

Libya

Country profile



Key messages

- Libya has an Agrobiodiversity Index status score of 42.7.
- There is a lack of data on several indicators that makes it difficult to assess the status of agrobiodiversity as comprehensively as for other Mediterranean countries.
- In consumption, there is an overdependence on cereals, oil, and sugars, which provide almost three-quarters of people’s energy supply, and may increase the risk of malnutrition, dietary health problems, and vulnerability of food supply to import disruptions.
- In production, crop and livestock diversity are moderate relative to other countries, yet this is quite impressive given that Libya is almost entirely desert and has extensive infertile soils. The proportion of natural vegetation in cropped landscapes could be substantially increased to boost ecosystem functions important for agriculture, including pollination, natural pest controls, soil erosion control, water infiltration, and local climate regulation.
- In conservation, native crop varieties are relatively well conserved while conservation of crop wild relatives, particularly in genebanks, should be substantially improved to safeguard plant genetic resources for food and agriculture.

Pillar 1: Agrobiodiversity in consumption for healthy diets
Pillar 2: Agrobiodiversity in production for sustainable agriculture
Pillar 3: Agrobiodiversity in conservation for future use options

| Score | 41-60 |
|-------|--------|
| 0-20 | 61-80 |
| 21-40 | 81-100 |

All raw scores are scaled from 0 to 100. See Annex 2 for details.

| SUB-INDICATOR (raw scores) | INDICATOR | PILLAR |
|------------------------------------|---|---|
| Overall agrobiodiversity: 0 (0) | Commitments supporting agrobiodiversity: 0 | Pillar 1 Consumption 0.0 |
| Varietal/breed diversity: 0 (0) | | |
| Species diversity: 0 (0) | | |
| Functional diversity: 0 (0) | | |
| Underutilized species: 0 (0) | | |
| Overall agrobiodiversity: 33.3 (1) | Commitments supporting agrobiodiversity: 8.3 | Pillar 2 Production 8.3 |
| Varietal/breed diversity: 0 (0) | | |
| Species diversity: 0 (0) | | |
| Functional diversity: 0 (0) | | |
| Underutilized species: 0 (0) | | |
| Pollinator diversity: 0 (0) | | |
| Soil biodiversity: 0 (0) | Commitments supporting agrobiodiversity: 33.3 | Pillar 3 Conservation 33.3 |
| Landscape complexity: 33.3 (1) | | |
| Overall agrobiodiversity: 33.3 (1) | | |
| Varietal/breed diversity: 33.3 (1) | | |
| Species diversity: 33.3 (1) | | |
| Functional diversity: 0 (0) | | |
| Underutilized species: 66.7 (2) | | |

13.9
Commitment

| | | |
|---|--------------------------------|---|
| Pillar 1 Consumption | Functional diversity: 54.0 | (Avoided) Disability Adjusted Life Years attributable to dietary risks per 100,000 adults: 54.0 (8,845) |
| | Varietal/breed diversity: 13.2 | Livestock breed diversity (Shannon's Index): 13.2 (0.4) |
| Pillar 2 Production | Species diversity: 40.2 | Crop species richness in production (count): 33.3 (41.0) |
| | | Crop species diversity in production (Shannon's Index): 47.0 (1.1) |
| | | Cropland with high crop species richness (%): 6.9 (6.9) |
| | | Freshwater fish species richness (average count): 66.9 (55.5) |
| | | Livestock diversity in production (Shannon's Index): 47.0 (0.8) |
| | | Soil biodiversity: 10 |
| Pillar 3 Conservation | Landscape complexity: 27.4 | Cropland with >10% natural and semi-natural habitat at 1x1km scales (%): 27.4 (27.4) |
| | Varietal diversity: 71.0 | Varietal diversity in genebanks (Shannon's Index): 71.0 (4.0) |
| | Species diversity: 52.0 | Species diversity in genebanks (Shannon's Index): 46.2 (2.9) |
| | | Crop wild relative occurrence diversity (Shannon's Index): 57.8 (3.7) |
| | Underutilized species: 30.8 | <i>In situ</i> conservation of useful wild species (%): 58.5 (58.5) |
| <i>Ex situ</i> conservation of useful wild species (%): 3.0 (3.0) | | |
| Status | 42.7 | 51.3 |

| PILLAR | INDICATOR | SUB-INDICATOR (raw scores) |
|--------|-----------|----------------------------|
|--------|-----------|----------------------------|

| | | |
|--------------------------|--|--|
| Pillar 1 Consumption | Management practices supporting agrobiodiversity: 0 | Published diet guidelines (Yes/No): 0.0 (0.0) |
| | | Published food composition tables (Yes/No): 0.0 (0.0) |
| Pillar 2 Production | Diversity-based practices: 2.0 | Crop-livestock integration (% agricultural land with cropland and pasture): 3.9 (3.9) |
| | | Integrated landscape initiatives (count): 0.0 (0.0) |
| | Management practices supporting agrobiodiversity: 51.8 | (Inverted) Sustainable Nitrogen Management Index (Index 0 to infinity): 56.3 (34.8) |
| | | Tree cover on agricultural land (%): 0.7 (0.2) |
| | | (Avoided) pesticide use (kg per ha): 98.5 (0.5) |
| Pillar 3 Conservation | Management practices supporting agrobiodiversity: 3.8 | Indicators reported to the World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture (%): 3.8 (3.8) |
| Action | 10.2 | |

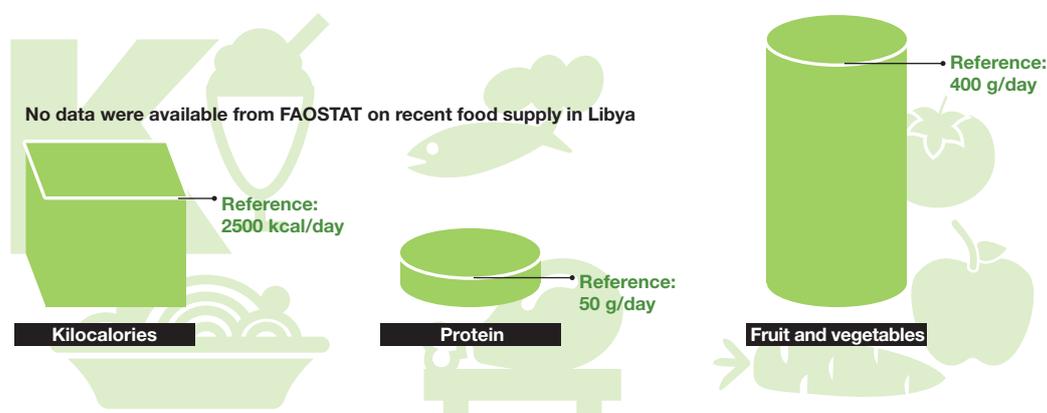
Context

Libya is a country with an upper middle income. In 2019, its annual GDP was US\$52 billion equating to an annual per capita GDP of US\$7,684.¹ Libya covers an area of about 1.8 million km²² and is home to more than 6 million people.³ Population density is low, estimated at four people per km² in 2018.⁴ Eighty percent of the population live in urban areas.⁵ An estimated 11.4% of the population are vulnerable to multidimensional poverty according to the latest survey data from 2014.⁶ Since 2014, Libya has been badly affected by civil war.

Consumption for healthy diets

The Libyan diet typically includes wholewheat and barley flour, couscous and low intakes of rice, dairy products such as cheese and buttermilk, and lamb meat (Figure 1). Consumption of vegetables, such as tomatoes, pumpkin, potatoes, and chickpeas, and fruit, especially dates, is common. Olive oil is widely used in local dishes. Tea is the most popular beverage.⁷ In Libya, the overall life expectancy of an average person is 73 years.⁸ No data are available on the percentage of Libyans who were undernourished in 2019,⁹ however, 16.8% and 35.9% of the population were estimated to be suffering from severe or moderate to severe food insecurity between 2017 and 2019.¹⁰ The prevalence of stunting and wasting for Libyan children under five was reported as 38.1% and 10.2% respectively in 2014.^{11,12} Around 33% of women aged between 15 and 49 are anemic¹³ and 10.2% of the population between 20 and 79 are diabetic.¹⁴ Obesity prevalence is estimated at 39.6% of adult women and 25.0% of adult men.¹⁵ In Libya, the overall life expectancy of an average person is 73 years.⁸ No data are available on the percentage of Libyans who were undernourished in 2019,⁹ however, 16.8% and 35.9% of the population were estimated to be suffering from severe or moderate to severe food insecurity between 2017 and 2019.¹⁰ The prevalence of stunting and wasting for Libyan children under five was reported as 38.1% and 10.2% respectively in 2014.^{11,12} Around 33% of women aged between 15 and 49 are anemic¹³ and 10.2% of the population between 20 and 79 are diabetic.¹⁴ Obesity prevalence is estimated at 39.6% of adult women and 25.0% of adult men.¹⁵

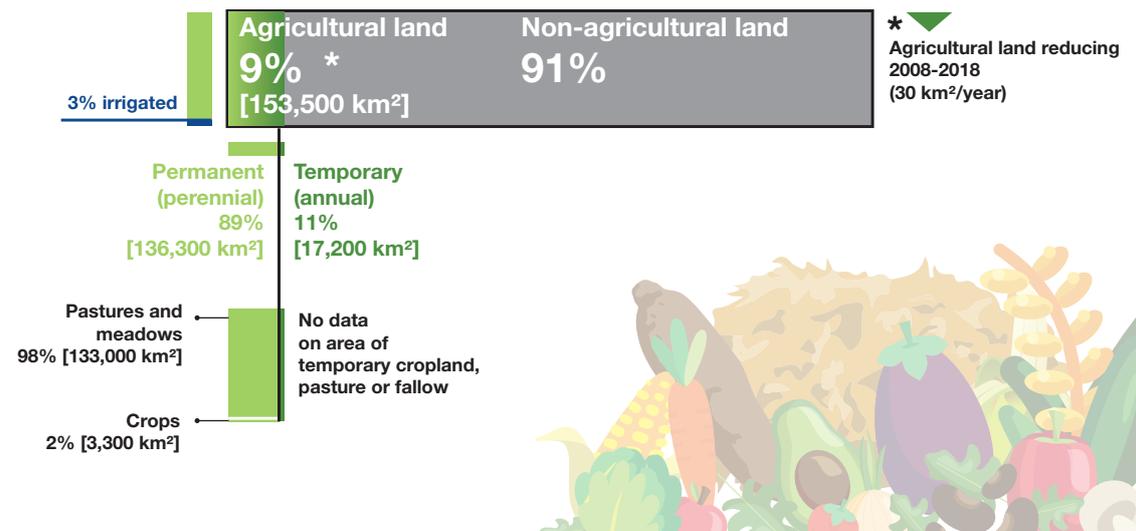
Figure 1: Kilocalorie, protein, fruit and vegetable supply



Production for sustainable agriculture

In Libya, approximately 8.7% (153,500 km²) of the total land area is dedicated to agriculture, of which a small 11.2% (17,200 km²) is arable land (Figure 2). No data are available on other land uses.^{16,17} Agriculture, forestry, and fishing contribute 1.8% of the country's GDP. Olives, barley, wheat, almonds, dates, watermelon, potatoes, onions, plums (and sloes), and tomatoes constitute the top ten commodities by harvested area and together account for 91.5% of the 0.8 million hectares of harvested land area. Approximately 19% of the Libyan population is employed in the agricultural sector, and of these 22% are women. Regarding Libyan fisheries production, in 2018, capture production and aquaculture were estimated at 30,266 tonnes and 10 tonnes respectively.¹⁸ In the same year, annual livestock production, with eggs, milk and meat as the three main animal-sourced food produced, was estimated at over 1 million tonnes.¹⁹

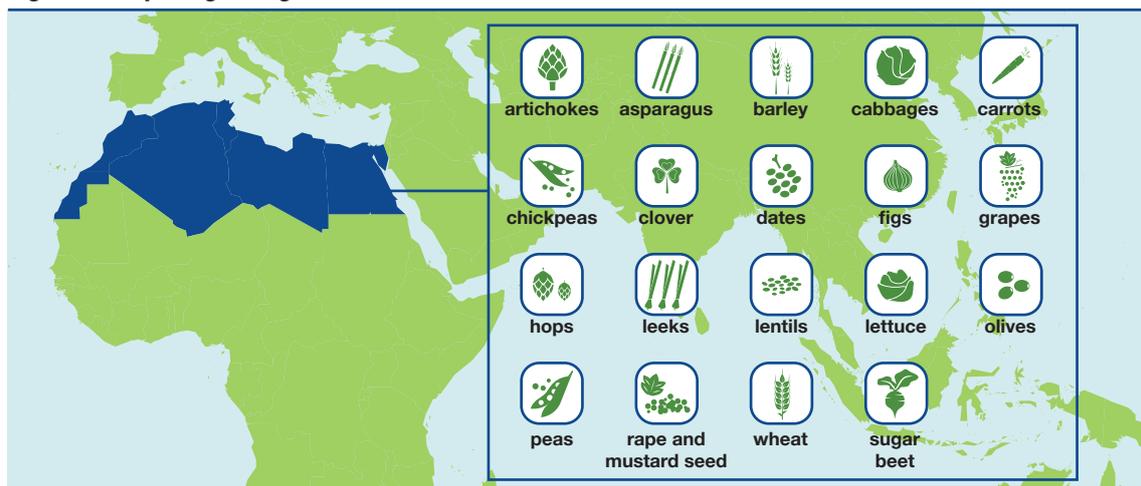
Figure 2: Land used for agriculture



Conservation for future use options

About 3,437 km² of terrestrial areas (0.21% of total land) and 357,895 km² of marine areas are protected in Libya.²⁰ Only 2,170 km² of its land area²¹ is forested. The country lost 2.72 km² of its tree cover from 2001 to 2019, showing a decrease of 4% since 2000.²² In Libya, the distribution and populations of 239 plant and 862 animal species have been assessed, of which nine plants, 11 mammals and eight birds are considered threatened.²³⁻²⁵ Libya is part of the south and east Mediterranean center of origin for a number of crop species, including artichokes, barley, dates, grapes and olives (Figure 3). Among plant genetic resources for food and agriculture, native species of barley and wheat are among those considered threatened.²⁶ Droughts, fires, and encroachment are among the major threats to plant genetic resources for food and agriculture.

Figure 3: Crops originating from South and East Mediterranean



Agrobiodiversity Index score

Libya has an Agrobiodiversity Index status score of 43.

Status: What's driving the Agrobiodiversity Index score?

Consumption

Species diversity in diets: There is a lack of FAO data on species diversity available for human consumption.

Functional diversity: The functional diversity score of 54 reflects a relatively high number of Disability Adjusted Life Years attributable to dietary risk factors. The three most important food groups that Libyan people consume are cereals, oils, and sugars, and these provide almost three-quarters of the energy supply. This diet, dense in energy and poor in micronutrients, is conducive to malnutrition and dietary health risks. The overreliance on cereals also adds to vulnerability in terms of food supply, particularly because currently Libya is highly dependent on cereal imports.

Underutilized species: There is a lack of FAO data on underutilized and local species available for human consumption.

There were no data available on varietal diversity in consumption.

Production

Varietal diversity: The diversity of livestock breeds maintained in production in Libya (0.4) is very low relative to other countries in the world and compared to the average for the ten Mediterranean countries (1.5). Libya has two breeds of cattle in production, one breed of sheep, and one of goat, though other species and breeds may exist whose population counts are not reported to FAO. Keeping multiple breeds in production would help farmers maintain livelihoods in times of pest and disease outbreaks or other production challenges, because different breeds have different resistance to pests and diseases.

Species diversity: With 41 distinct commodities in production, crop species richness is low relative to the global maximum of 123 species (in China) and below average across the ten Mediterranean countries. Cropped landscapes have moderate crop species diversity relative to other countries in the world, and just below average across the ten Mediterranean countries. A very low percentage (6.9%) of agricultural land contains a high diversity of crop species at 10x10 km scales. Enhancing crop diversity at field, farm, and landscape levels is recommended to enhance natural pest and disease controls, yield stability, biodiversity, and other ecosystem services.²⁷ With 56 recorded freshwater fish species, fish richness is high relative to other countries in the world and above average compared to the nine other Mediterranean countries. Livestock species diversity in production is moderate compared to other countries in the world and average compared to the nine other Mediterranean countries. Actions to boost livestock richness in areas of the country where these are low would help ensure farmers in all regions rely on a wide species base, helping shield them against pests and diseases and other production challenges.

Soil biodiversity: Soil biodiversity is very low for most of the country, averaging 0.2 on scale of 0.11 to 1.35 (representing the minimum and maximum global extremes). This makes Libya a country with one of the lowest soil biodiversity levels in the world. Targeted use of crop species with restorative traits (e.g. using deep-rooted trees to reverse salinization, application of mulch and animal manure to restore nutrients, and intercropping with legumes) together with low or no tillage and addition of organic material could help restore soils affected by salinization, low fertility, and soil erosion to improve soil health.

Landscape complexity: 27.4% of Libya’s cropped landscapes have at least 10 ha of natural vegetation at 1x1km scales, which is average for Mediterranean countries, even though well below the 100% recommended. Maintaining natural vegetation in and around cropland helps maintain habitat connectivity and ecosystem functioning to sustain nature’s contributions to agriculture, including reducing the risk of pest and disease outbreaks, maintaining pollinators, and safeguarding crop wild relatives. Retaining at least 10% natural habitat at local (1x1 km) and landscape (10x10 km) scales could be achieved on farm through practices suited to local soils and climates, such as drought-resistant grass, shrub and tree field borders and set aside, and off farm by safeguarding native trees and grasslands around cultivated areas.

There were no data available on functional diversity, underutilized species, or pollinator diversity in production.

Conservation

Varietal diversity: Libya has a high score of 71 for varietal diversity relative to the globally best performing country (France), and above average compared to the ten Mediterranean countries. This means that accessions of Libyan crop varieties are relatively well conserved in genebanks in terms of number of different varieties and their abundance.

Species diversity: The species diversity score of 52 indicates Libya has a moderate amount of its cultivated and wild plant species conserved in genebanks, and a moderate diversity of crop wild relative species have been identified growing in-country, relative to other countries in the world.

Underutilized species: Libya has a low score (30.8) for conservation of underutilized species (useful wild species). While above half (58.5%) of known useful wild plants in Libya are conserved *in situ*, only 3% are conserved *ex situ*.

There were no data available for functional diversity of genetic resources in conservation.



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Actions: What actions are being taken to maintain and increase agrobiodiversity?

Consumption: For consumption, Libya has not reported on food-based dietary guidelines or food composition tables for supporting agrobiodiversity for healthy diets.

Production: Action scores are low (26.9) for agrobiodiversity use in production. This score reflects very low adoption of diversity-based practices together with moderate adoption of agrobiodiversity-supportive management practices.

- **Diversity-based practices:** Available data indicate that there is low potential for integrated farming in Libya, with 3.9% of its agricultural landscapes (10x10 km areas) containing both cropland and pasture facilitating crop-livestock integration. This is much lower than the Mediterranean average (33.5%) and likely reflects the difficulty in growing crops in the 90% of the country that is desert, while these areas still include camels and other water-efficient livestock populations.
- **Production management practices supporting agrobiodiversity:** The environmental efficiency of production is moderate relative to other countries in the world, based on the Sustainable Nitrogen Management Index (SNMI) score, which combines data on both nitrogen use efficiency and land use efficiency (crop yields). Libya has very low levels of pesticide use relative to other countries in the world, estimated at 0.5 kg per hectare, far below the highest global user (28.0kg per hectare in Mauritius). The avoided use of pesticides has a positive impact on soil biodiversity, pollinators, and natural enemies of pests, with benefits for agriculture and biodiversity. Trees are integrated into 0.2% of agricultural land in Libya, which is extremely low relative to other countries in the world and likely reflects the difficulty in sustaining plants needing much water, such as trees, in extreme arid climates. Setting aside small areas of farmland for planting functionally and nutritionally diverse drought-resistant trees can provide multiple benefits for farmers in arid climates.²⁸ Drought-resistant, native tree varieties could be prioritized to minimize water consumption while providing other benefits to farmers. No data are available on the level of adoption of organic or conservation agriculture.

Conservation: It has not been possible to properly evaluate the action indicators for Libya, given that the country has not reported its progress towards the implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture in the country.



Commitments: How supportive of agrobiodiversity are national policies?

The commitments analysis was based on Libya's *Fourth National Report on the Implementation of the Convention on Biological Diversity*^{29,29}

Consumption: No commitments to enhancing agrobiodiversity in consumption for healthy diets were identified. This is based only on a review of Libya's national report to the CBD, and other national documents may include commitments to promoting the use of food diversity for healthy diets. Nonetheless, it highlights a potential gap in agrobiodiversity policy.

Production: Libya has a very low score (8.3) for commitments to enhancing agrobiodiversity in production. Libya mentions in their report that the government aims to preserve natural habitats from degradation and loss, particularly through environmental impact assessments, which would help maintain landscape complexity. However, there are no commitments to enhancing farmer use of local breeds and varieties, protecting pollinators or soil biodiversity, or improving species or functional diversity in Libyan's production systems.

Conservation: Libya has a low score (33.3) for commitments to enhance agrobiodiversity in conservation. The strongest commitments are to protect crop wild relatives and local crop and livestock breeds, including through maintaining the national genebank where the germplasm of different crops is protected and bred to develop new varieties. The report indicates an intention to expand protected areas and natural reserves to protect wildlife including crop and livestock wild relatives. The report mentions the importance of protecting its marine fish resources, particularly through reducing sea pollution. However, stronger commitments with measurable targets are needed to help safeguard varietal, species and functional diversity of crops, fish, and livestock.



Credit: Pixabay/Gero Birkenmaier

Recommendations

This section suggests concrete actions that can be taken to improve the use and conservation of agrobiodiversity for more sustainable food systems (Table 1). The list of actions is by no means exhaustive or prescriptive. It is intended for review, discussion, and improvement by in-country policy specialists.

Table 1: Recommended actions to enhance agrobiodiversity in the national food system

| Food system pillar in the Agrobiodiversity Index | Recommendations | Contributing to: | |
|--|---|---------------------|---|
| | | Risk and resilience | Global policy |
| Consumption for healthy diets | <p>Increase diversity in food supply and reduce dependence on cereals, oils, and sugars.</p> <p>Develop nutrition programs and food-based dietary guidelines to support dietary diversification using locally available products.</p> | | <p>SDG2 Zero Hunger</p> <p>SDG12 Responsible Consumption and Production</p> <p>WHO Decade of nutrition – reducing overweight, obesity and anemia</p> |
| Production for sustainable agriculture | <p>Target use of plant functional traits and agroecological farming practices to restore soil biodiversity, such as: deep-rooted drought-tolerant trees to reverse salinization, applying mulch and animal manure, and intercropping with legumes.</p> <p>Increase the proportion of natural habitat embedded in agricultural land.</p> | | <p>Convention on Biological Diversity (CBD) Post-2020 Goal 1ⁱⁱ No Net Loss</p> <p>SDG 1 No Poverty</p> <p>2 Zero Hunger</p> <p>14 Life Below Water</p> <p>15 Life on Land</p> |
| Conservation for future use options | <p>There seems to be no active plant genetic resources program in Libya. There is thus a need to develop a national program and build capacities to promote the effective conservation and use of genetic resources in the country.</p> | | <p>CBD Post-2020 Goal 3 Genetic Diversity</p> <p>4 Nature's benefits</p> <p>SDG 15 Life on Land</p> <p>FAO second Global Plan of Action on Plant Genetic Resources for Food and Agriculture</p> |

Agrobiodiversity highlight

The remarkable date diversity of Libya

An increasing demand for date fruits worldwide leading to the need to fulfil the market demand with high quality products has resulted in severe genetic erosion with loss of cultivars. Consequently, conservation of date palm germplasm is a fundamental topic for date production and food security in desert and semi-desert areas.

Libya, though only the eleventh most important country for date production, representing a tiny 2.5% of total production, has remained a repository of a rich date diversity. Past and recent political events deeply affected trade and consequently export is quite limited in comparison with the neighboring countries. Such a circumstance, which beyond question represents a limit from the economic point of view, resulted in a benefit for the conservation of date palm germplasm.

Unlike other North African countries, in which the predominance of elite cultivars determined severe genetic erosion and the overall impoverishment of date palm agrobiodiversity, Libya, free from market incentives, preserves a huge richness of date palm germplasm.

More than 400 different date varieties still grow in the country of which about one hundred are of commercial interest. This incredible genetic richness has served as a highly effective natural defence for the plantations, which have remained safe from pathogens such as *Fusarium oxysporum* f. sp. *albedinis* (Bayoud disease).

Libya's date varieties fall into three major groups: the fleshy-fruited coastal varieties, the semi-soft varieties from the central zone, mostly consumed fresh (Kathari, Abel, Tagiat) and the less succulent varieties from the southern oases (Amjog, Emeli, Awarig, Tascube, Intalia, Tamjog). These latter cultivars are suited for drying and can be stored for up to ten years, making them highly appreciated by the caravans that formerly crossed the desert.

Sources: ³⁰

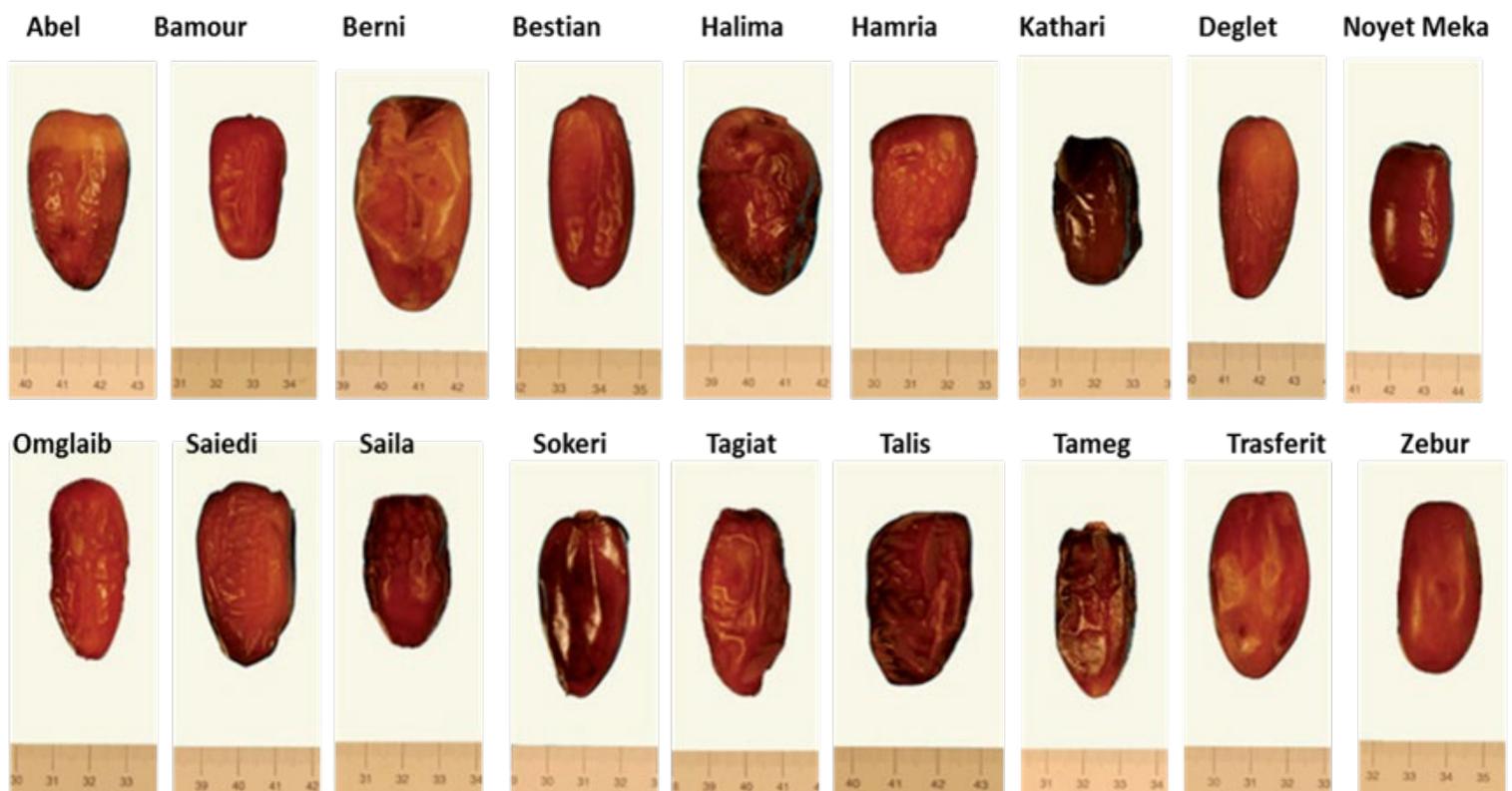


Photo: Fruits of date palm cultivars grown in Libya.

Credit: (IAO photograph archive)

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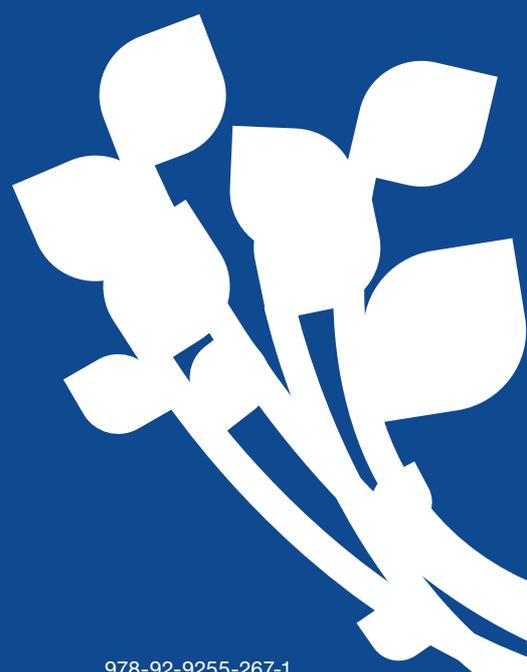
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End notes

- I. The International Union for the Conservation of Nature (IUCN) ranks species according to how threatened they are. Rankings range from 'extinct', through 'critically endangered', 'endangered' and 'vulnerable', to 'near threatened' and 'least concern'.
- II. The Convention on Biological Diversity is an international treaty for the sustainable use and conservation of biological diversity. In 2010 it launched a strategic plan, running from 2011 to 2020, with 20 ambitious targets known as the Aichi Targets from the city in which they were signed. The international community has developed new targets, but their signature has been delayed due to the COVID-19 crisis.



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Alianza



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