GLOBAL CROP CONSERVATION AND USE METRICS

CHICKPEA
(*Cicer* L.)

CROP TRUST

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Global crop conservation and use metrics

Description

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

- 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; and
- varietal registrations and releases.

The report also includes global statistics on crop production, trade, and availability in food supplies, as well as information about crop networks and partnerships. It is meant to provide an update to some of the information presented in the Global Conservation Strategy for chickpea (Crop Trust, 2008), but is primarily based on publicly available datasets, rather than a new survey of genetic resource collections and expert consultations.

Introduction and background on chickpea

Chickpea (*Cicer arietinum* L., Fabaceae), along with wheat, barley, peas, and lentils, is among the early domesticated crops originating from the Fertile Crescent of the Near East, and has been cultivated for nearly 10,000 years. The crop spread from that region eastward to South Asia and westward across the Mediterranean, and is now widely cultivated (Piergiovanni, 2022). Chickpeas have several varietal types, which can generally be categorized as either Desi (South Asian, small and dark seed color) or Kabuli (Mediterranean and Near East, larger and lighter seed color). Chickpeas are valuable sources of carbohydrates and protein, as well as unsaturated fatty acids, potassium, calcium, magnesium, phosphorus, riboflavin, niacin, thiamin, folate and β-carotene (Jukanti *et al.*, 2012). Global consumption of the crop continues to increase, driven by widespread demand for the processed chickpea paste hummus.

Based on the most recently available production statistics from FAOSTAT, reporting for the year 2023, chickpeas are cultivated in at least 49 countries on a total over 14 million hectares worldwide, producing over 16.5 million tonnes of dry grain at a value of over USD 11 billion (FAO, 2025a). Production is concentrated in India (with almost three-quarters of global production), as well as in Australia, Türkiye, the Russian Federation, Ethiopia, Myanmar, Pakistan, USA, Iran, Mexico, and Canada. These global production statistics place chickpeas among the most important pulse crops worldwide, after soybeans, common beans (*Phaseolus*), and cowpeas (Khoury *et al.*, 2023). Global production continues to expand significantly, as demonstrated by the difference between the most current (2023) reported values and those reported in 2015–2018 (Table 1). Global average yield (per hectare) of the crop is considerably lower than that of common

Table 1. Global status of chickpea production, trade, availability in food supplies, and public interest. Production, trade, and food supply statistics from FAOSTAT (2015 to 2018 average). Production and trade metrics are reported directly for the crop in FAOSTAT; for food supply the crop is placed within "Pulses, Other" and the estimates presented here were derived by disaggregating the generalized food supply statistic using a weighted average based on crop production statistics (Khoury *et al*., 2023). 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, trade, or food supply. The evenness metric quantifies evenness of production, trade, or availability in food supplies across world regions, where 0 equals highly uneven and 1 equals completely even. The international interdependence metric quantifies degree of production, trade, 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)	13,708,908	20.25	0.16	0.22
Total production (tonnes)	13,451,784	8.75	0.19	0.29
Gross production value (current thousand USD)	8,815,376	11.25	0.15	0.21
Export quantity (tonnes)	2,474,495	8.50	0.29	0.86
Export value (current thousand USD)	1,958,532	11.00	0.31	0.82
Import quantity (tonnes)	2,313,711	18.75	0.17	0.17
Import value (current thousand USD)	2,021,544	25.25	0.19	0.21
Contribution to calories in food supplies (kcal/capita/day)	10.91	65.00	0.50	0.55
Contribution to protein in food supplies (g/capita/day)	0.67	109.25	0.51	0.59
Contribution to fat in food supplies (g/capita/day)	0.09	29.00	0.47	0.41
Contribution to food weight in food supplies (g/capita/day)	1.15	55.50	0.50	0.56
Number of public pageviews on Wikipedia over one year	3,329			

beans, faba beans, and soybean, is roughly equivalent to that of lentils, and is higher than that of pigeonpeas (FAO, 2025a).

Global production is primarily for domestic purposes (particularly in India), although over 2.5 million tonnes are traded internationally per annum, primarily from Australia, the Russian Federation, India, Türkiye, Canada, and Tanzania (FAO, 2025a). Major importers include Pakistan, Bangladesh, Türkiye, India, and the United Arab Emirates (this final country as a re-export hub).

Global consumption statistics are imprecise, with FAOSTAT reporting the grain legume under its "Pulses, Other" category (Khoury *et al.*, 2023). Estimates derived from these data for the years 2015-2018 indicate that the global per capita dietary contribution of the crop – as measured in terms of both calories and protein – is among the highest for grain legumes, after common beans and soybeans. Chickpea is a significant contributor to protein in the food supplies of over 100 countries.

Identity and composition of *ex situ* collections

Based on data available in global genetic resource databases, chickpea germplasm collections are present in at least 110 genebank institutions worldwide, collectively maintaining 98,506 accessions (Table 2, Table 3; Supplementary Table 1). This is slightly more than the number of accessions reported for the crop (98,242) 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 institutions are distributed globally, including large collections in Asia, Australia, the Americas, Europe, and Africa. Two international institutions – the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) and the International Centre for Agricultural Research in Dry Areas (ICARDA) – along with the Australian Grain Genebank, collectively maintain over half (52.8%) of documented accessions, and these are included in the Multilateral System of Access and Benefit Sharing (MLS) of the International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty). There is a large degree of duplication between the international collections, although both also hold unique germplasm (Crop Trust, 2008). Reported information on the status of accessions under the MLS in many other institutions, as recorded in the Global Information System (GLIS) as well as in pertinent fields in Genesys and FAO WIEWS (Table 2; Table 4), likely underestimate the degree to which accessions are currently included in the MLS, as many of the major chickpea collections without information on MLS status are in countries that are contracting parties to the Plant Treaty (such as India, USA, and Türkiye) and distribute samples using the Standard Material Transfer Agreement (SMTA).

Based on a genebank stakeholder survey process, the 2008 Strategy identified 86,499 chickpea accessions maintained worldwide (Crop Trust, 2008). The major chickpea collections were largely the same as those

Table 2. Major *ex situ* collections of chickpea 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 (2024), with supplementary information as noted. Multilateral System (MLS) status from Plant Treaty GLIS (2025) and from Genesys and FAO WIEWS (2024).

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
IND002	International Crop Research Institute for the Semi-Arid Tropics (ICRISAT)	20,838	21.2%	21.3%	20,459	20,258	20,487
AUS165	Australian Grains Genebank, Agriculture Victoria	17,083#	17.3%	38.5%	12,862	22,001	11,181
LBN002	International Centre for Agricultural Research in Dry Areas (ICARDA)	15,385	15.6%	54.1%	Not listed*	15,229	15,229
IND001	National Bureau of Plant Genetic Resources (NBPGR)	14,548	14.8%	68.9%	14,548	0	0

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
USA022	Western Regional Plant Introduction Station, USDA-ARS, Washington State University (USDA)	7,058	7.2%	76.1%	6,732	0	0
RUS001	N.I. Vavilov All-Russian Research Institute of Plant Industry (VIR)	2,767	2.8%	78.9%	2,767	0	0
PAK001	Plant Genetic Resources Program	2,211	2.2%	81.1%	2,016	0	2,112
TUR001	Plant Genetic Resources Department	2,060	2.1%	83.2%	2,060	0	0
UKR001	Institute of Plant Production n.a. V.Y. Yurjev of UAAS	1,907	1.9%	85.1%	919	0	0
UZB006	Uzbek Research Institute of Plant Industry	1,731	1.8%	86.9%	Not listed	0	0
ETH085	Ethiopian Biodiversity Institute	1,180	1.2%	88.1%	851	0	1,157
HUN003	Centre for Plant Diversity	1,178	1.2%	89.3%	41	0	8
CHL150	Banco Activo INIA Carillanca	921	0.9%	90.2%	Not listed	0	0
ESP004	Centro Nacional de Recursos Fitogenéticos	853	0.9%	91.1%	387	581	544
JPN183	NARO Genebank	681	0.7%	91.8%	455	0	0
MAR088	Centre Régional de la Recherche Agronomique de Settat	644	0.7%	92.4%	Not listed	0	0
BGD003	Bangladesh Agricultural Research Institute	632	0.6%	93.1%	627	0	306
MMR015	Myanmar SeedBank	585	0.6%	93.7%	Not listed	0	0
CAN004	Plant Gene Resources of Canada, Saskatoon Research and Development Centre	542	0.6%	94.2%	542	0	542
DEU146	Genebank, Leibniz Institute of Plant Genetics and Crop Plant Research	527	0.5%	94.8%	508	527	527
	Other institutions (n = 90)	5,175	5.3%	100%	2,187	480	2,337

#From the time of data acquisition for this report to the current listing on Genesys (September 2025), the AUS165 collection has increased substantially, with 29,240 accessions currently listed as actively maintained.
*But documented in the 2008 Strategy as maintaining collections in long-term conditions (Crop Trust, 2008)

currently listed in Genesys and FAO WIEWS, although several other collections listed in the 2008 Strategy are not currently reported in the global genetic resource databases, including the Seed and Plant Improvement Institute (Iran, 5600 accessions based on 2008 survey) and the Institute of Crop Germplasm Resources (CAAS) (China, 567 accessions), among others. The majority of institutions have reported increases of several hundred to up to a few thousand new chickpea accessions since the 2008 Strategy; the Australian Grain Genebank is particularly notable for the growth in the number of accessions in the past two decades (Table 2).

During the 2008 Strategy stakeholder meeting, participants categorized ICRISAT, ICARDA, NBPGR, the USDA collections, and VIR in the "A" group due to the quantity of accessions and uniqueness of their chickpea collections, high maintenance standards, and availability for distribution. Other collections were grouped in B or C categories, with recommendations for further support to improve their standards, or for further safety duplication to ensure against loss. The Australian collection - despite being recognized as the fourth largest collection in 2008 – was not assigned to any of these categories; based on current global genetic resource databases, it is now the largest collection in the world (Table 2).

The genus *Cicer* comprises the cultivated species (*C. arietinum*) and around 46 wild species (USDA, 2025). No infraspecific taxa are currently recognized. Species description has continued over the past few decades; for example, the 2008 Strategy reported 42 wild species described at that time (Crop Trust, 2008). The crop is diploid (2n = 2x = 16) and predominantly self-pollinated. Around ten of the wild species are annuals, with the others being perennials (Crop Trust, 2008). *Cicer reticulatum* Ladiz., the likely progenitor, is recognized as within the primary genepool (USDA, 2025). Two species – *Cicer echinospermum* P. H. Davis and *Cicer turcicum* Toker et al. – are classified as in the secondary genepool; nine species are categorized in the tertiary genepool, and a further four in the quaternary genepool. The remaining ca. 30 species have not been categorized.

Along with the crop, 22 species as well as hybrids and accessions only recognized to

Table 3. Composition of *ex situ* collections of chickpea genetic resources. Main *ex situ* collections data from Genesys and FAO WIEWS (2024). Primary and secondary regions information from Khoury *et al*. (2023) and subsequent research for this summary. Botanic gardens data from BGCI PlantSearch (2024).

Metric	Number	Percentage
Total number of accessions in genebank collections	98,506	
Number of institutions holding genebank collections	110	
Number of distinct taxonomic names in genebank collections	25	
Number of accessions of crop wild relatives (CWR) in genebank collections	2,789	2.8%
Number of accessions of weedy materials in genebank collections	0	0%
Number of accessions of landraces in genebank collections	44,713	45.4%
Number of accessions of breeding materials in genebank collections	17,060	17.3%
Number of accessions of improved varieties in genebank collections	4,441	4.5%
Number of accessions of other materials in genebank collections	0	0%
Number of accessions not marked with an improvement type in genebank collections	29,503	30.0%
Number of countries where germplasm has been collected for genebank collections	84	
Number of accessions in genebank collections from the primary region(s) of diversity	34,625	35.2%
Number of accessions in genebank collections from the primary and secondary region(s) of diversity	38,148	38.7%
Number of taxa in botanic garden collections	23	
Number of botanic gardens holding collections of crop or its wild relatives	49	

the genus level are present in germplasm collections (Supplementary Table 2). The wild relatives represent only 2.8% of accessions as measured by pertinent (biological status) fields in the online databases, or 2.9% if calculated by taxonomic names in these databases (Table 3). Landraces make up the largest proportion of collections (45.4%), followed by breeding materials (17.3%), and improved varieties (4.5%); these percentages are estimates based on available data, but note that 30% of accessions do not have biological status data.

Chickpea germplasm has been collected from at least 84 countries, with approximately 35.2% of accessions originating from the primary region of diversity (i.e. West and South Asia and the Mediterranean) and 38.7% from primary and secondary (i.e. East Africa and Mesoamerica) regions. Comparing the total number of accessions worldwide to that of other grain legumes, chickpea follows only *Phaseolus* beans and soybeans. Information on botanic garden collections from BGCI PlantSearch indicate that 49 botanic gardens collectively conserve 23 species. All of these taxa are also conserved in genebank collections.

Aside from the taxa that appear to be entirely missing from, or with very small 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. The 2008 Strategy, drawing from stakeholder meetings and citing several published studies, identified species such as *C. reticulatum*, *Cicer bijugum* Rech. f., and *Cicer cuneatum* Hochst. ex A. Rich. as well as geographic gaps in west, south and southeastern Turkey, northern Iraq, northeastern Iran, Ethiopia, and Pakistan as priorities (Crop Trust, 2008). The 2008 Strategy also noted that drought tolerance traits were needed, as well as associated rhizobia from perennial wild relatives. It further remarked that regeneration challenges make maintenance of the perennial wild relatives difficult, and that *in situ* conservation of these species should be increased. In a global *ex situ* conservation gap analysis of wild relatives of major crops, Castañeda-Álvarez *et al.* (2016) listed three chickpea wild relatives – *C. echinospermum* (secondary genepool) and *C. bijugum* and *Cicer pinnatifidum* Jaub. & Spach (tertiary genepool) – as of medium priority for further collecting. Some progress has been made recently in filling wild relative germplasm gaps, including via the Adapting Agriculture to Climate Change: Collecting, Protecting and Preparing Crop Wild Relatives project (Crop Trust, 2025), which resulted in the collecting of 16 seed samples of three chickpea wild relative species (including six samples of *Cicer judaicum* Boiss., two of *Cicer macrancanthum* Popov, and eight of *Cicer microphyllum* Benth) from two countries (Lebanon and Pakistan) as well as the development of new varieties with introgressions from this wild germplasm (Eastwood *et al.*, 2022).

The 2008 Strategy stakeholder meeting identified as underrepresented in germplasm collections landraces from the Hindu Kush-Himalayan region (India, Pakistan, Afghanistan and Nepal); West and north China; Ethiopia; and Uzbekistan, Armenia and Georgia (Crop Trust, 2008). Ramirez-Villegas *et al.* (2022) identified geographic gaps for chickpea landrace groups in specific regions in the Near East, West, Central, and South Asia, Ethiopia, and Southern Europe and Morocco. Piergiovanni (2022) noted that lack of passport information for chickpea germplasm accessions limits the ability to comprehensively assess geographic coverage and identify gaps; in the current global genetic resources databases, 4% of landrace accessions and 1.7% of wild relative accessions do not contain information even of the country where the accession was collected.

Multilateral System status of accessions in *ex situ* collections

The genus *Cicer* is listed in Annex I of the Plant Treaty. Of the 98,506 accessions conserved globally, over one-third are held in international institutions (i.e., ICRISAT and ICARDA), and included in the MLS under Article 15 of the Plant Treaty, with the remainder maintained in national and other collections (Table 4).

As of 2025, 65,478 accessions are formally included in the MLS according to the Plant Treaty's GLIS database, and 77,022 accessions have been assigned Digital Object Identifiers (DOIs). Per the relevant fields in the global genetic resources databases, 54,430 accessions (55.3% of world total) are listed as included in the MLS; this is an underestimate, noting that 35.4% of accessions do not have MLS status data.

Table 4. Representation of chickpea 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 (2024). DOI and MLS data from Plant Treaty GLIS (2025).

Metric	Number	Percentage
Number of accessions in genebank collections in international institutions	36,801	37.4%
Number of accessions in genebank collections in national or other institutions	61,705	62.6%
Number of accessions in genebank collections in Annex I	98,506	100%
Number of accessions with DOI (Plant Treaty GLIS 2025)	77,022	
Number of accessions included in the Multilateral System (MLS) (Plant Treaty GLIS 2025)	65,478	
Number of accessions included in the Multilateral System (MLS) (genebank collections databases)	54,430	55.3%
Number of accessions included in the Multilateral System (MLS) that are in international collections (genebank collections databases)	35,925	36.5%
Number of accessions not included in the Multilateral System (MLS) (genebank collections databases)	9,216	9.4%
Number of accessions without information regarding inclusion in the Multilateral System (MLS) (genebank collections databases)	34,860	35.4%

Storage conditions, regeneration status, and safety duplication

As expected for an orthodox seed crop, almost the entirety (94.3%) of chickpea accessions are conserved as seed, with close to three-quarters (73.2%) of these accessions listed as conserved under long-term cold-storage conditions (Table 5). Information on storage in general is missing for 5.7 % of all accessions, and information on seed storage type (i.e., long, medium, or short term) is missing for 16.6% of seed accessions.

Current regeneration status and needs cannot be directly derived from the global germplasm databases. The 2008 Strategy listed the proportions of the collection in need of regeneration per institute, recognizing a need for further efforts on regeneration of chickpea germplasm. Regeneration status varied substantially across institutions, but for the majority, at least 20% of accessions were in need of regeneration at that time (Crop Trust, 2008). The 2008 Strategy also noted the need for development of regeneration protocols for wild relatives, particularly the perennial species; protocols for wild species have been established at ICARDA and at ICRISAT for annual wild relatives of chickpea (Yazbek M, personal communication; Ramachdran S, personal communication), but for perennials a gap likely remains. 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 2,354 accessions regenerated during this time by reporting institutions, with 3,981 accessions identified as needing regeneration and 850 of these lacking funds to be regenerated.

Analysis of the location of safety duplication sites of chickpea germplasm, as listed in Genesys, indicates that at least 44.5% of accessions listed 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 chickpea accessions worldwide, when also considering safety duplication within the same country, may be higher than this estimate, given that ICARDA's collections conserved in the Lebanon site and duplicated at the site in Morocco are not included in this estimate (because they have the same INSTCODE), and a number of national genebanks (such as the USA and Russian Federation) typically safety backup their collections in a different location within the country. Information from the SGSV database from 2024 indicated that approximately 38.2% of total accessions worldwide were duplicated in Svalbard.

The 2008 Strategy documented the proportion of the collection safety duplicated for some of the surveyed institutes, as well as the total number of chickpea accessions duplicated by that time at the recently opened SGSV. The data indicated that many important collections were inadequately duplicated. The stakeholder meeting process included further planning for safety duplication of unique accessions both in other institutions outside of the country as well as in the SGSV. The total number of chickpea accessions in SGSV has increased from 3905 in 2008 to 37,642 in 2024; this represents very significant progress, and turned out to be important for ICARDA due to the evacuation of their Aleppo site in 2014 (Simon, 2020).

Table 5. Storage conditions of chickpea *ex situ* collections, regeneration status, and safety duplication status. Main *ex situ* collections data from Genesys and FAO WIEWS (2024). Regeneration status information from FAO WIEWS (2024); data from 2014 to 2019. Safety duplication out of the country data based only on Genesys (2024) data. Svalbard Global Seed Vault data from SGSV portal (2024).

Metric	Number	Percentage
Number of accessions held in seed storage in genebank collections	92,848	94.3%
Number of accessions held in short-term seed storage in genebank collections	1	0%
Number of accessions held in medium-term seed storage in genebank collections	9,498	10.2%
Number of accessions held in long-term seed storage in genebank collections	67,961	73.2%
Number of accessions held in seed storage of undefined type in genebank collections	15,388	16.6%
Number of accessions held in field storage in genebank collections	11	0.01%
Number of accessions held in in-vitro storage in genebank collections	0	0%
Number of accessions held in cryo storage in genebank collections	0	0%
Number of accessions held as DNA in genebank collections	0	0%
Number of accessions held in other storage in genebank collections	0	0%
Number of accessions not marked with a storage type in genebank collections	5,651	5.7%
Number of accessions in genebank collections regenerated 2014–2019	2,354	32.3
Number of accessions in genebank collections in need of regeneration 2014–2019	3,981	54.5%
Number of accessions in genebank collections in need of regeneration without budget for regeneration 2014–2019	850	11.6%
Number of accessions safety duplicated out of the country in genebank collections*	23,821	44.5%
Number of accessions in genebank collections safety duplicated in Svalbard	37,642	38.2%

*ICARDA passport data list accessions under one institute code (LBN002) even though it has two main sites (in Lebanon and in Morocco) which enable safety duplication outside of the country of the main collection; thus this metric may underreport the proportion of accessions duplicated outside of country for this institute.

Documentation, information systems, and research resources

A descriptor list for chickpea was published in 1993 and is available online (IBPGR, ICARDA, and ICRISAT, 1993), and a prioritized list of characterization and evaluation descriptors was published in 2010 (Bioversity International, ICARDA, ICRISAT, and IARI, 2010). The World Vegetable Center published a descriptor in 2015 (WorldVeg, 2015).

The estimated completeness of passport information for chickpea accessions listed in Genesys was 6.2 on a scale of 0 (no data) to 10 (complete data), which indicates that much data is available, but also that there are gaps that it would be valuable to fill. Twenty-one chickpea characterization and evaluation datasets are available via Genesys, covering a total of 36,454 accessions. Four metrics of the current degree of digital sequence information (DSI) for chickpea (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. Upadhyaya *et al.* (2011) noted that significant research resources exist for the crop, including specialized germplasm subsets (core collections) and a variety of molecular markers including simple sequence repeats (SSRs), single nucleotide polymorphisms (SNPs), diversity arrays technology (DArT), and transcript sequences.

The stakeholder meeting for the 2008 Strategy identified several priorities for chickpea documentation and information systems (Crop Trust, 2008). The published descriptors for the crop were considered adequate, and these were prioritized for adoption by all institutions; a minimum list of descriptors was also prioritized. The Strategy noted that upgrading and standardization of databases across institutions was needed, as well as the generation of more georeferenced location data, characterization data, and evaluation data. The meeting further noted advances in integrated information systems for the crop, including a global chickpea registry being built by ICARDA and ICRISAT, the IChiS database (linking ICRISAT, ICARDA, USDA, and Australia collections), and the existing ECPGR, EURISCO, and USDA GRIN databases. The Strategy advised further collaborations with these efforts. The current Genesys and FAO WIEWS databases offer some essential taxonomic, institutional, and passport data, and Genesys now holds some characterization data for the crop, but a dedicated online information system including accession-level characterization and evaluation data for chickpea germplasm collections remains a gap.

Table 6. Documentation, information systems, and research resources for chickpea. Passport data completeness index (PDCI) from Genesys (2024), 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	6.2
Number of genes as recorded in NCBI's Entrez database as of 2022	145,150
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	1,004,077
Number of proteins as recorded in NCBI's Entrez database as of 2022	4,626,793
Number of publications listed in Google Scholar with taxon name in title published between 2009 and 2019	4,320
Number of publications listed in PubMed Central with taxon name in text as of 2022	6,724
Number of research materials as recorded in GBIF (2025)	166,699

Germplasm distributions and varietal registrations and releases

Germplasm distributions and varietal development statistics for chickpea 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). Chickpeas stand out compared to other grain legumes in terms of samples distributed with the SMTA, with more than double the other crops (Khoury *et al*., 2023) (Table 7). Information on varietal registrations and releases indicate that chickpea is an average grain legume in terms of varietal development, compared to other pulses.

Table 7. Chickpea 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	4,580.0
Average annual number of samples distributed worldwide as recorded in FAO WIEWS	5,047.8
Average annual number of samples distributed worldwide as recorded in the Plant Treaty Data Store	22,779.4
Number of countries receiving germplasm as recorded in the Plant Treaty Data Store	38.4
Evenness of distributions across world regions as recorded in the Plant Treaty Data Store	0.7
Average annual number of varietal registrations worldwide as recorded in UPOV's PLUTO	33.8
Average annual number of varietal releases worldwide as recorded in FAO WIEWS	16.2

Networks and partnerships

- ICRISAT and ICARDA continue to play critical roles in chickpea germplasm conservation and varietal development, maintaining active partnerships with national agricultural research organizations, other international centers, and several academic and industry institutions.
- The European Cooperative Programme for Plant Genetic Resources (ECPGR) Grain Legumes Working Group was initiated in 1991 and remains active, particularly in chickpea germplasm characterization and evaluation through competitive calls.
- The BEANS Meta Network (Better pulses for Environment, Agriculture, Nutrition and Societies) was launched in 2025 to transform Mediterranean food systems through the power of legumes. This initiative builds upon the MEDIET project, which highlighted the nutritional, health, and environmental benefits of faba beans, lentils, chickpeas, and dry beans.
- The Global Bean Project is a network that aims to increase the cultivation and consumption of legumes around the world.
- The USDA ARS has a pertinent Crop Germplasm Committee on food legumes (also here)

- The 2008 Strategy recognized the importance of regional genetic resource networks, and mentioned that West Asia and North Africa, Central Asia and the Caucasus, and South Asia, East Asia and Southeast Asia all had existing networks that recognize the conservation of chickpea germplasm as being important to their region, and, further, that these networks varied in funding and extent of work completed (Crop Trust, 2008). Very little information is currently available online that might indicate the persistence and level of activity of these networks over the past two decades.

Conclusions

Chickpea is an extremely important grain legume not only in its regions of traditional use but also globally, and it is likely that it will continue to grow in importance in future food systems for both human health and environmental sustainability. Chickpea genetic resources are bolstered by the activities of ICRISAT and ICARDA as well as several major collections in national agricultural research organizations. Available information indicates that the overall number of accessions maintained worldwide has increased gradually over the past two decades, and that almost three-quarters of the nearly 100,000 total accessions are now included in the MLS. Although difficult to discern clearly from available data, there has likely been significant progress made in safety duplication and in information systems over the past two decades, and there are considerable associated research resources as well as significant activity in germplasm distributions and varietal development for the crop. But the data also indicates that, similar to the findings of the 2008 Strategy, additional efforts are needed to fill persisting gaps in existing collections through further collecting of wild relatives and landraces, and to make the information accompanying accessions more complete and/or more accessible in online databases. Further efforts are also needed to address regeneration and safety duplication backlogs.

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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 chickpea genetic resources, in descending order by total number of accessions. Number of accessions and storage condition information from Genesys and FAO WIEWS (2024), with supplementary information as noted. Multilateral System (MLS) status from Plant Treaty GLIS (2025) and from Genesys and FAO WIEWS (2024).

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
IND002	International Crop Research Institute for the Semi-Arid Tropics	20,838	21.1%	21.2%	20,459	20,258	20,487
AUS165	Australian Grains Genebank, Agriculture Victoria	17,083	17.3%	38.5%	12,862	22,001	11,181
LBN002	International Centre for Agricultural Research in Dry Areas	15,385	15.6%	54.1%	Not listed	15,229	15,229
IND001	National Bureau of Plant Genetic Resources	14,548	14.8%	68.9%	14,548	0	0
USA022	Western Regional Plant Introduction Station, USDA-ARS, Washington State University	7,058	7.2%	76.0%	6,732	0	0
RUS001	N.I. Vavilov All-Russian Research Institute of Plant Industry	2,767	2.8%	78.9%	2,767	0	0
PAK001	Plant Genetic Resources Program	2,211	2.2%	81.1%	2,016	0	2,112
TUR001	Plant Genetic Resources Department	2,060	2.1%	83.2%	2,060	0	0
UKR001	Institute of Plant Production n.a. V.Y. Yurjev of UAAS	1,907	1.9%	85.1%	919	0	0
UZB006	Uzbek Research Institute of Plant Industry	1,731	1.8%	86.9%	Not listed	0	0
ETH085	Ethiopian Biodiversity Institute	1,180	1.2%	88.1%	851	0	1,157
HUN003	Centre for Plant Diversity	1,178	1.2%	89.3%	41	0	8
CHL150	Banco Activo INIA Carillanca	921	0.9%	90.2%	Not listed	0	0
ESP004	Centro Nacional de Recursos Fitogenéticos	853	0.9%	91.1%	387	581	544
JPN183	NARO Genebank	681	0.7%	91.8%	455	0	0
MAR088	Centre Régional de la Recherche Agronomique de Settat	644	0.6%	92.4%	Not listed	0	0
BGD003	Bangladesh Agricultural Research Institute	632	0.6%	93.1%	627	0	306
MMR015	Myanmar SeedBank	585	0.6%	93.7%	Not listed	0	0
CAN004	Plant Gene Resources of Canada, Saskatoon Research and Development Centre	542	0.6%	94.2%	542	0	542

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
DEU146	Genebank, Leibniz Institute of Plant Genetics and Crop Plant Research	527	0.5%	94.7%	508	527	527
PRT001	Banco Português de Germoplasma Vegetal	489	0.5%	95.2%	275	0	489
ESP046	Junta de Andalucía. Consejería de Agricultura y Pesca. Instituto Andaluz de Investigación y Formación Agraria, Pesquera, Alimentaria y de la Producción Ecológica. Centro Alameda del Obispo	452	0.5%	95.7%	1	0	176
BGR001	Institute for Plant Genetic Resources 'K.Malkov'	425	0.4%	96.1%	266	0	0
AZE015	Genetic Resources Institute	370	0.4%	96.5%		0	362
UKR009	Luganskaya Experimental Station	286	0.3%	96.8%	160	0	0
SVK001	National Agricultural and Food Centre (NPPC), Research Institute of Plant Production (RIPP)	214	0.2%	97.0%	Not listed	0	214
TJK027	National Center for Genetic Resources	206	0.2%	97.2%	147	0	206
BRA003	Embrapa Recursos Genéticos e Biotecnologia	156	0.2%	97.4%	156	0	0
BRA012	Embrapa Hortaliças	156	0.2%	97.5%		0	156
EGY087	National Gene Bank	152	0.1%	97.7%	85	0	152
ECU023	Departamento Nacional de Recursos Fitogenéticos	150	0.1%	97.8%	150	0	150
CUB005	Instituto Nacional de Ciencias Agrícolas	133	0.1%	98.0%	Not listed	0	0
POL003	Plant Breeding and Acclimatization Institute	129	0.1%	98.1%	73	4	54
NPL069	National Agriculture Genetic Resources Centre-Genebank	126	0.1%	98.2%	126	0	0
TZA016	National Plant Genetic Resources Centre	115	0.1%	98.4%	115	0	0
ROM081	Agricultural Research and Development Station Teleorman	108	0.1%	98.5%	Not listed	0	0
MDA010	Laboratory for Plant Genetic Resources	99	0.1%	98.6%	Not listed	0	0
TUR034	Field Crop Central Research Institute	86	0.1%	98.7%	86	0	0
ZMB030	SADC Plant Genetic Resources Centre	80	0.1%	98.7%	80	0	0
LKA036	Plant Genetic Resources Centre	74	0.1%	98.8%	Not listed	0	0

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
ERI003	National Agricultural Research Institute	73	0.1%	98.9%	73	0	19
CZE122	Gene bank	68	0.1%	99.0%	68	1	68
GUY021	National Agricultural Research and Extension Institute	67	0.1%	99.0%	Not listed	0	67
MNG030	Institute of Plant and Agricultural Science	65	0.1%	99.1%	Not listed	0	0
SDN002	Agricultural Plant Genetic Resources Conservation and Research Centre	56	0.1%	99.1%	56	0	40
CUB014	Instituto de Investigaciones Fundamentales en Agricultura Tropical	53	0.0%	99.2%	Not listed	0	0
GRC005	Greek Genebank, Institute of Plant Breeding and Genetic Resources	53	0.0%	99.3%	Not listed	0	0
CUB284	Centro de Investigaciones Agropecuarias	52	0.0%	99.3%	Not listed	0	0
MEX208	INIFAP, Centro Nacional de Recursos Genéticos (CNRG)	44	0.0%	99.4%	44	0	0
ARM059	Agrobiotechnology Scientific Center	41	0.0%	99.4%	34	0	0
ESP109	Junta de Castilla y León. Instituto Tecnológico Agrario de Castilla y León. Centro de Investigación de Zamadueñas	39	0.0%	99.4%	Not listed	0	0
ITA436	Istituto di Bioscienze e Biorisorse, Consiglio Nazionale delle Ricerche	39	0.0%	99.5%	39	0	0
JOR105	National Agricultural Research Center	37	0.0%	99.5%	Not listed	37	37
ISR002	Israel Gene Bank for Agricultural Crops, Agricultural Research Organisation, Volcani Center	30	0.0%	99.5%	4	0	0
CYP004	National (CYPARI) Genebank, Agricultural Research Institute, Ministry of Agriculture, Rural Development and Environment	28	0.0%	99.6%	Not listed	0	28
GBR004	Millennium Seed Bank - Royal Botanic Gardens Kew	26	0.0%	99.6%	Not listed	0	11
LBY006	National Bank for Plant Genetic Resources	26	0.0%	99.6%	Not listed	0	0

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
TWN001	World Vegetable Center	26	0.0%	99.6%	25	13	14
VNM049	Plant Resources Center	25	0.0%	99.7%	Not listed	0	0
LBN020	Lebanese Agricultural Research Institute	24	0.0%	99.7%	24	51	0
ITA363	Dipartimento di Chimica, Biologia e Biotecnologie, Universitá degli Studi Perugia	22	0.0%	99.7%	22	0	0
BGD028	Bangladesh Institute of Nuclear Agriculture (BINA)	20	0.0%	99.7%	Not listed	0	0
GBR016	Genetic Resources Unit, Institute of Biological, Environmental & Rural Sciences, Aberystwyth University	20	0.0%	99.8%	Not listed	0	0
ESP027	Gobierno de Aragón. Centro de Investigación y Tecnología Agroalimentaria. Banco de Germoplasma de Hortícolas	19	0.0%	99.8%	Not listed	0	8
ROM007	Suceava Genebank	18	0.0%	99.8%	3	0	0
BLR011	Republican Unitary Enterprise 'Research and Practical Centre of the National Academy of Sciences of Belarus for Arable Farming'	15	0.0%	99.8%	4	0	0
ESP172	Cabildo Insular de Tenerife. Centro de Conservación de la Biodiversidad Agrícola de Tenerife	14	0.0%	99.8%	Not listed	0	14
GHA091	Plant Genetic Resources Research Institute	14	0.0%	99.8%	Not listed	0	0
AZE003	Research Institute of Crop Husbandry	12	0.0%	99.9%	Not listed	0	0
ARE003	International Center for Biosaline Agriculture	10	0.0%	99.9%	Not listed	351	10
ALB026	Plant Genetic Resources Center	9	0.0%	99.9%	9	0	7
ARM005	Institute of Botany	9	0.0%	99.9%	9	0	8
GRC100	CIHEAM Mediterranean Agronomic Institute of Chania	9	0.0%	99.9%	9	0	0
KGZ040	Bank-Laboratory of Plant Genetic Resources of the KR	8	0.0%	99.9%	8	0	8
ROM055	Research and Development Station for Vegetables - Bacau	8	0.0%	99.9%	Not listed	0	0

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
ITA391	CREA-Centro di Ricerca Orticoltura e Florovivaismo - Sede di Pontecagnano	7	0.0%	99.9%	Not listed	16	7
BLR012	Department of Genetics, Faculty of Biology, Belarussian State University	6	0.0%	99.9%	Not listed	0	0
CUB030	Instituto de Investigaciones de Granos	5	0.0%	99.9%	Not listed	0	0
CUB251	Instituto de Investigaciones Agropecuarias Jorge Dimitrov	5	0.0%	99.9%	Not listed	0	0
MWI041	Malawi Plant Genetic Resources Centre	5	0.0%	99.9%	5	0	5
PRT102	Banco de Germoplasma - Universidade da Madeira	5	0.0%	99.9%	5	0	5
GRC006	Plant Production Department, Institute of industrial and forage crops	4	0.0%	99.9%	4	0	0
HRV021	Agricultural Institute Osijek	4	0.0%	100.0%	3	0	0
CRI001	Centro Agronómico Tropical de Investigación y Enseñanza	3	0.0%	100.0%	3	3	3
CRI085	CATIE - Banco de Germoplasma (Colecciones Semillas Ortodoxas)	3	0.0%	100.0%	3	0	3
ESP026	Generalidad Valenciana. Universidad Politécnica de Valencia. Escuela Técnica Superior de Ingenieros Agrónomos. Banco de Germoplasma	3	0.0%	100.0%	Not listed	0	3
ETH013	International Livestock Research Institute	3	0.0%	100.0%	Not listed	3	3
MKD007	Fabia CSB Bogdanci	3	0.0%	100.0%	Not listed	0	0
MLT003	Plant Protection Directorate, Veterinary and Phytosanitary Regulation Department	3	0.0%	100.0%	Not listed	0	0
USA971	Desert Legume Program	3	0.0%	100.0%	Not listed	0	0
USA995	National Center for Genetic Resources Preservation	3	0.0%	100.0%	1	0	0
AUT001	Austrian Agency for Health and Food Safety	2	0.0%	100.0%	2	0	2

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
ESP198	Comunidad de Madrid. Consejería de Medio Ambiente, Vivienda y Ordenación del Territorio. Instituto Madrileño de Investigación y Desarrollo Rural. Banco de Variedades Locales de Madrid	2	0.0%	100.0%	Not listed	0	2
ESP200	Govern de les Illes Balears. Conselleria de Presidència. Direcció General d'Agricultura i Desenvolupament Rural. Institut de recerca i formació agrària i pesquera	2	0.0%	100.0%	Not listed	0	2
GEO013	Niko Ketskhoveli Institute of Botany	2	0.0%	100.0%	Not listed	0	0
MEX006	UACh, Banco Nacional de Germoplasma Vegetal (BANGEV)	2	0.0%	100.0%	2	0	0
TUN029	Banque Nationale de Gènes de Tunisie	2	0.0%	100.0%	2	0	2
AUT025	Referat Pflanzengesundheit und Spezialkulturen	1	0.0%	100.0%	1	0	1
BEL002	Gembloux agro-biotech, Université de Liège, département des Sciences agronomiques, Phytotechnie tropicale et Horticulture	1	0.0%	100.0%	Not listed	0	1
CHL071	Banco de Germoplasma de Papa, Universidad Austral de Chile	1	0.0%	100.0%	1	0	0
ESP003	Comunidad de Madrid. Universidad Politécnica de Madrid. Escuela Técnica Superior de Ingeniería Agronómica, Alimentaria y de Biosistemas . Banco de Germoplasma César Gómez Campo	1	0.0%	100.0%	1	0	0
ESP117	Gobierno de Canarias. Consejería de Agricultura, Ganadería, Pesca y Medio Ambiente. Instituto Canario de Investigaciones Agrarias. Jardín de Aclimatación de La Orotava	1	0.0%	100.0%	Not listed	0	0

Institution Code	Institution name	Number of accessions	Percent of total	Cumulative percent	Number of accessions in long term storage (-18-20 C)	Number of accessions included in MLS (from Plant Treaty GLIS)	Number of accessions included in MLS (from genebank collections databases)
GRC102	Hellenic Mediterranean University	1	0.0%	100.0%	Not listed	0	0
ITA368	Banca del germoplasma autoctono vegetale regionale	1	0.0%	100.0%	1	0	0
KEN212	Genetic Resources Research Institute	1	0.0%	100.0%	1	0	0
MKD001	Faculty of Agriculture, University Ss. Cyril and Methodius	1	0.0%	100.0%	Not listed	0	0
NGA039	International Institute of Tropical Agriculture	1	0.0%	100.0%	Not listed	1	0
NZL001	Margot Forde Genebank, AgResearch Ltd	1	0.0%	100.0%	Not listed	0	0
UGA132	Plant Genetic Resource Centre	1	0.0%	100.0%	1	0	0
UGA528	Uganda National Genebank	1	0.0%	100.0%	Not listed	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 (2024).

Taxon	Number of accessions (from genebank collections databases)
Cicer arietinum L.	89,740
Cicer hybr.	5,437
Cicer reticulatum Ladiz.	1,386
Cicer echinospermum P. H. Davis	456
Cicer L.	430
Cicer judaicum Boiss.	329
Cicer pinnatifidum Jaub. & Spach	215
Cicer bijugum Rech. f.	185
Cicer microphyllum Benth.	129
Cicer cuneatum Hochst. ex A. Rich.	55
Cicer macracanthum Popov	26
Cicer yamashitae Kitam.	25
Cicer anatolicum Alef.	20
Cicer chorassanicum (Bunge) Popov	18
Cicer montbretii Jaub. & Spach	12
Cicer pungens Boiss.	8
Cicer flexuosum Lipsky	7
Cicer nuristanicum Kitam.	6
Cicer multijugum Maesen	5
Cicer songaricum Stephan ex DC.	5
Cicer canariense A. Santos & G. P. Lewis	4
Cicer oxyodon Boiss. & Hohen.	4
Cicer acanthophyllum Boriss.	2
Cicer incisum (Willd.) K. Malý	1
Cicer isauricum P. H. Davis	1

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