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# Knowledge Management and Dissemination (KMD) for Sustainable Development in Dry Areas (MegaProject 6)

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## Introduction

KMD is an area of research that aims to best capitalize on the experience gained by co-learning, sharing, networking and up scaling, and to bring out a change in culture and behavior in all partners to assure equity, transparency and flexibility in order to achieve maximum impact on the poor from ICARDA's research. The overall strategy is to develop and implement practical and widely popularized research programs in knowledge management and dissemination that generates international and national public goods (IPG & NPG) for immediate use by the rural poor communities in the dry areas. A primary goal of our KMD is to ensure that the knowledge generated from research is efficiently packaged and made accessible to rural communities beyond the research pilot sites/communities, so contributing to the goals of food security, poverty reduction, and the preservation of natural resources.

In order to be effective the KMD Program must translate ICARDA's specific and targeted research in the dry areas into NPGs and IPGs that meet macro-level expectations. First, one needs to know *which* particular approaches used by scientists and technology transfer agents in the field (the micro-level) could be relevant to stakeholders at the national and international level, such as NARS, advanced NARS, policy makers, *etc.* Although this is a potentially difficult task, it is possible to work effectively with proxies for knowledge by identifying methodologies which appear to 'work' across a range of situations and their commonalities. To establish this, the KMD Program at ICARDA needs to take one step back (*to explore the background*) in order to analyze the "*knowledge pathways*" emerging from ICARDA's on-going research for development projects. This process of abstraction will enable us to develop a *practical toolbox* of methodologies that can be considered IPGs and NPGs. These methodologies include *verified priority outputs* (Technological, Institutional and Policy Options (TIPOs), TIPO-Packages, Best Bet Practices (win-win-scenarios), and the packaging of a range of skills and innovations for wide use.

Meeting this first challenge will help enable ICARDA to meet the second challenge more effectively, namely continuing its research to generate knowledge of direct relevance to the communities it serves. The KMD Program acknowledges the importance of co-learning in developing methodologies and products and will assist ICARDA scien-

tists and their partners to evolve local knowledge systems and find ways to use local knowledge as building blocks for generating demand-driven and feasible pro-poor agricultural knowledge. The KMD Program will also help to identify the kinds of policy and institutional frameworks that are needed to encourage knowledge production and its application. To this end, the KMD Program is establishing research programs exploring innovative methodologies and approaches for knowledge management (documentation, learning, sharing, and equitable use of pro-poor agricultural knowledge through dissemination, up scaling, mainstreaming and out scaling). In meeting these challenges, the KMD Program is adding value to the work of ICARDA and the NARS scientists. It will assist scientific and farming communities to take full advantage of the advances in Information and Communication Technologies.

## Achievements and Current Activities

### Development of the Conceptual Framework and Model of KMD

Since its inception in early 2005, the KMD Program at ICARDA has been working on the development of a conceptual framework and model of KMD relevant to ICARDA's needs. This involves designing mechanisms capable of analyzing knowledge generated by research scientists, “*knowledge pathways*”, verifying key results, and publishing NPGs and IPGs for wider adoption at regional and global levels. Two key activities are: (1) the development and publication of the KMD model in a brochure (September 2005), and (2) on-going internal and external consultations aiming to generate understanding and feedback on the KMD model. An immediate and important objective of the consultation is to form Internal and External Communities of Practice to mentor and develop the KMD Program.

### Combining Supply and Demand Driven Approaches to KMD

The KMD Program aims to combine supply- and demand-driven approaches to KMD. *Supply-driven* approaches are meant to justify the benefits of public investment in agricultural research and development to the concerned donor community in the short-term. *Demand-driven* approaches explore ways in which human experience (knowledge) can be utilized in the development and dissemination of new technologies. With respect to dissemination in particular, methodological approaches include the use of community development communication, development journalism, and village drama. Specific examples of work in progress are given below.

### Case Study Development

The KMD Program has developed a *Case Study Template* (CST) to ensure consistency in the analysis and documentation of the various elements of the “*knowledge pathways*” emerging in projects approaching completion/already completed. The aim here is to identify ‘Best Bet Practices’ and innovative approaches that enhance the capacity of a broad range of users to access packages of verified priority technical, institutional and policy options (TIPOs).

Four Case Studies have been completed and published on the ICARDA Intranet (i) GEF Agrobiodiversity Project, completed July 2005; (ii) Barani Village Development Project (BVDP), completed September 2004, no-cost extension July-2007; (iii) Matrouh Resource Management Project (MRMP), completed September 2003, continuing with local funding; and (iv) the Integrated Crop-livestock Production in Low Rainfall Areas (M&M I&II) completed in October 2005. The Barani Project Case Study was presented to ICARDA scientists in December 2005. Following internal reviews, the case studies will be published to enable further comments and further synthesis into TIPO packages for use beyond the pilot sites.

### **KMD Technical Publication Series**

The KMD Technical Series aims to document both the knowledge generated, and technologies developed and tested in the target areas as a consequence. In particular it aims to package it in forms suited to the needs of different communities and physical environments. The KMD Technical Series will, through an analysis of the '*knowledge pathways*' thus identified, develop IPGs of benefit to a wider stakeholder community of scientists, professionals and agriculturalists beyond the immediate project area. The first publication in the Series, *Lessons Learned from ICARDA Applied Research Component of Barani Village Development Project Punjab, Pakistan*, was distributed in December 2005 for preliminary review by interested scientists. The second publication in the series, *Lessons Learned from Matrouh Resource Management Project (MRMP)* is ready for distribution for preliminary review.

### **Verification of Priority Outputs**

A framework for verification, upscaling, mainstreaming and outscaling of priority outputs was developed. Verification of the *key knowledge elements* (priority outputs, methodologies, best bet practices and innovation) that were identified from the case study surveys will be a major step before investigating the processes and approaches needed for upscaling. Verification will be performed through a *ground truthing and impact assessment* (GTIA) exercise that will involve close collaboration between KMD Program and MP5. For this purpose the KMD is developing a ground truthing and impact assessment template (GTAIT). The GTIA will be used specifically in assessing the suitability of selected *key knowledge elements* for upscaling and use by a wider community of concerned/ directly involved stakeholders.

### **Developing KMD Packages for Different Stakeholders**

The following activities have been initiated and partially completed:

- Development and dissemination of video and other media messages providing information on weed control and winter sowing of chickpea (target: grower end-users).
- Strengthening of knowledge dissemination networks, regional forums and links with international institutes through an assessment of the Regional Agricultural Information System (RAIS) for WANA (target: end users).
- Expert Systems for wheat and faba bean (target: improved ICT-KM systems for subject matter specialists and extension agents)

- Scientific Information Systems for barley (IBIS) and chickpea (ICIS) (target: NARS breeders)
- Soil database and linking meteorological data to applications (target: improved ICT-KM systems for scientists)
- Testing and implementing the Integrated Library Management System (ILMS) in the main ICARDA library (target: improved KMD infrastructure through knowledge management)

### **International Assessment of Agricultural Science and Technology for Development (IAASTD)**

The KMD Program is coordinating the CWANA Sub-global IAASTD. To this end over 40 AST experts have been brought together to assess past experience in the CWANA region, and to consider potential developments in the next half-century to 2050. The team will develop a portfolio of scenarios that policy makers may consider in their strategy development plans. Links to the other Sub-global and Global IAASTDs provide good mutual learning opportunities. Towards the end of 2007 a peer-reviewed publication will be made available.

### **Horticultural Program**

The KMD Program has just set up a program to identify, share and disseminate horticultural knowledge. A first step has been to distribute a structured survey template to resource persons working in different agro-ecological zones in the CWANA region. Analysis of the returned surveys demonstrates strong interest in adding horticultural crops to ICARDA's mandate, and in including post-harvest technology topics to ICARDA's research and training activities. This work is being carried out in collaboration with MP4, the University of California and the Arid Lands Agricultural Services and Research Center, Egypt.

### **Focal Point for Natural Disaster, Conflict and Post-conflict Situations**

To enable regions and countries to recover from disaster, it is necessary to move quickly by providing proven technologies. KMD is tasked as a focal point for rehabilitation of agriculture for natural disasters, conflict and post-conflict situations to better coordinate ICARDA's on-going activities in Afghanistan (see Afghanistan report in this volume) and future strategies elsewhere in the region (e.g. Iraq, Palestine and Sudan) where there is a need for immediate dissemination of relevant research results. Specifically, the task of KMD is to identify and disseminate key knowledge elements (priority outputs, methodologies, best bet practices and innovation) for immediate use in the rehabilitation of post-conflict agriculture. Examples include supporting the implementation of the on-going programs in Afghanistan: Research on Alternative Livelihoods (RALF) (see MP4 in this volume), Rebuilding Agricultural Markets Program (RAMP) and designing and implementing new projects directly involved in knowledge dissemination. Support is being provided to 11 research projects of the RALF program aimed at finding sustainable alternatives to opium poppy cultivation. KMD plans to play a key role in the dissemination of the research results to the stakeholders, and for this purpose it is currently developing a "*Communication Strategy*" on behalf of RALF.

## Strengthening National Seed Systems

Improved seed is a vital research output of ICARDA scientists and their NARS partners. A rapid dissemination of seed is crucial to achieve the desired benefit of improved agricultural productivity and economic well-being of the farmers concurrently. The Seed Unit (SU) is primarily responsible for seed issues at ICARDA and is housed in MP6. The overall objective of the SU is to strengthen seed systems in CWANA with major emphasis of transferring technology generated by research to enhance development. To help achieve its goal, the SU has seed multiplication fields (25 ha); a seed processing center (200–400 MT per year); a seed cleaning laboratory (6,000-10,000 seed samples per year); a seed testing laboratory; and a medium-term seed storage facility. The SU provides regular services both to ICARDA and NARS research and seed programs. Achievements (2000-05) in strengthening national seed systems are highlighted below.

### Support to the Informal Seed Sector

Many CWANA countries began liberalization of the agricultural sector and encouraging the private seed industry, which proved to be difficult because many of the important food crops are high-volume and low-profit crops with limited potential for private sector investment. The majority of farmers are dependent on informal seed supply. The village-based seed enterprise (VBSE) program becomes a corner stone for supporting seed production and marketing in the informal sector. The approach is a technically feasible and economically sustainable local seed production and marketing through farmer participation.

- Through a pioneering scheme for sustainable seed production (VBSE) developed under RAMP project, the Seed Unit established 21 VBSE in Afghanistan and strengthened their technical capacity in quality seed production with emphasis on enterprise development and financial management (business plans, demand assessment, marketing, record keeping, management, etc.). The VBSEs are producing and marketing annually more than 2000 MT of quality seed to farming communities in five provinces (Ghazni, Helmand, Kabul, Kunduz, Nangarhar, and Parwan).
- Similarly, under the integrated durum network (IRDEN) project, VBSEs are producing quality seed of durum wheat for small-scale resource poor farmers in marginal areas of Algeria, Morocco and Tunisia. VBSE programs were also initiated in Pakistan, Eritrea and Yemen.
- In collaboration with a private sector manufacturing company, an appropriate, low-cost seed cleaning and treatment machine was developed, and is widely serving farming communities in Afghanistan, Algeria, Jordan, Morocco, Palestine, Syria, Tunisia and Vietnam.

### Support to the Formal Seed Industry

This support has been a NARS-driven demand in the areas of policy, research, harmonization, and capacity building.

- *Policies:* Emphasis has been given to seed policy and regulatory reforms, seed sector privatization, accreditation of seed testing laboratories, plant variety protection, and

- capacity building in human resources. In Afghanistan and Iran, national governments have been assisted in developing national seed policy and seed laws and its bylaws.
- *Research:* A major study on the functioning of formal and informal sector of seed systems in Ethiopia and Syria was completed for a PhD degree from Wageningen University. The study revealed interesting results on the performance of formal and informal seed sectors including farmer's seed sources, seed quality and indigenous knowledge and management practices. An IDRC study of seed system in Afghanistan showed that formal seed system is weak, and the informal seed system has proven resilient to conflicts and drought in supplying seed to farmers. Moreover, genetic analyses showed that conflicts and droughts had no dramatic shift in biodiversity of wheat and chickpea although some alleles were lost and new ones gained. The number of missing alleles was higher than that of new alleles, which could be a result of difference in the number of accessions in the pre and post-conflict collections. Applied research was also conducted on wheat seed quality and seed longevity of range species.
  - *Harmonization:* The Regional Seed Network, conceived in 1992, has been consolidated into an information network. The Seed Network Newsletter *Seed Info* is published twice a year (with an Arabic version), and catalogues (Variety Catalogue, Field and Seed Standards Catalogue) and (Seed Industry Directory) are regularly updated and printed, and are available on the internet. The series 'Focus on Seed Programs' has now covered 17 countries, and 'Code of Conduct for Seed Associations' was recently published. Workshops and meetings were held to encourage harmonization, promote interaction, and stimulate seed trade among countries to meet farmers' choice. In March 2005, a regional workshop on seed policy and regulatory reforms was organized to review policies and regulatory frameworks relevant to varieties and seeds in respective countries, identify the constraints and explore opportunities for harmonization initiatives within the CWANA region. However, lack of funds is hampering progress of harmonization initiatives.
  - *Training:* The Seed Unit had historically emphasized training and this will continue, but the focus is shifting from a purely technical seed technology training to more business-oriented training topics (seed marketing, seed enterprise development, business management), and to the informal seed sector. During (2000-05), 677 NARS staff from CWANA region attended 35 seed technology courses.
  - *Private sector participation:* In an effort to bring the private seed sector together and to promote seed trade within the CWANA region and beyond, the Seed Unit organized an International Seed Trade Conference in collaboration with the Turkish Seed Industry Association that was held in November 2005.

### **Emergency Seed Relief and Rehabilitation in Afghanistan**

Initially, the SU has taken the lead in the rehabilitation of Agriculture in Afghanistan as part of the activities of the Future Harvest Consortium to Rebuild Agriculture in Afghanistan (FHCRAA) supported by USAID. In 2002, a need assessment of seed systems and crop improvement was carried out to target interventions and to develop a vision for agriculture in Afghanistan. As a result a total of 8500 MT of improved wheat seed (imported and locally produced) distributed to farmers for seed production, and 53

MT of breeding lines and foundation seed of different crops provided for testing and evaluation. Five research stations were rehabilitated and farm equipment provided to resume regular research work. Two main and two satellite seed testing stations were rehabilitated and they commenced seed testing.

## Future Directions

Future activities of the KMD Program will be steered in two main directions:

**Exploring the background and analyzing the key knowledge elements generated from ICARDA research programs:** Verification of the key knowledge elements by the Ground Truthing and Impact Assessment surveys (to commence, one Research Analyst: Knowledge Dissemination is on board)

**Mainstreaming and outscaling research outputs:** Identification and development of the following researchable ideas, concept notes, expressions of interest and proposals for design and implementation in collaboration and partnership with colleagues in ICARDA, NARS and ARIs:

The following represent future directions for the KMD program:

1. Translation of ICARDA targeted research results in the dry areas into national and international public goods.
2. Exploring background and analysis of the *knowledge pathways* emerging from ICARDA's on-going research for development projects.
3. Development of a *practical toolbox* of methodologies *verified priority outputs* (Technological, Institutional and Policy Options -TIPOs), TIPO-Packages, Best Bet Practices that can be considered IPGs and NPGs, and packaging them for wide use.
4. Establishment of research programs to explore innovative methodologies and approaches for knowledge management (documentation, learning, sharing, and equitable use of pro-poor agricultural knowledge through dissemination, upscaling, mainstreaming and outscaling).
5. Establishment of effective learning and sharing systems, decision support tools *etc.* that facilitate innovation and receptiveness. These systems will assist ICARDA scientists and their partners in exploring different ways to learn from, work with, and evolve local knowledge systems, and to study ways of using local knowledge as building blocks for generating demand-driven and feasible pro-poor agricultural knowledge.
6. Identifying the kinds of policy and institutional frameworks that are needed to encourage knowledge production and its application.
7. Outscaling of knowledge to a large number of end-users.