



Plant genetic resources in Central Asia and the Caucasus as a basis for food security

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Central Asia and the Caucasus



The Region

Countries involved: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan.

Land area: 410 million ha (256 m ha rangelands).

Environment: Low/variable rainfall; extreme temperatures; mountain, desert, steppe landscape.

Attributes: Diverse agriculture with high growth potential.

Economy: In structural transition from centrally planned to market-driven with a consequent decline in living standards.



Collaboration Since 1995



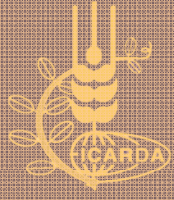
The First CGIAR Meeting on 5 December 1995, Tashkent



Agreement between Uzbekistan and ICARDA



8 may, 1998. First Deputy Prime Minister of Uzbekistan H.E. Mr. Ismail Djurabekov and
D.G. of ICARDA Dr. Adel El-Beltagy



Research Prioritization: a bottom-up approach



Research Needs Assessment Meetings have been held
1995, 2001, 2002, 2006, 2007, 2010
with all partners in a bottom-up approach



Plant Genetic Resource



Centers of Diversity

Two Vavilovian centers of origin and domestication of crop diversity of global importance are located in the region:

- **West Asian center** (Transcaucasian Republics and Turkmenistan): wheat, rye, oats, chickpea, lentil, vetch, pea, *Medicago*, *Lathyrus*, grape, fig, walnut, pomegranate, chestnut, loquat, etc. 83 species in total

- **Central Asian center** (Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan): bread wheat, *T. compactum*, rye, pea, faba bean, lentil, chickpea, *Lathyrus*, apple, apricot, grape, walnut, pistachio, etc., 42 species in total





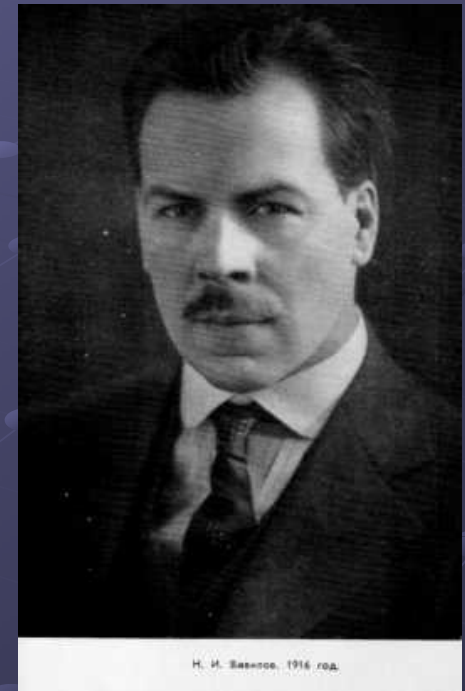
History of PGR in CA

- Central Asia is one of the richest places in the world: out of the 26 known species of wheat 21 were found in Central Asia



History of PGR in CA

- Nikolai Vavilov started from Central Asia in 1916 world famous 25-years collection missions of world continent .
- He visited Tashkent, Bukhara, Samarkand oasis, west Pamir, south Tajikistan and south-west Turkmenistan





History

During the time of USSR, All-Union Research Institute of Plant Industry named after N.I. Vavilov (VIR) was responsible for collection, conservation, studying and utilization of PGR throughout the Soviet Union, including CAC.



Acad. Nikolay Vavilov



History

- VIR had research stations in Georgia, Kazakhstan, and Turkmenistan and branch for Central Asia in Uzbekistan.
- After the collapse of Soviet Union, links with the VIR were stopped and the support for plant genetic resource activities got weakened





Development in PGR

- In 1997 Central Asia Network on Plant Genetic Resources (CAN-PGR) was established with support of IPGRI, ICARDA and FAO
- In 1999, the Caucasus countries joined the Network and Central Asia and Transcaucasian Network on Plant Genetic Resources (CATCN-PGR) has been established





CATCN-PGR

Coordination Committee is the supreme body of the Network and coordinates the Network's activities at regional level

- **Chairman of the Coordination Committee of CATCN-PGR - Dr. Zeynal Akparov, Director, Azerbaijan Genetic Resources Institute**



Areas of joint efforts

- Development of Regional and National Strategies on PGR
- Survey and evaluation of PGR
- Conservation of PGR: *Ex-situ* and *In-Situ*
- Information and germplasm exchange
- Joint projects
- Documentation/Inventory
- Training





Projects in CAC

- Project on “Genetic Resource Conservation, Documentation and Utilization in Central Asia and the Caucasus” funded by ACIAR.
- Project on “Inventory of ex-situ collections of annex 1 crops in Central Asia and the Caucasus” funded by GCDT
- Project on “Establishment of a Regional Plant Genetic Resources Information Network for the Central Asia and Caucasus (CAC) region” funded by GCDT
- “Improving the Facilities of Genebanks in the CAC region” funded by GCDT



Trainings

1999 - 2013

● >22 training
were organized

● >134 scientists
participated





Regional PGR Strategy

- Developing regional PGR Strategy started in 2006
- The final draft of the Regional PGR Strategy was approved in March 2007 by National Coordinators of CAC countries.





Ex-situ Conservation

National Genebanks

- In all CAC countries medium term Genebanks were established
- In **Kyrgyzstan** and **Tajikistan** Sida by financial support of Sweden Government constructed long term Gene Banks

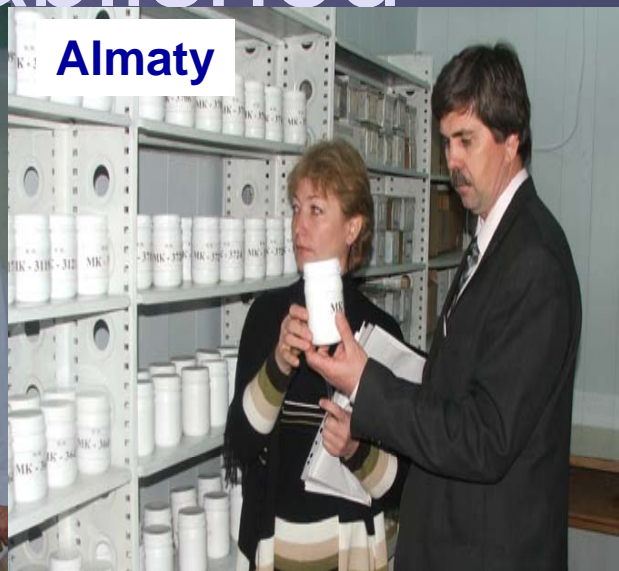


Renovated and new genebanks established

Baku



Almaty



Tbilisi



Ashgabat



Dushanbe





New Institutions Being Established



1. Genetic Resource Institute, Azerbaijan



2. Genetic Resource Center, Tajikistan



Genebank in Kyrgyzstan





Collection missions

- Starting from 1991, 22 collection missions were organized in CAC countries
- Totally 6 720 accessions were collected during these expeditions.



Georgia

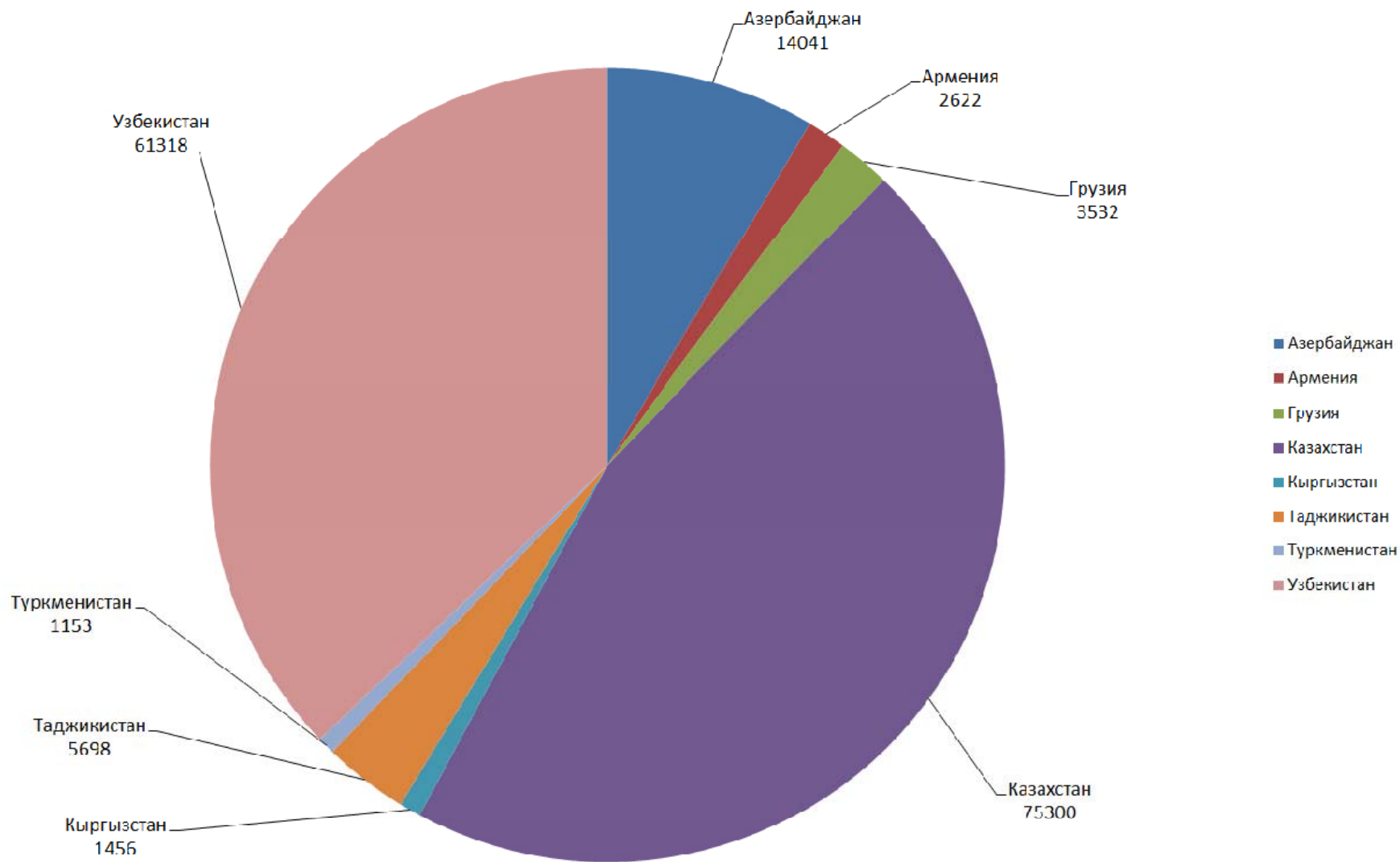


Documentation group





Inventory of Ex-Situ collections





Inventory of Ex-Situ collections

Культуры	Азербайджан	Армения	Грузия	Казахстан	Кыргызстан	Таджикистан	Туркменистан	Узбекистан	Всего
Зерновые	3675	641	672	40833	602	3006	875	26043	76347
Зернобобовые	1021	467	645	1050	29	502	122	2380	6216
Кормовые	676	13	245	17925	125	189	2	2034	21209
Овощные	855	425	200	8532	210	450		3221	13893
Технические	1566	27	367	51	26	24		20384	22445
Плодовые	2418	342	901	3182	408	913	154	5454	13772
Лекарственные растения	690		55	670	56	18		1802	3291
Картофель		50		1376		61			1487



Inventory of Ex-Situ collections

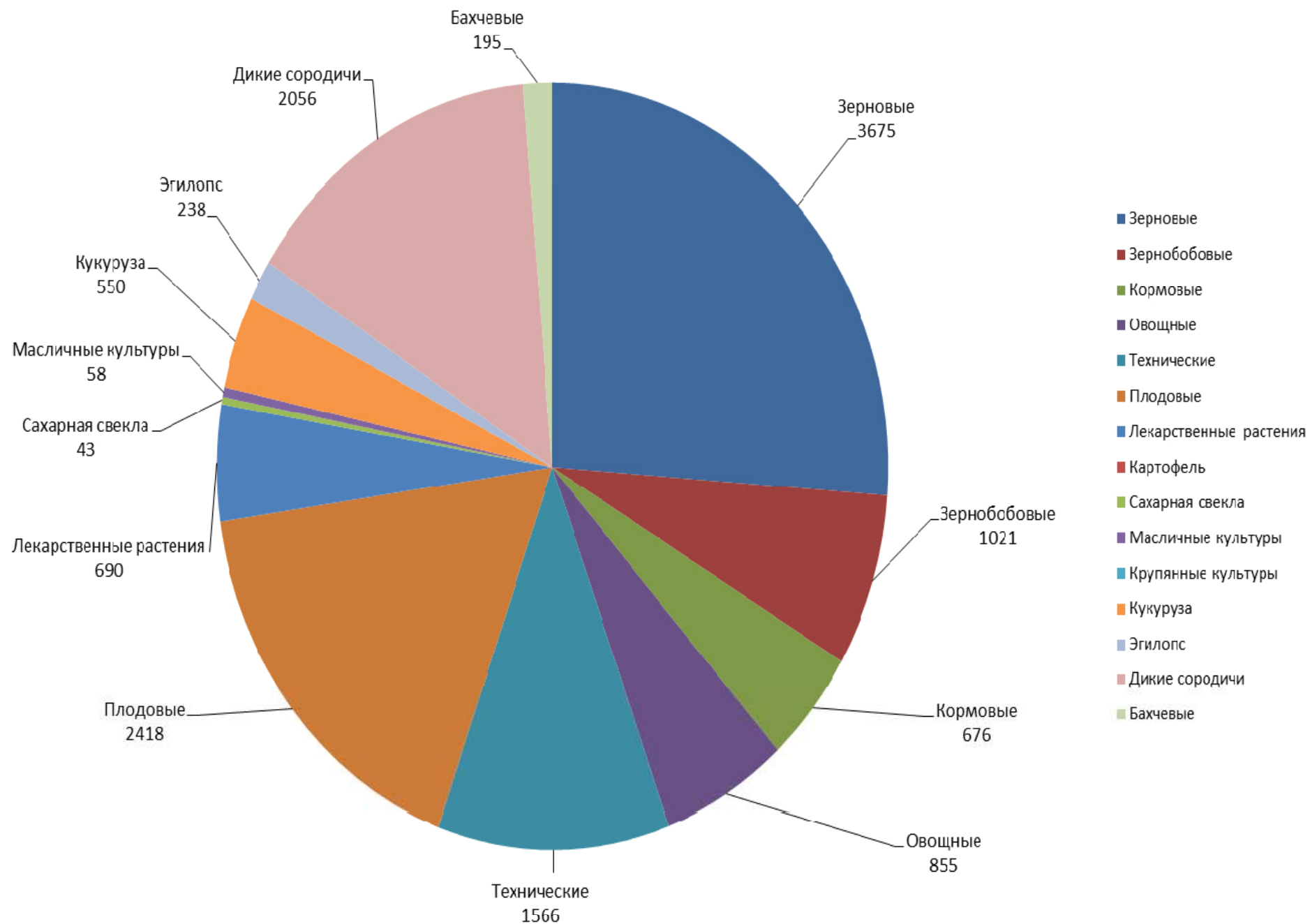
Культуры	Азербайджан	Армения	Грузия	Казахстан	Кыргызстан	Таджикистан	Туркменистан	Узбекистан	Всего
Сахарная свекла	43			354		4			401
Масличные культуры	58			1327		45			1430
Крупяные культуры			172						172
Кукуруза	550		250			307			1107
Эгилопс	238		25			19			282
Дикие сородичи	2056	420				17			2493
Бахчевые	195	237				143			575
Всего	14041	2622	3532	75300	1456	5698	1153	61318	165120



PGR in Azerbaijan

Considering the importance of plant genetic resources, the Government of Azerbaijan in 2003 made a strategic decision to rename its Institute Genetics as Genetics Resources Institute

Азербайджан





Present

In Central Asia and the Caucasus countries only 15-20% of released wheat varieties are from national breeding program

Only in Kazakhstan - 65% wheat varieties developed from national breeding program (100 varieties cultivated in Kazakhstan)



Needs for PGR utilization

- Training – human resources is a key
- Infrastructure
- Funding (both in national and international level)
- International and Regional collaboration



Needs for local PGR utilization

- **The available collections has to be evaluated by national partners and international organization**
- **Screening of selected germplasm – biotic and abiotic stresses using modern technologies**



PGR Activities

- International Conference "Diversity, characterization and utilization of plant genetic resources to enhance resilience to climate change" Baku, Azerbaijan, on 3-4 October 2011.
- Over 140 scientists from 12 countries and 5 international organizations, including FAO, CIMMYT, ICARDA, Bioversity International and the Global Crop Diversity Trust attended the conference



Baku Conference

Wheat

- Yellow Rust – Kazakhstan and Turkey
- Stem Rust – Kobuleti, Georgia,
- Leaf Rust - Kobuleti, Georgia,
- Drought and Heat tolerance – Azerbaijan (Farming and Gen. Res. Inst.)



Baku Conference

● Wheat

- Salt tolerance – Uzbekistan
- Grain Quality – Kazakhstan (spring), Azerbaijan (winter)
- Early maturity – Kazakhstan
- Winter hardiness – Ukraine
- Leaf Spots - Kobuleti, Georgia



Salinity Tolerant Winter Wheat

- Research on identification of tolerant varieties started in 2010 in Uzbekistan, Kazakhstan and Turkmenistan with funding support from BMZ/GIZ
- Some successes have been achieved



Yield advantage of best wheat lines under medium saline conditions

Year	Location	Number of lines tested	Grain yield of best line (%Check)
2011	Karshi, Uzbekistan	625	248**
2011	Krasnovodapad, Kazakhstan	154	149**
2011	Dashouz, Turkmenistan	125	125**
2011	Syrdarya, Uzbekistan	125	135**
2012	Karshi	154	157**
2012	Urgench	150	149**

** Significantly higher than check at $P = 0.01$)





Evaluation of PGR

- **Evaluation for drought, heat, frost resistant started for wheat, barley, chick-pea in collaboration with NARS**
- **National scientists evaluating the available collections for different characters**



The Changing World





PGR for future generations



Thank you for your
attention