

ICARDA and the Private Sector

With the increasing use of participatory methodology in ICARDA's research approach much of our research is with end users who could be deemed within the private sector. However, for the purposes of this document we have included groupings of private individuals, such as commercial enterprises and finance-generating community-based organizations, and have excluded individual private farmers and resource users.

Seed Unit and the Private Sector

I - Principle and Mode of Engagement with the Private Sector

Principle

The guiding principle of engagement with the private sector is to create synergetic circumstances for achieving bigger impacts in terms of improving livelihoods and reducing poverty through research and training in dry areas of the developing world that face more complex challenges than other areas. It is strongly believed that the private sector can contribute to food security through increased investments, developing and delivering new ideas and solutions to existing agricultural problems.

Mode of engagement

- Direct solicitation of partnership where compatible, competent, and reliable private sector exist.
- Establishment, encouragement, and promotion of small private entities to exploit locally available market opportunities for seeds (VBSEs).
- Demand-driven approach upon request from the private sector.
- Market monopoly is not permissible

A key motivation for seeking partnership with the private sector is to strengthen linkages between technology generation within ICARDA research programmes, as the case may be for other IARC, and the technology delivery systems to end-users or farmers. Current partnership is not strong enough as a result of ineffective national extension and input delivery systems, and lack of economic incentive for profit-oriented private companies to engage in business.

The private sector can play advocacy roles and sensitise policy makers in providing support and regulatory reforms that enable the creation of a competitive, efficient and sustainable seed industry. The expected benefit is an increase in the choice of varieties available to farmers, improvement of quality of seed marketed, enhancement of improved seed uptake, and the movement of varieties and seeds within or across national boundaries, thus providing opportunities for regional or global seed trade.

Improving private sector access to ICARDA germplasm and other public goods is another issue that could emerge as national seed systems become more diverse. Until recently, new varieties were passed automatically to the public sector. However, private companies may also wish to use these materials, and may even be more effective at

marketing them to farmers. ICARDA is exploring alternative approaches for partnership for the private sector in getting access both to the germplasm and public-bred varieties to ensure that the efforts in plant breeding and crop improvement reach farmers.

The potential for biotechnology to contribute to solving agricultural problems and create opportunities to enhance sustainability and improve the livelihoods of farms and communities cannot be overstated. For example, in most developed countries, the seed industry has gradually transformed into ever-larger groups through mergers and acquisitions of agrochemical, pharmaceutical and oil-related companies stimulated by the potential offered by genetic engineering and the high cost of research. These companies endeavour to integrate agricultural productivity, human nutrition and health issues that are equally important in the developing world. However, they generally target global or regional markets instead of purely national or local markets to recuperate their investments. Therefore, biotechnology or new products may not be easily accessible to a large segment of the rural population, especially the poorest in developing economies, under the changing environment for intellectual property protection, and due to lack of both physical and financial resources.

An alliance with these private companies can be negotiated whereby transgenic proprietary varieties having relevant traits for biotic and abiotic stresses and adapted to less favorable areas can be made accessible for use by researchers in the National Agricultural Research Systems for the benefit of small-scale resource poor farmers in locations where they are acceptable and the benefits justified but it poses no market threat to the private sector. Another significant development in this endeavor is a strategic alliance between the private sector and NARS that can be steered towards a joint research for the development of crop varieties with multiple characteristics such as disease and drought resistant, product traits (e.g. malting quality), whether through biotechnology or conventional techniques.

The benefit of such partnership is two fold where it will ensure quick access to improved crop varieties without going through long-term process of variety development, and increases in farmers' income through diversification of their production systems. It would be interesting to find new models of partnership between the private sector and IARCs whereby the latter supports applied plant breeding research at centers in recognition of the benefits derived from the center in terms of access to research results and the provision of germplasm.

II - Key examples of collaboration with the private sector focusing on Seed Issues

We focused on Seed Issues because while the seed industry is undergoing privatisation globally the CGIAR is in general concerned with staple, often-orphan crops where potential profit margins are too small to be an incentive to the Private Sector. So there are many opportunities for pro-poor engagement with the Private Sector on a 'Win-Win' basis.

Development of Appropriate Seed Processing Machines for Farmers

Demand for seed of certain crops is so small and geographically scattered that it undermines the economic viability of large-scale 'industrial' processing and distribution. Both the high capital investment and the transportation costs of seed in and out of the processing plant could hardly be recovered from the price of seed which farmers are willing or prepared to pay. The high investment costs of conventional seed processing equipment is also a deterrent to new or small enterprises wishing to enter the seed business.

One of the constraints of agricultural productivity in the dry areas in many developing countries is the low quality of seeds sown by farmers. Although seed can be processed to an acceptable standard at the farm or village level using traditional methods, treatments that are required to control seed-borne diseases cannot be properly done manually. For example, the application of 1 millilitre of chemical on a kilogram of seed is not easily, if not feasibly, carried out properly by hand. For large quantities, farmers are more likely to simply plant without even cleaning or treating. Therefore the opportunity to apply seed treatment to a reasonable level of accuracy is also a benefit in some crops or locations.

In order to tackle these problems, ICARDA developed over the years a prototype machine for seed cleaning and treatment. It collaborated with a local manufacturer (Darbas Company, Syria) to modify a grain cleaner into a purposely-built integrated machine that could be adapted and used for a wide range of crop seeds. Development began in 2000 and since that time, many modifications have been made based on intensive testing at ICARDA Headquarters and feedback received from users. Because of the need to serve scattered rural communities and to reduce seed transportation costs, the machine is made in a mobile form, easy to clean, and suitable for small seed lots which need to be kept separate. It has proven very useful for use at the village and farm levels or on research stations. A full technical description and guidelines for operation, adjustment and maintenance of the machines has been prepared by ICARDA in English and Arabic, and made available to users after regular training sessions. At present over 25 machines are being used in Afghanistan, Lebanon, Jordan, Vietnam, Palestine Authority and Syria.

Establishment of Seed Enterprises

The lack of seed continues to be a major constraint to the rapid dissemination and widespread adoption of new varieties by farmers. One aspect of ICARDA's interaction with the private sector is the establishment and promotion of community or village-based seed enterprises (VBSE). These are farmers-led production, processing, and marketing entities that produce high quality seeds of local and improved crop varieties, adapted to local conditions. Depending on the case, these enterprises target other farmers in less favourable or marginal areas where the formal seed system or private seed companies hardly exists or do not provide their services, due to high risks, transaction costs, low demand and its geographic dispersion, etc. The VBSEs have comparative advantages over large seed companies in serving geographically dispersed communities owing to their proximity and reduced transport, distribution and supervision costs. They are therefore an effective means of targeting and reaching resource poor small-scale farmers with improved quality seeds to help them achieve food security in locations where there

is limited competition from the formal sector, less opportunity for commercial crop production and often limited off-farm employment opportunities. In-formal (community-based) seed production is to produce quality seeds locally at affordable prices. This is done by farmers themselves (after enhancing their capacity in seed production), and thus the motivation is not necessarily the absolute and direct profit from the seed production enterprise. Rather, it is the yield increase and quality associated with the use of improved seeds. This offers an effective mode of partnership with the private sector (farmers in this case). Additionally seed enterprise for remote areas and minor crops in dry areas may not be profitable enough (compared to other investing opportunities) due to the absence of economies of scale/size and thus may not encourage investment from the private sector (specialized seed-production companies). Again this is why ICARDA has chosen the community-based seed production approach.

In Afghanistan and in close collaboration with many partners (MAAH, NGOs, CIP, ICRISAT, IRRI, CIMMYT, etc) along with financial support from USAID, ICARDA is leading the Future Harvest Consortium to Rebuild Agriculture in Afghanistan (FHCRAA) in providing institutional support to set up Village-based Seed Enterprises (VBSE) in five provinces (Ghazni, Helmand, Kunduz, Parwan and Nangarhar). ICARDA organizes farmer groups, provides technical support in preparing business plans, sources high quality seeds of improved varieties which have shown to be adapted to the specific agro-ecologies, builds capacities of farmers and staff of partner organizations, assists in sourcing fertilizers, equipment and credit, monitors and evaluates VBSE activities. It focuses specifically on assistance in enterprise development, quality seed multiplication and marketing, and training and public awareness as a means to put an efficient and profitable seed production and marketing system in place. By the end of the first year (2004) 15 VBSE were established, 9 of them produced 1,278 tons seeds of various crops (wheat, rice, chickpea and mung bean) that were marketed to the FAO, the Ministry of Agriculture and Animal Health (MAAH), NGOs and other farmers. The seed production level achieved represents 85% of the annual production target expected by the project end in 2006. In collaboration with CIP, 19 additional potato seed production and marketing groups were established. Training activities, among other things, benefited hundreds of farmers, extension, MAAH, and NGO staff.

In North Africa, the adoption and diffusion of modern varieties and associated technologies developed by the National Agricultural Research Systems in partnership with IARCs have shown mixed results with resource poor farmers in less favourable environments and remote areas. The prevalent inadequate seed production and distribution systems have significantly slowed down the dissemination of newly released improved varieties of most field crops, especially cereals and food and feed legumes. Under the IRDEN project, ICARDA is developing methods and guidelines to encourage the involvement of the private sector and stimulating the emergence of grassroots organizations to efficiently, and in a sustainable manner, engage in seed multiplication, processing, storage, and distribution of adapted modern varieties of durum wheat in Algeria, Morocco and Tunisia. Farmer seed producers are being identified to engage them in local seed multiplication and marketing. The process will ensure on-time seed

availability and adequate seed quality to farmers. Mobile seed processing equipment are being manufactured for delivery in these countries in the coming harvest season.

Networking and Promoting Seed Trade Associations

ICARDA spearheaded the formation of the West Asia and North Africa (WANA) Seed Network that was established in June 1992. The objective of the WANA Seed Network is to enhance cooperation, exchange information, and create a forum for consultation to share existing experiences, expertise, and resources for seed program development in the region. ICARDA facilitated the linkage between member countries and the international organizations so that they benefit from sharing experiences in seed sector development. Currently, it has 19 member countries in the region and linked to 11 regional and/or international organizations dealing with seeds and agricultural development. Moreover, member countries are assisted in strengthening national seed programs and are encouraged to achieve international standards.

Realizing the synergy between the public and the private seed sector, the Network called upon the international organizations such as the International Seed Federation (ISF), the International Union for the Protection of New Varieties of Plants (UPOV) and the International Seed Testing Association (ISTA), the Organization for Economic Cooperation and Development (OECD) to become observers of the Network. This meant for the Network to respond to the changing environment in the seed sector and reflect the increasing diversity of the national seed systems.

The formation of national seed associations plays a key role in representing the interests of the seed industry, both public and private sectors. It is anticipated that such association could play a key role to assist governments in creating favorable environments for policy and regulatory reforms that are required for seed sector development in the region. In 1999, ICARDA through the WANA Seed Network established formal linkages with national seed trade associations from Egypt (Egyptian Seed Association), Morocco (Association Marocaine des Semences et Plants), Pakistan (Chamber of Private Seed Industry) and Turkey (Turkish Seed Industry Association) representing the private sector. 'Strengthening Seed Associations' considered as a way of involving the private sector in the national seed sector development. The Pakistan Chamber of Seed Industry took the lead in developing a strategy for the formation of national seed associations in collaboration with the existing national seed trade associations (Egypt, Morocco, and Turkey), ICARDA and ISF.

ICARDA contributed to the debates of regional collaboration with ISF, American Seed Trade Association, etc in the establishment of the African Seed Trade Association in 2000. At present a strong working relationship has been established with African Seed Trade Association and Asia Pacific Seed Association in promoting the formation of national seed associations within the sub-region to strengthen the role of the private sector in the countries of the CWANA region.

International Seed Trade Conference

In collaboration with the Turkish Seed Industry Association, ICARDA is organizing the International Seed Trade Conference in 2005. The main objective of the conference is to explore opportunities and promote seed trade by providing a forum for exchange of experiences and to make contacts among the private sector particularly within the CWANA region and beyond. The specific objectives of the conference are to: (i) demonstrate the potential of the seed market in the CWANA region; (ii) Share experience and knowledge in seed trade among seed industry stakeholders of the CWANA region; (iii) Serve as a forum to promote business interactions and alliances among seed companies within and outside the region; (iv) Provide opportunities for stimulating regional seed trade.

Promoting Intellectual Property Rights

ICARDA, in collaboration with the International Union for the Protection of New Varieties of Plants (UPOV), is promoting the awareness of intellectual property rights as a means to stimulate private sector participation in the seed sector. ICARDA in collaboration with UPOV have organized regional workshops/seminars on Plant Variety Protection for the countries of Central and West Asia and North Africa. The majority of countries are expected to introduce a plant variety protection system similar to that advocated by the International Union for Protection of New Varieties of Plants as part of international obligations or to stimulate the private sector. Plant variety protection is intended to encourage private investment in plant breeding and thereby increase the choice of varieties available to farmers. Likewise, it may encourage foreign companies to introduce their varieties and technology to countries where protection is available.

Capacity Building in Seed Enterprise Development and Management

Since 1990s some countries in CWANA started liberalizing their seed industry where the private sector started emerging in seed delivery systems. As a result, many small to medium seed enterprises are being established in countries such as Egypt, Morocco, Pakistan and Turkey. ICARDA is providing a course in Seed Enterprise Development and Management, aimed specifically at meeting the growing need of many countries in the CWANA region that are now shifting to market-oriented seed production. The courses focus on enhancing skills for developing cost effective small-scale seed enterprises in low margin crops. The course is designed for seed business promoters and advisors, seed program managers, staff of NGOs involved in seed business ventures, and staff of other organizations interested in creating mechanisms for market-oriented sustainable seed supply.

In 2000, a management course was organized in collaboration with the Pakistan Chamber of Seed Industry and the Federal Seed Certification and Registration Department for senior managerial and technical staff from local companies engaged in the seed business in Pakistan, with emphasis on companies that have entered the market recently where a total of 51 participants attended the course.

The collaborative agreement between the ICARDA/CIMMYT breeding program and Busch Agricultural Resources Inc. (BARI) (especially their international program) started

in August 2000 with the objective of exchanging breeding material and technical support between both programs. BARI gave our program 4 of their malting varieties and asked us to introgress multiple disease resistance, with emphasis in FHB resistance. At the beginning, 12 populations were generated and advanced from crosses between their barleys and our elite lines. In the following cycles their well-known high quality material collaborated in an important fashion to our crossing block. Three years ago they also started delivering their advanced material to test with us. Approximately 80 lines generated in the program have been delivered to them every year. The agreement does not cover exclusivity the germplasm, it is freely available to all barley community, especially to the developing countries with which we collaborate. In return, during their yearly visits to the program, we have had knowledge exchange and inputs from the industry, quality and market trends, consumer preferences, etc. More than 150 samples were micro-malted at their lab (market cost of the analysis approx. US\$ 100 per sample). The collaboration in cash has been US\$ 15,000 per year.

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Breeding with the Private Sector

Busch Agricultural Resources Inc

The collaborative agreement between the ICARDA/CIMMYT breeding program and Busch Agricultural Resources Inc. (BARI) (especially their international program) started in August 2000 with the objective of exchanging breeding material and technical support between both programs. BARI gave our program 4 of their malting varieties and asked us to introgress multiple disease resistance, with emphasis in FHB resistance. At the beginning, 12 populations were generated and advanced from crosses between their barleys and our elite lines. In the following cycles their well-known high quality material collaborated in an important fashion to our crossing block. Three years ago they also started delivering their advanced material to test with us. Approximately 80 lines generated in the program have been delivered to them every year. The agreement does not cover exclusivity on the germplasm; it is freely available to all barley community, especially to the developing countries which we collaborate. In counterpart, during their yearly visits to the program, we have had knowledge exchange and inputs from the industry, quality and market trends, consumer preferences, etc. More than 150 samples were micro-malted at their lab (market cost of the analysis approx. US\$ 100 per sample). The collaboration in cash has been of US\$ 15,000 per year.

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Biotechnology and the Private Sector

The following are various co-operation arrangements in the biotechnology area that ICARDA has. We include in this section, in addition to the private sector, some specific licensing arrangements with public institutions on biotechnology.

Bayer AG, Germany

ICARDA has a research license together with the University of Hannover, Germany to use the stilbene synthase gene (*vst*) for incorporation in chickpea. The aim of this research is to increase the fungal resistance in chickpeas.

Monsanto

ICARDA has contacted Monsanto for the use of its glyphosate resistance gene. The gene is to be used in legumes (lentil, chickpea, and faba bean) to control parasitic weeds and weeds.

Centre for Legumes in Mediterranean Agriculture (CLIMA)

CLIMA had licensed its lentil transformation technology to ICARDA. An ACIAR-funded research project between CLIMA and ICARDA has enabled the technology transfer. The technology transfer included training of ICARDA scientists in the technology in Australia, and follow up of the implementation of the technology. Active **MATERIAL** included in the transfer were: plasmids containing BASTA resistance, *Agrobacterium* strains suitable to induce genetic transformation.

Mediterranean Agronomic Institute of Chania, Crete, Greece

Chania has given ICARDA a research license for the following constructs: BI-GST, LeGST-T2, LeGST-T5. This is part of a cooperation agreement under the project: EC (AIDCO)-CIHEAM Co-operation Project, 1998-2003, Contract No. ME 8/B7-4100/TB/97/0398-1. The constructs are potentially useful in increasing abiotic stress tolerance.

The Samuel Roberts Nobel Foundation

The Samuel Roberts Nobel Foundation, a non profit corporation (hereinafter "Provider") agrees to non-exclusive transfer *Medicago truncatula* EST-SSR markers to ICARDA as well as any progeny and unmodified derivatives thereof (collectively "Material") for the use by Dr. Michael Baum ("Scientist").

University of Napoli

ICARDA has received the plasmid pGIRIP containing the cloned Ph-R1P1 cds, accession number AY327475 ("Material") for the purpose of non-commercial research. The construct might potentially increase fungal resistance in plants.

Japan International Research Center for Agricultural Science (JIRCAS)

We have received from JIRCAS the rd29 promoter and the DREB1a gene. These constructs can be selected with kanamycin as they have a NPTII gene. DREB1a is a transcription factor and can potentially increase the tolerance to drought and salinity. The license was renewed as of January 2006. ICARDA has to provide an annual report by the end of each year, and consider Japanese scientists in possible publications coming from the research using the DREB gene.

CSIRO Plant Industry, Australia

ICARDA has received the plasmid pWBVec8, a vector used for transformation of barley.

GenXPro

GenXPro is a Frankfurt based private company involved in medical and agricultural research. The company emerged from our cooperating partner in Frankfurt University Prof. Dr. G. Kahl/Dr. P. Winter. GenXPro is to develop a legume chip (microarray) suitable for screening for abiotic stress resistance in chickpea and lentil. The chip would be available for ICARDA to use.

Engagement in Agro-Biodiversity with the Private Sector in West Asia

Location	Partners	Description
Jordan Private business created	2 men and 1 women 4 women 3 women	Fruit tree nurseries Dairy production (Singlish cheese) Home gardens and cultivation of medicinal and herbal plants
Lebanon Private sector	Cyclamen and 2 other eco-tourism companies	Introduction of eco-tourism in Ham/Maaraboun
	Four supermarkets at Zahle and Beirut	Marketing of local products and of herbs
	Mectat (member of NRM Platform)	Training on food processing
	Debbane Company	Training on small machinery
	Dr. Hyam Malat, Attorney	Development of legal options
Palestine Private sector	Al-Sahel for Institutional Development	Local needs assessment study (contract)
	Beit Jala olive pressing and marketing cooperative	Establishment of nurseries
Syrian Private Sector	Five fruit tree nurseries	Multiplication of landraces of fruit trees
	Restaurant close to Saladin Castle	Management of Agrobiodiversity shop

Engagement with the Private Sector in Central Asia

In Kazakhstan, one of our collaborators is a private company “Logos Trade”, Astana. It has business in production, processing, storing and marketing grain including export. We are collaborating in the introduction of zero tillage technologies in grain production. In 2005, the company planted over 5,000 ha of wheat on zero tillage technology. Another private company “Amangeldy” has 42,000 ha operation in both south and north Kazakhstan. It also is involved in zero tillage testing with adoption in future.

Links on Malting Barley in Syria

Location: Syria

Background:

Al-Shark Company is a (Syrian) government owned establishment in Aleppo. The full name is Governmental Food Processing Company.

One main activity of Al-Shark is to procure barley and carry out malting for both breweries in Syria. The larger part of malt is used for the Aleppo brewery (Al-Shark) and a smaller part for the sister brewery in Damascus. The company started malting and brewing in 1954.

Scope of Co-operation:

In 2003 the company started to use local varieties of barley for their malting. ICARDA started breeding work for malting varieties around 2000. The breeding program offers varieties suitable for Syria and surrounding countries.

Malting barley is often irrigated, aiming at large seed sizes. At present the malting industry is using two suitable ICARDA-lines which are not true malting varieties. Al-Shark selected three lines from ICARDA’s breeding program, which are currently multiplied on about 2.5 ha. They are expected to be available for malting with the 2008-harvest.

The industry, covering two state-owned breweries, has a demand of about 3500 tons of barley, with the predicted demand of 5000 tons in the near future. For farmers the malting barley production is a good chance for a reasonable income, because malting quality is paid about SL 2000 higher than forage quality (SL 9500/ton, \approx \$175/ton). This is substantially above the world market price.

ICARDA had agreed to boost the distribution of acceptable varieties by:

- breeding adapted varieties on the base of existing malting barleys.
- Multiplying seed of these varieties for a few years. From 2008 onwards only normal quantities of new varieties shall be handed out.

The sale of farm produce as malting quantity barley may continue, provided quality demands and prices are acceptable.

Another possible cooperation may be the breeding for biscuit-quality soft wheat. The demand for biscuit-quality soft wheat in Syria is in the range of 10 000 tons, or above. At present a testing program with Al-Shark Company is discussed (Al-Shark is also one of Syria's largest biscuit producers).

Training with the Private Sector

The following two training courses were organized at ICARDA and partially financed by Syngenta Foundation:

- **“Intellectual and Tangible Property Management in Agriculture”**, June 23-25, 2003 with a total of 11 participants from selected CWANA countries, and a financial contribution from Syngenta Foundation of US\$ 5,400 to the course.
- **“The Annual CGIAR Women's Leadership and Management”**, May 22-28, 2005, and a total of 37 participants from all CGIAR centers and selected NARSs. Financial contribution of Syngenta Foundation to the course: US \$15,000 to cover costs of 9 participants in this course