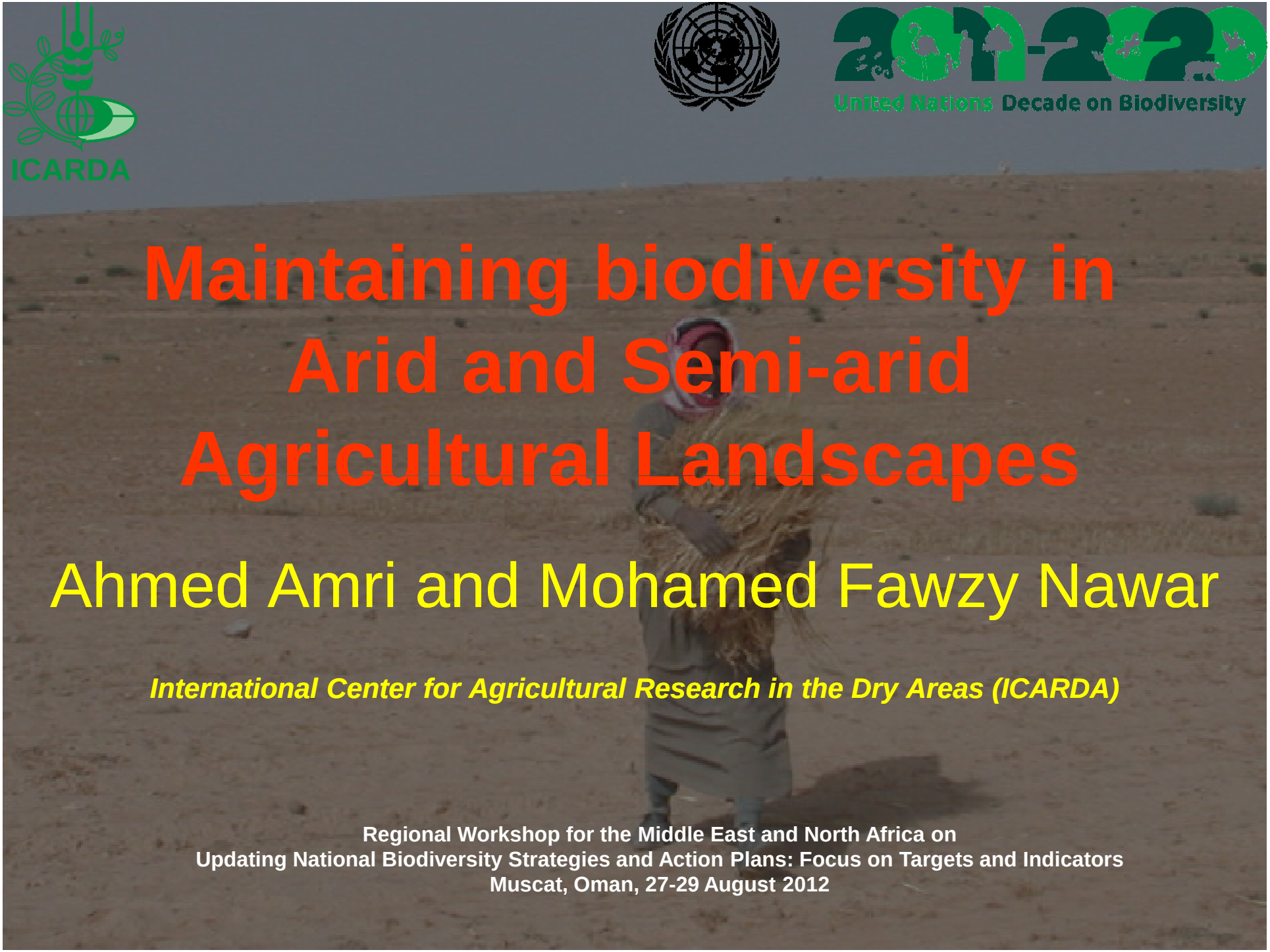


Maintaining biodiversity in Arid and Semi-arid Agricultural Landscapes

Ahmed Amri and Mohamed Fawzy Nawar

International Center for Agricultural Research in the Dry Areas (ICARDA)

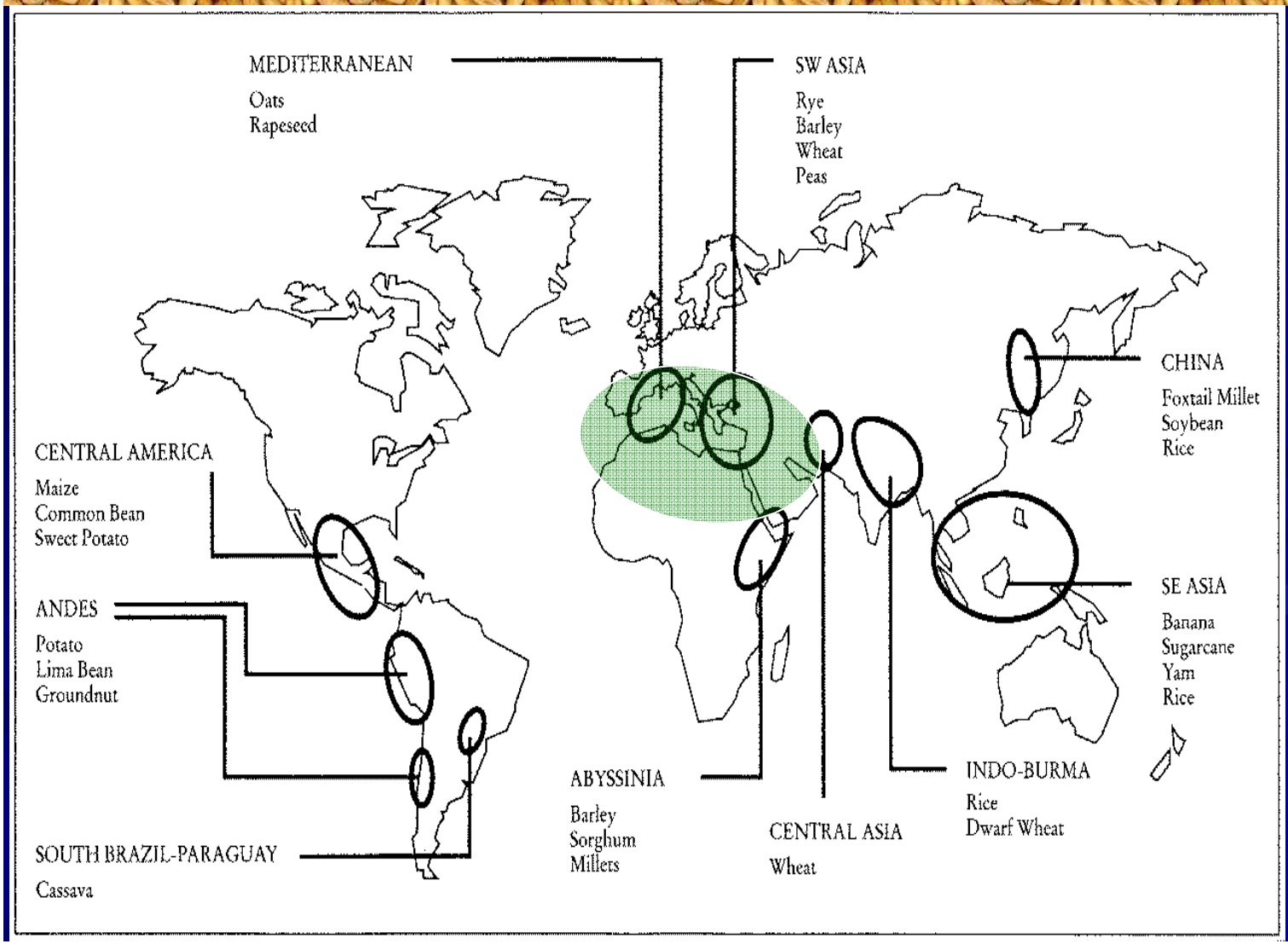
Regional Workshop for the Middle East and North Africa on
Updating National Biodiversity Strategies and Action Plans: Focus on Targets and Indicators
Muscat, Oman, 27-29 August 2012

Characteristics and importance of dryland agrobiodiversity

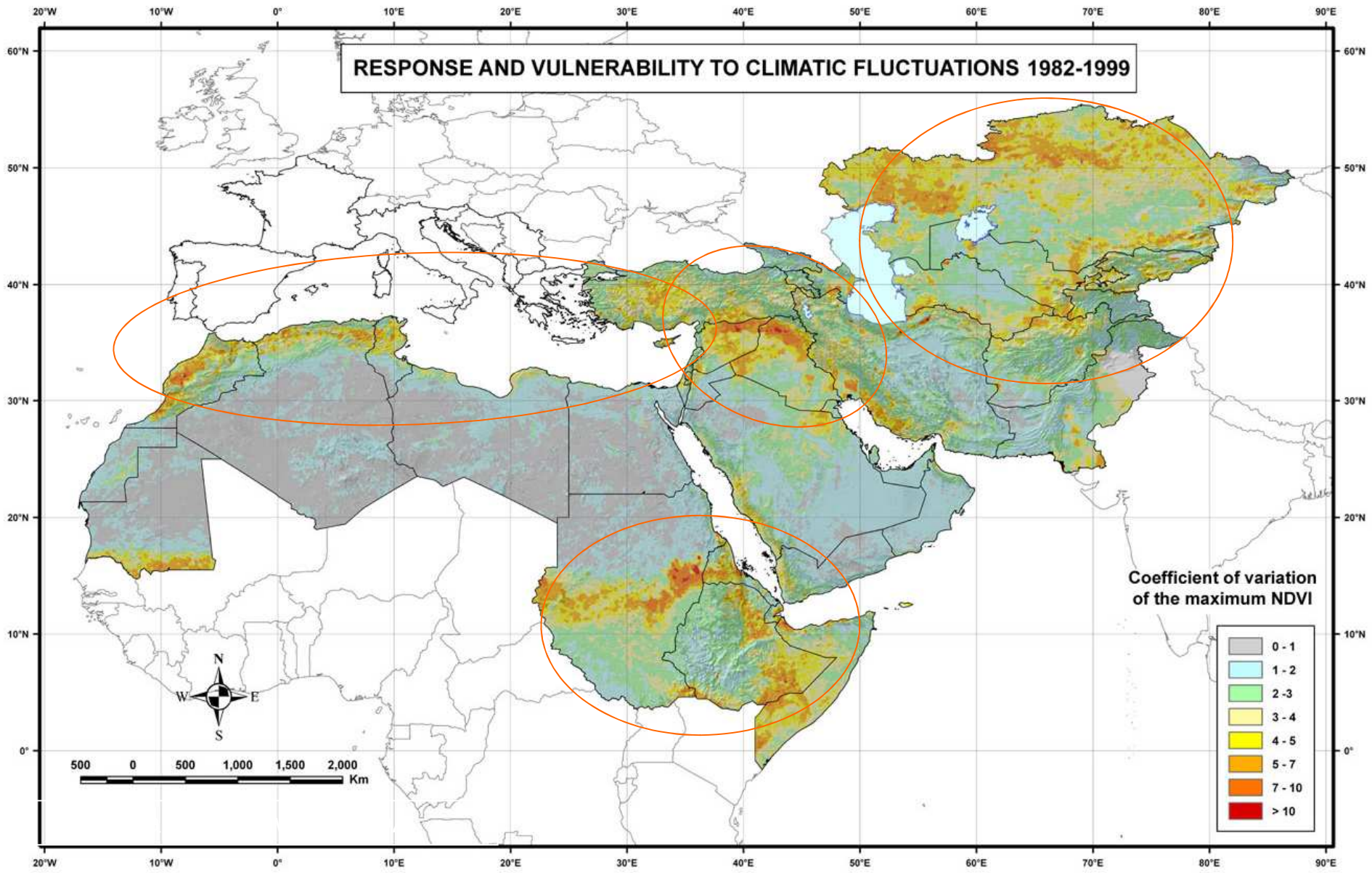
- Drylands regions cover about 40 percent of the world's surface. In MENA region they represent more than 80%.
- Dryland regions encompass major primary and secondary centers of diversity of global importance including for wheat, barley, lentil, forage legumes and many dryland fruit and nut crops including olive, fig, pistachio, almond, etc., and for small ruminants.
- Traditional farming systems are still prevailing in drylands, mountainous regions and Oasis areas.
- Rather known for its within species diversity but Mediterranean ecosystems are well known for their high species richness and endemism;
- Fragile environments that can lead to irreversible loss.
- Alarming loss of dryland agrobiodiversity due to habitats destruction, overuse, etc.

- Dryland agrobiodiversity is important for sustaining agricultural development and food security and in supporting the livelihoods of agricultural and pastoral communities;
- Dryland agrobiodiversity crucial for overcoming the major global concerns of desertification, global warming, loss of biological diversity and reducing rural poverty;
- Important source for commercial and industrial products (gums, resins, oils, biocides) and plant medicinal products;
- Inherent attributes for quality, adaptation including tolerance to extreme temperatures, drought, salinity,…;
- Drylands provide critical habitats for wild life and are indispensable for many migrating species;

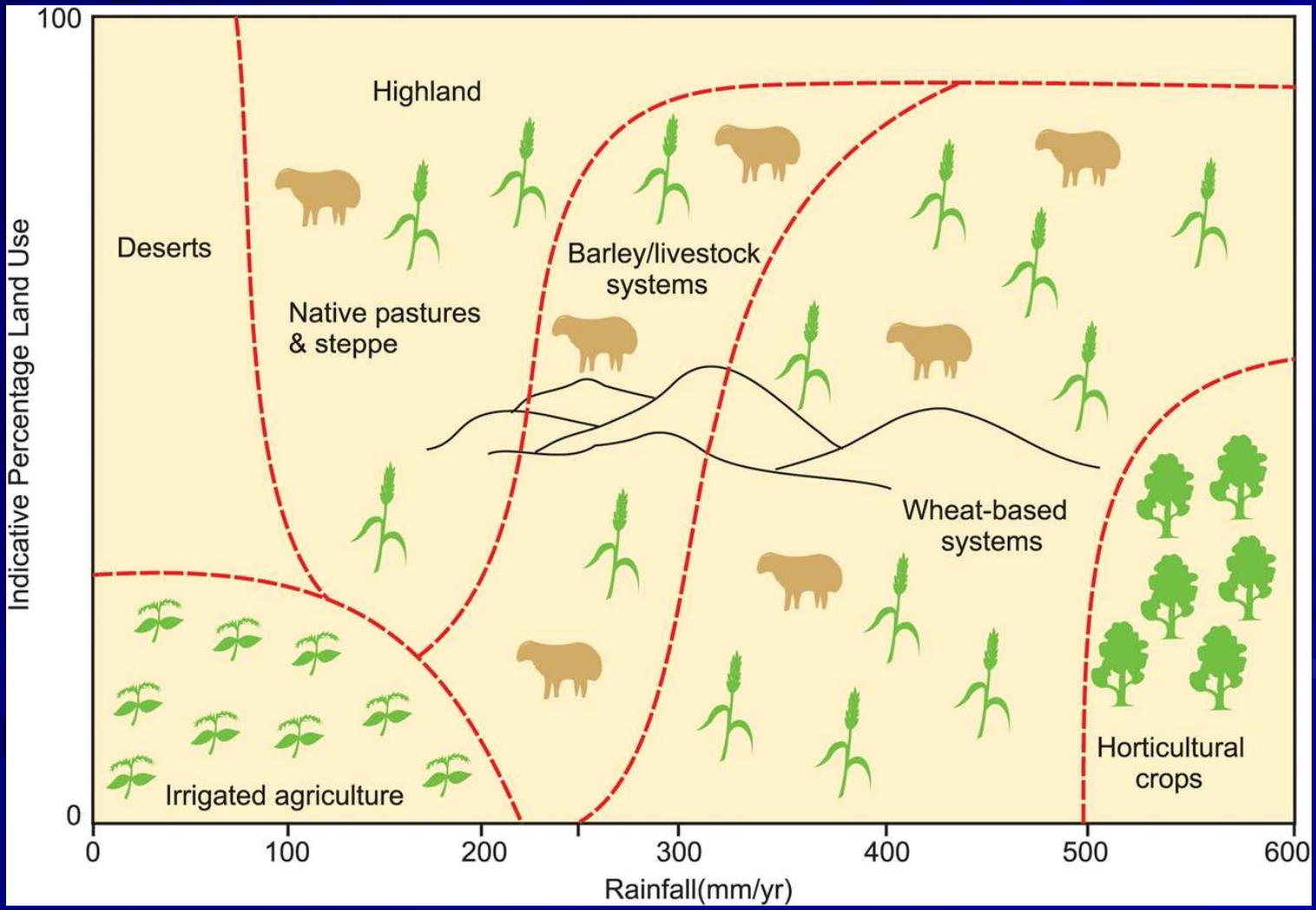
Middle East and North Africa region encompasses four major centers of diversity and the Mediterranean hot spots of endemic flora



Major centers of diversity in the Central and Middle East and North Africa are vulnerable to the effects of climate change



Agricultural Environments and Farming Systems in MENA region



State of ratification (* signing) of major biodiversity related international agreements by the MENA countries

Agreements	N. countries	Period	Countries
CBD	16 (+4)	1993-2003	ALG,BAH,EGY,JOR,LEB,LIB,MAUR, MOR,QAT,SYR,TUN,UAE,YEM, (DJI,OMA,SUD, SAR)*, TUR, AFG, IR
UNCCD	17	1995-1999	ALG,EGY,JOR,KWT,LIB,MAUR,MOR, OMA,QAT,SAR,SYR,TUN,UAE,YEM, TUR, AFG, IRA
CITES	16	1975-2001	ALG,EGY,JOR,MAUR,MOR,OMA,QAT,SAR, SUD,SYR,TUN,UAE,YEM, TUR, AFG, IR
Wetlands	12	1977-2000	ALG,BAH,EGY,JOR,LEB,LIB,MAUR, MOR,SYR,TUN, TUK, IR
Cartagena Protocol	4 (+8)	2003-2007	ALG,EGY,JOR,TUN, (SUD,DJI,LIB,MAUR,SYR,OMA,QAT,SAR)*
UPOV	4	-	JOR, TUN , EGY, MOR
FAO-PGRFA Commission	17		All except BAH and DJI
WHC	17	-	ALG,BAH,EGY,IRAQ,JOR,LEB,LIB, MAUR,MOR,OMA,PAL,QAT,SAR,SUD,SYR, TUN,YEM
ITPGRFA	10 (+10)	2001-2004	EGY,JOR,LEB, MOR, SUD,SYR,TUN, (ALG,LIB,MAUR,DJI, KUW, OMA, QAT,SAR,UAE,YEM)* , IR, TUR, AFG

Institutional arrangements for *ex situ* conservation in Arab countries

Countries	Strategy Action Plan	Number institutions	National focal institution	National PGR committee	Long-term conservation	Cryo-conservation	Field genebanks
Morocco	Yes	5	No	Yes (1992)	Yes	Yes	Yes
Algeria	Draft	4	INRAA (2007)	No	No	No	Yes
Tunisia	Yes	6	NGBT (2007)	Yes (2007)	Yes	Yes	Yes
Libya	No	1	No	No	No	No	Yes
Egypt	Yes	9	NGB (2004)	Yes (1994)	Yes	Yes	Yes
Syria	Yes	2	GCSAR (2001)	Yes (2004)	Yes	No	Yes
Sudan	Yes	3	No		Yes	Yes	Yes
Lebanon	Yes	2	No	No	No	No	Yes
Jordan	Yes	3	NCARTT (2002)	Yes (2001)	Yes	No	Yes
Iraq	No	1	No	No	No	No	Yes
Qatar	No	2	No	No	No	No	Yes
Kuwait	No	2	No	No	No	No	Yes
Saudi Arabia	No	3	No	No	No	No	Yes
Oman	No	2	No	No	Yes	No	Yes
UAE	No	2	No	No	No	Yes	Yes
Yemen	Yes	2	No	No	No	No	Yes

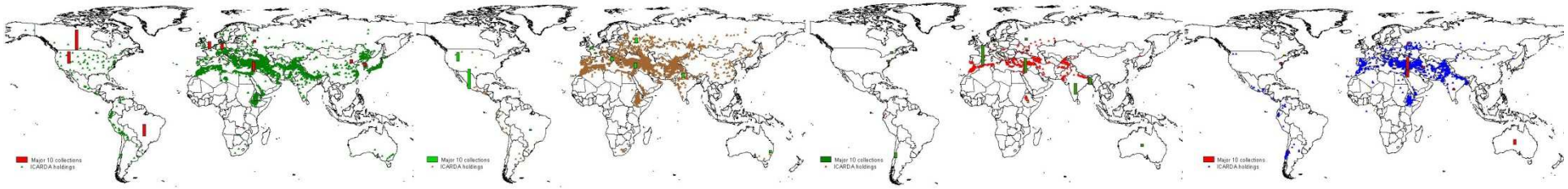
Distribution of genetic resources and major genebanks worldwide

TABLE 3 Genebanks and accessions in ex situ collections by region (8)

Region	Accessions		Genebanks	
	Number	%	Number	%
Africa	353,523	6	124	10
Latin America & the Caribbean	642,405	12	227	17
North America	762,061	14	101	8
Asia	1,533,979	28	293	22
Europe	1,934,574	35	496	38
Near East	327,963	6	67	5
Total	5,554,505	100	1,308	100
CGIAR	593,191	—	12	—

The fifteen largest national collections hold about one third of the world's plant genetic resources stored *ex situ* ●. A further 12% are held by the International Agricultural Research Centres ●. These include: International Centre for Agricultural Research in Dry Areas (ICARDA), International Centre for Tropical Agriculture (CIAT), International Centre for Maize and Wheat Improvement (CIMMYT), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), International Institute for Tropical Agriculture (IITA), International Rice Research Institute (IRRI)

Total number of seed accessions conserved in Arab genebanks in 2007: 91,519.



Triticum *Hordeum* *Lathyrus* *Lens*

State of the World PGRFA and the Global Plan of Action

Limited information is available for MENA region to contribute to the State of the World and the Global Plan of Action

- ***State of biodiversity***
- ***State of in situ conservation***
- ***State of Ex situ conservation***
- ***State of utilization***
- ***Contribution of PGRFA management to food security and sustainable development***
- ***State of national programs, training, and legislation***

2010

Status of genetic resources at ICARDA genebank

Crops (percent	Total accessions conserved	Breeding germplasm to be processed into collections	Accessions safe duplicated (%)	Accessions safe duplicated Svalbard	5th shipment to Svalbard
Barley	24998	17,000	24854 (99.42%)	21,851 (87.41%)	2542
Wild *Hordeum*	1977	-	1897 (95.95%)	1407 (71.17%)	90
Bread wheat	13576	7,000	13173 (97.03%)	10,621 (78.23%)	1537
Durum wheat	19592	3,000	19588 (99.98%)	18,031 (92.03%)	853
Primitive wheat	912	-	910 (99.78 %)	417 (45.72%)	208
Wild *Triticum*	1584	-	1583 (99.94%)	1390 (87.75%)	179
Aegilops	3985	-	3881 (97.39%)	2708 (67.95%)	365
Faba bean	9424	5200	5818 (92.92%)	4538 (72.48%)	27
Chickpea	13553	2800	12932 (95.42%)	8426 (62.17%)	1906
Wild *Cicer*	270	-	265 (98.15%)	144 (53.33%)	-
Lentil	10425	1000	10399 (99.75%)	9531 (91.42%)	670
Wild *Lens*	587	-	587 (100%)	574 (97.79%)	-
Lathyrus	3341	1800	3235 (96.83%)	2433 (72.82%)	1
Vicia	6143	-	5682 (92.5%)	3385 (55.1%)	26
Medicago	8397	-	8346 (99.39%)	6469 (77.04%)	22
Trifolium	4536	-	4303 (94.86%)	1596 (35.19%)	9
Pisum	6105	-	5804 (95.07%)	3752 (61.46%)	44
Other range species	5782	-	4486 (77.59%)	3321 (57.44%)	86
Others	219	7800	106 (48.4%)	16 (7.3%)	2
Total	135,406	45,600	130,956 (96.71%)	102,105 (75.41%)	8576

Total deposited at Svalbard 110,672 accessions

Conservation and Sustainable Use of Dryland Agrobiodiversity In Jordan, Lebanon, the Palestinian Authority and Syria

GEF/UNDP/ICARDA/IPGRI/ACSAD

(July 1999 – June 2005)

GEF

Palestinian National Authority

Ministry of Agriculture

GCSAR

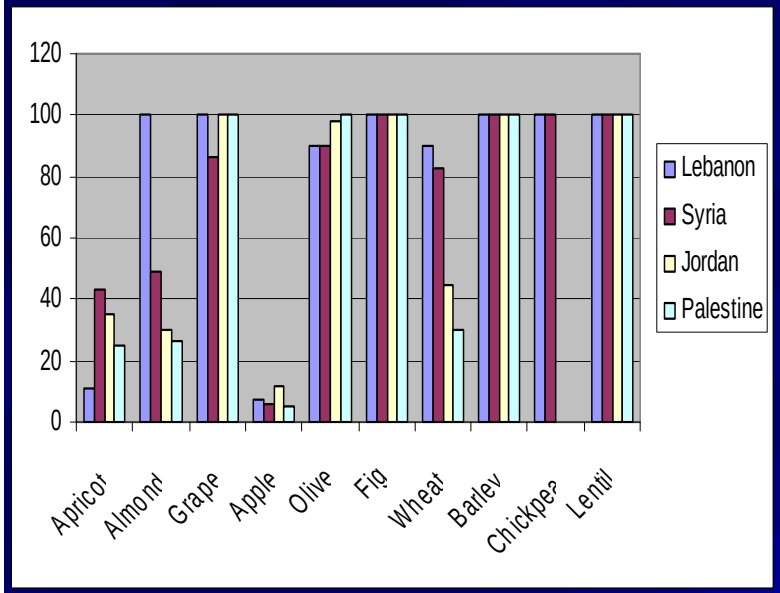
L.A.R.I

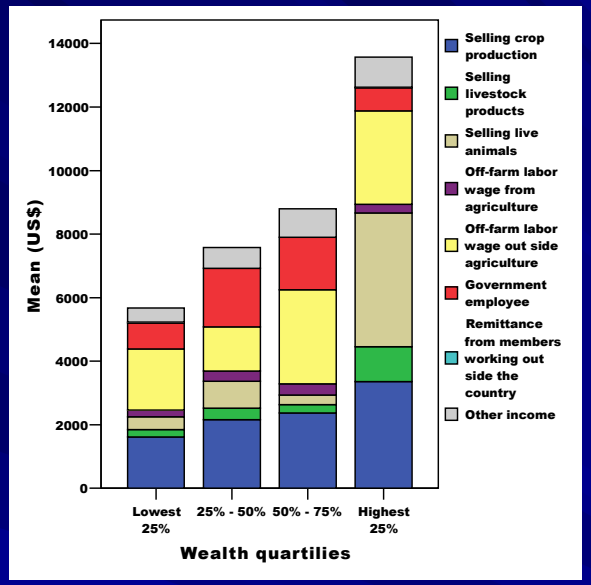
ICARDA

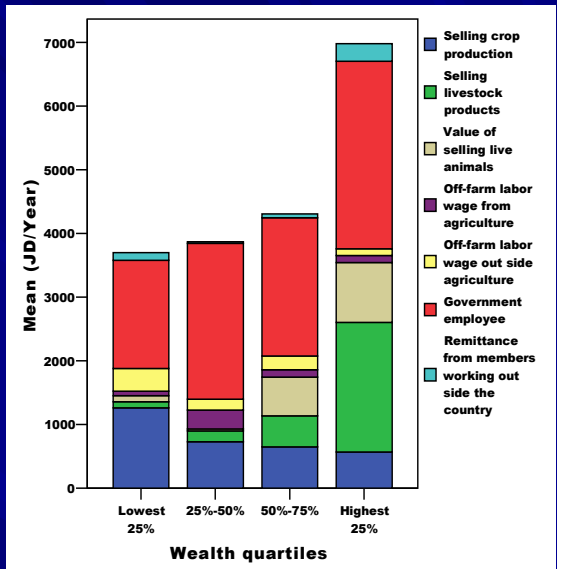
IPGRI

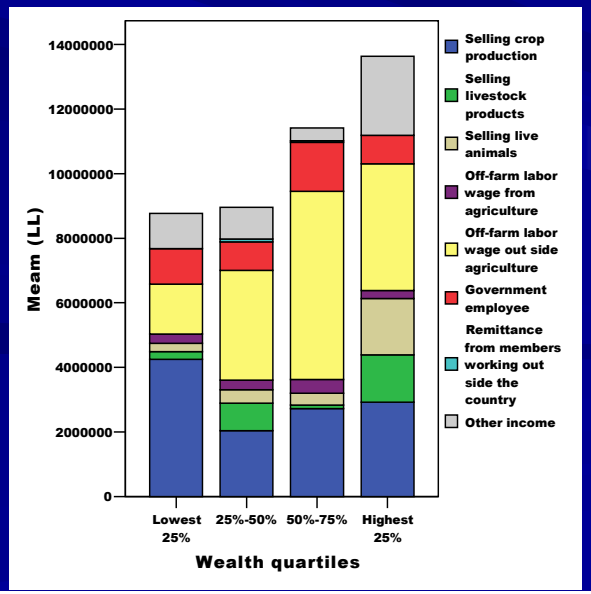
Agrobiodiversity and the livelihoods of rural communities in drylands of four countries in West Asia region

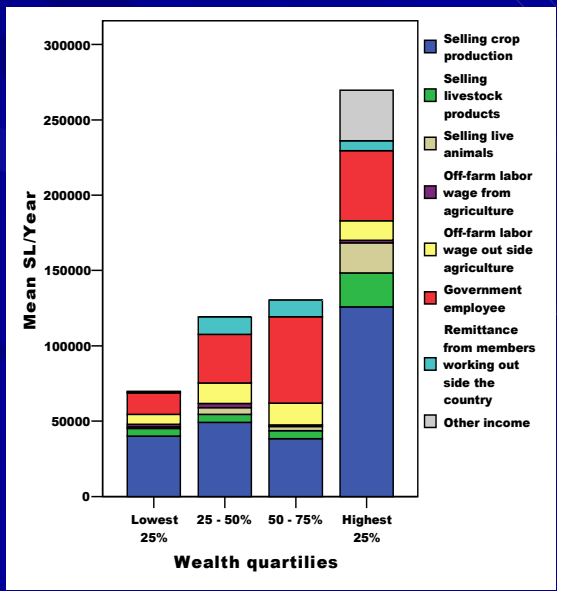
Jordan



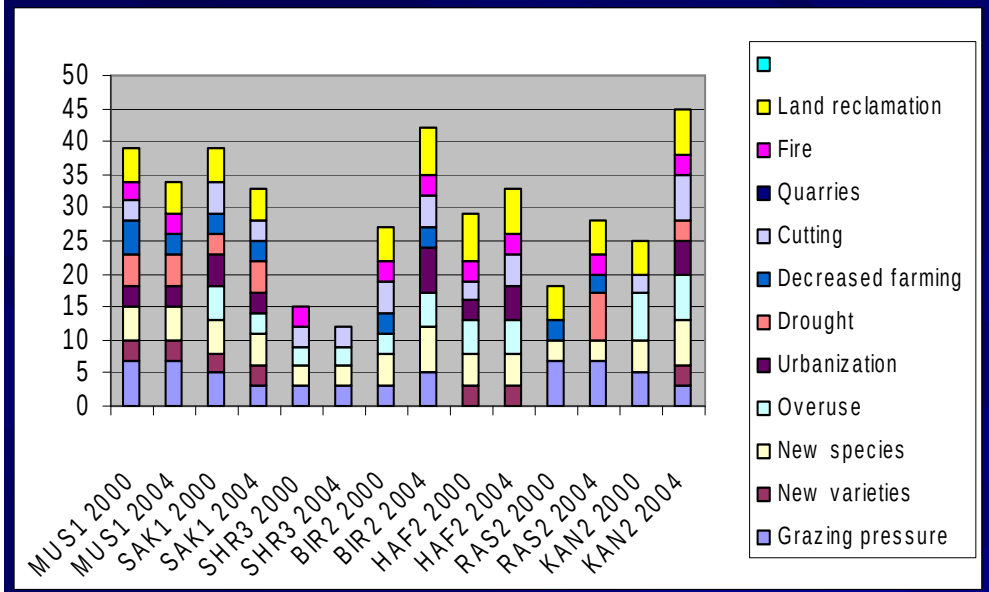


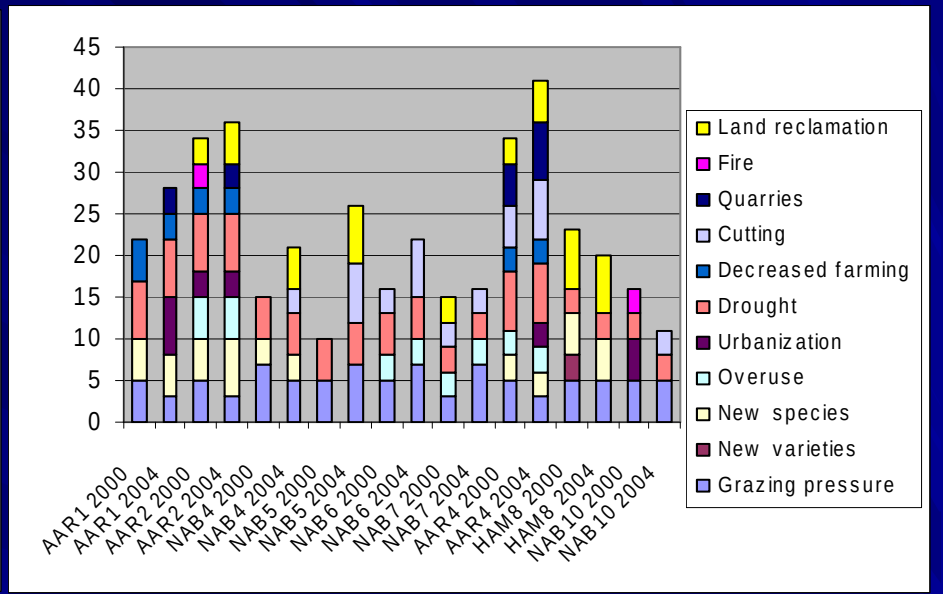


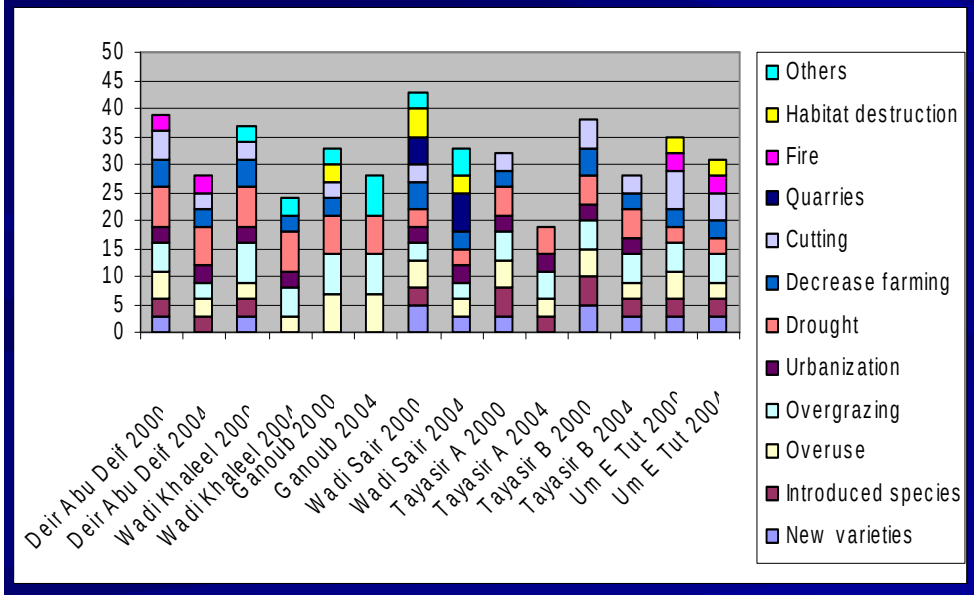


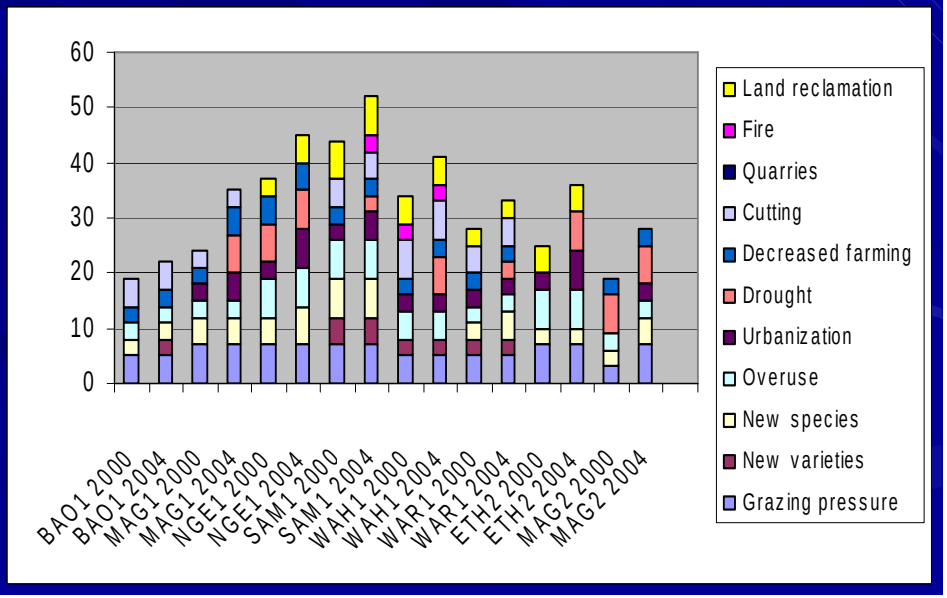


Major factors affecting agrobiodiversity in selected monitoring areas in Jordan, Lebanon, Palestine and Syria assessed in 2000 and 2004

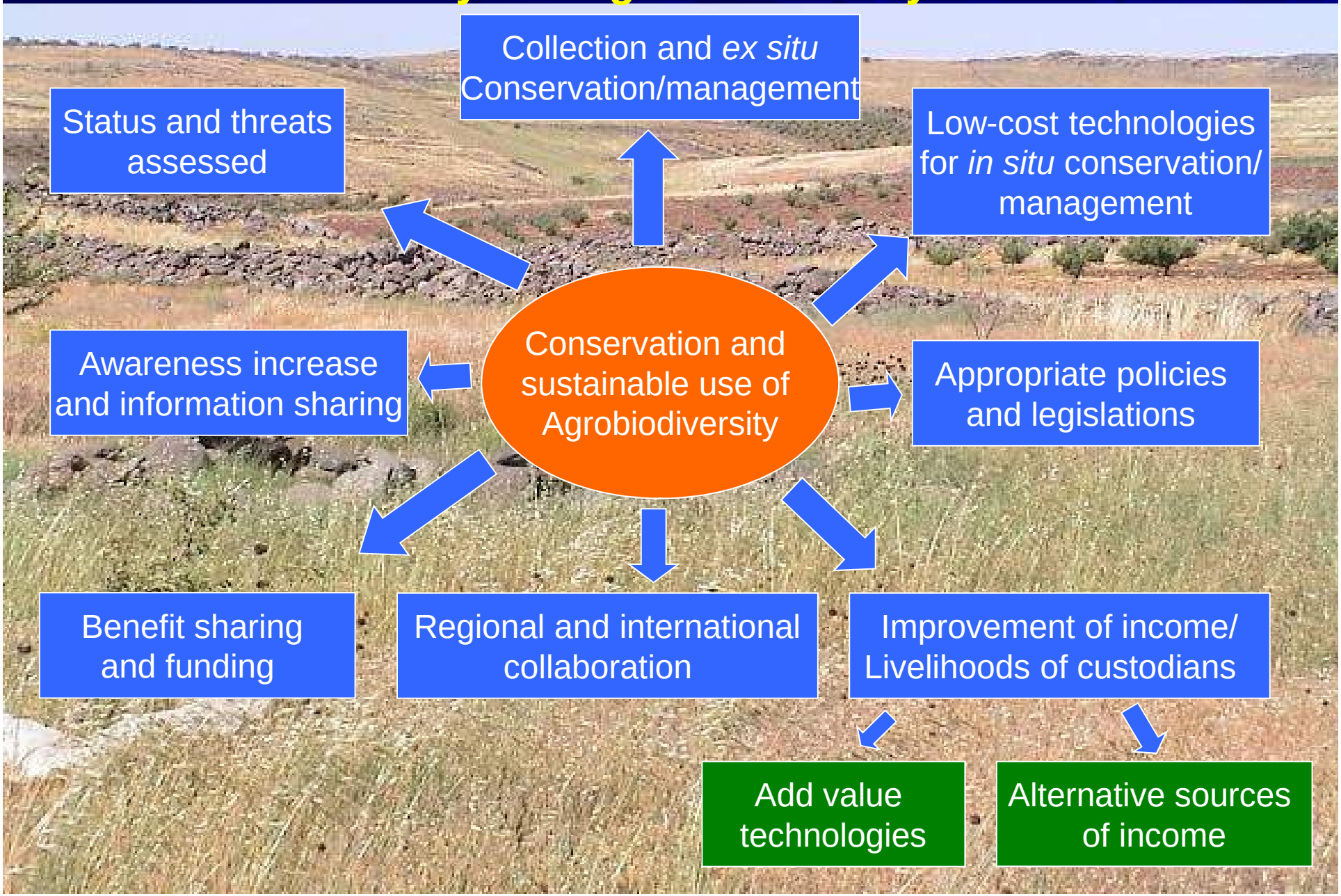








Strategy for promoting in situ/on-farm conservation of dryland agrobiodiversity

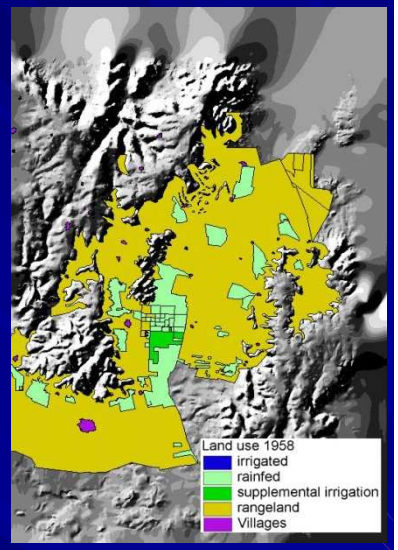


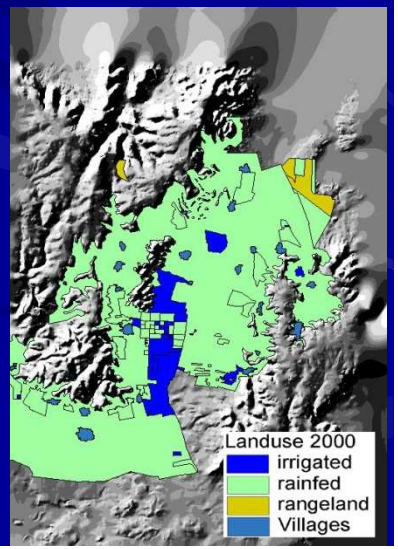
Framework for development of management plan for *in situ* management of agrobiodiversity

Options/Levels	Technological	Add-value	Alternative sources of income	Human and Institutional capacity	Policy
International					
Regional					
National					
Community					
Farm/habitat					
Species/crop					

Assessing and monitoring agrobiodiversity and its threats

- Conducting periodical eco-geographic and botanic surveys in selected areas in four countries;
- Follow-up of *in situ* conservation sites in Syria;
- Use of GIS/RS tools for assessing the status and trends of agrobiodiversity;
- Develop software and database related to *in situ* conservation of agrobiodiversity;
- Selecting priority biodiversity hot spots for *in situ* conservation;
- Conducting farming systems surveys and gender roles;
- Characterization of local breeds of small ruminants;
- Investigation of the effects of climate change and land degradation on dryland agrobiodiversity.
- Contribute to update of IUCN red list;
- Assessment of the extent to which existing protected areas are conserving dryland agrobiodiversity, mainly crop wild relatives.





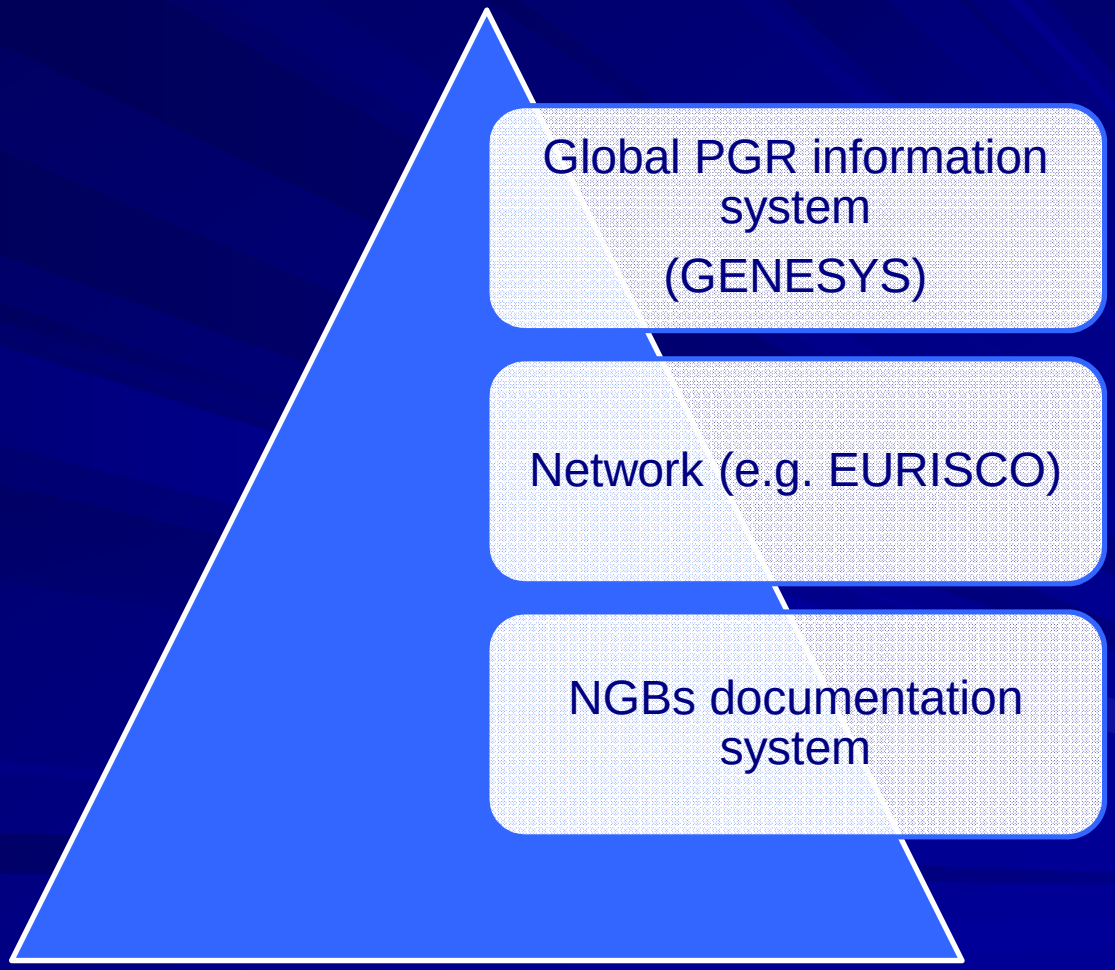
Researchable issues

- Assessing and monitoring biodiversity and its major threats;
- Selecting priority biodiversity hot spots for in situ conservation;
- Development and demonstration of management plans;

Policy options

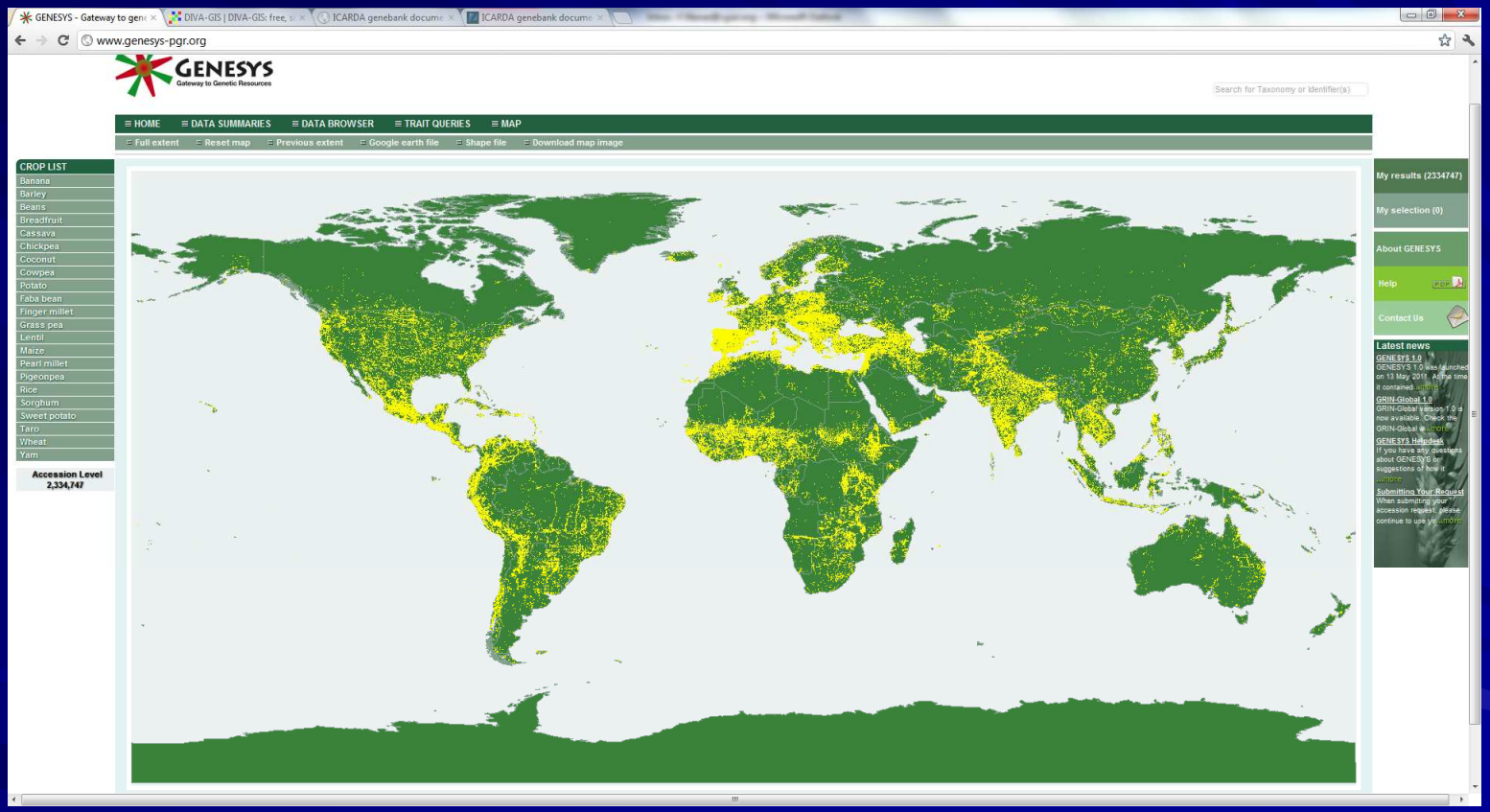
- Development of national agrobiodiversity conservation strategy;
- Land use suitability maps;
- Use of native species for rehabilitation of degraded systems (reforestation, etc.);
- Farmers rights and local knowledge issues;
- Awareness increase including introduction of biodiversity in education systems;
- Contribution to regional and global actions/fora (networking) on conservation and sustainable use of agrobiodiversity;

Publishing and sharing genetic resource information?



Genesys, the global portal on plant genetic resources

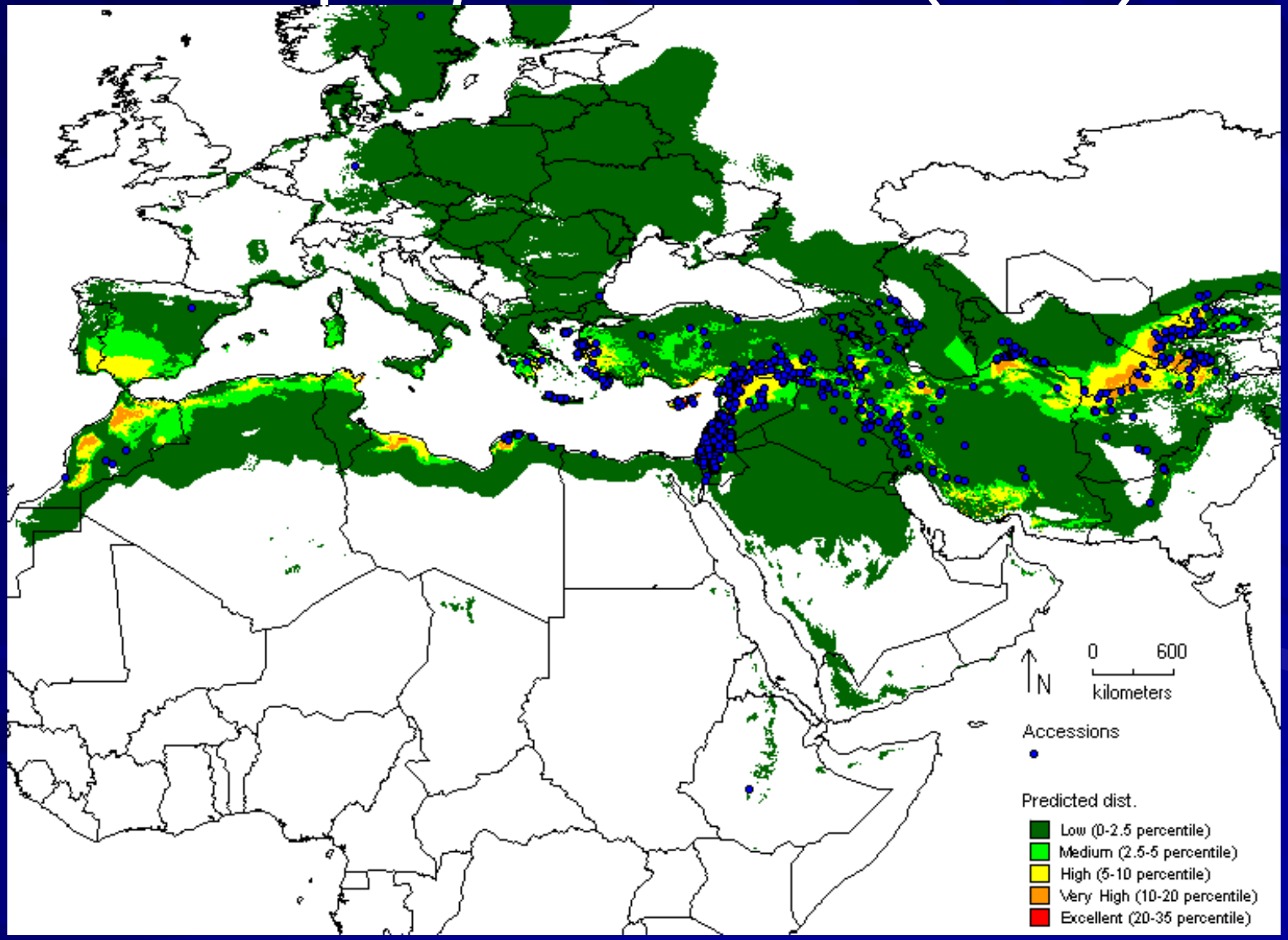
http://www.genesys-pgr.org



Genetic resources collected from MENA countries

Afghanistan	14332
Algeria	6784
Bahrain	9
Djibouti	8
Egypt	5624
Iran	45992
Iraq	4520
Jordan	6457
Kuwait	4
Lebanon	4433
Libya	2215
Mauritania	323
Morocco	11644
Oman	743
Palestine	261
Qatar	0
Saudi Arabia	476
Sudan	9569
Syria	16807
Tunisia	7531
Turkey	66139
UAE	86
Yemen	8521

Gap Analysis of *H. vulgare* subsp. *spontaneum* (GP1)

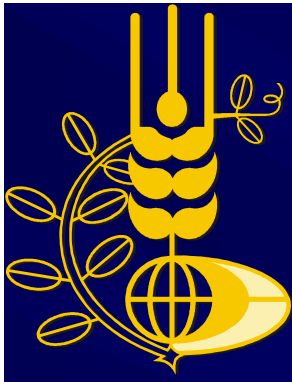









Indigenous breeds of small ruminants characterization and adaptation to harsh conditions and climate



Thank you