Value
Annual rainfall, 1991-2020	1,514 mm
Reference evapotranspiration	1,606 mm
Annual water deficit	92 mm
Months with less than 50 mm of rain	5
Global solar radiation	2,090 kWh/m²
Mean temperature	26.1 °C

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

Kara (Kara)

Sorghum, millet, yam and cotton on hills often farmed in terraces.

Indicator	Value
Annual rainfall, 1991-2020	1,357 mm
Reference evapotranspiration	1,686 mm
Annual water deficit	329 mm
Months with less than 50 mm of rain	5
Global solar radiation	2,119 kWh/m²
Mean temperature	26.7 °C

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

Savanes (Dapaong)

The driest region: Sorghum, millet, lowland rice, onion, cotton and livestock; a long dry season.

Indicator	Value
Annual rainfall, 1991-2020	738 mm
Reference evapotranspiration	2,010 mm
Annual water deficit	1,272 mm
Months with less than 50 mm of rain	6
Global solar radiation	2,186 kWh/m²
Mean temperature	27.8 °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), Togo	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 and imports, 2005-2023	A
A6	FAOSTAT, land use, areas equipped for irrigation, organic farming, 2000-2025	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 (regions)	B
A11	FAO, AQUASTAT, "Irrigation in Africa in figures", Togo chapter: Land suitable for full-control irrigation	A
A12	ECOWAS common external tariff (heading 3906.90.00.00: Customs duty, statistical fee, levies); Togo general tax code (VAT)	A
A13	ECOWAS Regulation C/REG.13/12/12 on fertiliser quality control; review of fertiliser policy in the ECOWAS area (countries that published it)	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 (223 Mm³, 2022) × agricultural share (34.08%) = 76.0 Mm³.

2. Irrigation. The equipped area (7,860 ha) and agricultural water are shared between rice and vegetables in proportion to their harvested areas (141,709 ha). Other crops are treated as rainfed and receive no irrigation water in the calculation.

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

4. Extra hectares. Water saved ÷ water per equipped hectare (9,669 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%), with the same quarter, half and whole.

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).

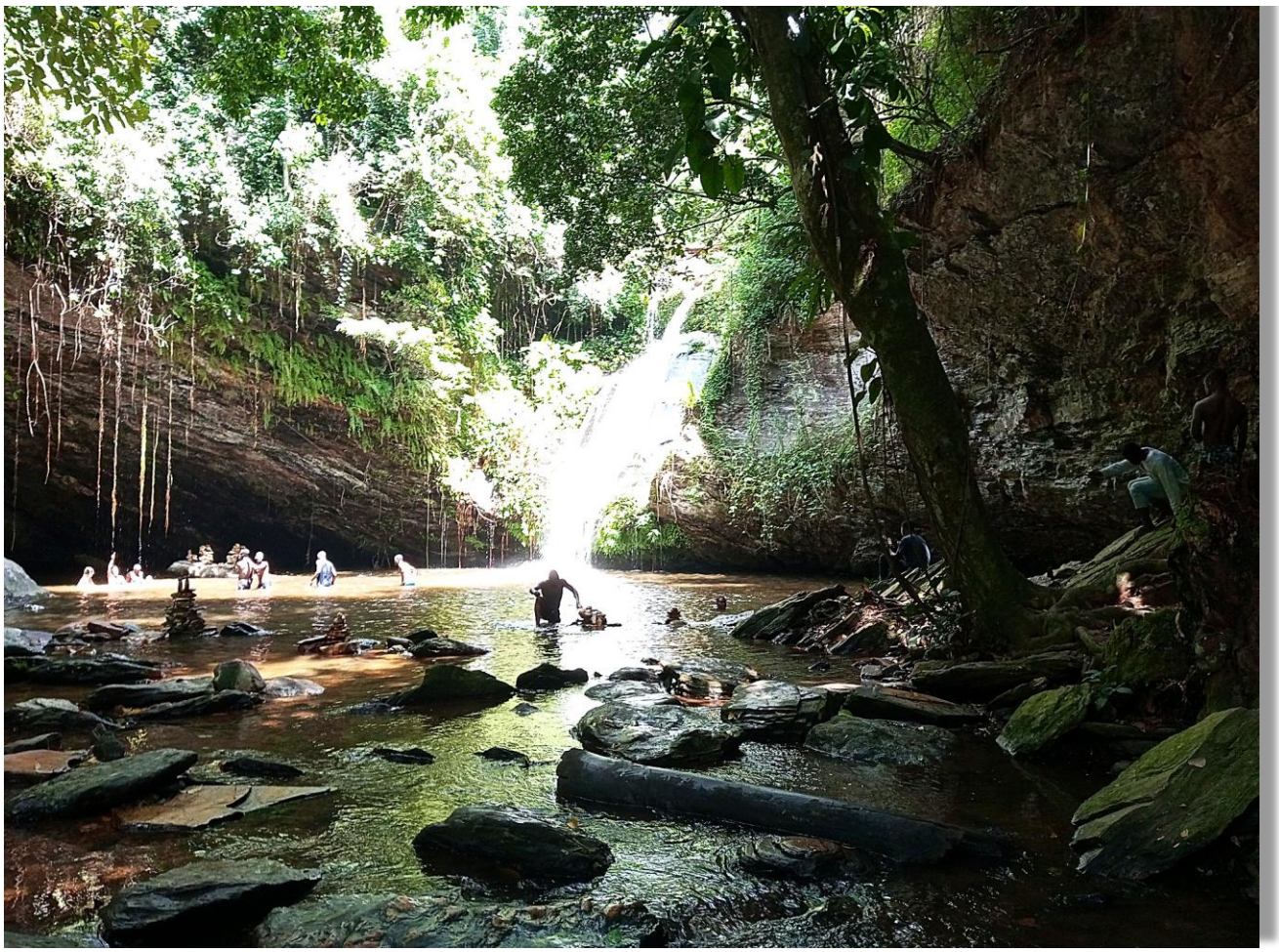
8. Climate. Rainfall, reference evapotranspiration (FAO-56) and temperature: 1991-2020 means of the ERA5 grid cell containing each city; radiation: PVGIS, 2005-2020. Temperature trends are linear regressions over 1981-2024. On the maps, the Plateaux region takes the value of Atakpamé.

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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Paysage savane Togo.jpg	AKOUETE Ata Franck	CC BY-SA 4.0
Champs de maïs à Agou Carrefour 01.jpg	Theophile-kk	CC BY-SA 4.0
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Womé waterfall, near Kpalimé.

Green Solutions

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