GLOBAL CROP CONSERVATION AND USE METRICS

SUGARCANE
(*Saccharum* L.)

CROP TRUST

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Global crop conservation and use metrics

SUGARCANE
(*Saccharum* L.)

With support from

CROP TRUST

International Treaty on Plant Genetic Resources for Food and Agriculture

Federal Ministry of Agriculture, Food and Regional Identity

Description

This report provides an up-to-date overview of the global status of *ex situ* conservation of genetic resources of sugarcane and its wild relatives, including key metrics on:

- global statistics on crop production and availability in food supplies;
- the identity and composition of genebank collections;
- the Multilateral System (MLS) status of accessions in these collections;
- storage, regeneration, and safety duplication status;
- documentation, information systems, and research resources;
- germplasm distribution;
- varietal registrations and releases; and
- crop networks and partnerships

Introduction and background on sugarcane

Sugarcane (*Saccharum officinarum* L.) originated in Southeast Asia and New Guinea, where it was first domesticated around 8,000 BCE before spreading across Southeast Asia, India, and eventually to the rest of the world through Arab traders and then European colonization (Dillon et al., 2007). This tall perennial grass has become one of humanity's most economically significant crops, primarily cultivated for sugar production - its stalks contain high concentrations of sucrose that can be extracted and refined into table sugar, molasses, and various syrups. Beyond sweetening, sugarcane has diverse applications: it serves as a feedstock for bioethanol fuel production, its fibrous residue (bagasse) is used for paper manufacturing and as a biofuel, and it is processed into alcohols such as rum and cachaça. Sugarcane cultivation has fundamentally shaped human history, driving the transatlantic trade in enslaved people, colonial expansion, and major demographic shifts. Today it remains crucial to the economies of many tropical and subtropical nations, including Brazil, India, and Thailand, supporting millions of livelihoods and representing a key resource in plant-based renewable energy (Barbosa *et al.*, 2012; Kandel *et al.*, 2018; Nyack *et al.*, 2014).

Based on the most recently available production statistics from FAOSTAT, reporting for the year 2023, sugarcane is cultivated in at least 95 countries on 27 million hectares worldwide, producing over 2 billion tonnes of cane at a value of USD 96.7 billion (FAO, 2025a). The largest producers include Brazil (782.6 million tonnes), India (490.5 million tonnes), and China (105 million tonnes), as well as Thailand, Pakistan, Mexico, Indonesia, Australia, and Colombia, all of these producing over 30 million tonnes per annum.

International trade in sugarcane amounts to around 1.4 million tonnes exported, and 2 million tonnes imported, per annum, with Lao People's Democratic Republic and Myanmar reporting the largest exports (FAO, 2025a). Among the 78 countries reporting importing sugarcane, the top recipients include China, Saudi Arabia, and Singapore. These statistics are for sugarcane itself and thus represent only a small portion of the actual total trade of the crop, as the majority is traded in refined form, which may include both sugarcane and sugar beet. Trade statistics for refined sugar amount to over 26 million tonnes exported per annum, with 144 countries exporting sugar and 196 countries importing the commodity.

Global consumption statistics for sugarcane are imprecise, with FAOSTAT reporting a portion of the contribution of the crop under its own specific category in food supply statistics, yet with a substantial amount of actual contribution to food supplies attributed to general sugar commodities (Khoury *et al.*, 2023). Statistics specifically for sugarcane (only) indicate that the crop is a major contributor to food weight in the food supplies of at least 29 countries (Table 1); this is undoubtedly an underestimate of the full contribution of the crop to food supplies. Production metrics indicate that sugarcane is widely produced outside of its regions of origin, implying significant international interdependence with regard to its genetic resources.

Table 1. Global status of sugarcane production, availability in food supplies, and public interest. Production and food supply statistics from FAOSTAT (2015 to 2018 average); trade data was not available for sugarcane under this time frame. Number of countries refers to the count of countries where the crop is reported as within the top 95 percent of crops in terms of contribution to production or food supply. The evenness metric quantifies evenness of production or availability in food supplies across world regions, where 0 equals highly uneven and 1 equals completely even. The international interdependence metric quantifies the degree of production or availability in food supplies outside of the primary region of diversity of the crop, where 0 equals low estimated international interdependence and 1 equals high estimated international interdependence. Wikipedia metric is public pageviews over one year (2019) of the taxon name of the crop. All values from Khoury *et al.* (2023).

Metric	Global value	Number of countries where significant contributor	Evenness of contribution across world regions	Estimated international interdependence
Harvested area (ha)	26,478,864	57.75	0.26	0.73
Total production (tonnes)	1,880,703,827	87.00	0.24	0.73
Gross production value (current thousand USD)	82,319,706	47.25	0.20	0.85
Contribution to calories in food supplies (kcal/capita/day)	4.00	9.75	0.28	0.48
Contribution to protein in food supplies (g/capita/day)	0.02	3.50	0.27	0.69
Contribution to fat in food supplies (g/capita/day)	0.03	4.25	0.24	0.38
Contribution to food weight in food supplies (g/capita/day)	5.09	29.00	0.29	0.47
Number of public pageviews on Wikipedia over one year	60,935			

Identity and composition of *ex situ* collections

Based on the latest data in global genetic resource databases, germplasm collections of sugarcane and its wild relatives (i.e., genus *Saccharum* L.) are present in at least 25 institutions worldwide, collectively maintaining 9,602 accessions (Table 2, Table 3; Supplementary Table 1). The largest collections are in Cuba, Japan, Bangladesh, USA, and Vietnam; these collectively maintain over three-quarters of documented germplasm accessions worldwide.

The information reported in the global databases is somewhat lower than the number of accessions reported for the crop (11,187) in the major germplasm collections listed in *The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture* (FAO, 2025b). The main collection listed in the FAO document but not currently present in the global databases is Cenicaña (COL115), with 1519 accessions.

In the International Board for Plant Genetic Resources (IBPGR)/International Plant Genetic Resources Institute (IPGRI) Register of Base Collections, the Sugarcane Breeding Institute (SBI, India), the National Institute of Agricultural Research (NIAS, Japan), and the USDA National Plant Germplasm System collections (USA) were recognized as base collections having agreements with IBPGR for "Long-term Conservation of Crop Gene-pools on Global or Regional Basis" (IBPGR/IPGRI, 1993; Thormann *et al.*, 2019). These collections appear to continue to be active; SBI is not reported in the global genetic resources databases; while the NIAS and USDA collections are. The USDA collection is termed a "world collection" (Tai and Miller, 2001; Park *et al*., 2024).

Saccharum L. (Poaceae) contains around 19 species, native to South, Southeast, East, and Central Asia; the Pacific region; Africa; Australia; and South America, and introduced to several other regions (WFO, 2025). A published genepool concept is available for sugarcane (*Saccharum officinarum* L.) (USDA, 2025). In this concept, *Saccharum barberi* Jeswiet and *Saccharum edule* Hassk. along with *Saccharum officinarum* L., are considered crop (cultivated only) taxa. For sugarcane:

The primary genepool contains:
Saccharum robustum E. W. Brandes & Jeswiet ex Grassl
Saccharum sinense Roxb.

The secondary genepool contains:
Saccharum longisetosum (Andersson) V. Naray. ex Bor (and varieties)
Saccharum narenga (Nees) Wall. ex Hack.
Saccharum spontaneum L. (and subspecies)

The tertiary genepool contains additional taxa in *Saccharum*, as well as several species in related genera:
Saccharum alopecuroides (L.) Nutt.
Saccharum angustifolium (Nees) Trin.
Saccharum baldwinii Spreng.
Saccharum beccarii (Stapf) Cope
Saccharum brevibarbe (Michx.) Pers. var. brevibarbe
Saccharum brevibarbe (Michx.) Pers. var. contortum (Elliott) R. D. Webster
Saccharum coarctatum (Fernald) R. D. Webster
Saccharum fallax Balansa
Saccharum filifolium Steud.
Saccharum formosanum (Stapf) Ohwi
Saccharum giganteum (Walter) Pers.
Saccharum perrieri (A. Camus) Clayton
Saccharum viguieri (A. Camus) Clayton
Saccharum villosum Steud.
Saccharum wardii (Bor) Bor ex Cope
Saccharum williamsii (Bor) Bor ex Cope
Cenchrus americanus (L.) Morrone
Imperata cylindrica (L.) Raeusch.
Miscanthus ecklonii (Nees) Mabb.
Miscanthus floridulus (Labill.) Warb. ex K. Schum. & Lauterb.
Miscanthus intermedius (Honda) Honda
Miscanthus junceus (Stapf) Pilg.
Miscanthus longiberbis (Hack.) Nakai (and varieties)
Miscanthus lutarioriparius L. Liou ex Renvoize & S. L. Chen
Miscanthus oligostachyus Stapf
Miscanthus sacchariflorus (Maxim.) Benth. & Hook. f. ex Franch.
Miscanthus sinensis Andersson (and subspecies)
Miscanthus tinctorius (Steud.) Hack.
Miscanthus transmorrisonensis Hayata
Miscanthus violaceus (K. Schum.) Pilg.
Sorghum bicolor (L.) Moench subsp. bicolor
Zea mays L.

Data compilation for this report on sugarcane genetic resources included all taxa in *Saccharum*. Along with the crop, eight taxonomic names as well as hybrids and accessions only determined to the genus level are present in germplasm collections (Supplementary Table 2). The largest collections are of accessions determined only at the genus level, followed by the crop species, *S. spontaneum*, and hybrid accessions.

Breeding materials make up the largest proportion of collections (38.4%), followed by improved varieties (21.8%), landraces (15.1%), and wild relatives (8.5%) (Table 3);

these percentages are estimates based on available data, noting that 14.4% of accessions do not have biological status data. *Saccharum* germplasm has been collected from at least 44 countries, with approximately 11.7% of accessions originating from the primary region of diversity of the crop (i.e. South and Southeast Asia); these statistics are also general estimates, as 7.7% of sugarcane landrace accessions and 76.7% of wild relative accessions do not contain information even of the country where the accession was collected. Information on botanic garden collections from BGCI PlantSearch indicate that 165 botanic gardens collectively conserve 11 *Saccharum* taxa; of these, one (*Saccharum griffithii* Munro ex Aitch.) may only be conserved in botanic gardens and not in genebank collections, although its taxonomy is disputed.

Aside from the taxa that appear to be entirely missing from, or with limited representation in, germplasm collections, the global genetic resources databases do not offer insights on diversity gaps, but published research has indicated specific priority species and geographic regions for further collecting for conservation. In a global *ex situ* conservation gap analysis of the wild relatives of major crops, Castañeda-Álvarez *et al.* (2016), assessing 11 sugarcane wild relative taxa, listed 10 (90.1%) as of high priority for further collecting, and one as of medium priority.

Table 2. Major *ex situ* collections of sugarcane genetic resources. Top 20 institutions listed in descending order by total number of accessions. Number of accessions and storage condition information from Genesys and FAO WIEWS (2025), with supplementary information as noted. Multilateral System (MLS) status from Plant Treaty GLIS (2025) and from Genesys and FAO WIEWS (2025).

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions conserved *in vitro* or in cryo storage	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
CUB041	Instituto Nacional de Investigación de la Caña de Azúcar	3,154	32.9%	32.8%	0	0	0
JPN183	NARO Genebank	1,601	16.7%	49.5%	0	0	0
BGD015	Bangladesh Sugarcrop Research Institute (BSRI)	1,223	12.7%	62.3%	0	0	0
USA047	Subtropical Horticultural Research Unit, National Germplasm Repository - Miami, USDA	965	10.1%	72.3%	0	0	0
VNM120	Sugar Cane Research and Development Center	493	5.1%	77.4%	0	0	0
ARG1217	Estación Experimental Agropecuaria Famaillá	428	4.5%	81.9%	0	0	0
FRA201	Station de la Guadeloupe, CIRAD-FLHOR	423	4.4%	86.3%	0	0	0
KEN212	Genetic Resources Research Institute	304	3.2%	89.5%	0	0	0
IND001	National Bureau of Plant Genetic Resources	271	2.8%	92.3%	0	0	0
CRI149	Banco de Germoplasma de Caña de Azúcar	238	2.5%	94.8%	0	0	0
USA995	National Center for Genetic Resources Preservation	176	1.8%	96.6%	0	0	0

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions conserved *in vitro* or in cryo storage	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
COL032	Centro de Investigación La Suiza, Corporación Colombiana de Investigación Agropecuaria	137	1.4%	98.0%	0	0	0
BRA035	Embrapa Tabuleiros Costeiros	98	1.0%	99.1%	9	0	0
GUY021	National Agricultural Research and Extension Institute	48	0.5	99.6%	0	0	1
GBR004	Millennium Seed Bank - Royal Botanic Gardens Kew	9	0.1%	99.6%	0	0	0
MWI041	Malawi Plant Genetic Resources Centre	8	0.1%	99.7%	0	0	8
ZAF062	RSA National Plant Genetic Resources Centre	7	0.1%	99.8%	0	0	0
USA151	National Arboretum-Germplasm Unit, USDA/ARS	6	0.1%	99.9%	0	0	0
FJI049	Centre for Pacific Crops and Trees	5	0.0%	99.9%	5	5	5
ISR002	Israel Gene Bank for Agricultural Crops, Agricultural Research Organisation, Volcani Center	3	0.0%	99.9%	0	0	0
	Other institutions (n = 5)	5	0.0%	100.0%	0	0	0

Table 3. Composition of *ex situ* collections of sugarcane genetic resources. Main *ex situ* collections data from Genesys and FAO WIEWS (2025). Primary and secondary regions information from Khoury *et al.* (2023) and subsequent research for this summary. Botanic gardens data from BGCI PlantSearch (2025).

Metric	Number	Percentage
Total number of accessions in genebank collections	9,602	
Number of institutions holding genebank collections	25	
Number of distinct taxonomic names in genebank collections	12	
Number of accessions of crop wild relatives (CWR) in genebank collections	816	8.5%
Number of accessions of weedy materials in genebank collections	0	0.0%
Number of accessions of landraces in genebank collections	1,448	15.1%
Number of accessions of breeding materials in genebank collections	3,691	38.4%
Number of accessions of improved varieties in genebank collections	2,093	21.8%
Number of accessions of other materials in genebank collections	169	1.8%
Number of accessions not marked with an improvement type in genebank collections	1,385	14.4%
Number of countries where germplasm has been collected for genebank collections	44	
Number of accessions in genebank collections from the primary region(s) of diversity	1,120	11.7%
Number of taxa in botanic garden collections	11	
Number of botanic gardens holding collections of crop or its wild relatives	165	

Multilateral System status of accessions in *ex situ* collections

The genus *Saccharum* is not listed in Annex I of the International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty) and is thus not included in its Multilateral System of Access and Benefit Sharing (MLS). This said, institutions can voluntarily place their collections under the MLS. As of 2025, six accessions are formally included in the MLS according to the Plant Treaty's GLIS database, and 313 accessions have been assigned Digital Object Identifiers (DOIs) (Table 4). Per the relevant fields in the global genetic resources databases, 14 accessions (0.2% of world total) are listed as included in the MLS; this may be an underestimate, noting that 96.5% of accessions do not have MLS status data.

Table 4. Representation of sugarcane accessions in international and national institutions, number of accessions with DOIs, and representation of accessions in the Multilateral System of Access and Benefit Sharing of the International Treaty on Plant Genetic Resources for Food and Agriculture. Main *ex situ* collections data from Genesys and FAO WIEWS (2025). DOI and MLS data from Plant Treaty GLIS (2025).

Metric	Number	Percentage
Number of accessions in genebank collections in international institutions	5	0%
Number of accessions in genebank collections in national or other institutions	9,597	100%
Number of accessions in genebank collections in Annex I	0	0%
Number of accessions with DOI (Plant Treaty GLIS 2025)	313	
Number of accessions included in the Multilateral System (MLS) (Plant Treaty GLIS 2025)	6	
Number of accessions included in the Multilateral System (MLS) (genebank collections databases)	14	0.2%
Number of accessions included in the Multilateral System (MLS) that are in international collections (genebank collections databases)	5	0%
Number of accessions not included in the Multilateral System (MLS) (genebank collections databases)	321	3.3%
Number of accessions without information regarding inclusion in the Multilateral System (MLS) (genebank collections databases)	9,267	96.5%

Storage conditions, regeneration status, and safety duplication

Sugarcane is primarily maintained in field collections, with approximately 80% of accessions conserved in the field (Table 5). Conservation of sugarcane accessions in *in vitro* or cryopreservation conditions appears to be extremely limited currently. Information on storage is missing for 11.9% of sugarcane germplasm accessions.

Current regeneration status and needs cannot be directly derived from the global germplasm databases. FAO WIEWS reporting for the *Third State of the World's Plant Genetic Resources for Food and Agriculture* (FAO, 2025b) for the years 2014 to 2019, documented 2,686 sugarcane accessions regenerated during this time by reporting institutions, with 50 accessions identified as needing regeneration.

Analysis of the location of safety duplication sites of sugarcane germplasm, as listed in Genesys, indicates that under 1% of accessions are safety duplicated in an active collection (i.e., apart from potentially being duplicated at the Svalbard Global Seed Vault [SGSV]) outside of the country of the main

collection (Table 5). The actual extent of safety duplication of sugarcane accessions worldwide, when also considering safety duplication within the same country, may be higher than this estimate, given that some national genebanks, such as the USA, typically provide safety backup of their collections in a different location within the country. Information from the SGSV database from 2024 indicates that only three accessions (out of approximately 764 accessions held as seed globally) are duplicated in Svalbard.

Table 5. Storage conditions of sugarcane *ex situ* collections, regeneration status, and safety duplication status. Main *ex situ* collections data from Genesys and FAO WIEWS (2025). Regeneration status information from FAO WIEWS (2025); data from 2014 to 2019. Safety duplication out of the country data based only on Genesys (2025) data. Svalbard Global Seed Vault data from SGSV portal (2025).

Metric	Number	Percentage
Number of accessions held in seed storage in genebank collections	764	8.0%
Number of accessions held in short-term seed storage in genebank collections	0	0.0%
Number of accessions held in medium-term seed storage in genebank collections	9	1.2%
Number of accessions held in long-term seed storage in genebank collections	578	75.7%
Number of accessions held in seed storage of undefined type in genebank collections	177	23.2%
Number of accessions held in field storage in genebank collections	7,679	80.0%
Number of accessions held in *in vitro* storage in genebank collections	14	0.1%
Number of accessions held in cryo storage in genebank collections	0	0.0%
Number of accessions held as DNA in genebank collections	0	0.0%
Number of accessions held in other storage in genebank collections	0	0.0%
Number of accessions not marked with a storage type in genebank collections	1,145	11.9%
Number of accessions in genebank collections regenerated 2014–2019	2,686	59.0%
Number of accessions in genebank collections in need of regeneration 2014–2019	50	1.1%
Number of accessions in genebank collections in need of regeneration without budget for regeneration 2014–2019	0	0.0%
Number of accessions safety duplicated out of the country in genebank collections	3	0.6%
Number of accessions in genebank collections safety duplicated in Svalbard	3	0.0%

Documentation, information systems, and research resources

A descriptor list for sugarcane has not been published by the international agricultural research community, but descriptors have been proposed and reviewed in the scientific literature (Gallacher and Berding, 1997) and used by collections such as the USDA (USDA, 2025a).

The estimated completeness of passport information for sugarcane accessions listed in Genesys is 3.3 on a scale of 0 (no data) to 10 (complete data), which indicates that there are extensive gaps for most accessions that it would be valuable to fill. Four metrics of the current degree of digital sequence information (DSI) for sugarcane (from the National Center for Biotechnology Information USA database), two metrics of published literature on the crop (Google Scholar and PubMed Central), and one metric of the degree of research resources such as herbarium specimens (from the Global Biodiversity Information Facility - GBIF), are listed in Table 6.

Table 6. Documentation, information systems, and research resources for sugarcane. Passport data completeness index (PDCI) from Genesys (2025), based on the methods outlined in van Hintum *et al.* (2011). Global Biodiversity Information Facility data from GBIF (2025). All other metrics data from Khoury *et al.* (2023).

Metric	Number
Passport data completeness index (range 0-10) as a median value across accessions in genebank collections	3.3
Number of genes as recorded in NCBI's Entrez database as of 2022	9,321
Number of genomes as recorded in NCBI's Entrez database as of 2022	1
Number of nucleotides as recorded in NCBI's Entrez database as of 2022	36,673
Number of proteins as recorded in NCBI's Entrez database as of 2022	56,448
Number of publications listed in Google Scholar with taxon name in title published between 2009 and 2019	1,840
Number of publications listed in PubMed Central with taxon name in text as of 2022	5,974
Number of research materials as recorded in GBIF (2025)	175,311

Germplasm distributions and varietal registrations and releases

Germplasm distributions and varietal development statistics for sugarcane are listed in Table 7. Germplasm distribution data from FAO WIEWS and the Plant Treaty Data Store reflect different reporting scopes: FAO WIEWS primarily reports distributions from national genebanks, while the Plant Treaty Data Store includes all transfers made under the SMTA, encompassing distributions made by genebanks as well as by breeding programs and other organizational types (Khoury *et al.*, 2025). Distributions as reported in the FAO WIEWS dataset were made from institutions in 7 countries, with the largest numbers of samples distributed from institutions in Tanzania, France, China, and Guyana, and were primarily to within-country national agricultural research centers, the private sector, and to other (unspecified) users (Khoury *et al.*, 2025). The differences in numbers of samples distributed as recorded by FAO WIEWS versus the Plant Treaty Data Store is likely a reflection of the lack of inclusion of the crop in Annex 1 of the Plant Treaty (Khoury *et al*., 2023).

Table 7. Sugarcane germplasm distributions and varietal registrations and releases. FAO WIEWS distributions data is annual average over years 2014 to 2019. Plant Treaty Data Store distributions data is annual average over years 2015 to 2021. Evenness metric quantifies evenness of germplasm distributions across world regions, where 0 equals highly uneven and 1 equals completely even. International Union for the Protection of New Varieties of Plants (UPOV) PLUTO data is annual average over years 2014 to 2018. FAO WIEWS varietal releases data is annual average over years 2015 to 2019. All metrics data from Khoury *et al.* (2023), with Plant Treaty Data Store additions for more recent years (2019 to 2021).

Metric	Number
Average annual number of accessions distributed worldwide as recorded in FAO WIEWS	377.5
Average annual number of samples distributed worldwide as recorded in FAO WIEWS	6,167.1
Average annual number of samples distributed worldwide as recorded in the Plant Treaty Data Store	0
Number of countries receiving germplasm as recorded in the Plant Treaty Data Store	0
Evenness of distributions across world regions as recorded in the Plant Treaty Data Store	0
Average annual number of varietal registrations worldwide as recorded in UPOV's PLUTO	0
Average annual number of varietal releases worldwide as recorded in FAO WIEWS	22.8

Networks and partnerships

Currently active networks include:

- The International Society of Sugar Cane Technologists (ISSCT) is an association of scientists, technologists, managers, institutions and companies/corporations concerned with the technical advancement of the cane sugar industry and its co-products.
- The USDA ARS Sugarcane Crop Germplasm Committee (also here)
- Brazilian network RIDESA (Barbosa *et al.*, 2012)
- Communities related to sugarcane genetics and genomics, e.g. SugarcaneOmics

Conclusions

Sugarcane continues to be the most important sugar crop worldwide, with multiple industrial and other applications as well. Its genetic resources are bolstered by the activities taking place in collections in national and subnational agricultural research organizations; there are no major international collections for the crop. Available data indicates that these collections, in combination, are diverse and extensive, although they may not represent the full range of crop varieties as well as species and populations of wild relatives that could be conserved *ex situ* and made available for use. Lack of inclusion of the crop in Annex 1 of the Plant Treaty constrains international access to germplasm, with less than 1% of total accessions worldwide currently included in the MLS. There are considerable amounts of associated research resources, and there has been significant activity in germplasm distributions. Further efforts are required to: identify/determine taxa within current *ex situ* accessions; regenerate accessions in need; more fully secure these accessions in long-term seed storage conditions (as feasible) as well as in *in vitro* and cryopreservation, and to safety duplicate unique accessions; and provide more complete accession-level passport information as well as generate further characterization and evaluation datasets.

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Methods and materials

Primary data sources for the metrics reported in this summary include: Genesys; World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture of the Food and Agriculture Organization of the United Nations (FAO WIEWS); Botanic Gardens Conservation International PlantSearch database (BGCI PlantSearch); Global Information System of the International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty GLIS); Data Store of the International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty Data Store); Svalbard Global Seed Vault portal (SGSV portal); International Union for the Protection of New Varieties of Plants (UPOV) PLUTO database; FAOSTAT; National Center for Biotechnology Information's Entrez database (NCBI Entrez); Google Scholar; PubMed Central; Wikipedia; and the Global Biodiversity Information Facility (GBIF). Some of these data were acquired from literature/databases including Khoury et al. (2023) and Khoury et al. (2025). Data processing, metric calculation, and table generation were conducted in R, with code available on this GitLab repository. Extended methods are available here.

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Supplementary information

Supplementary Table 1: Full list of *ex situ* collections of sugarcane genetic resources, in descending order by total number of accessions. Number of accessions and storage condition information from Genesys and FAO WIEWS (2025), with supplementary information as noted. Multilateral System (MLS) status from Plant Treaty GLIS (2025) and from Genesys and FAO WIEWS (2025).

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions conserved *in vitro* or in cryo storage	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
CUB041	Instituto Nacional de Investigación de la Caña de Azúcar	3,154	32.9%	32.8%	0	0	0
JPN183	NARO Genebank	1,601	16.7%	49.5%	0	0	0
BGD015	Bangladesh Sugarcrop Research Institute (BSRI)	1,223	12.7%	62.3%	0	0	0
USA047	Subtropical Horticultural Research Unit, National Germplasm Repository - Miami, USDA	965	10.1%	72.3%	0	0	0
VNM120	Sugar Cane Research and Development Center	493	5.1%	77.4%	0	0	0
ARG1217	Estación Experimental Agropecuaria Famaillá	428	4.5%	81.9%	0	0	0
FRA201	Station de la Guadeloupe, CIRAD-FLHOR	423	4.4%	86.3%	0	0	0
KEN212	Genetic Resources Research Institute	304	3.2%	89.5%	0	0	0
IND001	National Bureau of Plant Genetic Resources	271	2.8%	92.3%	0	0	0
CRI149	Banco de Germoplasma de Caña de Azúcar	238	2.5%	94.8%	0	0	0
USA995	National Center for Genetic Resources Preservation	176	1.8%	96.6%	0	0	0
COL032	Centro de Investigación La Suiza, Corporación Colombiana de Investigación Agropecuaria	137	1.4%	98.0%	0	0	0
BRA035	Embrapa Tabuleiros Costeiros	98	1.0%	99.1%	9	0	0
GUY021	National Agricultural Research and Extension Institute	48	0.5%	99.6%	0	0	1
GBR004	Millennium Seed Bank - Royal Botanic Gardens Kew	9	0.1%	99.6%	0	0	0
MWI041	Malawi Plant Genetic Resources Centre	8	0.1%	99.7%	0	0	8
ZAF062	RSA National Plant Genetic Resources Centre	7	0.1%	99.8%	0	0	0
USA151	National Arboretum-Germplasm Unit, USDA/ARS	6	0.1%	99.9%	0	0	0
FJI049	Centre for Pacific Crops and Trees	5	0.0%	99.9%	5	5	5
ISR002	Israel Gene Bank for Agricultural Crops, Agricultural Research Organisation, Volcani Center	3	0.0%	99.9%	0	0	0

ECU023	Departamento Nacional de Recursos Fitogenéticos	1	0.0%	100.0%	0	0	0
ECU308	Estación Experimental Central de la Amazonia	1	0.0%	100.0%	0	0	0
LBN020	Lebanese Agricultural Research Institute	1	0.0%	100.0%	0	0	0
MRT002	Centre National de Recherche Agronomique et de Développement Agricole	1	0.0%	100.0%	0	0	0
USA108	Tropical Agricultural Research Station, Clonal Repository USDA/ARS	1	0.0%	100.0%	0	0	0

Supplementary Table 2: Full list of taxonomic names in *ex situ* genetic resource collections, in descending order by number of accessions conserved. Germplasm data from Genesys and FAO WIEWS (2025).

Taxon	Number of accessions (from genebank collections databases)
Saccharum L.	6,256
Saccharum officinarum L.	1,631
Saccharum spontaneum L.	1,185
Saccharum hybr.	220
Saccharum sinense Roxb.	171
Saccharum robustum E. W. Brandes & Jeswiet ex Grassl	111
Saccharum spontaneum var. *edulis* (Hassk.) K. Schum.	14
Saccharum brevibarbe var. *brevibarbe*	9
Saccharum longisetosum Nayaran. ex Bor	2
Saccharum longesetosum (Andersson) V. Naray. ex Bor	1
Saccharum narenga Wall.	1
Saccharum spontaneum subsp. *aegyptiacum* (Willd.) Hack.	1

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