

# COUNTRY REPORT ON THE STATE OF PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

## IRAQ



**IRAQ:**

**COUNTRY REPORT TO THE FAO INTERNATIONAL  
TECHNICAL CONFERENCE ON PLANT GENETIC RESOURCES**

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**Note by FAO**

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# INTRODUCTION



Since ancient days Iraq was known as the valley of the two rivers Mesopotamia. Its bountiful land, fresh waters, and varying climate contributed to the creation of deep-rooted civilization that had fostered humanity from its affluent fountain since thousand of years.

Iraq is situated between longitudes (38° 48'E) and between latitudes (29°37 N). In length from north-west to south-east it approximates (1 000 Km) and in width about (500 Km). The widest region from the Jordan to the Persian border near Rawandoz will be about 750 Km. In area it covers about 4 444 500 sq. Km. more than half of this area, comes strictly under the arid zone. Being not far away (about 400 Km.) from the Mediterranean Sea on the west, about 1 000 Km. from the Red Sea on the south-west and almost same distance from Black Sea on the north and practically touching the Arabian Gulf at its southern limit. Its climate is considerably influenced by the atmospheric condition of these vast water sheets.

The climate of Iraq in general is arid and continental having very hot summers and severe cold winters with less rainfall in the south and in the middle and much rainfall in the north. The precipitation on the northern part of the country is sufficient to support the winter crops, while in the middle and in the south part of Iraq cultivation depends on irrigation both in the winter and in the summer. In the desert area precipitation is very low and usually it rains during the winter months.

No doubt, Iraq occupies an excellent geographic position where it encompasses mountainous areas in which temperature drops below zero, desert areas of very high temperatures, and pelagic humidity impregnated areas.

All these factors gave Iraq a special geographic characteristic scarcely acquired by any other country. The enjoyment of such a peculiar geographic position by Iraq led to the creation of different environments that helped considerably in the diversification of its agriculture.

Iraq may primarily be divided into four main physical regions, these are:

1. The Lower Mesopotamia.
2. The Desert Regions.
3. The Upland Hilly Regions.
4. The Mountain Regions.

The major agricultural crops constitute: Dates, (Cereals like Wheat, Barely, Maize, little Rice, while Cotton stopped now, and other industrial crops. Many vegetables are grown by individual farmers(2003-2007) like Tomatoes, Potatoes, Egg-plant, Cauliflower, Cabbage, Lettuce, Melon and water melon, Cucumber, Beans, Okra, Onion, Pepper, etc. The main fruit plants are: Apples, Pears, Plums, Figs, Pomegranates, Apricot, Oranges, Lemons and Grapes and Olives; also a good number of plants are grown for ornamental, forestry and medical purposes mostly at Nineveh and the north of Iraq. Aquatic vegetation in the marshy tract of south Iraq is dominant. In the northern mountains high altitude flora forms a dominant feature of vegetation i.e. pastures and forages are found extensively.

# INDIGENOUS PLANT GENETIC RESOURCES

The Plant Genetic Resources activities were started in 1977 by the ministry of Agriculture, on a limited scale and with few scientific staff. A genebank facility was built at Abu-Gharib Baghdad with the assistance of FAO/IPGRI. The collection activities were started in 1977 by Iraqi team but in 1989 by expedition. In total 4 collecting expeditions were undertaken, which helped to assemble one thousand four hundred accessions of different crops. Due to the limited staff and facilities the exploration and collection work was not organized in a systematic way. There is an urgent need to realize not only the scientific community but also to the administrators the major role of Plant Genetic Resources in crop improvement programmes and to acquire financial and technical support for conservation of Iraq genetic diversity. The collection being maintained in the genebank are being maintained in working collections. There is a demand of a time to undertake genetic resources activity in the country to:

- To collect and document the status of important species. Cultivated and wild
- Programmes and measures for the management of these natural resources.
- To enlist important threatened species on country level.

List of crop accessions which were collected and conserved in the Iraqi gene-bank are presented in 2007:

TABLE 1  
Germplasm Status

## اعداد العينات الموثقة لغاية 2007

### العينات الموثقة لدى بنك الجينات العراقي

SAMPLE	الاسم العربي	Accession قبل الحرب	Accession بعد الحرب
Cultivated <i>Triticum</i>	الحنطة المزروعة	396	450
Wild <i>Triticum</i> & <i>Aegilops</i>	الحنطة البرية والخافور	320	340
Cultivated <i>Hordeum</i>	الشعير المزروع	165	172
Wild <i>Hordeum</i>	الشعير البري	45	50
<i>Avena</i>	الشوفان	10	10
<i>Zea-mays</i>	الذرة الصفراء	22	25
<i>Sorghum</i>	الذرة البيضاء	11	15
<i>Medicago</i>	الجث	172	175
<i>Panicum</i>	الدخن	4	5
<i>Oryza</i>	الرز	38	45
<i>Lens</i>	العدس	47	47
<i>Cicer</i>	الحمص	47	47
<i>Vigna</i>	ماش واللوبيا	21	25
<i>Vicia-faba</i>	الباقلاء	79	7
Wild <i>Vicia-faba</i>	الباقلاء البرية	6	2
<i>Helianthus</i>	زهرة الشمس	7	10
<i>Clycine max</i>	فول الصويا	2	6
<i>Carthamus</i>	عصفر	4	4
<i>Poa</i>	القباع	3	3
<i>Agrostis</i>	-	2	2
<i>Lolium</i>	الثيلم	3	3

SAMPLE	الاسم العربي	Accession قبل الحرب	Accession بعد الحرب
Forage-grass	رعوي	40	175
<i>Melilotus</i>	-	2	2
<i>Astragalus</i>	شرشر	6	6
<i>Sesamum</i>	السمسم	30	30
<i>Phaseolus</i>	فاصوليا	25	25
<i>Solanum</i>	باننجان	25	25
<i>Abelmoschus</i>	الباميا	34	34
<i>Cucumis</i>	بطيخ وخيار	34	38
<i>Citrullus</i>	الرقبي	6	10
<i>Daucus</i>	الجزر	9	9
<i>Brassica</i>	ثملغم	8	8
<i>Lycopersicon</i>	طماطة	25	-
<i>Capsicum</i>	فلفل	8	10
<i>Legenaria</i>	القرع	7	10
<i>Lepidium</i>	رشاد	9	12
<i>Raphanus</i>	الفجل	12	12
<i>Pisum</i>	البزاليا	3	3
<i>Beta</i>	السلق والبنجر	4	10
Spice & Herbs	التوابل	11	15
<i>Linum</i>	كتان	7	7
Medicinal plant	النباتات الطبية	45	65
<i>Melica-sp</i>		-	1
<i>Cannabis-sativa</i>	القنب	-	1
<i>Chenopodium-sp</i>		-	3
<i>Allium</i>	الصل	2	3

Note: Accession Number are continuously increasing, also there are three table indicating germplasm accession by crop at 2005 as indicated in table below :



P1

مداخل المادة الوراثية حسب أجناسها في بنك الجينات العراقي  
Germplasm Accessions by Crop

المحصول Crop		Total Accessions/Iraq	Storage Facilities (%)				Type of Accessions (%)			
Grouping	Genus		LT	MT	ST	Others	WS	LC/OC	AC/BL	Others
المجموع	الجنس	المجموع الكلي للمداخل الوراثية	خزن طويل الأمد	خزن متوسط الأمد	خزن قصير الأمد	أخرى	أصناف برية	أصناف متأنقة/ أصناف قديمة	أصناف محسنة/ خطوط تربية	الآخري
<b>1. Cereal</b> الحبوب										
Wheat	Cultivated Triticum	404	50 %	50 %	-	-	-	18 %	22 %	60 %
Wheat	Wild Triticum & Aegilops	320	50 %	50 %	-	-	100 %	-	-	-
Barley	Cultivated Hordeum	167	50 %	50 %	-	-	-	9 %	10 %	84 %
Barley	Wild Hordeum	45	50 %	50 %	-	-	100 %	-	-	-
Rice	Cultivated Oryza	38	-	50 %	-	-	-	50 %	-	-
Sorghum	Cultivated Sorghum	11	50 %	50 %	-	-	-	50 %	50 %	50 %
<b>2. Food Legume</b> البقوليات الغذائية										
Bean	Cultivated Phaseolus	25	0 %	0 %	0 %	1 %	-	-	-	-
Soybean	Cultivated Glycine	2	100 %	-	-	-	-	-	10 %	90 %
Cowpea	Cultivated Vigna	21	50 %	50 %	-	-	-	30 %	-	70 %
Groundnut	Cultivated Arachis	1	100 %	-	-	-	-	-	100 %	-
Pea	Cultivated Pisum	3	50 %	50 %	-	-	-	-	100 %	-
Chickpea	Cultivated Cicer	47	50 %	50 %	-	-	-	40 %	-	60 %
Faba bean	Cultivated Vicia	79	100 %	-	-	-	-	50 %	-	50 %
Lentil	Cultivated Lens	47	50 %	50 %	-	-	-	40 %	-	60 %
<b>3. Forage Legume</b> الأعلاف البقولية										
Clover	Trifolium	6	-	100 %	-	-	80 %	20 %	-	-
Medicago	Medicago	172	50 %	50 %	-	-	70 %	30 %	-	-
Vicia	Wild Vicia	6	50 %	50 %	-	-	100 %	-	-	-
Grasspea	Lathyrus	2	100 %	-	-	-	70 %	30 %	-	-
Trefoil	Lotus	1	100 %	-	-	-	-	-	-	100 %
<b>4. Forage grass</b> الأعلاف النجيلية										
Grass	Dactylis	1	-	-	100 %	-	100 %	-	-	-
Grass	Lolium	3	-	50 %	-	50 %	100 %	-	-	-
Grass	Panicum	4	-	100 %	-	-	-	-	50 %	50 %
Grass	Poa	3	-	100 %	-	-	100 %	-	-	-
Grass	Agrostis	2	-	100 %	-	-	100 %	-	-	-
Grass	Bromus	2	-	-	100 %	-	100 %	-	-	-
Grass	Melilotus	1	-	100 %	-	-	100 %	-	-	-
Grass	Astragalus	6	-	100 %	-	-	100 %	-	-	-
<b>5. Other Forage (Weed)</b> الأعلاف الأخرى (ضمنها الأعلاف)										
		40	-	100 %	-	-	100 %	-	-	-
<b>6. Fiber</b> الياف الصناعية										
Cotton	Gossypium	4	-	100 %	-	-	-	-	100 %	-
Fax	Linum	7	-	100 %	-	-	-	-	-	100 %
<b>7. Vegetable</b> الخضراوات										
Brassica	Brassica	8	59 %	50 %	-	-	-	100 %	-	-
Tomato	Lycopersicon	25	59 %	50 %	-	-	-	-	-	-
Capsicum	Capsicum	8	59 %	50 %	-	-	-	95 %	-	5 %
Cucurbita	Cucurbits	6	59 %	50 %	-	-	-	95 %	-	5 %
Okra	Abelmoschus	34	59 %	50 %	-	-	-	95 %	-	5 %
Carrot	Daucus	9	59 %	50 %	-	-	-	-	20 %	80 %
Radish	Raphanus	12	59 %	50 %	-	-	-	50 %	-	50 %
Legenaria	Legenaria	7	59 %	50 %	-	-	-	50 %	-	50 %
Lepidium	Lepidium	9	59 %	50 %	-	-	5 %	95 %	-	-
<b>8. Spice</b> التوابل										
		11	50 %	50 %	-	-	-	95 %	-	5 %
<b>9. Medicinal Plant</b> الطبية										
		55	50 %	50 %	-	-	30 %	70 %	-	-
<b>10. Oil</b> الزيتية										
Sun Flower	Helianthus	7	-	100 %	-	-	-	40 %	60 %	-
Sesame	Seamum	30	-	-	-	100 %	-	-	-	100 %
Saff flower	Carthamus	4	50 %	50 %	-	-	-	-	50 %	50 %





## 2.1 Genetic resources of fruit trees

The northern part of Iraq is a rich center of diversity for a number of stone fruits, both domesticated and wild. Evergreen fruit trees, including date palm predominate in the central and southern parts of the country. A country-wide program was stopped now because security condition nowadays in this country, Nevertheless major efforts have been initiated for the proper conservation and propagation of these trees by farmer.

## 2.2 Genetic resources of vegetable crops

In Iraq harbors a tremendous wealth of vegetables adapted to various ecogeographical regions of the country. A nationwide project was initiated in 1986 with the following objectives:

- Survey, collect and evaluate plant genetic resources of vegetables.
- Enhance yield potential through pure line selection.
- Distribution of improved lines to farmers.

As a result of this project, landraces of these vegetable crops have been collected and conserved; the genetic diversity of most crops, especially the cross-pollinated ones, has been improved and high yielding and good quality, adapted lines, derived from these landraces have been developed increased and distributed to farmers.

This project stopped but there is one under planting by state board of a Horticulture.

The project managed to cover the following vegetable crops: Tomato, eggplant, okra, watermelon, melon, onion, cucumber, garlic, lettuce, cabbage, pepper, guard and carrots.

## 2.3 Forest genetic resources

The germplasm collection of forest species have not begun yet.

## 2.4 Other wild species and wild relatives of crop plants

There are several wild species of wheat and barley which need to be collected immediately and conserved in addition to this there are other cultivated crops/landraces which also request immediate attention. Anyhow the following wild progenitors of crops were collected during the field trips:

- *Triticum dicoccoides*
- *T. araraticum*
- *T. boeoticum*
- *T. arartu*
- *Ae. triuncialis*
- *Ae. Crassa*
- *Ae. Umbellate*
- *Ae. biuncialis*
- *Ae. speltoides*
- *Ae. ovate*
- *Ae. juvenalis*
- *Ae. cylindrica*
- *Ae. columnaris*
- *Ae. caudate*
- *Ae. lorentii*
- *Aekotschy*
- *Ae. peregrine*
- *Ae. ligustica*
- *Ae. triaristata*
- All species for wild *Hordium*

## **2.5 Landraces (farmer's varieties) and old cultivars**

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Saberbeq is a bread wheat landrace which is under cultivation in the northern part of Iraq due to its drought tolerance and quality of bread. Although this is very susceptible to rust and low yielder. There is a breeding programme to improve this cultivar through breeding. Where as in case of barley local landrace Aswad is under cultivation in the Northern part of Iraq.

# CONSERVATION ACTIVITIES



## 3.1 *In situ* conservation

Presently Iraq does not have any *in situ* conservation activities in the country.

## 3.2 *Ex situ* conservation

Within country 3 000 Sample of cereals, oil seed crops, medicinal plants etc.at 2007 were collected and conserved in the genebank. In addition to this 3 000 acc. of wheat ( breeding programme). These are also being maintained in the national genebank of Iraq at Abu Gharib. Presently this project is not financially secure and needs special attention both for equipments and funds. The principal purpose of storing seeds of economically important plants in gene banks is to preserve seed stocks for the current and future use of plant breeders, cytogeneticist, taxonomists, and other researchers and scientists. In maintaining our genebank collection, the following steps are being followed:

- Registration of seed sample.
- Seed cleaning.
- Seed moisture-content monitoring.
- Seed viability testing prior to cold storage.
- Seed packing.
- Seed storage.
- Monitoring viability.
- Distribution on request.
- Regeneration and multiplication of accessions whose viability and quantity have become low.

3 000 accessions which were collected during the field trips stored in the genebank up 2007. The first collection was made in 1975 by Mr. M.N. Hussain, of the Botany Directorate, who covered all the regions of Iraq. The plant genetic resources unit is situated at Abu-Ghraib, about 20 Km west of Baghdad, and is adjacent to many other departments belonging to the State Board for Agricultural Research, who are directly or indirectly associated with the crop improvement programme.

The local collection generally comprises landraces and indigence cultivars. The sample of cereals germplasm has been duplicated at Bari-Italy. Some wild wheat samples has been duplicated at Izmir, Turkey and Kyoto-Japan. In addition to ICARDA-GRU, Aleppo-Syria.

## 3.3 Evaluation and characterization

Characterization of the cereals accessions were carried out Abu Gharib according to IPGRI's descriptors. The data has been maintained on the crop registers and available to the user community, but it has not been published due to the lack of facilities and funds. The evaluation data need to generated with the help of breeders and other researchers in the country. But for this purpose the germplasm evaluation laboratory is needed to be established. The International collaboration in this field could prove very effective till we established evaluation lab in the country.

### 3.4 Regeneration

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- Regeneration 400 accession at Abu-Ghraib field: 2000-2001
- Regeneration 100 accession at Abu-Ghraib field: 2004-2005
- Regeneration 500 accession at Abu-Ghraib field: 2006-2007

### 3.5 Storage facilities

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The plant genetic resources unit has a cold store of 40 sq. meter capable of housing a minimum of 10 000 cans. Each can has the capacity to hold about half kg. seed of different crops. The cold store is cooled by two cooling units which have so far not proved to be very effective and reliable.

In the winter months the cold store can run at 5°C but during the three hottest months it may run at 10°C. The cold store is insulated and fitted with a cold room door. There are two defreezers for long term conservation. But there is no control over the humidity in the genebank and also there is stand by electric generator but no fuel. Therefore the cold storage room suffers from high humidity and temperature cheneibility, which has adverse effect on seed viability.

The germplasm is stored in *Cans/Aluminum* plastic bags (as supplied under REM-5) in cardboard trays with capacity to hold 10 cans, and the cans are stored at two level in the shelves. The other facilities include a large laboratory, two offices. There are ample germplasm multiplication facilities both at Abu-Ghraib adjacent to the buildings and at the Botanic Garden at Zafaraniya. In addition, the National Herbarium of Iraq, belonging to Botany Research Department, is participating in identification of accession samples. The difficulties are also experienced for multiplication/ rejuvenation of cross pollinated crops germplasm to maintain the genetic integrity of a bulk population sample. Presently the space isolation is being practice for multiplication.

Many crop germplasm stored accessions have been grown for evaluation and multiplication like wheat, wild wheat, barely and many other cereals and vegetable crops by the genetic resources unit. The collaborative efforts of commodity programmed are required to enhance the utilization of local germplasm.

### 3.6 Documentation

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We use for the time being the accession record sheets for documentation of our collections. These sheets contain the important characterization data which are necessary for researcher and plant breeder to know the desirable traits of an accession.

Our plant genetic resources unit were document by seed info program and computerize the samples of the genebank. We make the information available to users, either by letters or personal communication. We computerize the genetic resources information. The printed information copies will be circulated to the respective crop breeder and other researchers.

# NATIONAL GOALS, POLICIES, PROGRAMMES AND LEGISLATION

## 4.1 Training

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GRU of Iraq is neither adequately staffed with scientific manpower nor they have given ample opportunity of training on different disciplines of plant genetic resources. The staff need to be trained in the field of collection, conservation, documentation, plant taxonomy, health agronomy etc. In these fields if a training be organized within the country it will be rather more than beneficial. At GRU men and women are equally involved in all plant Genetic Resources activities.

A year ago one scientist has been shifted to other department which is called Mesopotamia Company. This has further weakened the genetic resources activities in the country. The most available skills in our national programme is in the field of plant taxonomy, and these plant taxonomists identify many of our collections. We have no discrimination regarding training so men and women equally involved in training programmes in large at all levels.

## 4.2 National legislation

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The Iraqi quarantine laws do not affect the import or export of genetic resources material and we are satisfied with the present situation, as we have not experienced any crop disaster in the country.

The government's laws do not restrict the planting of imported material in the field. The government does not provide any incentive for the cultivation of traditional varieties. The Government encourages the provision and cultivation of certified seed of commercially important crop varieties.

The government of Iraq is in agreement with ICARDA for exchange of germplasm and training of scientists.

## 4.3 Other facilities

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The fertilizer, insecticide and agriculture machinery are provided to the farmer at subsidized rates. The Plant Genetic Resources scientists are neither involved in the planning of major rates. The Plant Genetic Resources scientists are neither involved in the planning of major agricultural projects nor during the appraisal process.



# INTERNATIONAL COLLABORATION

## 5.1 FAO global system

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Iraq is a member of FAO global system on plant genetic resources. The GRU was benefited by acquiring cooling units seed drier and training. The government of Iraq signed the international undertaking and believe that genetic resources are heritage of mankind and should be available freely for human benefit. The government of Iraq agree to the establishment of International fund as a part of global system for the improvement of Genetic Resources facilitates in the country and training of manpower.

## 5.2 International agricultural research centers

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One of our plant genetic resources unit's aim is the fair and equitable exchange of plant genetic resources with international institutions. Iraq enjoy good relation with International Agricultural Research Centers i.e. IPGRI, CIMMYT, ICARDA. The following genetic resources activities were accomplished in collaboration with IARCs.

### **Germplasm Exchange:**

Our plant genetic resources is already exchanging germplasm with other institutes such as ICARDA, ACSAD, or FAO etc.

# NATIONAL NEEDS AND OPPORTUNITIES

- Building up a new genebank for both intermediate and long term storage along with allied facilities.
- Equipment for laboratory, seed processing, drying room, field equipments, and field cars.
- Providing expertise and training courses in the field of genetic resources as well as opportunities to attend international conferences, workshops, financial support to the local collecting missions and supporting local training courses.



# PROPOSAL FOR A GLOBAL PLAN OF ACTION

The proposal for global plan of action are as follow:

- Identification the threatened areas in order to give priority for collection.
- More support in term of equipment, and training course to the national programmes.
- Establishment of seed health unit in the genebanks.
- Exchange of germplasm through IPGRI.
- Publishing global germplasm catalogue.
- Regional seminars and meetings.
- Training national staff.



