

Second Annual Report

July 2006 – June 2007

Project: Better crop germplasm and management for improved production of wheat, barley and pulse and forage legumes in Iraq

Project number:	CIM/2004/024
Project title:	Better crop germplasm and management for improved production of wheat, barley and pulse and forage legumes in Iraq
Period covered by this report:	01 July 2006 – 30 June 2007

PROJECT DETAILS (PUBLIC CIRCULATION VIA WWW.ACIAR.GOV.AU)

This section is for recording CHANGES ONLY.

Project number:	
Project title:	
Project extension dates:	
Research organisations, lead researchers and countries involved (names only):	
Commissioned organisation/IARC:	
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1. PROJECT OBJECTIVES (PUBLIC CIRCULATION VIA WWW.ACIAR.GOV.AU)

No revisions

2. PROGRESS SUMMARY (PUBLIC CIRCULATION VIA WWW.ACIAR.GOV.AU)

Similar to the year of 2005/06 the implementation of the project has been difficult given the political and security situation in Iraq. There has been severe violence and bombings in Mosul and Tel Afar, where much of the project

activity is located, which has made it difficult and dangerous for project personnel in both the office and field – these problems have escalated considerably since the start of the project. Another constraint is that in-country field visits by ICARDA and Australian collaborators for planning, implementing and checking the work are not possible.

Despite these difficulties, the project has gone remarkably well since 1 July 2006. This has been facilitated by the enthusiasm, flexibility and dedication of Iraqi collaborators, the proximity of ICARDA, and the interest and support of ICARDA and Australian scientists. There was a major reporting and planning meeting at ICARDA in October 2006, which was well attended by Baghdad, Mosul, ICARDA and Australian scientists. Using the experience of 2005/06, more manageable and realistic workplans were developed for cereal evaluation, legume evaluation, agronomy, socio-economic, and seed production R & D for 2006/07. The Ninevah Implementation Committee, set up by MOA to manage the project, which functioned excellently in 2005-06, has been unable to meet regularly in Mosul/Ninevah as it is too dangerous, so coordination and oversight has been through regular visits and interactions at research and demonstration sites. The agreed workplans for the demonstration and research programs were carried out at 12 locations, 3 in each the four main agroclimatic zones, with a target of 41 demonstrations (33 for cereals and 8 for legumes) and 22 research yield trials (15 for cereals and 7 for legumes).

Some 60-70% of the demonstration workplan has been implemented with all crops sown in most of the 12 demonstration locations under farmer, improved tillage, and zero-tillage treatments. There is great enthusiasm about the potential of zero-tillage, which reportedly has never been tried before in Iraq. Enthusiasm has no doubt been increased by the increase in the price of 200 l of diesel from \$2 a few years ago, to \$125 in 2006, and to \$250 in 2007 (near world prices). The two sub-soilers (deep tillage machines) requested by the DOA Ninevah group for trials and demonstrations have been purchased and dispatched, arriving a little late for 2006/07 planting but ready for 2007/08. There has been considerable interaction in the arrangements for purchase of 10 MOA-requested seed cleaning plants. A final inspection and specification check by MOA at the manufacturer's factory in Syria is pending. It is hoped the seed cleaners will be in place for use in seed cleaning after the 2007 harvest.

The agreed training program at ICARDA for about 20 Iraqi scientists was exceeded and a total of 34 participants took part in short-term courses and on-the-job training. In addition, 8 farmers accompanied by 4 DOA Ninevah scientists including the Iraqi Project Manager, visited ICARDA and inspected research on soil and crop management and crop improvement including zero-till direct sowing compared with conventional deep tillage.

Activities were initiated and facilitated through two major meetings to identify "best-bet" varieties and technologies for demonstrations and varieties/lines and technologies for further research. These meetings were held at ICARDA in October 2006 with ICARDA, Iraqi and Australian scientists and in Amman, Jordan, in January 2007 with project coordinators both from ICARDA and Iraq during the Iraq/ICARDA coordination meeting. Much of the discussion was based on previous experiences by collaborators in Iraq and in similar environments in north-east Syria.

Cereal and legume varieties and technologies of interest including zero-till direct sowing identified in these meetings were incorporated into a detailed 2006/07 workplan prepared at the October 2006 meeting, which formed the basis of trials and demonstrations undertaken in 2006/07. ICARDA and Australia provided additional seed for trials and demonstrations based on these evaluations and workplan.

On-farm demonstrations of improved cereal and legume varieties were conducted as planned in the following locations:

- High Rainfall Areas: Al Shekhan, Rabiah, Al Kosh
- Medium Rainfall Areas: Al Hamdaniah, Tel Keyf, Basheeka
- Low Rainfall Areas: Tel Abta, Al Hatra, Al Mahlabiah
- Supplementary Irrigation: Rabiah, Al Namroud, Humeysat

Similar to the 2005/06 season, best-bet technologies and new lines/varieties were tested and demonstrated at these sites in a participatory manner with farmers. Thus, crop varieties in demonstrations were planted under three crop management practices (zero-tillage, chisel plough soil preparation, farmers' practice). Experiences and findings were promoted widely amongst farmers through field days at each of the demonstration sites. Many farmers were interested in some of the improved varieties which seemed to perform better than farmer varieties. Dissemination will be encouraged further through distribution of seed from the demonstrations/trials to interested farmers for planting in 2007/08.

In the research program, a range of nurseries and trials were planted in late Dec/early Jan and these established well because of good January rains (>31 mm during late January) in Rasheedya Experimental Station in Mosul. These were:

1. Barley Nursery for Iraq
2. International Barley Yield Trial – Moderate Rainfall Areas 2006 -2007 (IBYT07 – MRA set 25)
3. International Barley Observation Nursery Moderate Rainfall Areas (IBON-MRA) 2006-2007
4. Chickpea International Elite Nursery-Latin America 2007 (CIEN-LA-2007)
5. Chickpea International Elite Nursery-Winter-2007 (CIEN –W-2007)

6. Faba Bean S1 populations 2007
7. Selection from Lentil F3 populations 2007
8. Comparison of 16 genotypes of "Bekia" (*Vicia sativa*)
9. Effect of land management and crop rotation with Lentil on Durum Wheat Om-Rabi5 productivity and quality

New seed from ICARDA for trials and demonstrations was discussed and agreed at the Reporting/Planning meeting at ICARDA in October 2006. This supplemented the considerable amount of seed saved from the 2006 harvest in Ninevah. About 2 tonnes of seed was prepared and tested for pests/diseases - some seed was found to be contaminated and was replaced and retested. Testing was finished and the shipment was received by DOA Ninevah on 16 December. This did not delay the planting program which proceeded with seed already on hand following good rains in early November.

In project-linked research at ICARDA, four agronomy trials linked to the project on zero-tillage of oats, wheat, chickpea, and barley and adaptation/seed increase of Australian-supplied oilseeds and oats were established using the Indian zero-till planter at ICARDA in November 2006. These gave good information on new systems of conservation cropping and were useful for training of Iraqi visitors. Some on-farm demonstrations of growing crops with zero-tillage and stubble mulching were also established on farms around ICARDA with the Indian zero-till seeder and local cooperating farmers seem very interested - encouragingly, the machine has worked very well, even on somewhat stony soils. A range of varieties/lines of oats from Australian collaborators tested in 2005/06 season for adaptation and use in Iraq were planted for seed increase in 2006/07. Mitika and Possum outyielded the others including local in a dry year with about 315 mm of seasonal rainfall. The trials were inspected and discussed with several groups of visiting Iraqi scientists and farmers.

Demonstrations and trials have been harvested and measured and data collected are now undergoing analysis and evaluation. Reports are being prepared and will be presented at the September 2007 annual reporting/planning meeting at ICARDA.

The project has again re-established international linkages amongst Iraqi, ICARDA and Australian scientists. Formal interactions at ICARDA included thirty four (34) Iraqi scientists participating in seven (7) ICARDA training courses, eight (8) farmers visiting accompanied by 4 Iraqi scientists to view conservation cropping and crop improvement research, and several MOA/DOA scientist groups visiting to discuss and plan project activities. Australian collaborators presented four seminars in the October 2006 planning meeting on advances of relevance to Iraq on genotype-environment studies in chickpea and improved crop agronomy and management for more productive and sustainable dryland cropping in Mediterranean environments.

3. PROJECT IMPACTS (NOT FOR PUBLIC CIRCULATION)

Community impact

Participating farmers at the 12 demonstration locations have been impressed with the performance of some new varieties of tested crops and expressed interest in obtaining more seeds for planting in 2007/08. Farmers were impressed also with zero-till direct sowing from the point of view of economics and timeliness of operations – this is reportedly the first time zero-till has been tried in Ninevah (or Iraq?) – and also believe it could improve the soil quality as well except under very hard soil conditions.

Capacity impact

Thirty four Iraqi scientists undertook short-term training and increased their capacity in the following areas: Utilization of Expert Systems in Agricultural Research and Production; Automated Library and Information Management; Seed Health Testing; Weed Management; Crop Variety Management and Seed Quality; Integrated Crop and Livestock Production Systems Management; and Water Management. Eight collaborator farmers accompanied by four scientists from DOA Ninevah visited to inspect and discuss crop improvement activities on wheat, barley, chickpea, lentil and faba bean and disease and insect management; and agronomic management of conservation cropping systems including zero-till direct sowing, stubble retention and diverse rotations and discussed with ICARDA scientists the best bet varieties/technologies for further testing in their fields for higher adoption.

4. PROJECT MANAGEMENT (NOT FOR PUBLIC CIRCULATION)

4.1 Progress towards prescribed outputs in project document

1. To identify, promote and widely disseminate among farmers in the rainfed cropping regions of northern Iraq

"best-bet" improved varieties and crop management systems for wheat, barley and pulse and forage legumes.

1.1 Constraints/limitations in rainfed crop production identified through diagnostic study of farmers' existing practices.

A baseline survey was developed and conducted with 260 farmers in July/August 2005 by MOA and University of Mosul socio-economists, which characterized the dryland environments and farming systems in Ninevah and identified constraints. The final results and a draft report were presented at the annual reporting/planning meeting at ICARDA in October 2006. Finalisation of the report was delayed because of travel limitations on Iraqi scientists coming to ICARDA to interact with Dr Kamel Shideed, Program Director for Social, Economic and Policy Research. A 7 page summary report was made available in February 2007, and circulated to all involved scientists and ACIAR. It is planned that the final report will be presented during the annual reporting and planning meeting in September 2007.

1.2 Available "best bet" technologies identified and prioritized based on existing knowledge.

Best bet varieties/lines and technologies for testing in demonstrations and research trials in the 4 target agro-climatic zones[high rainfall areas (HRA), medium rainfall areas (MRA), low rainfall areas (LRA), supplementary irrigation (SI)] were discussed and agreed at the reporting and planning meeting in October 2006 with ICARDA, Iraqi and Australian scientists. Much of the discussion was based on 2005-06 project results and also previous experiences by collaborators in Iraq and in similar environments in north-east Syria.

The project reporting and planning meeting involved 3 scientists from Australia, 7 from MOA Baghdad/Mosul, 11 from Ninevah DOA Mosul, 2 from Mosul University, and 15 from ICARDA. The following presentations were made:

Dr Colin Piggin: Overall introduction and progress of the Project
Dr Sa'ad H. Mohamed: Baseline survey summary outputs
Dr Adnan Adary: Cereal research
Dr Adnan Adary: Legume research
Dr Abdul Sattar Alrajbu: Cereal demonstrations
Dr Kasim Khalil: Legume demonstrations
Dr Colin Piggin: New crops introduction and zero-till research at ICARDA

In addition; there was a series of seminars by the Australian participants on various aspects of advanced crop research and development in Australia, to expose, illustrate and discuss diversity in approaches to crop yield improvement, especially for Iraqi scientists who have had opportunities to interact internationally quite curtailed over the last decade. The seminars, each attended by some 50 ICARDA and ACIAR-project scientists, were as follows:

- 1) "Dryland cropping in Iraq - the way forward." Dr Wal Anderson, Principal Research Agronomist, AgWA, WA.
- 2) "Chickpea collections: G*E responses and characterization of habitats." Dr. Jens Berger, Ecophysiologicalist, CSIRO Plant Industry, WA.
- 3) "Farming System Changes in Southern Australia." Dr David Coventry, Adelaide University, South Australia.
- 4) "Agronomy as applied ecology-or why we shouldn't lose sight of the big picture when marking the white pegs. A chickpea example." Dr. Jens Berger, CSIRO.

Building on experiences of 2005/06, more manageable and realistic workplans were developed for agronomy, legume nursery, cereal nursery, and socio-economic R & D for 2006/07. The seed required for this program was provided from clean seed collected on 2005/06 trials and demonstrations in Iraq and new seed supplied from ICARDA. Some 2 tonnes of new seed from ICARDA was supplied in 15 cartons and 32 nylon bags, including 14 varieties/lines of barley, 11 of durum wheat, 6 of bread wheat, 2 of faba bean, 1 of chickpea and 3 of vetch); it was sent on 7 Dec and received by DOA Mosul on 16 December 2006.

The review of experiences and literature on rotations in Ninevah/Iraq was presented by Dr. Kasim Khalil Kasim of DOA Iraq and used in deliberations at the September 2006 reporting/planning meeting. A proposed review on sowing dates/rates has not yet been prepared.

1.3 On-farm demonstrations established.

On-farm demonstrations of improved varieties were conducted according to the workplan in 3 locations per environment as follows:

High Rainfall Areas:	Al Shekhan, Rabiah, Al Kosh
Medium Rainfall Areas:	Al Hamdaniah, Tel Keyf, Basheeka
Low Rainfall Areas:	Tel Abta, Al Hadar, Al Mahlabiah

Supplementary Irrigation: Rabiah, Al Namroud, Humeysat

- Demonstrations were up to 1ha in farmer fields with farmer/researcher input to management/evaluation
- All demonstrations included 2-3 best-bet lines of each of the cereals (bread wheat, durum wheat, barley) and legumes (chickpea, lentil, faba bean, forage vetch) were planted under three crop management practices (zero-tillage, chisel preparation, farmers' practice)
- Soil samples were collected from these sites and analysed at the MOA laboratory for soil analysis. Results will be reported and presented at the September 2007 meeting
- Planting was done with available MOA/DOA seed in November and with seeds obtained from ICARDA in December 2006/January 2007.
- About 60-70% of the demonstration workplan has been implemented with all crops sown in most of the 12 demonstration locations under farmer, improved tillage, and zero-tillage treatments. There is enthusiasm about the potential of zero-tillage, which reportedly has never been tried before in Iraq. Enthusiasm has no doubt been encouraged by the increase in the price of 220l of diesel from \$2 a few years ago, to \$125 in 2006, and to \$250 in 2007 (near world prices), which is focusing the farmers on efficiency.
- Establishment and growth of all crops were reported only during the farmers' visit to ICARDA in late May 2007. Rains were late in contrast to the situation at ICARDA, so there was slower development of crops and lower yield expectations by farmers.
- Field days were held on all sites as we have been informed by scientists and farmers visited ICARDA in late May 2007.
- There have been no more recent reports of crop performance from Ninevah and it is expected that detailed results will be presented at the September 2007 meeting. Hopefully, this will include details of regular inspections/observations and necessary management (weeding, pest control), harvesting, and collection of clean seed for 2007/08 trials and demonstrations.

Following inspections and field days at the demonstrations, there is great enthusiasm about the potential of zero-tillage, which reportedly has never been tried before in Iraq. Enthusiasm has no doubt been increased by the increase in the price of 200 l of diesel from \$2 a few years ago, to \$125 in 2006, and to \$250 in 2007 (near world prices).

Demonstrations were implemented and managed under the Ninevah Implementation Committee (NIC), which was established by MOA under the designated Project Director, Dr. Abdul-Sattar Alrajbu. Dr Alrajbu was the Director of Ninevah DOA, but recently joined Mosul University. He is keeping still his coordination role of the project according to information from the Project Coordinator, Dr Salah Bader of MOA, Baghdad. However, we know it has been impossible for the Committee to meet regularly in Mosul because of the extreme danger of travel to and participation in large, regular meetings, and the project has been managed and coordinated through regular site visits by the Director. So, there is no report on meetings of NIC in Mosul to monitor, direct and report on the demonstration program. It is a fact that there is a difficulty to communicate with Dr Abdul Sattar Alrajbu as we do not have his new e-mail address and we still communicate with him through the DOA Ninevah e-mail address. It is expected that all will be clarified at the October meeting.

1.4 Potential constraints to adoption identified.

As the final report is under preparation for the baseline survey, the outputs from this and farmer responses to demonstrations will provide guidance on potential constraints to adoption and also indicate attractive technologies for further promotion. This will be discussed at the September 2007 annual meeting to guide demonstration and promotion activities in 2007/08.

1.5 Acceptable technology packages promoted and disseminated.

Best-bet technologies, particularly zero-till direct sowing this year for the first time and new lines/varieties were tested and demonstrated in 12 locations in a participatory manner with farmers. Experiences were also promoted more widely amongst farmers through field days at each of the demonstration sites. Many farmers were interested in some of the improved varieties which seemed to perform better than farmer varieties as well as zero-till direct sowing, which is seen to perform effectively and economically under current high prices of inputs. Dissemination will be encouraged through distribution of seed from the demonstrations/trials and provision of information and advice to interested farmers for planting in 2007/08 as was done last year.

1.6 Assessment of potential adoption and impact

Given that this is the second year of project trials and demonstrations, there is not yet adoption or impact of best-bet technologies, but hopefully we may see some outputs in the next year reporting period on the basis of the outputs of 2006/07, which are not yet in our hands, but will be discussed at the September 2007 planning meeting.

2. To introduce, evaluate and select improved germplasm of wheat, barley and pulse and forage legumes for adaptation to rainfed farming systems in northern Iraq
- 2.1 Cultivars of these crops that produce higher yields and/or better satisfy local market requirements through better disease resistance, drought tolerance, bread quality characteristics, etc., identified and evaluated with farmers at research stations and in farmers' fields.

In the research program, a range of nurseries and trials was planted under the supervision of Drs Adnan Adary and Kassim Khalil Kasim in late Dec/early Jan and these have established well because of good January rains (>31 mm during late January) in Rasheedya Experimental Station in Mosul. These were:

1. Barley Nursery for Iraq
2. International Barley Yield Trial – Moderate Rainfall Areas 2006 -2007 (IBYT07 – MRA set 25)
3. International Barley Observation Nursery Moderate Rainfall Areas (IBON-MRA) 2006-2007
4. Chickpea International Elite Nursery-Latin America 2007 (CIEN-LA-2007)
5. Chickpea International Elite Nursery-Winter-2007 (CIEN –W-2007)
6. Faba Bean S1 populations 2007
7. Selection from Lentil F3 populations 2007
8. Comparison of 16 genotypes of Bekia (*Vicia sativa*)
9. Effect of land management and crop rotation with Lentil on Durum Wheat Om-Rabi5 productivity and quality

- 2.2 Efficient production systems of the seed needed in research and demonstrations established.

New seed from ICARDA for trials and demonstrations was discussed and agreed at the Reporting/Planning meeting at ICARDA in October 2006. This supplemented the considerable amount of seed saved from the 2006 harvest in Ninevah, which was coordinated by three previously trained scientists from Ninevah State Board for Seed Inspection and Certification. About 2 tonnes of seed from iCARDA was prepared and tested for pests/diseases - some seed was found to be contaminated and was replaced and retested - and the shipment was received by DOA Ninevah on 16 December. This has not slowed the planting program which proceeded with seed already on hand following good rains in early November.

There was a big effort to proceed with the purchase and delivery of 10 MOA/DOA-requested portable seed cleaners from the Capital Budget in 2006/07. The concluding step should be a final MOA/DOA inspection of the agreed machines at the Darbas factory in Kamishley ini NE Syria. Hopefully, this will proceed before the September 2007 meeting and the cleaners can be used to prepare seed of better varieties/lines to farmers for on-farm testing in 2007/08 cropping. It is also planned that the project will provide training for mobile seed cleaners which will support the development of efficient seed production systems for MOA and farmers in Ninevah.

3. To identify, evaluate and select improved cropping system management options suited to rainfed farming systems in northern Iraq.
- 3.1 Specific production constraints, identified under Output 1.1, for which there are no immediate available technologies are identified and prioritized.

Potential research areas identified with Iraqi partners in the 2005 and 2006 planning meetings and other discussions were tillage and sowing systems (especially zero-tillage and stubble mulching), pest and weed management, and new crop rotation options (especially oilseeds, oats, peas).

- 3.2 New crop management options that solve these constraints identified, tested and evaluated with farmers.

Comparisons of crop performance under conventional and conservation tillage (farmers conventional practice, modified tillage by chisel plough, and zero tillage direct sowing) were successfully applied for all demonstration trials after the supply of three small Indian zero-till seeders in the 2006 summer. Sowing date/rate trials and long-term rotation trials were discussed and targeted for the 2006/07 cropping season following the review of literature and past experience, but it was agreed at the 2006 planning meeting that there was considerable information on these issues from northern Iraq-type environments and other crop management research/demonstration was of higher priority with limited resources. A trial on the 'Effect of land management and crop rotation with Lentil on Durum Wheat Om-Rabi5 productivity and quality' was reported to be conducted.

Four large scale replicated research trials comparing zero-tillage and conventional cultivation with chickpea and oats on wheat stubble and wheat on lentil stubble as two course rotations and wheat-chickpea-barley-

lentil crops on lentil stubble as four-course rotation were conducted at ICARDA. As observed in similar demonstrations in 2005/06 (290 mm seasonal rainfall) these 2006/07 trials (315 mm seasonal rainfall) promising results with zero-till technology. Yields of zero-till versus conventional cultivation were 1.47 vs 1.18 for oats and 0.65 vs 0.50 t/ha for chickpea on wheat stubble and 1.42 vs 1.37 for wheat on lentil stubble. These demonstrations, and the operations of the new Indian zero-tillage seeder, were shown and discussed with the Iraqi group of district supervisors attending the Seed Health and Weed Management Courses and during the visit of Dr Abdul Sattar Alrajbu and three other scientists accompanying eight farmers to ICARDA.

Testing for adaptation and seed production of a range of varieties/lines of oats, peas, canola and other oilseeds (*Brassica napus*, *B. juncea*, *B. carinata*, *B. rapa*, *Camelina sativa*, *C. abyssinica*, *Sinapis alba*, *Linum usitatissimum*) from Australia with potential for adaptation and use in Iraq was continued in 2006/07. However, for as yet unknown reasons, none of these crops established as well in 2006/07 as in 2005/06. But among the oats, Mitika and Possum outyielded the others including local in this dry year with about 315 mm seasonal rainfall. The trials were inspected and discussed with several groups of visiting Iraqi scientists and farmers. Results will be presented at the September 2007 meeting.

4. To enhance the capacity of Iraqi research and extension programs to identify and evaluate potentially valuable germplasm and better crop/soil management technologies and promote their adoption by farmers

- 4.1 Enhanced capabilities of Iraqi research program through joint research and specialized training programs.

Thirty-four Iraqi scientists took part in seven training courses conducted at ICARDA. Details are listed below under Section 4.5. This was more than the 20 trainees identified and budgeted for in the Project Document.

- 4.2 Research and extension staff are better able to promote and disseminate new technologies in partnership with farmers.

Iraqi staff capability to plan and implement a program to identify, demonstrate and disseminate new technologies has been enhanced through involvement in planning and conducting the research and demonstration activities. They have received good guidance from ICARDA and Australian scientists but, because of their isolated situation, have been completely responsible for implementation. This has encouraged communication and innovation.

Eight collaborating farmers accompanied by four scientists from DOA Ninevah enhanced their knowledge through a visit to ICARDA to see and discuss crop improvement program activities on wheat, barley, chickpea, lentil and faba bean and diseases and insects management; and agronomic management of cropping systems including zero-till direct sowing. They discussed with ICARDA scientists potential best bet varieties/technologies and are keen to undertake further testing of these in their fields. It is likely that some new varieties and technologies, especially zero-tillage and stubble mulching, will be tested and taken up more widely by farmers in Ninevah in the next few years.

- 4.3 Enhanced capabilities in evaluating adoption and impact of improved technologies.

Four Iraqi socio-economists from the University of Mosul and MOA Baghdad have collaborated in the analysis, evaluation and writing up the baseline survey. This has been an excellent update on the training of the staff since the inception of the Project. This will be on-going with further data collection to assess uptake and impact and with publication of results as will be discussed in detail at September 2007 planning meeting.

- 4.4 Effective international collaborative networks between Iraqi, ICARDA and Australian institutions and scientists.

The project has re-established close contact between ICARDA and Iraqi scientists, with regular visits and participation by 34 Iraqi scientists in 7 training courses, a visit of eight farmers accompanied by the project Coordinator from DOA Ninevah and three scientists to inspect ICARDA crop improvement and agronomy activities, and several other visits by MOA/DOA scientists to discuss and plan project activities.

The project provided an opportunity for all partners to get together at the October 2006 reporting and planning meeting. Australian participants presented 4 seminars sharing experiences on various aspects of advanced crop research and development in Australia, to expose, illustrate and discuss diversity in approaches to crop yield improvement, especially to Iraqi scientists who have had opportunities to interact internationally quite curtailed over the last decade. The seminars, each attended by some 50 ICARDA and ACIAR-project scientists, were as follows:

- Dryland cropping in Iraq - the way forward. Dr Wall Anderson, Principal Research Agronomist, AgWA, WA.
- Chickpea collections: G*E responses and characterization of habitats. Dr. Jens Berger, Ecophysicologist, CSIRO Plant Industry, WA.

- Farming System Changes in Southern Australia. Dr David Coventry, Adelaide University, South Australia.
- Agronomy as applied ecology-or why we shouldn't lose sight of the big picture when marking the white pegs. A chickpea example. Dr. Jens Berger, CSIRO.

A further opportunity to promote collaborative networks could not be taken when the planned visits of 6-8 weeks by one young Iraqi scientist to the Sustainable Agriculture group at Roseworthy campus of Adelaide University to undertake training on conservation cropping (zero-tillage, stubble mulching), and two scientists on cereals and legumes improvement and their production technologies to AgWa and CLIMA/UniWA, were once more postponed due to nomination difficulties in MOA Baghdad. These visits now planned for Autumn (April-June) 2008 with the approval of ACIAR, will be discussed in detail with Iraqi and Australian scientists at the September 2007 planning meeting.

Iraq-ICARDA Consultation Meeting, Amman, Jordan, 21-22 January:

This meeting was attended by Dr Subhi Jumaily, Deputy Minister MOA, Baghdad, Project Coordinator Dr Saleh Bader, DG State Board of Agricultural Research, MOA Baghdad, and Project Leader Dr Abdul Sattar Rajbu, Director, DOA Ninevah, Mosul, and was an excellent opportunity to discuss project progress and problems. Dr Piggin gave an overview of the ACIAR project (1 May 2005 -31 Dec 2006) with details on progress with the research and demonstration program on crop adaptation, training, equipment purchase and funding. Dr Rajbu gave an overview of activities in Ninevah, especially focusing on implementation of the workplan in the current 2006-07 cropping season. Participants were impressed and pleased with project achievements to date.

4.2 Describe any variations to activities scheduled in the flow chart [§3.3a] of the project document

The planned study visits in early 2007 by a young Iraqi scientist to the Sustainable Agriculture group at the Roseworthy campus of Adelaide University to undertake training in conservation cropping, and two other scientists to the cereal and legume improvement programs at AgWA and CLIMA/UniWA were postponed because of nomination difficulties in MOA Baghdad. These visits will now hopefully take place in autumn 2008 with suitable nominations from Iraq and the approval of ACIAR.

4.3 Project personnel changes

Dr. Abdul-Sattar AlArjbu, Director of Ninevah Agricultural Directorate, has joined Mosul University and there were some communication problems for some time but we were informed in May 2007 by Dr Salah Bader, Director General Agricultural Research, Baghdad (Overall Project Coordinator) that Dr Abdul Sattar will be coordinating the project activities in Ninevah from Mosul University as this Institution is also a partner in the Project.

Dr Colin Piggin has left ICARDA in April 2007 and Dr Mustafa Pala, Senior Cropping Systems Agronomist of ICARDA took the responsibilities of project management. Dr Piggin remains as a consultant to the project and will visit ICARDA for a month starting from the third week of August to help in streamlining of the project activities with respect to reporting for 2006-07 and coordination meeting of the 2007-08 cropping season work plan.

4.4 List of publications, communications and dissemination activities

The project has produced the following internal project reports:

Kasim Khalil Kasim (2006). Review of background information on crop rotation under the rainfall conditions in North of Iraq, MOA/DOA Ninevah, Iraq. June 2006. 5pp.

Report of the Project Planning Meeting, 1-5 Oct 2006, ICARDA, Aleppo, Syria, 28pp.

Kamel Shideed, Salem Younis Sultan, Sa'ad H. Mohamed, Watheq Abdul Kahar Al-Rawi, and Emad Yousif Ismael Abdullah (2006). Summary Report of the Baseline Socio-economic Survey Conducted in Ninevah Governorate, in July-August 2005. ICARDA/MOA-DOA Iraq. 7pp.

First Technical Report April 2005 - October 2006 (including Appendix 3 Details of crop management for all crops in alphabetical order of sites). ICARDA/DOA-MOA Iraq/University of Adelaide/University of WA-CLIMA,

Agriculture WA. 100pp.

Pala, M., A. Haddad, and C. Piggin. 2007. Challenges and Opportunities for Conservation Cropping: ICARDA experience in dry areas. Presentation in International Workshop on 'Conservation Agriculture for Sustainable Land Management to Improve the Livelihood of People in Dry Areas' by ACSAD, GTZ and FAO, 7-9 May, 2007, Damascus, Syria. 16pp.

4.5 Training activities

ICARDA training:

The following seven short-term training courses were held at ICARDA with a total of 34 participants from Iraq. Courses and participants are listed below. Most of funding was provided by the project.

- 1) Automated library and information operations: 12-23 November 2006 (1 trainee)
 - Mr Haydar Nasser Al-Sammak, Computer Engineer, DOA/MOA Ninevah
- 2) Utilization of Expert Systems in Agricultural Research and Production, 5-16 November 2006 (4 trainees)
 - Dr. Ismail Khalil Ibrahim, Head, Dept. of Laboratories, MOA Mosul
 - Mr Kafil Burhan Adel, Supervisor, Natural Pastures Station, Mosul
 - Mr Manhal Matti Yousif, Head, Dept of Planning, Mosul
 - Mr Mudhafar Abdulrazaq Alsafar, Director, Agricultural Extension Department, DOA Mosul
- 3) Seed Health Testing Course: 19-29 March 2007 (6 Iraqi trainees)
 - Mr. Abdul Salam Abdul Wahab Ghaib - plant protection, DOA DIALA Governorate
 - Mr. Ahmed Rahim Nasir - plant protection, State Board for Agricultural Research, Baghdad
 - Mr. Hadeel Badry Dawood - plant protection, State Board for Agricultural Research, Baghdad
 - Mr. Jomah Sideeq Khalid - plant protection, DOA Kirkuk Governorate
 - Mr. Talal Ahmed Hussein - Head of Seed Section (Seed Health), DOA Ninevah Governorate
 - Mr. Eisa Al Helami Swadi Aiez - State Borrad for Seed Testing and certification, DOA Wassit Governorate
- 4) Weed Management Training: 19-29 March 2007 (3 Iraqi trainees)
 - Mr. Abdul Khareem Abdul Hamed - plant protection, State Board for Agricultural Research, Baghdad
 - Mr. Abdul Jabar Jassim - plant protection, State Board for Agricultural Research, Baghdad
 - Mr Azim Mohammad Yahia - Head of Plant Protection Section (Weed Management), DOA Ninevah Governorate
- 5) Variety Management and Seed Quality Assurance: 6-17 May 2007 (3 trainees)
 - Mr Abbas Othman
 - Mr Khidhir Abbas Hameed
 - Mr Dheyaa Mohan Akoosh/Iraq
- 6) Integrated Crop and Livestock Production funded by JICA/ICARDA: 8-26 April 2007 (10 trainees)
 - Mr Osama Saied Yasin
 - Mr Saddam Abdul Sattar Ghaeb
 - Mr Bashar Mohammed Taher
 - Mr Athel Abdullah Abbas
 - Mr Ameer Thamir Mohammed
 - Mr Nafe'e Abd Kadhum
 - Mr Nawfel Hamed Abdullah
 - Mr Subhi Yassen Hassan
 - Mr Sulayman Aula Muhammad
 - Mr Sattar Ali Autaq
- 7) Water Management for Improved Water Use Efficiency in the Dry Areas- Water Harvesting funded by JICA/ICARDA: 7 May - 7 June, 2007 (4 trainees)
 - Ms Haifa Mohammed Sheet
 - Mr Namir Suleiman Dawood
 - Mr Mohammed Naser
 - Mr Mahdi Saleh Kheder

Farmers' visit: 20-24 May, 2007 (8 farmers and 4 Ninevah DOA staff)

This visit to inspect and discuss ICARDA on-station and on-farm trials was designed to provide a wide coverage of methodologies and technologies on agronomic management with specific emphasis on replicated large scale application of no-till direct sowing, weed management, wheat, barley, chickpea, lentil, forage legume, and faba bean variety testing trials/demonstrations and on-farm trials in farmers' fields. Participants were:

Employees from Ninevah Agricultural Directorate:

- Dr Abdul Sattar AlRajbo (Project Coordinator, now in Mosul University)
- Mr Jaafar Sadiq Saeed (Vice Director, DOA Ninevah)
- Mr Abdul Moneim Mohamed Mahmoud (DOA Ninevah)
- Mr Adel Abdul Wahab (DOA Ninevah)

Farmers:

- Mr Abdul Hamid Mohamed Hussein
- Mr Ghazi Hikmet Fathi
- Mr Ammar Yousuf Boulos
- Mr Adel Mohamed Kheder Wahab
- Mr Mohamed Ali Najm
- Mr Mahmoud Abdullah Ali Hamadi
- Mr Shaker Ibrahim Jumaa
- Mr Leith Ne'ema Mousa

Conference attendance:

The project supported Dr Suaad R Abdullah, an entomologist from Mosul University, to attend the 9th Arab Congress of Plant Protection (ACPP) organized by the Arab Society for Plant Protection (ASPP) in collaboration with the General Commission for Scientific Agricultural Research in Damascus, Syria, on 19-23 November 2006. Dr Abdullah had previously visited ICARDA for the Project Reporting/Planning meeting in October 2006 and discussed a small IPDM program for the project with the ICARDA IPDM group (Drs Bayaa, Kumari, Yahyaoui, Bohssini, Abang). Her attendance at the meeting and conference are part of an initiative to involve the University of Mosul more in the project and provide plant protection expertise and students into project activities in Ninevah.

Australian training

There was considerable effort to make arrangements for three young and active MOA/DOA cropping research/extension scientists to undertake the programmed short-term Australian training commencing in about April 2007, to coincide with the start of the rainy season and crop establishment in southern Australia, on the topics of crop establishment (zero-tillage, stubble mulching) at the University of Adelaide, South Australia (Contact: Prof. David Coventry): legume improvement and management technologies at the Centre for Legumes in Mediterranean Agriculture (CLIMA), University of Western Australia, Perth (Contact: Prof Kadambote Siddique); and cereal improvement and management technologies at the Department of Agriculture, Perth Western Australia (Contacts: Dr Keith Alcock, Dr Wal Anderson). Despite several sets of nominations, no suitable candidates with good English, agricultural qualifications, and involvement in Ninevah crop R & D could be selected. It has been agreed between ACIAR, ICARDA, MOA and the Australian institutions that this training will be postponed until the autumn (April-June) of 2008. MOA will propose some names with detailed CVs, according to the criteria requested, for discussion at the September 2007 meeting.

4.6 Intellectual property

None

4.7 Current or potential research or logistical problems

Since the reporting period of last year (2005/06), implementation of the project has been and remains difficult given the political and security situation in Iraq. Research activities have been confined to Rashidiya Research Station because of on-going and severe land disputes and security concerns which have prevented operations at Tel Afar research station. There has also been severe violence in Mosul and other areas where project activities are conducted, which makes it difficult and dangerous for project personnel in both the office and field – these problems have escalated considerably since the start of the project. Another constraint is that in-country field visits by ICARDA and Australian collaborators for planning, implementing and checking the work are not possible.

According to Dr Abdul Sattar Alrajbu, DOA project coordinator, it has been impossible to hold central Ninevah Implementation Committee (NIC) meetings in the directorate like last year because of the security conditions and most managers of the agriculture section can not travel easily to Mosul. Information about central direction and coordination was passed on through the telephone and visits to the field by sectors managers to the all locations. The only NIC meeting was held after the October 2006 planning meeting at ICARDA and before the start of the

planting season and all the details of the workplan were explained to all of the agriculture sector managers and the workers involved in the project field demonstrations.

Similar to previous delays with dispatch of the budget to Iraq, there have been problems in sending the 2007 Iraqi project funds through the Capital Bank in Amman, with the Bank recently requiring original letters of request sent to ICARDA signed and stamped from the Ministry of Agriculture (MOA) in Baghdad in order to proceed with the transfer. This is still pending with MOA (Dr Salah Bader) to provide the letter to pass on to the Bank via the ICARDA Amman office for action. However, the project is running well with MOA money until the transfer can be made.

The purchase of capital items is taking considerable time but it has not been possible to expedite the process.

- a) seed cleaning equipment: the DOA/MOA requested that a major part of the capital refurbishment budget to be allocated to ten seed cleaners, as provision of clean seed is considered a major constraint to the dissemination of better crop varieties to farmers. ICARDA obtained specifications and prices for a range of seed cleaning equipment and the following developments have taken place:
- Syrian made machines were recommended by ICARDA and the Ninevah DOA suggested on 8 August 2006 to visit the Syrian company and see the machines they produce,
 - The first inspection was made by staff of the Ninevah DOA and mechanical engineers from the MOA Baghdad on 25 January 07,
 - The second inspection mission made at the end of May 07 by Dr Abdull Sattar Alrajbu, DOA Project coordinator, and a Mechanical Engineer, Mr Abdul Moneim Mohamed Mahmoud recommended the importation of 1 machine for testing before ordering the remaining 9,
 - But immediately before sending the machine to Mosul for testing, a new inspection mission was suggested by MOA, which was not agreed by ICARDA that it would delay the procedure.
 - This has been a very slow and time consuming process for the ICARDA staff members involved and ICARDA is still waiting for MOA acceptance to dispatch the sample seed cleaner so that DOA and MOA could make a quick test in the middle of the harvest season so the dispatch of remaining 9 seed cleaners would have been processed to be used for the seeds cleaning for the next season (2007/08)

In view of the above, the project has gone remarkably well since July 2006. This has been facilitated by the enthusiasm, flexibility and dedication of Iraqi collaborators, the proximity of ICARDA and the support and interest of ICARDA and Australian collaborators. There has been one reporting/planning meeting well attended by Baghdad and Mosul scientists in October 2006 at ICARDA and an Iraq/ICARDA Consultation meeting in January 2007 where the project was reported and discussed by Drs Colin Piggin and Kamel Shideed of ICARDA and Drs Dr Subhi Jumaily, Deputy Minister MOA, Baghdad, Dr Saleh Bader, DG State Board of Agricultural Research, MOA Baghdad, and Dr Abdul Sattar Rajbu, Director, DOA Ninevah, Mosul, Dr Nawal Shamoon, DG, Directorate of Agric Res and Food Tech, MOST.

The Ninevah Implementation Committee, set up by MOA to manage the project, however, could not meet regularly because of the security difficulties of staff members traveling from outside to and meeting in Mosul. However, the agreed workplan for the demonstration program has been carried out in 12 locations in the 4 main agroclimatic zones with 60% success and about 60% of the research program in 1 research station only because of the security problems in other stations. The agreed training program at ICARDA for 20 Iraqi scientists was exceeded with 34 scientists undertaking training courses. Capital purchase of seed cleaning plants is under way. Operational funds were transferred to all partners with pending problems in MOA.

4.8 Budget discussion

Confirmation was received on 6 September 2006 that the balance of the first-year Iraq operational funding of A\$60,000 (US\$43,754.10), transferred from the ICARDA office in Amman, Jordan, to the MOA Baghdad Bank on 28 June 2006, was received by MOA/DOA. There was no dispatch of the second-year budget to Iraq in 2007 because of advised MOA problems with this 2006 budget transfer. Fortunately, fund transfer problems did not affect technical progress and the extensive 2006/07 demonstration and research programs were implemented with a special allocation of funds from MOA, support with fertilizers and time/money from farmers, and willing contributions of vehicles and time from DOA staff.

The fund transfer issue still continues to be a problem, but Dr Salah Bader, Overall Project Coordinator from MOA, is working to solve it using transfers through The Bank in Amman. Hopefully, with a requested letter from the MOA to ICARDA supplied to the Bank, it will be soon possible to transfer funds.

Operational funds were transferred to all Australian partners.

Allocations and expenditure (AUD) have been as follows:

Institution	Payment 1 (1/5/06)	Acquittal (1/5/06 to 31/4/07)
ICARDA	57 752	160 467.55
AgWA	13 500	58 500.00
CLIMA	26 000	26 000.00
UniAdelaide	46 000	26 000.00
MOA Iraq	15 491	71 513.71
Total	155 743	342 481.26

Unexpended carryover balance: AUD 421 116

This unexpended balance is due to:

- 1) low expenditure on the capital budget pending MOA approval for the purchase of MOA-requested seed cleaners
- 2) inability to transfer operational funds to Iraq because MOA/DOA was unable to advise bank transfer details

4.9 Other issues

None