



The Research Council
Animal and Plant
Genetic Resources Center



**Implementation
of the Regional/Near East North Africa
Plant Genetic Resources
Network Strategy: National, Regional
and Global Roles**

Book of Abstracts

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Theme 1

***The Strategy of Animal
and Plant Genetic Resources –
Sultanate of Oman.***

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The Animal and Plant Genetic Resources Center: A Conservation Strategy

*Dr Nadiya Al-Saady, Executive Director,
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Oman is blessed with an abundant and unique fauna and floral biodiversity, including at the genetic level. This unique pool of genetic resources spans the entire animal and plant worlds, both domesticated and wild, as well as the world of micro-organisms. The unique geo-conditions have given birth to a diverse range of aridity tolerant plant genetic resources. Oman also benefits from numerous wild species, but many of them are critically endangered. A unique marine genetic diversity is also accessible from the long shores of Oman recognized by scientists around the world.

In 2010, the Research Council was mandated to look into establishing a center for genetic resources. A Steering Committee for the Animal and Plant Genetic Resources Center was formed, to formulate a comprehensive and integrated plan for a Genetic Resources Center.

Local and international experts and stakeholders worked together in the development of a comprehensive strategy for the Animal and Plant Genetic Resources Center that mirrors the aspirations of the Omani society, concentrating of the local threats and opportunities and ensuring that it translates into an implementation whose success hinges on acceptance and participation by local stakeholders.

The mission: To promote the recognition, sustainable exploitation and valuation of the genetic diversity inherent in Oman's animals, plants and microorganisms as a natural heritage resource. Clear goals have been defined to support the center strategy's mission. A balanced mix of programs were developed that would create value from genetic resources, each with a unique set of specificities so that, overall, a portfolio of activities would be implemented, all in line with the overall mission and vision.

Currently the APGRC is in the process of establishing the center after receiving approval from the Cabinet of Minister's to initiate the center. The APGRC, now located in Al-Athaibah, is currently in the process of recruiting new staff to assist with the establishment of the center as well as in the operation of the programs. Four programs are currently running in line with the centers strategy those include: the public awareness, coordination and dialogue, data collection and the documentation programs .

Theme 2

Funding Plant Genetic Resources (PGR) Activities

Al Lawati, Ali H.; holds a Ph. D in Agronomy/ Plant Breeding and Genetics from New Mexico State University, U.S.A. since 2006. His dissertation dealt with quantitative genetics and DNA profiling of alfalfa germplasms. He earned a Master of Science in Environmental Sciences from Sultan Qaboos University – Oman in Natural Resources. His master thesis was on water-use efficiency in forage production. He has enormous experience in Agronomy research of grain and forage crops since 1990. In 2001, Ali had Islamic Development Bank Merit Scholarship for High Technology. He has more than 20 publications in refereed international journals and other forms of publications. Al Lawati current research interest is conservation and use of plant genetic resources (PGR) especially for food and agriculture. He involved in scientific research on date palm diversity, alfalfa improvement, and plant genetic resources in saline environment. He involved in several national, regional, and international activities dealing with conservation of PGR since 2006, including establishment of the Animal and Plant Genetic Resources. Al Lawati is currently director of Research Administration in the Research Council, Sultanate of Oman.

Mobilization of regional financial resources for PGR activities

*Ali Al Lawati, Director, Research Administration
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It is documented that Plant Genetic Resource (PGR) activities in the region is hindered by financial constrains, as one of the major constrain. The aim of this presentation is to look to mechanisms and ways to enhance regional flows and domestic funding for PGR in the region. The presentation is aiming as well to discuss the best practices for mainstreaming financing, practices such as contribution of AARINENA and country members in the matter. It is also looking for potential funders regionally and internationally. Having a roadmap of financial resources for the years (2013-2015) activities is very important for successful planning and implementation.

Theme 3

Capacity building for PGR

Johannes M.M. Engels

Johannes Martinus Marie Engels has been trained in genetics, plant breeding and pedagogic and didactics at the Agricultural University of Wageningen between 1967 and 1974.

He started his career at the tropical Central American research institute CATIE, Costa Rica in 1976 as a team member of a GTZ (now GIZ) implemented project on the establishment of a regional plant genetic resources (PGR) programme in Central America. During this period he also initiated his PhD research on taxonomic and genetic aspects of cacao genetic resources and defended his thesis successfully in Wageningen in 1986.

From 1981 -1987 he was project leader of the BMZ funded and GIZ implemented genebank project in Ethiopia with technical responsibilities on genetic resources management and use aspects as well as managerial project responsibilities.

In 1988 he joined the International Board for Plant Genetic Resources (IBPGR). He coordinated for three years regional PGR activities in South and Southeast Asia, from the base in New Delhi, India.

In 1991 he moved to Rome and joined the Regional Programme of IBPGR (later IPGRI and now Bioversity International). In 1993 he assumed the responsibility as Director of the Germplasm Management Unit. In 1998 he was appointed Director of the Genetic Resources Science and Technology Group. In 2006 he stepped down as Director. As the Genetic Resources Management Advisor he accepted more specific responsibilities such as the coordinator of the global cacao genetic resources network (CacaoNet) and coordinator of the virtual European genebank system initiative (AEGIS).

In January 2012 he formally retired from Bioversity and was offered an Honorary Research Fellowship position. He continued his AEGIS Coordinator responsibilities as a consultant.

The role of Bioversity International in capacity building for PGR activities in NENA

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The strategy for conservation and sustainable use of plant genetic resources (PGR) for the Near East and North Africa (NENA) Region, concluded in November 2011, is an important step towards sustainable management of the Region's genetic diversity for food and agriculture. Implementing the strategy will require that capacity is strengthened in a number of areas, both regarding further improvement of genebank practices, but also in addressing new areas, such as linking in situ and ex situ conservation, and strengthening networking and institutional collaboration across the Region. To this end, the NENA-PGR Network is joining other regional networks that have been using training materials and other resources developed by Bioversity International. This paper introduces these resources and invites to a dialogue on how to collaborate in future.

Bioversity International as one of the CGIAR Consortium Research Centres places the conservation and use of agricultural biodiversity in smallholder farming systems at the centre of its work. In its new 2012 - 2021 Research Agenda it recognizes two strategic priorities, i.e. to improve the use of biodiversity by smallholder farmers and to improve the conservation and availability of plant diversity. Research at the genetic, species and ecosystem levels is carried out at representative sites and agricultural ecosystems; it focuses on important crops, trees and other useful food and non-food plant species, and the associated diversity that supports their production.

Whereas research on ex situ conservation is not any longer a priority, Bioversity continues to make conservation and knowledge products produced in the past available to its partners. More substantial support to regional and national PGR set-ups can only be made available through funded (on a full cost recovery basis) and jointly implemented projects in the aforementioned strategic priority areas. For the aforementioned 2nd priority this includes the provision of information and the furtherance of developing guidelines and standards that improve conservation procedures and ensure the maximum availability of ex situ collections. The latter will include the development of a global information system and will continue to help create a supportive policy and legal environment that stimulates the flow of genetic resources as well as the fair and equitable sharing of the benefits associated with increased availability.

With respect to identified areas for overall capacity building in the NENA Region, Bioversity can offer targeted advice and a number of knowledge products such as publications, databases and web-materials with respect to germplasm management. These can be made available as hard copies and/or on-line. With respect to documentation systems Bioversity is involved in the development and application of GRIN Global, a genebank information management system with networking features. The FAO National Information Sharing Mechanism is mentioned in this context as it allows adequate and comprehensive PGR information management at the national level. The European Search Catalogue EURISCO is a regional PGR information platform at the accession level that greatly facilitates regional collaboration (see separate presentation). With respect to enabling policies and legislation

Bioversity has an active programme of work and a number of publications that will be of relevance to the NENA Region. The enhancement of technical and research capabilities are possibly best achieved through the involvement of NENA countries in the CGIAR coordinated research programmes.

With respect to the NENA PGRN priority area of training and education, Bioversity has developed a number of tools and programmes that can be used. Examples include a pre-breeding self-learning training course; a training module on the implementation of the International Treaty; project based training courses (at the global level); as well as a programme on mainstreaming agro-biodiversity aspects into higher education curricula. Bioversity is prepared to assist and/or organize tailor-made training courses on a cost recovery basis.

The NENA PGRN priority area 'upgrading management systems' includes several aspects for which Bioversity has expertise and ongoing research work. These include the development of descriptors, setting technical standards for genebank operations (in the context of AEGIS and in collaboration with the FAO Commission), conservation protocols (crop and tree species) as well as the development of a quality management system for AEGIS (<http://aegis.cgiar.org/>). With respect to policy and legal matters the IT implementation module has been already mentioned as well as several publications that address access and benefit-sharing issues. With respect to genebank information and database management reference is made to GRIN Global as well as to the Global Crop Diversity Trust coordinated Genesys.

With regard to the priority area 'upgrading infrastructures and facilities' a number of products is available. The CGIAR system-wide Crop Genebank Knowledge Base is an internet-based portal with ample information on a number of genebank matters, procedures and issues that will be helpful for individual scientists as well as programmes to improve their operations. In this context also the ECPGR and AEGIS websites contain useful information, especially in the context of regional operations.

Regarding capacity building in general we have identified opportunities that the NENA countries could think of when searching on how to meet specific needs. One important opportunity would be to engage in discussions with CGIAR Centres with the aim of participating in their CGIAR Research Programmes. A number of funding opportunities in the area of PGR(FA) exist such as the International Treaty Benefit Sharing Fund (<http://www.planttreaty.org/content/benefit-sharing-fund>); the Global Crop Diversity Trust; bilateral support from donor countries; European Union funding schemes (a number of different schemes).

Theme 4

Regional Plant Genetic Resources Information Management

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Hassan Ouabbou began his career as a plant breeder at the National Agricultural Research Institute in 1984 after he earned his Master's degree in plant breeding from both the Agronomic and veterinary Medicine Institute in Rabat and from the University of Minnesota, and spent four years at INRA as a plant breeder of sugar cane. After returning to school and earned his PhD in 1995 from Kansas State University, USA in Crop Physiology with a minor in Biochemistry, he moved to the INRA-regional center in Settat. From 1995 to 2008, Hassan worked as crop physiologist at Settat. His interest was on cereal physiology especially, plant-water relations, heat stress, photosynthesis, electron transport, and chlorophyll fluorescence. In 2001 Hassan was promoted as a genebank curator. He published many research papers in international journals in plant breeding, genetics, and genetic resources. Hassan Ouabbou supervised many master and PhD students from the University Hassan 1st in Settat.

Highlights on the status of Plant Genetic Resources Management and Information System in NENA region

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Within the framework of the Global Plan of Action (GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (PGRFA) which was formally adopted by 150 countries during the International Technical Conference on Plant Genetic Resources held in Leipzig in 1996, FAO has developed a proposal for establishing National Information Sharing Mechanism (NISM) in order to strengthen national PGRFA programs and to improve the conservation and sustainable utilization of PGRFA through enhancing world-wide information management and exchange.

The mechanism is based on the participation of stakeholders at national level and seeks to promote information exchange and strengthen stakeholder cooperation, in so doing contributing to enhance the capacity of the National Program for Conservation and Utilization of Plant Germplasm and Agro-biodiversity. Through a computer application, the Mechanism facilitates the management of the information addressed by a list of internationally agreed indicators for monitoring in the country the implementation of all 20 priority areas of the GPA.

Among NENA countries, only 9 countries have established a National Information Sharing Mechanism. Eighteen countries within NENA region are not covered by the system. The NISM has generated some valuable data and information on 9 countries which took active part in providing information on their PGRFA activities. Efforts of updating it, and extend it to other countries in the NENA region will promote information exchange on PGRFA and strengthen stakeholder cooperation nationally and regionally.

Good progress has been made since 1996 on documenting accessions held in the main genebanks. However, Egypt, Jordan, Morocco, Oman, Libya and the Syrian Arab Republic all reported that their germplasm information is now fully maintained in a system supported technically by ICARDA and Bioversity International. Sudan is using the Nordic genebank documentation system (SESTO). Other countries, reported that documentation was not systematic or standardized. Yemen reported that documentation process is still manually implemented due to the lack of personal qualification. Iraq, and Lebanon are using excel format on germplasm documentation.

Based on the information stated above, the documentation and information systems are at different stages of development in the NENA countries and several genebanks have limited resources and knowledge on documentation and data base management systems, calling for more coordinated efforts to overcome these limitations, through a harmonization of documentation systems, standardization of data, and the establishment of national and regional information network, and an online portal to publish and share the available information.

Experiences of ECPGR with EURISCO as a Regional Platform for PGR Information Management

*Johannes M.M. Engels and Lorenzo Maggioni,
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The FAO State of the World Report shows that worldwide approximately 1750 genebanks and germplasm collections exist, maintaining about 7.4 million accessions. For Europe about 625 genebanks/collections have been reported maintaining approximately 2 million accessions. The NENA Regional Strategy refers to 20 national genebanks in its member states, holding more than 325 000 accessions.

EURISCO is a web-based catalogue that provides information about *ex situ* plant collections maintained in Europe. It is an output of the European Collaborative Programme on Plant Genetic Resources (ECPGR) and relies on a network of National Focal Points (NFPs). Each NFP, one per country, creates a National Inventory (NI) of the *ex situ* PGR in his/her country, by gathering information from the genebanks maintaining the material. This NI is made available to EURISCO. Thus, EURISCO is 'just' a portal showing the data in the NIs and thus in the genebanks. Consequently, EURISCO is not a database; it enables a view on databases maintained at the national level, exactly like Genesys or other portals.

EURISCO has been developed initially through a European Union funded project in which the National Inventory Focal Points were identified, the National Inventories established, the standards for the data exchange agreed, the NFPs trained and the central database and website established. EURISCO was launched in 2003 after "Memoranda of Understanding" were concluded with the member countries and the host institute, i.e. Bioversity International. A Coordinator was appointed, the helpdesk installed and an ECPGR Advisory Committee nominated.

The EURISCO Catalogue contains passport data of more than 1.1 million accessions of crop germplasm conserved *ex situ* in 43 countries, including 9% crop wild relatives, 25% landraces, 15% breeding material, 19% improved cultivars (the remaining 32% is of 'unknown' population type). The data are supposed to be updated at least once per year, but in reality this happens less frequently. Since a few years EURISCO also shows information which accessions countries have formally included in the Multilateral System of the International Treaty, currently a total of 251 188 accessions from 13 countries. Since 2012 also an AEGIS status descriptor has been added, that will enable countries to indicate which accessions were included in the virtual European Collection.

The heart of EURISCO is a set of agreed descriptors that comprise the 28 FAO/ Bioversity International Multi-Crop Passport Descriptors as well as eight EURISCO specific descriptors. Through the conclusion of a so-called "Data Sharing Agreement", the EURISCO member countries and the host institute countries agree on the use of the above descriptors as well as on the uploading format of the data. ECPGR is currently in the process of also including characterization and evaluation data, using a simple format for experimental, trait and genotype description.

It should be mentioned that the organizational structure of the data management varies slightly within Europe. Whereas most countries have their National Inventory, containing the information of all participating genebanks in a given country and a NFP that transfers the data to EURISCO, the Nordic countries have one common regional database for the centrally

stored seed germplasm with one National Focal Point in each of the five countries. Each country or sub-regional Focal Point is responsible for the gathering and inclusion of all data into the NI, for the data quality and availability and for keeping the data in the NI and EURISCO updated. At the central level (i.e. EURISCO) there is a check conducted on the conformity of the data with the agreed standards, feedback will be given to the NFPs, the provided data are included into EURISCO, the website is maintained and upon request or identified need, depending on the availability of funds, the NFPs are being trained.

Based on the EURISCO experience it can be concluded that strong institutional databases are the foundation for a regional information management system; that it is essential to have well-functioning national programmes with 'dedicated' NFPs; the establishment and operation of national inventories is essential; as well as data sharing and transfer agreements within and outside the countries. Furthermore, the central search catalogue needs to have strong technical support and management as well as a networking component for capacity building and helpdesk function. Clearly arranged governance (EURISCO is being supervised by the ECPGR Documentation and Information Network) and secured availability of budget are critically important.

The advantages of a regional central database are on one side the support that can be given to potential PGR users in selecting and locating material for their breeding and research programmes. On the other side policy makers, genebank managers and crop curators can use the database for gap and strength analyses, and rationalisation of collections. A spin off effect of the increased visibility of the PGR data is a strong improvement of the quality of the documentation, and consequently, possibly also of the management of the collections.

A number of ways that ECPGR would be able to assist the NENA PGR Network within the limits of available funds, include the provision of advice; the participation of EURISCO experts in a NENA regional workshop to establish the foundation of a NENA regional information system; and the training of national focal points.

Theme 5

***Establishment of Strong
PGR National Programs
as Basic Building Blocks
for Regional Collaboration***

Dr Ahmad Abbasi Moghadam

His was born in 1971 in Damghan a small but very historic place in Semnan province Iran but his primary education was in Sabzevar till 1989 when he accepted as Bs C student in Shahid Chamran University, Ahwaz Iran (Jondishapor University) in Agricultural Engineering with major in plant protection. In 1993 he got his Bs C with honor and received a full National Scholarship for Ms C studies from Ministry of Agriculture by Agricultural research, Education and Extension Organization and Start his post graduate study in Ferdowsi University, Mashhad Iran in 1994 in Plant Pathology. He graduated in 1997 with Honor and during National competition awarded Full Scholarship for Ph D studies from Ministry of Agriculture by Agricultural research, Education and Extension Organization. In 2000 he start his Ph.D studies in Indian Agriculture research Institute, Delhi India in Plant Pathology with fungal Pathology major and plant Breeding and Biochemistry minor and graduated in 2004 then he start to work for Agricultural research, Education and Extension Organization in Iran. From 2005 he moved to National Plant Gene Bank of Iran as Assistant Professor in Research and From 2007 as Deputy of Head of Department of Genetics and National Plant Gene Bank of Iran, Seed and Plant Improvement Institute, Karaj Iran.

Iranian Experience to Establish and Build a National PGR Program in Iran.

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Collection of plant genetic resources in Iran has been started during prehistoric time when human starts agriculture rather than hunting and settled besides rivers to cultivate crops. Their collection provides a lot of selected germplasms to provide base for different land races later. There are a lot of historical evidence on the interest of Iranian people and their rulers on collecting different germplasms to be utilize later. During 20th century collection of germplasm accession go back to 80 years ago to the establishment of first agriculture university in Iran and then conservation and use of plant genetic resources has been noticed with the cereal breeding and improvement program in 1930 but these activity was not centralized with proper plan of collection, identification, characterization and use of plant genetic resources. In 1977 a small unit of plant genetic resources was established in Seed and Plant Improvement Institute and then in 1983 National Plant Gene Bank of Iran was established in collaboration of Iranian government and Food and Agriculture organization (FAO) to prioritize, organize and manage the research activities on collection, conservation and use of plant genetic resources at national level. During the last 15 years due to environmental constrain and the probability of high genetic erosion with consonant management the amount of collection has been doubled and new techniques of molecular biology adjusted to national needs and used in detection of diversity and conservation of germplasms for future utilization.

Currently the Genetics and National Plant Gene Bank of Iran implement collection expeditions and research projects with fifty researchers/ scientists at its headquarter in Karaj and provincial agricultural and natural research centers across the country.

The mandate of Genetic and National Plant Gene Bank of Iran can be summarize as collection, conservation and utilization of plant genetic resources with high priority given to field and horticultural crops and their wild relatives to conserve and protect germplasm of the most valuable treasure of the country and to characterize genetic resources supplement by basic genetics research to facilitate the use of the genetic materials in different breeding and research programs in the country.

Achievement of the first rank among the plant gene banks in the Central Asia, West Asia and North Africa countries, collection and conservation of more than 70 thousands plant genetic accessions of field and horticultural crops, and their wild relatives that more than 6000 of them are fruit trees accessions live in 30 live collection gardens are among the most important achievement of Genetic department and National Plant Gene Bank of Iran.

Plant Genetic Resources In Oman

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The Sultanate embraces diverse agro-climatic regions and the principal occupations of the population are agriculture and fishing. It is very well perceived that from the point of long-term national economy and food security, diversification of the agricultural production and sustainable utilization of existing resources are a necessity.

Oman has a wide diversity of crop plants for food or feed purpose in addition to other human use. Among the important crop plant species are 12 field crops, 7 vegetables, 11 fruit trees, 20 forest trees and rangeland pasture species and a few aromatic and medicinal plant species which are known to be grown in the Sultanate since time immemorial. Oman has not only several locally adapted cultivars and land races of crop species but also unexplored wild relatives of some crop plants that may be an irreplaceable source of diversity for traits useful for crop improvement. There are evidences of an increasing pressure on this diversity from several factors, among these, soil and water salinity, drought, scarcity of irrigation water, and high grazing pressure by increased number of livestock. These factors are inevitably posing a serious threat to the very survival of Omani indigenous crop species and cultivars. It is a challenge for the institutions of Oman to revert this trend through an integrated and balanced approach, which takes advantage of the expertise and capacity of all national stakeholders.

Plant genetic resources for food and agriculture (PGRFA) inventories and surveys for wheat, barley, forages, some vegetables and fruit crops have been conducted although not systematically for describing the state and distribution of all Omani indigenous species/cultivars for food and agriculture and their wild relatives. There are protected areas under Ministry of Agriculture (MoA) in the vast rangelands of Dhofar (Southern Oman) which are monitored to conserve and protect the diversity of rangeland, pasture, and wild crop relative species. There are numerous activities towards conservation of local landraces of vegetable crops such as onion, garlic, cucumber, sweet potato etc. and grain crops such as wheat, barley, chickpea etc. through on-farm management since early 1990s. There is an urgent need in Oman for raising awareness of the importance of these local plant genetic resources for food and agriculture and of the role of on-farm management in their conservation and improvement.

Collection missions of indigenous plant genetic resources were undertaken by the Ministry of Agriculture during 1980s in collaboration with the International Bureau of Plant Genetic Resources. Further missions were conducted in late 1990s and early 2000 with international institutes like the International Center of Agriculture Research in Dry Areas (ICARDA) and the International Center of Biosaline Agriculture (ICBA). More than six hundreds of these accessions currently are conserved in International centers such as ICARDA and national institute such as USDA. These accessions need to be repatriated and subjected to conservation and utilization in the country.

Oman is fully aware of the importance of utilization of its indigenous plant genetic resources for food and agriculture. Since 1990's, activities have been started for the characterization,

selection and improvement through traditional breeding, as well as biotechnology and tissue culture techniques of indigenous germplasm like dates, mango, banana, sweet-lime, acid-lime, cucumber, barley, alfalfa and pasture plant species.

Several collaborative efforts with respect to the conservation and utilization of PGRFA have taken place since the early 1980's with IBPGR (currently, Bioversity International) and more recently with ICARDA, ICBA, AARINENA etc. Oman has ratified several international conventions and signed agreements dealing with the conservation and utilization of plant genetic resources for food and agriculture. These include the Convention of Biological Diversity in 1994, the Global Plan of Action for conservation and utilization of PGRFA in 1997, and the International Treaty on Plant Genetic Resources for Food and Agriculture in 2004.

The country has already developed some legislation and policies on conservation and utilization of PGRFA, which need to be followed up according to 20 activities of the Global Plan of Action (GPA).

In late 2007, the FAO country report was produced through a participatory process involving several national stakeholders, which has also led to the establishment of the National Information Sharing Mechanism on plant genetic resources for food and agriculture (www.pgrfa.org), a related database and a web portal. It addresses and discusses relevant aspects concerning, inter alia, the state of diversity of Oman's plant genetic resources for food and agriculture, in situ management, ex situ management and utilization, as well as national programs, training and legislation, regional and international collaboration, sharing of benefits and farmers' rights related to plant genetic resources for food and agriculture and contribution of their management to food security and sustainable development of the country.

El Tahir Ibrahim Mohamed is a Sudanese by nationality. He was born in Khartoum on December 7, 1956. He is currently an Associate Professor in the Agricultural Research Corporation (ARC) of Sudan. He graduated from University of Khartoum in 1981 with a B. Sc in Agriculture. After he joined the ARC in 1982 he studied in the University of Birmingham, U.K. and got M. Sc in Conservation and Utilization of Plant Genetic Resources in 1985. Later he obtained a PhD degree in 2000 on Evaluation of Plant Genetic Resources from University of Gezira in Sudan. At present he is the Head of the Plant Genetic Resources Unit in the Agricultural Research Corporation, Sudan.

Plant Genetic Resources Programme in Sudan: a National Experience

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A Plant Genetic Resources (PGR) Programme is operating under the Agricultural Research Corporation (ARC) in Sudan. It is being run through a PGR Unit in the ARC, with main objective of conserving and enhancing the use of the plant agro-biodiversity in Sudan.

This programme has been established officially since 1995 by upgrading into a separate programme related activities on horticultural genetic resources, which were being conducted under horticultural research in the ARC since mid 1980s. The programme is operated through a central unit to which some in-country regional units affiliate. The programme is concerned with issues related to conservation and enhancement of utilization of local plant genetic resources for food and agriculture, as well as initiating activities related to policies and legislation on PGR. It is also concerned with establishing necessary links at national, regional and international levels in its endeavors to attaining its goals. So far a number of achievements have been realized by the programme, while a number of challenges are lying ahead.

As a result of the efforts exerted by the programme a total of more than 11000 accessions of local crop genetic resources are being conserved. The capacities to conserve and enhance the use of PGR have also been relatively improved. This is reflected in the improvement of germplasm storage capacity as well as increase in number of germplasm accessions that have been collected, multiplied and characterized. Human capacity of the PGR programme in Sudan has also been upgraded through post-graduate trainings leading to master and PhD degrees, as well as through specialized and on-job short-term trainings. A PGR documentation system for facilitating data capturing, storage, access and retrieval has been adopted. Arrangements for back-up and safety duplication of PGR collections from Sudan have been initiated in collaboration with sister institutions inside and outside the country.

This paper is, therefore, highlighting this Sudanese experience in terms of achievements, challenges and constraints, lessons learnt and future prospects with emphasis on a number of aspects such as developmental stages of the programme, structure and institutional arrangements, stakeholders and partners involved, and funding.

Ph.D. Kursad OZBEK

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Ministry of Food, Agriculture and Livestock
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OZBEK was born on 31th March 1971, in Karaman/Turkey. After he graduated from high school he went to Ankara for universty in 1990. He graduated from Ankara Universitesi (University of Ankara) Agricultural Engineering Department in 1996, and then he get his master and doctoral degrees in same universty. He also studied Economics at Anadolu Üniversitesi (University of Anatolia) in Eskişehir. Then he started his professional life in Plant Genetic Resources Department in Central Field Crops Research Institute, in 2004. He is still working in same departmet as a Head of department.

Conservation and Utilization of PGR in Turkey

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Developing part of the world is under a tremendous pressure of increasing demands of growing population. Population growth means growing needs for food, natural resources, education and health services and many others. Plant genetic resources of developing countries suffer from this unfavourable situation by over grazing, over collecting or replacement of natural areas with settlements or other uses. Plant genetic resources conservation is generally not a priority issue for high degree officials and politicians in developing countries, where there are many other urgent problems to be solved. For this reason it is not very easy to convince a developing country government to set up and maintain a costly conservation program for genetic resources.

Germplasm is the treasury for any crop improvement where we can find the rare and/or new gene pool. Conservation is one of the main components of germplasm study in which the scientific knowledge and tool should be applied in order to preserve the genetic materials from extinction and future utilization. The utilization of germplasm by scientific approaches is the real outcome with the help of human knowledge.

Turkey is one of the pioneering countries started to maintain the genetic resources and has considerable experiences on ex situ conservation since 1960s. Currently there are three gene banks in Turkey, two of which are run by Ministry of Food, Agriculture and Livestock, and the other is run by Ankara University Faculty of Agriculture. Within the framework of national program, the ex situ conservation is implemented both for generative and vegetative collections which are preserved in seed and field gene banks respectively. The vegetatively propagated material, mainly fruit genetic resources are kept in field gene banks at 16 institutes. The total number of accessions of national collection is about 65 000 with about 3250 species.

There are many collections of landraces collected in Turkey. Most of these genetic material conserved in Turkish Seed Gene Bank of Central Research Institute for Field Crops. The main activities of this foundation is collecting of wild relatives and primitive forms and local varieties of crops, multiplication, characterization-evaluation, documentation, seed viability control, seed drying and storage. Approximately 30.000 accessions are stored in long term storage rooms.

Dr. Ahmed Amri holds a PhD from Kansas State University, USA on genetics and plant breeding in 1989. He worked at the Research Institute (INRA-Morocco) from 1980-1999 as cereal breeder and coordinator and he contributed to the development of 21 barley, 7 durum wheat, 5 bread wheat and 5 triticale released varieties. He joined ICARDA in 1999 as regional Coordinator of the GEF dryland agrobiodiversity project (1999-2005), Regional Coordinator West Asia Program (2001-2008), Iran-ICARDA Coordinator (2005-2009), and Head of Genetic Resources Unit (2008-uptodate). He has participated to technical backstopping, training, collecting and enhancing regional and international collaboration. He has contributed to advising of more than 52 BSc. MS.c and PhD students from Morocco, Jordan, Syria and Iran. He has published 98 scientific articles including 57 in referred journals. He has expertise in breeding, conservation of agrobiodiversity, policies and legislations related to genetic resources, in situ conservation of agrobiodiversity and sustainable agricultural development and development of research strategies.

Agrobiodiversity conservation activities in WANA region: Status and needs

Ahmed Amri

West Asia and North Africa region (WANA) encompasses major centers of diversity for crops of global importance including wheat, barley, lentil, chickpea, fababean, several forage species and dryland fruit trees. Most of the countries have signed the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture showing their keen interest to contribute to effective conservation and sustainable use of their respective genetic resources.

The genetic resources programs in WANA are at different stages of development and differ in the scope and organization with only few countries having reliable genebanks and several working towards strengthening their genetic resources programs. At the national level, there is need more commitment from the government and for effective coordination among all institutions involved in agrobiodiversity conservation. The International Center for Agricultural Research in the Dry Areas (ICARDA) is playing a key role in promoting the conservation and sustainable use of dryland agrobiodiversity and has the largest holdings of accessions from WANA region.

However, there is a need for: 1) a comprehensive analysis of the status and needs of the genetic resources conservation programs focusing on genebanks and institutional arrangements; 2) organize proper training on genebank management and best practices for handling accessions; 3) increase the understanding of policies and legislations governing the genetic resources and local knowledge transfer and sharing and benefit sharing; and 4) enhancing regional collaboration and networking.

WANA-Genetic Resources Network, ICARDA and other regional and international organizations will need to coordinate their efforts to better serve WANA countries and region to enhance their capacities towards contributing to building effective plant genetic resources global system.

Theme 6

Towards a Plan of Action

Saifan, Sobhia M.; holds a Ph. D in Agriculture/Plant genetic resources and biodiversity from University of Jordan, Jordan since 2009. Her dissertation dealt with genetic diversity (molecular, phenotype, chemotype), conservation and cultivation potential of wild Thyme. The molecular parts of her thesis carried out at ICARDA. Her MSc thesis was on molecular and morphological diversity of eggplant landraces. She has vast experience in plant genetic resources and biodiversity researches since 1991. She has many publications in refereed journals, proceedings and booklets. The recent were on Implementation of ITPGRFA through usage of the SMTA in exchanging Jordanian barley and a study on Policy oriented research guidelines and procedures to support implementation of CBD. Her current research interest is *Ex situ* conservation and utilization of Plant Genetic Resources (PGR) and policies and treaties relevant to exchange and management of these resources. She is the PI in scientific research on vegetable landraces diversity and cultivation potential of wild species (*Gundelia tournifortii*). Currently she is coordinating a project funded by European commission under FP7 program; the project is tackling with improving capacities in conservation and sustainable utilization of plant diversity. She involved in numerous PGR activities at national, regional and international level; all in relation to management of PGR, among these are: the national Biodiversity thematic research group, NENA PGRN focal point and the Millenium seed bank. Dr Saifan is currently the head of plant genetic resources at National Center for Agricultural Research (NCARE) Jordan and also working as a consultant for the Royal Botanic Garden in Jordan.

Visibility of NENAPGRN

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The plant genetic resources network (NENAPGRN) was established in 2008 under the AARINENA where Sudan is coordinating its activities. The network includes members of 26 countries representing five sub-regions: Arabian Peninsula, Maghreb, Mashreq, Nile Valley & Red Sea, and Western Asia. To date 15 countries expressed their interest to be members in NENAPGRIN where 12 countries are actually participate in network activities. In November 2011, a strategy for the network entitled "Conservation and sustainable use of plant genetic resources" was developed and it was agreed during the 2nd Coordinating Board meeting conducted in Cairo in Sep 2012. The main objective of the strategy is to strengthen coordination and collective action within and among countries of the NENA region for best management of their Plant Genetic Resources (PGR). To accomplish this objective it's very important for the network to put action plan and start working in various dimensions, among these is increasing the network visibility in the region of NENA as well as in other regions of the world so communication will be more effective and fruitful. Developing dissemination and Promotion Plan is important for the NENAPGRIN to support communication within and among country members and other PGR networks in the world. This paper aims to outline the following: objectives and approach for dissemination; targeted audience who may benefit from the network activities; Instruments and communication channels to disseminate the knowledge available in county members of NENAPGRN like Knowledge hubs and mediators which may act as multipliers of information on NENAPGRIN activities; and the main exploitable assets of the network to be communicated. Making the network more visible is expecting to increase opportunities of supporting the NENAPGR and also encourage all country members contribute effectively in the network activities.

**Conservation and sustainable use of plant genetic resources:
a strategy for the Near East and North Africa region**

Dr. Abeer El Halwagi

The Near East and North Africa Plant Genetic Resources Network (NENAPGRN) was established under the AARINENA following a decision by the AARINENA 11th general conference, which was held in Damascus, Syria in October 2008. The network is governed by a Coordinating Board (CB) composed of all members that are represented by identified focal points. At its first meeting held in Muscat in June 2011, the Coordinating Board (CB) of NENA-PGRN commissioned the development of a strategy on the conservation and sustainable use of plant genetic resources in the region. A draft regional strategy for conservation and sustainable use of Plant Genetic Resources in NENA region was then developed by a team of experts requested by the CB. The draft strategy was circulated to all NENAPGRN member countries through their focal points along with a detailed questionnaire with the aim of soliciting the views of the competent national plant genetic resources (PGR) authorities regarding the orientation and content of the draft strategy. The Coordinating Board of NENAPGRN, in its second meeting held in Cairo on 18 to 20 September 2012, adopted the strategy as the basis for the future programmes and activities of the network. Comments by different member countries were appreciated and considered by the CB as integral part of the strategy that should be attached to strategy document as an appendix.

The final strategy document includes:

Introduction;

Developing Near East and North Africa Strategy for the Future;

Mission of the Strategy;

Vision of the Strategy;

Goal;

Objectives of Near East and North Africa Strategy;

Outputs of the Strategy;

Strategy Content;

Conclusion.

The present presentation is briefly highlighting the main contents of the strategy document, which has been adopted by the NENAPGRN as the network strategy

Harry Palmier has a degree in International Public Law and Development (University of Paris). He has more than 25 years of experience in agricultural research management and international cooperation: a) in the French System: Head of External Relations, IRD; Deputy Director for International Relations, CIRAD Annual Crops Department; and b) internationally: Institutional Development Specialist in the World Bank Special Program for African Agricultural Research (SPAAR) and Department for Environment and Rural Development (1995-2002). He contributed to different national agricultural research and community development programs in Africa, the development of CORAF/WECARD and creation of the Forum for Agricultural Research in Africa (FARA). Actively involved in the recent CGIAR Reform, he also contributed to the Report on transforming agricultural research for development for the Global Conference on Agricultural Research (GCARD 2010). He has responsibility in GFAR Secretariat for putting GCARD Road Map principles into practice and strengthening partnerships between national, regional AR4D systems and the CGIAR Research Programs.