

COUNTRY DOSSIER

Mauritania

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 palm grove of the Varesse oasis, in the Adrar.

Foreword

This dossier describes Mauritania 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, Mauritanian public bodies (Ministry of Agriculture, SONADER, National Statistics Office) and the OMVS).
- **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 Mauritania.

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Summary

The points below summarise the dossier. The figures come from public sources: The World Bank, FAO (FAOSTAT, AQUASTAT), Mauritanian public bodies (Ministry of Agriculture, SONADER, National Statistics Office) and the OMVS, PVGIS and NASA POWER. The production gains and water savings are scenarios, described in Annex B.

5.32 M
Inhabitants in 2025 (World Bank)

240,000 ha
Of sorghum harvested in 2024, the main crop

45,010 ha
Equipped for irrigation (2024)

+550 t
Of maize per 10,000 ha treated, central scenario

170 Mm³
Of irrigation water saved a year, central scenario

42 M$
Of agricultural exports in 2024 (FAOSTAT)

Key points

• **Irrigation, a pillar of production.** 0.05 million hectares equipped for irrigation in 2024, or 10% of the 0.46 million hectares of cropland.

• **Sorghum: The main crop.** 240,000 ha harvested in 2024, for 0.11 million tonnes, or 0.47 t/ha.

• **Water is not scarce over the year as a whole; it is scarce between rainfall events.** National water stress is only 13.2%, but at Akjoujt, atmospheric water demand exceeds rainfall by 3,066 mm.

• **In rainfed farming, the gain is counted in tonnes.** In the central scenario, an additional 550 t of maize per 10,000 ha treated.

• **In irrigated farming, the water saved could allow irrigation schemes to be expanded.** 170.3 Mm³ a year in the central scenario, enough to irrigate about 6,275 more ha, or 13.9% of the equipped area.

• **All nitrogen is imported.** 1,867 t of nitrogen used in 2024, 21,761 t imported, no national production.

• **Farm trade.** $42 million of exports and $1,148 million of imports in 2024. Leading export: Sheep ($13 million). Leading import: Refined sugar ($330 million).

Key figures

Key indicators for Mauritania

Indicator	Value	Year	Source (level)
Population	5.32 M	2025	World Bank (A1)
GDP per capita	2,198 $	2025	World Bank (A1)
Agriculture's share of GDP	20.0%	2025	World Bank (A1)
Agricultural employment	32.1%	2025	World Bank (A1)
Cropland	460,000 ha	2024	FAOSTAT (A6)
Area equipped for irrigation	45,010 ha	2024	FAOSTAT (A6)
Harvested area: Sorghum	240,000 ha	2024	FAOSTAT (A2)
Agricultural exports	42 M$	2024	FAOSTAT (A4)
Agricultural imports	1,148 M$	2024	FAOSTAT (A4)
Mineral nitrogen, agricultural use	1,867 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 Mauritania. 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.



Traditional cropping in Mauritania.

2. Mauritania in figures

Mauritania had 5.32 million inhabitants in 2025, 39% of them in rural areas. Agriculture accounts for 20.0% of gross domestic product and employs 32% of the labour force. The country covers 1,030.7 thousand km², of which 39% is agricultural land. Undernourishment affects 11.0% of the population.

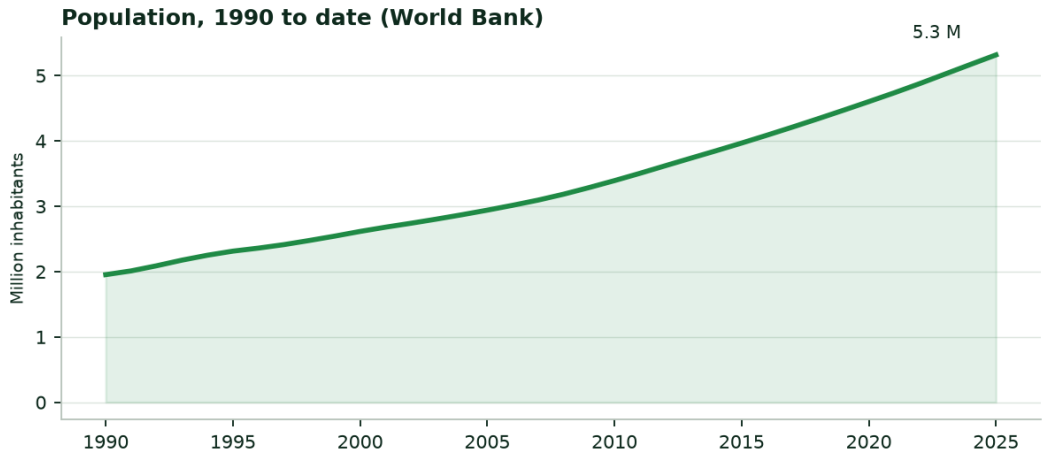


Figure 1. Population of Mauritania, 1990 to date. Source: World Bank (A1)

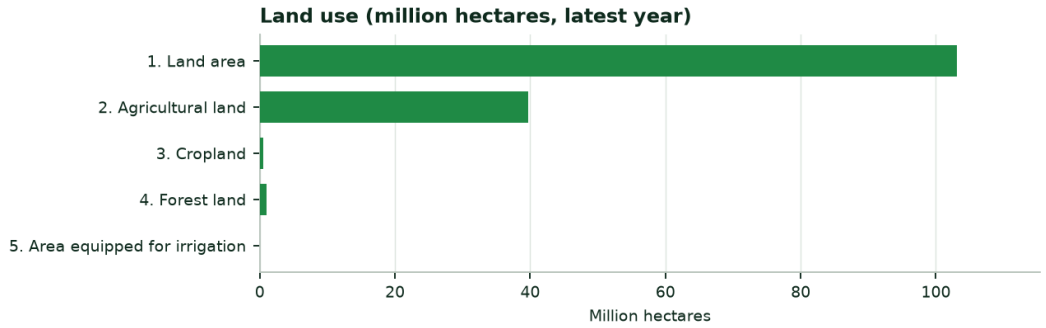


Figure 2. Land use, latest year published. Source: FAOSTAT (A6)

Agricultural and water indicators, latest year published

Indicator	Value	Year	Source
Average cereal yield	1,537 kg/ha	2024	World Bank (A1)
Fertiliser use per hectare of arable land	8.0 kg/ha	2024	World Bank (A1)
Water withdrawals, agricultural share	90.6%	2022	World Bank (A1)
Internal freshwater resources	0.4 km³	2022	World Bank (A1)
Internal resources per inhabitant	82 m³	2022	World Bank (A1)



Gardens under the palms in the Mhaïreth oasis (Adrar).

3. Sunshine, rainfall and climate change

3.1 Sunshine

Global solar radiation reaches 2,275 to 2,379 kWh/m² a year depending on the region. Energy is not the limiting factor: Water available at the right time determines the harvest.

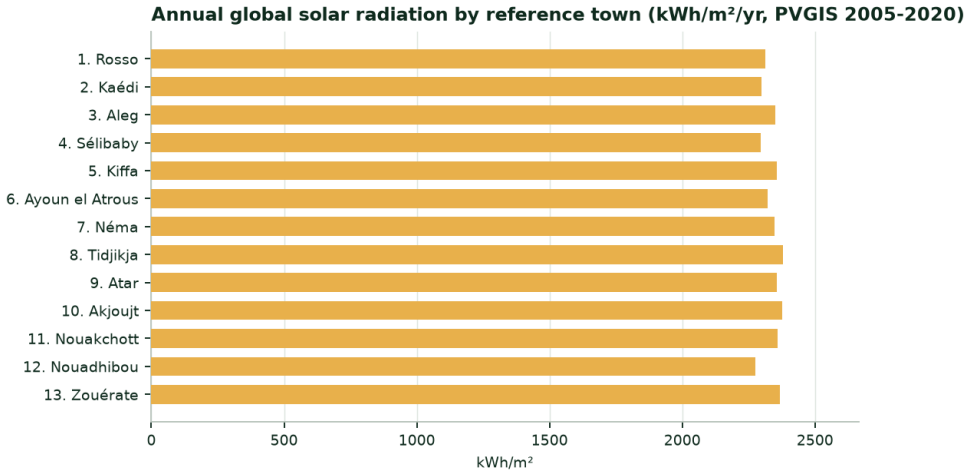


Figure 3. Annual global solar radiation in each reference town. Source: PVGIS (A8)

3.2 Rainfall and evapotranspiration

Annual rainfall is 635 mm at Sélibaby, but only 40 mm at Nouadhibou, where reference evapotranspiration reaches 1,979 mm. Rain falls from July to September, mostly in the south (Guidimakha, Assaba, the two Hodh); the centre and north are desert. Flood-recession crops follow the Senegal River flood, and the oases live from their wells.

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

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rosso	2	4	7	0	0	11	55	118	90	18	0	1
Kaédi	1	0	0	2	1	18	74	132	106	17	1	1
Aleg	1	0	0	0	1	11	43	91	73	19	1	1
Sélibaby	1	0	0	0	8	57	158	218	148	41	2	1
Kiffa	0	0	1	0	3	21	79	133	81	18	0	1
Ayoun el Atrous	0	0	0	1	5	20	76	143	68	18	0	0
Néma	0	0	0	2	9	20	75	136	62	13	0	0
Tidjikja	1	1	5	1	1	4	22	63	35	24	0	1
Atar	2	2	2	0	1	2	10	24	19	96	2	2
Akjoujt	1	1	7	0	1	3	11	29	27	20	2	2
Nouakchott	1	2	11	0	0	1	13	49	46	15	2	2
Nouadhibou	2	2	2	1	1	0	1	6	7	11	2	4
Zouérate	3	2	2	0	1	2	1	8	19	12	2	3

Source: NASA POWER (A9); author's calculation.

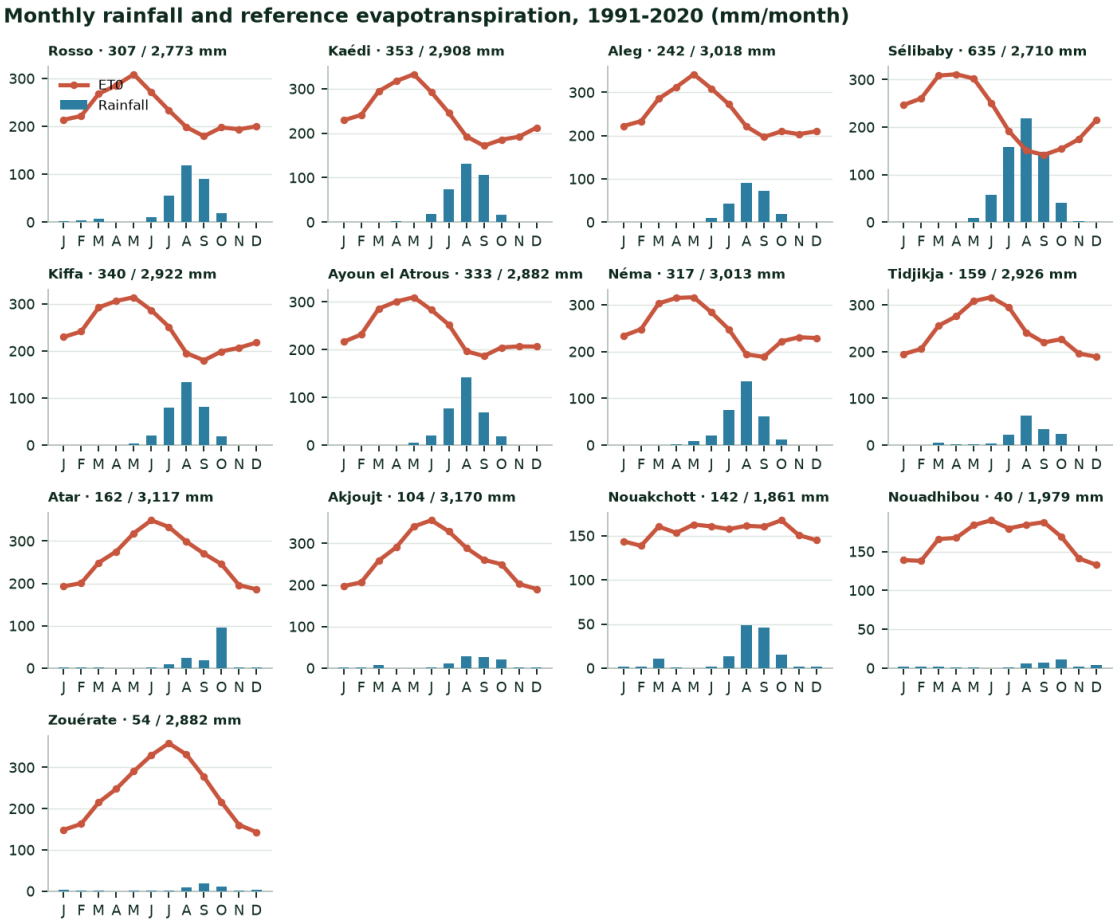


Figure 4. Monthly rainfall and reference evapotranspiration by city, 1991-2020. Source: NASA POWER (A9)

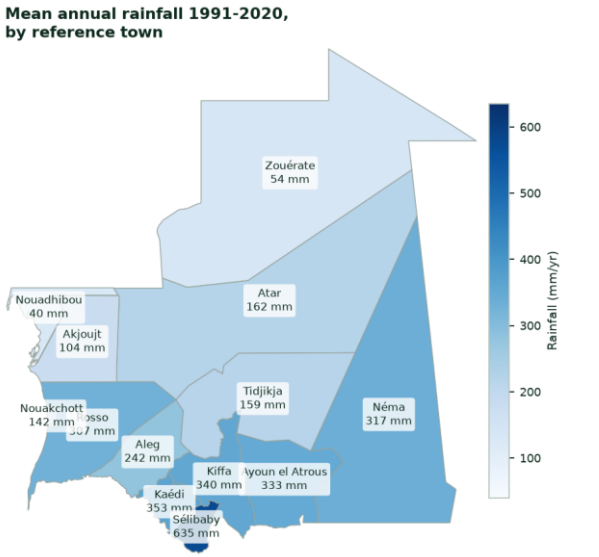
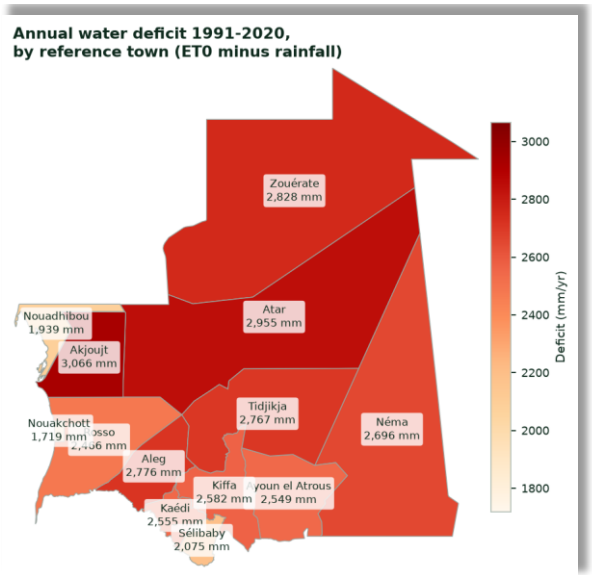


Figure 5. Mean annual rainfall 1991-2020, by region. Source: NASA POWER (A9), Natural Earth (A10).



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

3.3 Climate change

Mean annual temperature is rising. At Kaédi it went from 28.8 °C in 1981 to 29.9 °C in 2024, a trend of 0.13 °C per decade. At Atar the trend is 0.33 °C per decade, from 27.2 °C to 29.0 °C. Warmer air dries the soil faster between rainfall events.

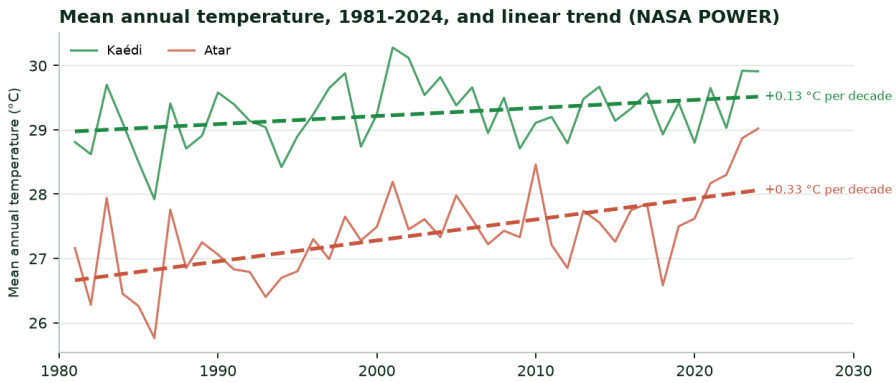


Figure 6. Mean annual temperature, 1981-2024, and linear trend. Source: NASA POWER (A9)



Date palm groves near Tichitt.

4. Water: Resources, irrigated areas, withdrawals

4.1 Resources and withdrawals

Total freshwater withdrawals are 1,348 million m³ a year (2022). Agriculture accounts for 90.6% of these withdrawals, that is 1,221 Mm³. Internal resources are 0.4 km³ a year and water stress is 13.2%: The country has water, but little of it is mobilised for crops.

Freshwater: Withdrawals and resources

Indicator	Value	Year	Source
Total withdrawals	1,348 Mm³	2022	World Bank (A1)
Agricultural share	90.6%	2022	World Bank (A1)
Agricultural withdrawals	1,221.2 Mm³	2022	Calculated from A1
Area equipped for irrigation	45,010 ha	2024	FAOSTAT (A6)
Agricultural withdrawals per equipped hectare	27,131 m³/ha	—	Calculation (Annex B)
Water stress	13.2%	2022	World Bank (A1)

4.2 Irrigated areas

FAOSTAT counts 45,010 hectares equipped for irrigation in 2024. FAO puts the irrigation potential at 250,000 ha, of which 136,500 ha in the Senegal River valley (A11): Less than a fifth of this potential is equipped. Most schemes serve the rice of the valley.



The Senegal River.

4.3 What the water saving represents

In the central scenario, the saving is 170.3 million m³ a year, or 13.9% of agricultural withdrawals. At 27,131 m³ per equipped hectare, this water would irrigate about 6,275 more hectares, or 13.9% of today's equipped area.

5. Fertilisers: Quantities, purchases, spending

5.1 Quantities used

In 2024, agricultural use reaches 1,867 tonnes of nitrogen, 901 tonnes of phosphate (P2O5) and 837 tonnes of potash (K2O). The country produces no nitrogen fertiliser: It imported 21,761 tonnes of nitrogen in the same year. Per hectare of arable land, use is 8.0 kg per hectare.

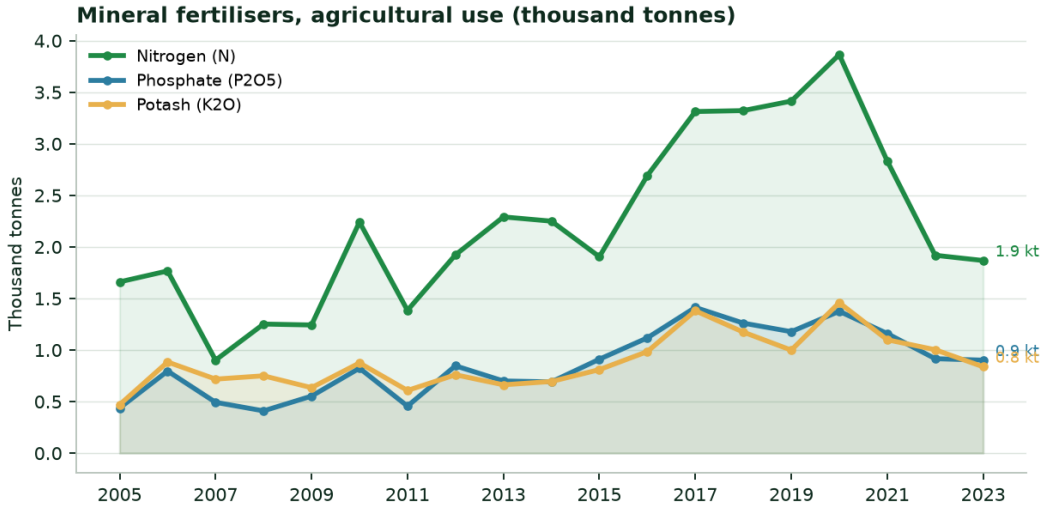


Figure 7. Mineral fertilisers, agricultural use, 2005-2023. Source: FAOSTAT (A5)

5.2 Regulatory framework

Law No. 2000-042 on plant protection gives the minister in charge of agriculture the registration of crop protection products (A13). No text specific to fertilisers or water-retaining agents was found: The applicable regime is to be confirmed with the Ministry of Agriculture.



A farmer in a Mauritanian palm grove.

5.3 Indicative spending

In 2024, the indicative minimum spending on mineral fertilisers reaches $3 million, at international fertiliser prices (calculation in Annex B, lower bound).

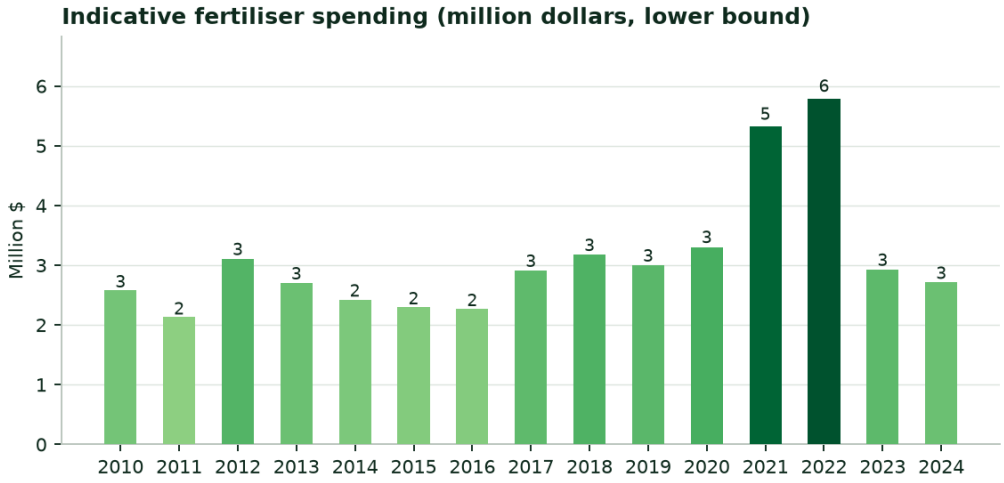


Figure 8. Indicative fertiliser spending, lower bound. Source: Author's calculation from A5 and A7

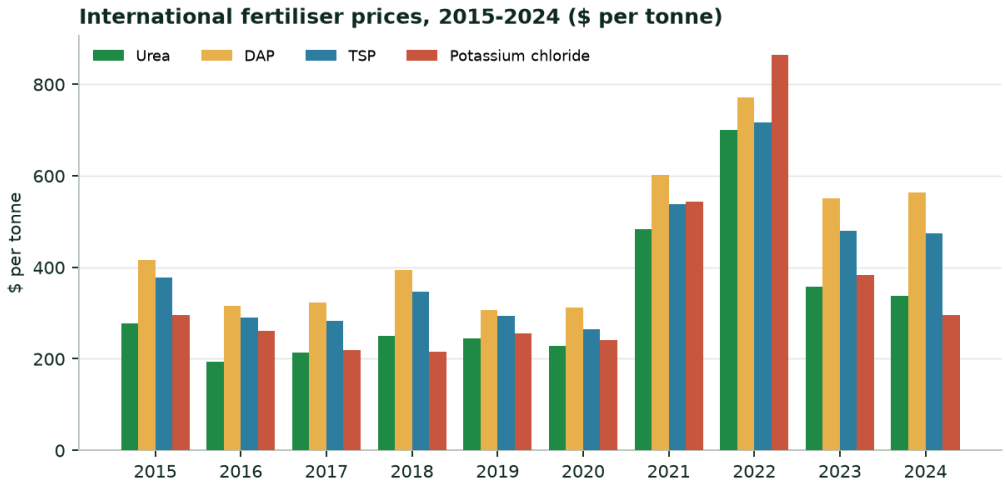


Figure 9. International prices of urea, DAP, TSP and potassium chloride. Source: World Bank, Pink Sheet (A7)

6. The regions at a glance

The table compares the thirteen wilayas, each represented by its 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)
Trarza (Rosso)	307	2,773	2,466	2,312	27.8
Gorgol (Kaédi)	353	2,908	2,555	2,299	29.3
Brakna (Aleg)	242	3,018	2,776	2,349	29.1
Guidimakha (Sélibaby)	635	2,710	2,075	2,297	29.1
Assaba (Kiffa)	340	2,922	2,582	2,357	28.9
Hodh el Gharbi (Ayoun el Atrous)	333	2,882	2,549	2,321	28.6
Hodh ech Chargui (Néma)	317	3,013	2,696	2,348	29.2
Tagant (Tidjikja)	159	2,926	2,767	2,379	26.9
Adrar (Atar)	162	3,117	2,955	2,356	27.3
Inchiri (Akjoujt)	104	3,170	3,066	2,375	28.3

Region (city)	Rainfall (mm/yr)	ET0 (mm/yr)	Deficit (mm/yr)	Radiation (kWh/m²/yr)	Temperature (°C)
Nouakchott (Nouakchott)	142	1,861	1,719	2,359	23.4
Dakhlet Nouadhibou (Nouadhibou)	40	1,979	1,939	2,275	22.3
Tiris Zemmour (Zouérate)	54	2,882	2,828	2,367	25.2

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

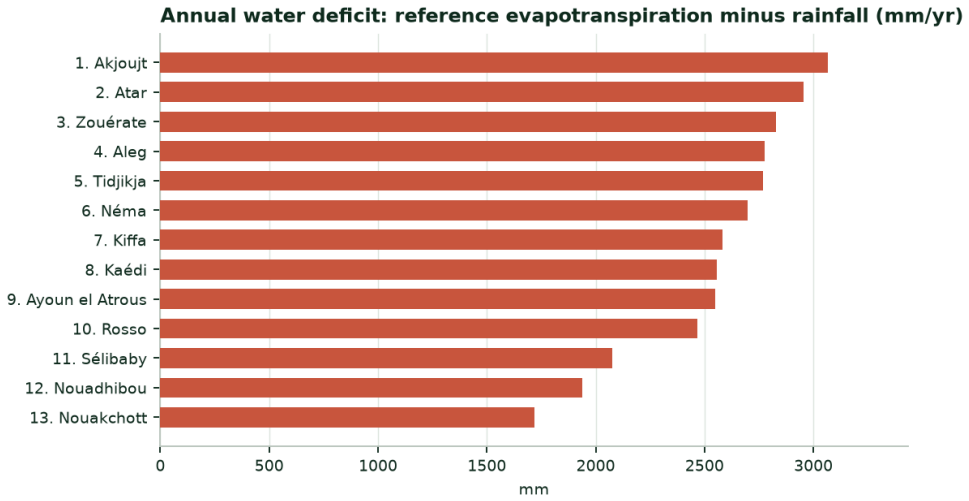


Figure 10. Annual water deficit: Reference evapotranspiration minus rainfall. Source: NASA POWER (A9)



An oasis between Aleg and Kiffa.

7. The twenty main crops: Three rankings

7.1 By harvested area

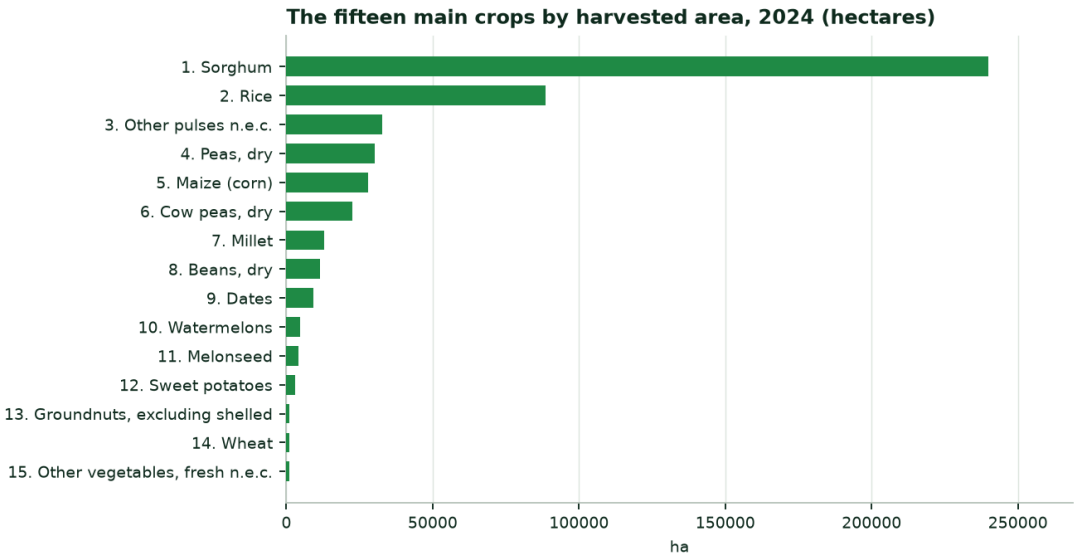


Figure 11. The fifteen main crops by harvested area, 2024 (hectares). Source: FAOSTAT (A2)

The ten main crops by area, 2024

Crop	Harvested area (ha)	Production (t)	Yield (t/ha)
Sorghum	240,000	114,000	0.47
Rice	88,500	431,700	4.88
Other pulses n.e.c.	32,825	22,183	0.68
Peas, dry	30,219	9,050	0.30
Maize (corn)	28,000	18,000	0.64
Cow peas, dry	22,493	7,948	0.35
Millet	13,000	3,000	0.23
Beans, dry	11,362	13,792	1.21
Dates	9,336	22,276	2.39
Watermelons	4,709	2,627	0.56

Source: FAOSTAT (A2).

7.2 By production

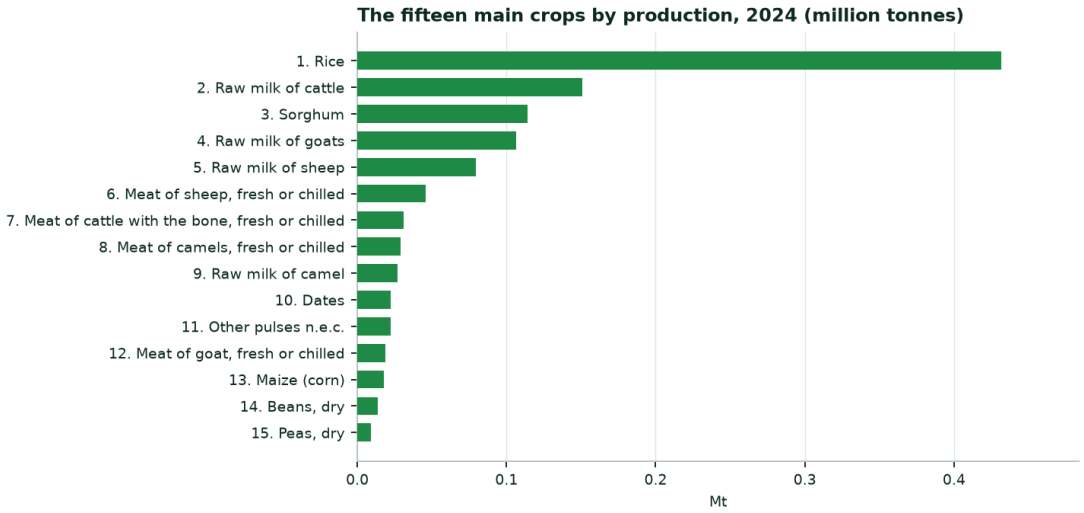


Figure 12. The fifteen main crops by production, 2024 (million tonnes). Source: FAOSTAT (A2)

7.3 By production value

By production value, the three main crops are: Rice, dates and sorghum (FAOSTAT, 2023, constant international dollars).

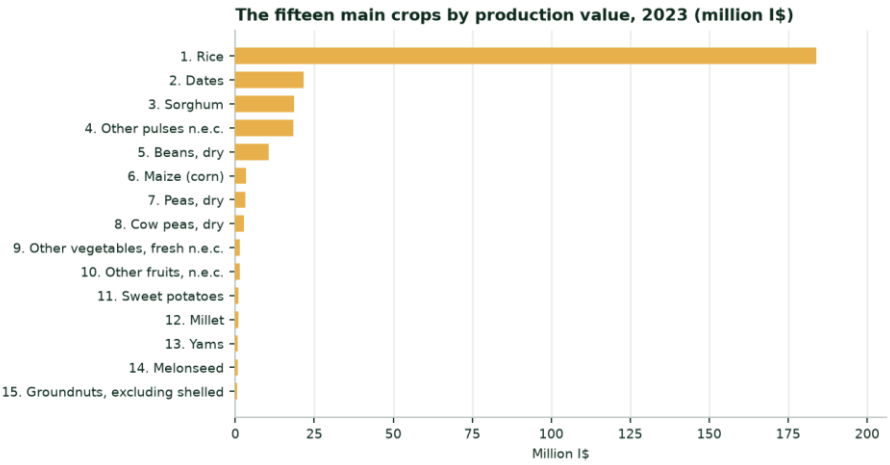


Figure 13. The fifteen main crops by production value, 2023 (million I$). Source: FAOSTAT (A3)



Date palm cultivation near Tichitt.

8. Extrapolation by crop: Irrigation and rainfed crops

8.1 Method

Method in brief

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

• **Rainfed crops.** For crops that have a trial (maize), 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%	Not used; cited for reference
Watermelon, Mexico (2023)	Watermelon	-60.5%	+30.0%	Vegetables and melons: Water and yield
Potato, South Africa (2025)	Potato	-52.0%	+31.4%	Potato: Water and yield
Date palm, UAE (ICBA, 2021)	Palm	-82.0%	+20.0%	Date palm: Water and yield

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

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

8.3 Rainfed crops: Maize

Average 2024 yields (FAOSTAT): Maize 0.64 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	0.64	275	550	1,099

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

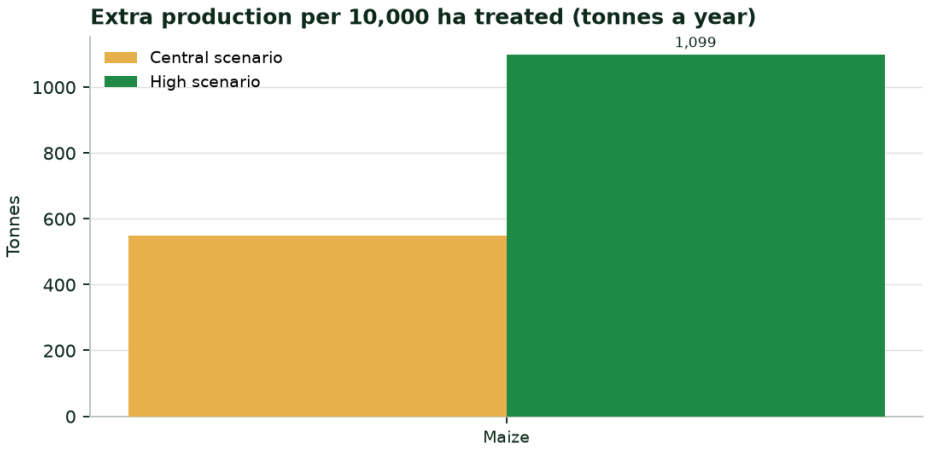


Figure 14. Extra production per 10,000 ha treated, central and high scenarios. Source: Author's calculation

8.4 Irrigation: Irrigated rice, Vegetables and melons, Potato and Date palm

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

Crop group	Equipped area (ha)	Share	Trial or assumption	Water saved (Mm³/yr)
Irrigated rice	38,359	85.2%	Generic assumption, no trial	104.1
Vegetables and melons (watermelon, others)	2,429	5.4%	Watermelon, Mexico (2023)	19.9
Potato	176	0.4%	Potato, South Africa (2025)	1.2
Date palm (oases)	4,047	9.0%	Date palm, UAE (ICBA, 2021)	45.0

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	85.1	3,138	810
Central	170.3	6,275	1,619
High	340.5	12,551	3,239

Source: Author's calculation (Annex B).

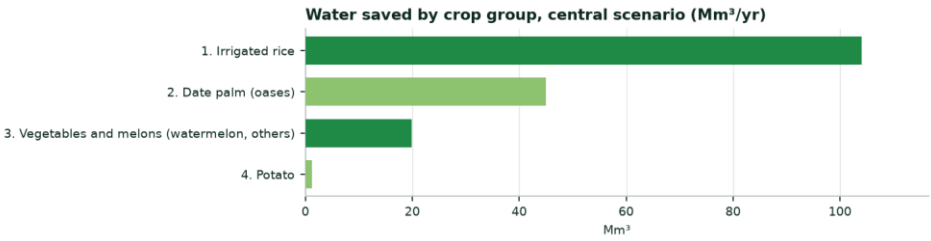


Figure 15. Water saved by crop group, central scenario. Source: Author's calculation

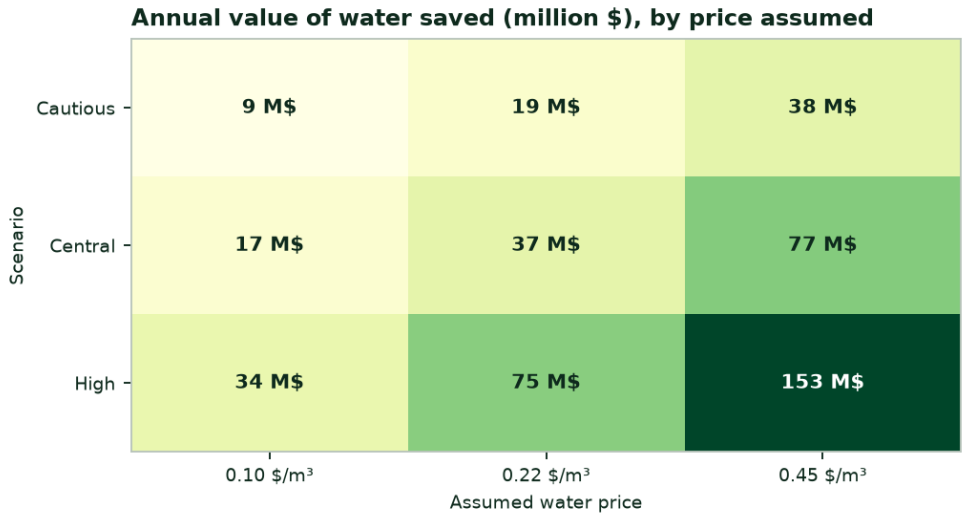


Figure 16. Annual value of the water saved, by price assumed per cubic metre. Source: Author's calculation; prices assumed, no national tariff

8.5 Reading the results

Key points

• The "irrigated rice" group gives 61% of the irrigation water saving (generic assumption, no trial).

• 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 Mauritania
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 Mauritania

Source: Annex A.



The Tergit oasis, in the Adrar.

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)	45	42
Agricultural imports (crops and livestock)	1,215	1,148
Exports, all merchandise	4,017	4,228
Imports, all merchandise	5,242	4,798

Source: FAOSTAT (A4).

10.2 Exports

The three main farm products exported in 2024 are: Sheep ($13 million), cotton lint, ginned ($10 million) and watermelons ($10 million).

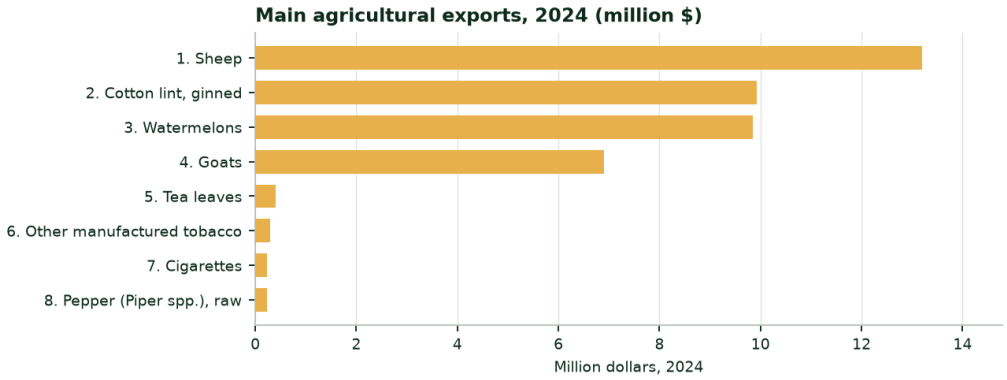


Figure 17. Main agricultural exports, 2024. Source: FAOSTAT (A4)

10.3 Imports

The main farm purchases are: Refined sugar ($330 million), wheat ($251 million) and palm oil ($156 million).

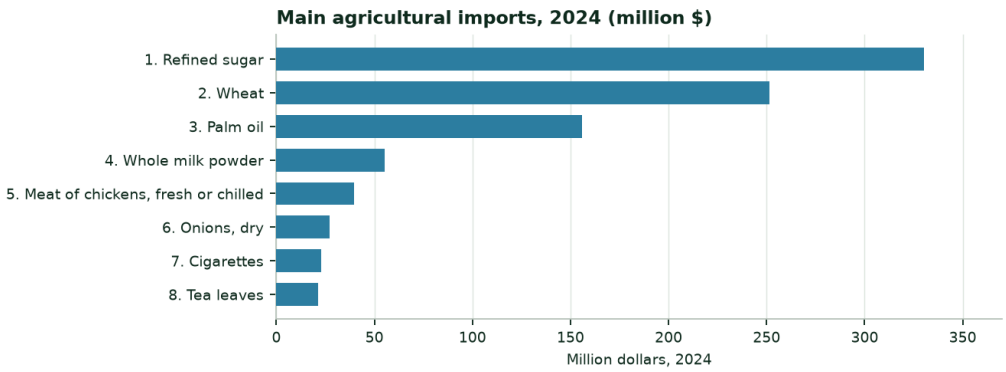


Figure 18. Main agricultural imports, 2024. Source: FAOSTAT (A4)



Figure 19. Date stalls at the Tidjikja festival.



A street market in Nouakchott.

10.4 Importing water-retention polymers into Mauritania

What to know

• **Customs duty (subheading 3906.90):** 5% under the MFN tariff applied by Mauritania in 2023 (A12).

• **VAT:** Standard rate of 16% (A12). Other import taxes may apply; they are to be confirmed with a freight forwarder.

• **Placing on the market:** Law No. 2000-042 gives the minister in charge of agriculture the registration of crop protection products (A13). No text specific to fertilisers or water-retaining agents was found: The applicable regime is to be confirmed with the Ministry of Agriculture.

• **Classification:** Code 3906.90 is an inference for our products; Mauritanian Customs settles 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.



A camel caravan in the Amatlich erg.

Trarza (Rosso)

Trarza: Irrigated rice, vegetables and sugar cane in the Senegal River valley, where the irrigation schemes are concentrated.

Indicator	Value
Annual rainfall, 1991-2020	307 mm
Reference evapotranspiration	2,773 mm
Annual water deficit	2,466 mm
Months with less than 50 mm of rain	9
Global solar radiation	2,312 kWh/m²
Mean temperature	27.8 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Gorgol (Kaédi)

Gorgol: Irrigated rice, flood-recession sorghum and vegetables along the river and the Gorgol.

Indicator	Value
Annual rainfall, 1991-2020	353 mm
Reference evapotranspiration	2,908 mm
Annual water deficit	2,555 mm
Months with less than 50 mm of rain	9
Global solar radiation	2,299 kWh/m²
Mean temperature	29.3 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Brakna (Aleg)

Brakna: Rice and vegetables in the valley, flood-recession crops around Lake Aleg and livestock.

Indicator	Value
Annual rainfall, 1991-2020	242 mm
Reference evapotranspiration	3,018 mm
Annual water deficit	2,776 mm

Indicator	Value
Months with less than 50 mm of rain	10
Global solar radiation	2,349 kWh/m²
Mean temperature	29.1 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Guidimakha (Sélibaby)

Guidimakha: The wettest wilaya, with rainfed sorghum, millet, maize and groundnuts, and livestock.

Indicator	Value
Annual rainfall, 1991-2020	635 mm
Reference evapotranspiration	2,710 mm
Annual water deficit	2,075 mm
Months with less than 50 mm of rain	8
Global solar radiation	2,297 kWh/m²
Mean temperature	29.1 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Assaba (Kiffa)

Assaba: Rainfed sorghum and millet, crops behind dams and in lowlands, and livestock.

Indicator	Value
Annual rainfall, 1991-2020	340 mm
Reference evapotranspiration	2,922 mm
Annual water deficit	2,582 mm
Months with less than 50 mm of rain	9
Global solar radiation	2,357 kWh/m²
Mean temperature	28.9 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Hodh el Gharbi (Ayoun el Atrous)

Hodh el Gharbi: Livestock, rainfed sorghum and millet, crops behind dams.

Indicator	Value
Annual rainfall, 1991-2020	333 mm
Reference evapotranspiration	2,882 mm
Annual water deficit	2,549 mm
Months with less than 50 mm of rain	9
Global solar radiation	2,321 kWh/m²
Mean temperature	28.6 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Hodh ech Chargui (Néma)

Hodh ech Chargui: A major livestock region; rainfed sorghum, millet and cowpea.

Indicator	Value
Annual rainfall, 1991-2020	317 mm

Indicator	Value
Reference evapotranspiration	3,013 mm
Annual water deficit	2,696 mm
Months with less than 50 mm of rain	9
Global solar radiation	2,348 kWh/m²
Mean temperature	29.2 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Tagant (Tidjikja)

Tagant: Date palm groves in the oases, small-scale vegetables and livestock.

Indicator	Value
Annual rainfall, 1991-2020	159 mm
Reference evapotranspiration	2,926 mm
Annual water deficit	2,767 mm
Months with less than 50 mm of rain	11
Global solar radiation	2,379 kWh/m²
Mean temperature	26.9 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Adrar (Atar)

Adrar: Oases and date palm groves, with vegetables grown under the palms and watered from wells.

Indicator	Value
Annual rainfall, 1991-2020	162 mm
Reference evapotranspiration	3,117 mm
Annual water deficit	2,955 mm
Months with less than 50 mm of rain	11
Global solar radiation	2,356 kWh/m²
Mean temperature	27.3 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Inchiri (Akjoujt)

Inchiri: A desert and mining area; camel herding and small gardens.

Indicator	Value
Annual rainfall, 1991-2020	104 mm
Reference evapotranspiration	3,170 mm
Annual water deficit	3,066 mm
Months with less than 50 mm of rain	12
Global solar radiation	2,375 kWh/m²
Mean temperature	28.3 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Nouakchott (Nouakchott)

Nouakchott: Irrigated peri-urban vegetable growing for the country's largest market.

Indicator	Value
Annual rainfall, 1991-2020	142 mm
Reference evapotranspiration	1,861 mm
Annual water deficit	1,719 mm
Months with less than 50 mm of rain	12
Global solar radiation	2,359 kWh/m²
Mean temperature	23.4 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Dakhlet Nouadhibou (Nouadhibou)

Dakhlet Nouadhibou: Coast and fishing; very little cropping.

Indicator	Value
Annual rainfall, 1991-2020	40 mm
Reference evapotranspiration	1,979 mm
Annual water deficit	1,939 mm
Months with less than 50 mm of rain	12
Global solar radiation	2,275 kWh/m²
Mean temperature	22.3 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Tiris Zemmour (Zouérate)

Tiris Zemmour: A mining desert; camel herding and a few palm groves.

Indicator	Value
Annual rainfall, 1991-2020	54 mm
Reference evapotranspiration	2,882 mm
Annual water deficit	2,828 mm
Months with less than 50 mm of rain	12
Global solar radiation	2,367 kWh/m²
Mean temperature	25.2 °C

Source: NASA POWER (A9); PVGIS (A8); author's calculation.

Annex A. Sources and confidence levels

Ref.	Source	Level
A1	World Bank, World Development Indicators (WDI), Mauritania	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	NASA POWER (NASA Langley Research Center), daily data: Rainfall, temperature, humidity, wind and radiation, 1981-2024; reference evapotranspiration calculated by the author with FAO-56 (Penman-Monteith)	B
A10	Natural Earth, first-level administrative boundaries and country outline	B

Ref.	Source	Level
A11	FAO, AQUASTAT, Mauritania country profile: Irrigation potential of 250,000 ha, of which 136,500 ha in the Senegal River valley	A
A12	World Bank, WITS (UNCTAD TRAINS database), Mauritania, applied MFN duties, subheading 3906.90, 2023; PwC, Worldwide Tax Summaries, Mauritania: Standard VAT rate	A
A13	Law No. 2000-042 on plant protection (registration by the minister in charge of agriculture)	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 (1,348 Mm³, 2022) × agricultural share (90.58%) = 1,221.2 Mm³.

2. Irrigation. The equipped area (45,010 ha) and agricultural water are shared between irrigated groups (irrigated rice, vegetables and melons, potato and date palm) in proportion to their harvested areas (103,845 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. Rice, vegetables and melons, potato and date palm are treated as irrigable; the equipped area is attributed to them in proportion to their harvested area. Sorghum, millet, maize, pulses and the other crops are treated as rainfed or flood-recession crops.

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 (27,131 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%), 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 NASA POWER grid cell containing each city; radiation: PVGIS, 2005-2020. Temperature trends are linear regressions over 1981-2024. NASA POWER combines reanalyses and satellite data on a grid of about 50 km: Two nearby cities can share the same cell, and its rainfall can differ from local station records. On the maps, each wilaya is coloured according to 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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Vegetation of the Chinguetti oasis.

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