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1 Progress summary

The project aims to promote CA adoption by smallholder farmers in North Africa in order to reduce natural resources degradation and to increase productivity, profitability and sustainability of the crop/livestock systems in the region.

The Setif platform in Algeria is located in the semi-arid highlands where cereals are the main crop associated with sheep. Several limiting factors are hindering agricultural production and are related to a harsh climate and land degradation leading to a very fragile production system. Therefore the adoption of conservation agriculture will help reducing these constraints and improve the sustainability of production systems. In addition, the Setif region has been chosen for its experience as a pilot area in the development of conservation agriculture where many farmers grouped in association have adopted direct seeding. Setif platform is spread over eight municipalities (communes) split from the north, center to south in twelve sites for on farm research managed trials.

All planned activities have been initiated for the first year of the project. The emphasis has been mainly for the establishment of a platform for adaptive research with farmers, to identify environmental and socio-economic constraints and also to enhance a national capacities building of research teams, extension, farmers, institutions and agricultural services and other stakeholders to plan together the development of conservation agriculture, the dissemination of knowledge and raising awareness. The twelve sites for on farm research managed trials installed this year (more than 57 ha of area) performed well due to the good cumulative rainfall from September to April (354 mm) and with a good distribution of rainfall within the season. Nevertheless, some difficulties have been encountered like providing seeds, plants, herbicides, and personnel availability. A partnership agreement was initiated with a public company manufacturing agricultural machinery (PMAT / CMA) for the development of low-cost and affordable seeders.

The **Chaouia-Ouardigha** platform of Morocco, located in the semiarid region, is known for cereals and mainly small ruminant's production. However, this year has been very wet compared to the average rainfall over the last 20 years. By the end of April, the accumulated rainfall was already over 420 mm. Two communities in Oued Zem - Khouribga region were selected because they were not heavily involved in previous INRA research and R&D No-Till programs. All selected farmers for the research managed trials are newly experiencing No Till and CA. The innovation platform includes some experienced leader farmers, from the region, that had a long experience with No Till. They have developed reasonable knowledge and contribute to the promotion and adoption of CA.

The main objective for the first year is to stimulate farmers' interest in CA, meet their queries and get them more involved in implementing the project. More emphasis was given to enhance farmers' awareness about CA and utility of farmers' organization for promoting and adopting CA technologies. The challenge for the project also was to consolidate the research team and collaborative relationships with agricultural services and extension staff in the region. Finally, identify research and R&D needs with stakeholders of the platform. Eleven farmers were involved in the research managed trials this year (45 ha of No Till experiments were established). The coincidence of Eid feast and heavy rains delayed crops establishment and the organization of the on-farm trials' with the partners. The machinery and mainly seed drills development was an important consideration. The partner manufacturer (ATMAR) hired an engineer and is investing in No Till seed drills development. CANA farmers' fields have used the low-cost Syrian seed drill. The purpose was to show farmers that a simple machine and low-cost machinery can be effectively used. Seed availability, mainly for food legumes and forage crops, was a big constraint at the beginning of the project. No certified seeds were available in the market

and farmers' seeds were the only solution. A seed multiplication program started with some farmers and in the experimental station with available small quantities of seeds from INRA or any other sources.

In the **Fernana platform** (Tunisia), the project is progressing as planned in spite of the delay in the acquisition of some of the equipment requested by the researchers for the implementation of the work. The fact that the former coordinator of the project (Dr. H. Ben Haj Salah) was also in charge of the National Institute for Field Crops (INGC) contributed a great deal to the facilitation of the necessary inputs for normal implementation of the project activities.

The Tunisian scientific team has organized many meetings after the inception workshop in order to discuss and organize project activities. Meetings with farmers and local administrative agents has also been organized in Fernana region, at the beginning and at the mid-season, aiming to present the project objectives, to meet farmers and to discuss with them benefits that conservation agriculture practices can offer for the region and for their farms. Also the Fernana platform has received the visit of experts from Australia for two days on April 1 and 2.

Concerning implementation of the project activities, earlier in October all farmers and fields have been chosen according to their motivation and leadership. Fields were chosen according to accessibility, slope and water erosion risk. After being chosen, fields have been traced and staked. Soil samples have been taken and characterized (physical and chemical characterization).

On the basic work of characterization of the Tunisian platform some departure from the initial guidelines provided in the project document took place. The departure concerned the targeted farm size limit which was increased beyond 20 Ha. This was motivated by the fact that all interviewed farmers of size 20 Ha and below declared that they had no ownership of the machinery they use in general, much less of seeders. This was important because some of the questions that were addressed to farmers concerned their attitudes towards eventual modifications and adaptations of their ordinary seeders into direct drills for use by themselves and possible rental.

This concern was debated within the Tunisian research team and shared with the other two teams (Algeria and Morocco). The conclusion was that in order to prospect possible reactions to such equipment adaptation, the size of the farms was extended beyond the 20 ha limit and the survey sample size was increased from 100 to 150, as a result.

For improvements in seeding machinery, a common seeder specification collection form was elaborated and an integrated survey within the socio-economic program was developed. Analysing and interpreting mechanization data to identify the suitable representative seeder is in progress and the work of Identifying existing equipment and modification kits for the Syrian seeder is almost achieved (80%). A Tunisian prototype of No-till seeder was designed and it is under initial laboratory tests also strong contacts have been made with industrial manufactures and commercial agencies to promote later development.

Activities related to weed control has begun by an initial weed flora survey then estimations of weeds densities and frequencies were monthly elaborated. The estimation of weed biomass in different herbicide treatments was made in the middle of May and weed seed-bank determination is in progress.

For crop sequences options, some agro-physiological parameters were measured (emergence, tillering rates, dry matter estimation, chlorophyll index...). The soil moisture was measured monthly by gravimetric method. For next cropping seasons, soil moisture will be measured by TDR and water mark sensors.

In order to assess soil quality, health and water productivity under CA system within the project an evaluation of main initial soil characteristics (texture, CaCO₃, salinity, pH, total organic matter, N, P, K); soil aggregate stability rate; organic matter biodegradability and nitrogen mineralization (60 days at optimal lab conditions) were made in the four sites of crop rotation. The evaluation of root diseases at seedling stage in four sites revealed different fungal species including *Fusarium culmorum* and *Gaeumannomyces graminis*. *Bipolaris sorokiniana*, *Rhizoctonia sp.* and *Pythium sp.* were observed too but at lower frequencies. The isolation from roots of 50 random samples plants showed different fungal species including *Fusarium culmorum*, *Gaeumannomyces graminis*, *Bipolaris sorokiniana*, *Pythium sp.* and *Rhizoctonia sp.* At the third week of May soil samples were taken from the four sites and will be sent to SARDI, South Australia, to conduct the qPCR Predicta B Test to evaluate *Fusarium spp.*, *Gaeumannomyces graminis*, *Rhizoctonia solani* and nematodes. At the same time samples of wheat plants were collected from the four sites and the incidence of root and stem diseases will be evaluated.

After the second week of June yields parameters will be collected and analysed. After harvesting, trials of crop residues management will be implemented.

To enhance capacity of Tunisian staff and stakeholders to practice and promote CA, three training sessions were organized and another one is planned for June or July 2013. Four Farmer Field Schools were organized and the fifth one is programmed at the harvesting time. We have also received visits of international experts; Jacky Desbiolles twice, the first on December for drills design and development and the second one in April for a training; Barry Mudge, Allen Mayfield and Pat Wall through an inter-Maghreb workshop to identify agronomic constraints to trials implementation and management.

In order to identify possibilities that Conservation Agriculture may offer to increase job creation and enhance entrepreneurial opportunities for farmers and farmers' association, we have received the visit of Mr. David Doepel an expert in this field for one week. He has visited the platform of Fernana, discussed with farmers and other stakeholders. He has also visited many institutions implicated in CA development in Tunisia (extension, research, universities, farmers associations, banks, manufactures, input and service providers). Then, he met decision makers with ICARDA staff and discussed with them some issues.

2 Achievements

2.1 Achievements against project activities and outputs/milestones

Objective 1: To identify constraints to adoption of CA by smallholder farmers and ways of enhancing adoption, most importantly identifying and testing socioeconomic options.

Operational coordinator: Dr. Boubaker Dhehibi (ICARDA)

| No. | Activity | Outputs/ milestones | Due date of output/ milestone | Achievements, advances, problems and comments. |
|-----|--|---|-------------------------------------|---|
| 1.1 | Characterize the 3 platforms and conduct similarity studies within country and across the region for efficient project implementation and result out-scaling | Report detailing agro-ecological and socio-economic characterization and typology of the different production systems in the target platforms and similarity analysis | Yr 1-4 | <p>Algeria</p> <ul style="list-style-type: none"> • Milestone in progress <p>Socio-economic characterization is in progress. A survey was conducted on 100 farmers concerning different aspects (machinery, farm economy, crop systems, livestock ...), to identify environmental and socio-economic constraints.</p> <p>The survey is completed now and data captured</p> <p>Soil characterization was conducted and completed at 12 sites -descriptive sheets with interpretation were completed:</p> <p>Description of soil profiles on field and physicochemical analysis of soil in the laboratory</p> <p>Problem faced by equipment for analysing N</p> <p>Morocco</p> <ul style="list-style-type: none"> • Milestone in progress <p>Agro-ecological Characterization:</p> <ul style="list-style-type: none"> - Soil characterization conducted at 10 farmers' sites. - Climatic characterization of Ouardigha region. - Weed and diseases characterization of targeted farmers' sites. - Livestock system production and forage production characterization in Ouardigha region <p>Socio-economic characterization:</p> <ul style="list-style-type: none"> - 100 farmers surveyed for household. |

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| | | | | <p>Tunisia</p> <ul style="list-style-type: none"> - Baseline survey completed (150 farms) - Responses coded and inputted in an Excel file - Platform indicators elaborated and discussed among all three teams - Report narrating the Tunisian platform should start next week (1-5 July) with the completion of the socioeconomics training due to take place in Tunisia - Some analysis was delayed due to the delay in receiving the ICARDA authorization to purchase computers. But now that the authorization has just arrived, the elaboration of the report should proceed smoothly |
| 1.2 | Study farmers behavioural change and analyse constraints to adoption of CA systems in the three platforms (including mechanisation aspects and machinery supply industry) | Review of existing documentation in the 3 core countries, rapid rural appraisal (RRA) at each platform, and national workshop; 300 farmers surveyed for behavioural change in the 3 platforms | Yr 1-4 | <p>Algeria Not yet started</p> |
| | | | | <p>Morocco Milestone in progress: - 25 farmers surveyed for adoption constraints in Chaouia.</p> |
| | | | | <p>Tunisia Milestone in progress</p> <ul style="list-style-type: none"> - Documents were reviewed in order to identify the structure of the sample on which the survey was conducted. The 100 farmer mark initially planned was exceeded as there was a need to include farms of size greater than 20 Ha since all smaller farms do not own their farm equipment but proceed with rental and this aspect was deemed critical for the planned studies. - Questions in the survey included a complete section on behavioural attitudes regarding adoption. |
| 1.3 | Undertake a household survey to assess economic, environmental and social project impact through ex-ante analysis | Database on the livelihoods of at least 100 households per platform; Calculated ex-ante CA benefits at the level of 100 households per platform One paper published in a scientific journal | Yr 1-4 | <p>Algeria As per plan of work, not yet started</p> |
| | | | | <p>Morocco As per plan of work, not yet started</p> |
| | | | | <p>Tunisia</p> <ul style="list-style-type: none"> - The survey was comprehensive enough to include different economic aspects of the households and their expected impact of the CA technology adoption. - Rough ex-ante cost benefit calculations will be attempted but the collected data is too limited to allow thorough analysis since most surveyed farmers do not know much about the technology - The Tunisia team plans to present a paper at the World Congress on conservation agriculture in Winnipeg, Canada in the summer 2014 |
| 1.4 | Investigate enabling policy and institutional | Review of existing policy and institutional set-up Report with | Yr 1- 3 | <p>Algeria not yet started</p> |
| | | | | <p>Morocco not yet started</p> |

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| | options to promote CA adoption | recommendations for new policy and institutional options to favour uptake of CA | | Tunisia Policies are being reviewed and discussed, including within the mission that the Australian expert Doepel just conducted in Tunisia (May 2013), about possible incentives that could be envisaged for CA adoption promotion in Tunisia |
| 1.5 | Analyse and quantify the degree and rate of CA adoption at the three platforms at the end of the project | Adoption studies implemented within and around the platform at the level of 200 (out of the platform total of 500) participating farmers Scientific paper published | Yr 4 | Algeria As per plan of work, not yet started Morocco As per plan of work, not yet started Tunisia As per plan of work, not yet started |
| 1.6 | Conduct farmers perception study on CA system by end of project at the three platforms | Data from survey of 100 farmers per platform (same in activity 1.3) Report presenting analysis of results | Yr 4 | Algeria As per plan of work, not yet started Morocco As per plan of work, not yet started Tunisia As per plan of work, not yet started |

Objective 2: To identify and test improvement in seeding machinery, and in weed (pest) and biomass management of CA systems.

Operational coordinator: Dr. Jacques Desbioles (Australia)

Sub-objective 2.1. Develop and test affordable ZT seeding machinery and crop establishment systems for small to medium sized farms

| No. | Activity | Outputs/milestones | Due date of output/milestone | Achievements, advances, problems and comments. |
|-------|--|--|------------------------------|---|
| 2.1.1 | Conduct ZT seeder international inventory and select suitable low-cost options for available and potential power sources in the selected platforms | Review report Suitable low-cost ZT drills acquired for evaluation by the project: Report detailing availability and characteristics of low-cost seed drills from suppliers in Australia, Europe (Spain, France, Italy), Brazil, Chile, India, China, Turkey -List of potential seed drill candidates with names & addresses of originating companies/institutions as well as technical characteristics and prices | Yr1- Semester1 | Algeria, Morocco, Algeria • Milestone not completed as yet <u>Problems:</u> limited suitable tine seeder options found to date within targeted price range (<\$10k ex-works) <u>Advances:</u> Search for low-cost suitable tine seeders continuing. A suitable ZT seeder is intended to provide improvements upon the limitations observed during testing to date of basic Syrian ZT seeders. Some low cost seeders with either poorly defined specifications or not meeting the targeted specifications have been identified. Some suitable seeders in the \$12-14k price range have been identified, <u>Comments:</u> ZT seeder options linked with the ACIAR Iraq project are looking promising. A retained selection of ZT tine seeders is to be finalized by the machinery team in July 2013 and detail recommendations for purchase. |
| 2.1.2 | Review existing conventional drills available | modification kits (4) for existing local seeders developed in collaboration with | Yr 1, 2 | Algeria - Milestone in progress Negotiations with manufacturer CMA in Sidi bel Abbes have been formalised into an MoU |

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| | in the target core countries and develop improvements to enable ZT seeding | local manufacturers and tested | | <p>with partners PMAT and ITGC, which is aiming to develop a modified SOLA seeder base - currently manufactured under licence - to enable light-duty zero-till</p> <p>Morocco Milestone not relevant This option has been discussed and was found not to be cost-effective in the context of high subsidies available for new seeders vs duties imposed on imported parts including steel required to modify seeders.</p> <p>Tunisia Milestone in progress: Ets Jouini Md & Cie - Tunis, importer of GIL ZT seeders is partnering on commercial seeder evaluation and specification upgrade. A ZT seeding tine kit is being developed as part of a final year student project (Ghazoua Haouari: Design and analysis of suitable low cost tine seeding system) .</p> |
| 2.1.3 | Design and test a new ZT drill prototype to meet key specifications identified in the target platforms | One ZT drill prototype developed and pre-tested in the targeted environment in collaboration with industry | Yr 2 | <p>Algeria Milestone in progress Considerations of a heavy duty ZT seeder manufacture by CMA is to be reviewed in Year 2, subject to a successful outcome in above activity 2.1.2.</p> <p>Morocco Milestone in progress A strong team has been formed (including mechanical engineers and PhD student) to implement design and performance improvements to the existing INRA ZT seeder and undertake the development new low cost seeders concept. An early tine prototype has been designed and is under tests in controlled condition</p> <p>Tunisia Milestone in progress New versatile seeder prototype designed and manufactured by INGC, spring loaded tine prototype in development. Negotiations with manufacturer SPM Sud in Sfax was also formalized into an MoU with INGC. A program of collaboration on design, fabrication (by October 2013) and field evaluation of a commercial ZT seeder prototype has been agreed.</p> |
| 2.1.4 | Undertake field performance assessment of a range of ZT drill options for successful crop establishment in relevant CA cropping contexts | 9 platform-years of data sets on factors such as seeder type, soil and residue conditions, crops etc.. acquired over the duration of the project | Yr 2,3, & 4 | <p>Algeria Milestone in progress: Year 1 field evaluation have been conducted in each platform furthering the benchmarking of the Syrian ZT seeder technology. A program of field performance evaluation is being planned for the upcoming new/modified ZT seeders in parallel with the field research and demonstration program at each platform</p> <p>Morocco not yet started</p> <p>Tunisia Milestone in progress: Year 1 field evaluation was conducted in each</p> |

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| | | | | <p>platform furthering the benchmarking of the Syrian ZT seeder technology.</p> <p>A program of field performance evaluation is being planned for the upcoming new/modified ZT seeders in parallel with the field research and demonstration program at each platform</p> |
| 2.1.5 | Engage local manufacturers and farmers in the development, manufacture and promotion of low cost appropriate ZT machinery options | Several manufacturers in the 3 core countries actively manufacturing and supplying successful ZT seeders in the 3 selected platforms - farmer organisations directly involved in evaluation and promotion activities | Yr 2,3, & 4 | <p>Algeria</p> <p>Milestone in progress:</p> <p>Farmer consultation workshops were conducted to identify the main limitations to ZT seeder performance. Various manufacturers and potential industrial partners have been exposed to the project and are actively engaged in it.</p> <p>One importer (Salah RIGHI) from Setif has imported 10 ZT seeders from Pakistan and aims to contribute in the project through the testing his equipment within project activities which will take place during the next cropping season.</p> <p>The project team is supervising the modification and transformation occurred to an old SACSONIA conventional drill (6 m width) by a private manufacturer (Mr REFOUFI SEBTI, (Mezloug locality 10 km southern Setif). The manufacturer involved in upgrading the CT to ZT In Mezloug has received many requests from farmers to transform their conventional seeders</p> <p>The help provided by Desbiolles is essential, useful and needed.</p> <p>Two old seeders Jhon Sherer and Conor belonging to the station are dedicated to the project in order to be upgraded and make them available to the project farmers</p> <p>CMA – Sidi Bel Abbes partnering with PMAT/ITGC in the manufacture, evaluation and promotion of a modified existing SOLA tine seeder for ZT.</p> <p>Morocco</p> <p>Milestone in progress:</p> <p>ATMAR – Rabat, Partnering with INRA on manufacturing new seeder.</p> <p>AGENDA Farmers' and machinery service providers' consultation on key requirements for No-Till seeders specifications.</p> <p>Tunisia</p> <p>Milestone in progress:</p> <p>Farmer consultation workshops were conducted to identify the main limitations experience with ZT seeder performance. Various manufacturers and potential industry partners have been exposed to the project in meetings and discussions with a number now actively engaged in the project:</p> <p>Ets Jouini Md & Cie - Tunis, importer of GIL ZT seeders partnering with INGC on commercial seeder evaluation and specification upgrade.</p> <p>Societe de Production Metallique du Sud (SPMSud) in Sfax partnering with INGC on</p> |

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| 2.1.6 | Conduct economic assessment and investment opportunities of the new ZT drills in the relevant CA systems | Report presenting cost-benefit analysis and internal return rate (IRR) Business plan for investment in ZT drill | Yr 3 & 4 Yr 3 & 4 | Algeria, Morocco, Tunisia As part of the first year program it was agreed in the Hammamet inception workshop that some calculations would be made to determine the investment ceilings in agricultural equipment, namely direct seeders, that would be affordable by the targeted farmers. Such work is underway and its methodology will be presented at the upcoming socioeconomics meeting 1-4 July 2013. Results should be part of the report due in September 2013. |
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Objective 2. To identify and test improvement in seeding machinery, and in weed and biomass management of CA systems

Sub-objective 2.2. Fine-tune weed management and crop sequences for sustainable land & water management

| No. | Activity | Outputs/milestones | Due date of output/milestone | Achievements, advances, problems and comments. |
|-------|---|---|------------------------------|---|
| 2.2.1 | Study the dynamics of weeds and develop an integrated management for weed control under CA systems, including consideration of herbicide resistance | Report on dynamics of weeds at 3 farms per platform Integrated weed management guidelines Options of weed management tested in 3 onfarm researcher managed trials/platform. Best options verified in 20 farmer-managed trials A guide for weed management | Yr1-4 | <p>Algeria Milestone in progress The on farm trials were implemented early November-end of December:</p> <ul style="list-style-type: none"> - 3 on farm trials were performed and monitored (3.2 ha), for comparative study of ZT seeders existing locally (modified drill with a drill type) on the level of infestation by weeds. - 4 on farm trials were performed. and monitored (9.45 ha).to study the effect of chemical weeding on weed control in three crop rotation - 4 on farm trials were performed and monitored (6.3 ha).to study the Effect of planting date and chemical control against weeds. - Trials monitoring and result interpretation is ongoing - Weed flora initial determination and Identification of weed species and their density after glyphosate application are performed in January, - Evaluation of crop establishment is performed in February (plant density and emergence rate). - Identification of weed species and their density after post-emergence herbicide treatments are in progress. <p>Morocco Milestone in progress: - Characterization of seeds stock in all research managed trial site:</p> <ul style="list-style-type: none"> - Soil samples from farmers' fields monitored under controlled environment. - Weed counts before glyphosate application and post crops emergence conducted. |

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| | | | | <p>Weed species and their biomass identified in the weedy fallow.</p> <p>Tunisia</p> <ul style="list-style-type: none"> - Initial weed flora surveys conducted - Estimation of weed densities and frequencies with different herbicide treatments - Estimation of weed biomass in different herbicide treatments - Weed seed bank determination - Weed densities and levels of weed infestations are variable among plots - High level of infestation by the parasitic weed (<i>Orobanche foetida</i>) in one site <p><u>Problems and comments</u></p> <ul style="list-style-type: none"> - Trials are set in three sites (the fourth has been ploughed) - Faba bean emergence is higher in plots with narrow row spacing. - Herbicide applications were delayed due to bad weather conditions |
| 2.2.2 | Test crop sequence options to enhance diversification and sustainable productivity | <p>Adapted crop species introduced and tested in rotation with dominant cereal crops in 3 farms per platform, and a publication in scientific journal initiated at the end of the project</p> <p>Trials established with wheat and barley crops grown in rotation with legumes, forages and oil crops</p> <p>Crop rotations conducted in 3 researcher-managed trials per platform</p> <p>Promising rotation</p> | Yr1-4 | <p>Algeria</p> <p>Milestone in progress</p> <p>4 on farm trials (16 ha) were performed and monitored (implemented early November until the end of December) and four crops rotations are tested (wheat, barley, chemical fallow, pea triticale association as forage mixture).</p> <p>The chemical fallow is a new practice for the region to replace weedy fallow.</p> <ul style="list-style-type: none"> - Identification of weed species and their density after glyphosate application performed in January, - Evaluation of crop establishment is performed in February (plant density and emergence rate). - Identification of weed species and their density after post-emergence herbicide treatments are in progress. <p><u>Problem</u></p> <p>The canola crop initially planned could not be planted because the non-availability of the seed.</p> |

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| | | options verified in 20 farmer-managed demonstrations | | <p>Morocco</p> <p>Milestone in progress:</p> <ul style="list-style-type: none"> - Bread wheat and forage mixture sequence were established in 10 farmers' fields. - Total biomass and wheat grain yield measured. - Three conventional farmers' plots in the surrounding area monitored for wheat yields. <p>Problems:</p> <ul style="list-style-type: none"> - Food legumes and forage seeds unavailable in the market and unsuccessful farmers' previous experiences with these crops. - Canola program is still under development and Ouardigha region is not included for this year. <p>Progress:</p> <ul style="list-style-type: none"> - Seed multiplication program launched with farmers. - Visits to implementation and demonstration farmers' sites in Chaouia organized. <p>Comments:</p> <ul style="list-style-type: none"> - Results from crop sequences trials in ACLIMAS project shared with CANA farmers. |
| | | | | <p>Tunisia</p> <ul style="list-style-type: none"> - Determination of weed densities and frequencies in the four plots - Evaluation of some agro-physiological parameters (emergence, tillering rates, dry matter estimation, chlorophyll index...). - Soil moisture was measured monthly by gravimetric method. - Assessment of crop residue after harvest - Determination of Water balance and WUE - Crop yields - Measurement of total nitrogen in the soil and plant uptake <p><u>Comments:</u></p> <p>For next cropping seasons, soil moisture will be measured by TDR and water mark sensors.</p> |
| 2.2.3 | Assess soil quality/ health and water productivity under CA system | <p>Paper published on results of assessment of soil fertility and health and water productivity in 3 farms (same as in 2.2.2)</p> <p>Report on soil organic matter and moisture content and soil erosion in the rotation trials (activity 2.2.2), to include grain yield and dry matter of grown species and water use efficiency</p> | Yr 1-4 | <p>Algeria</p> <p>Milestone in progress</p> <p>Evaluation of soil humidity and soil compactly in four trials of crop sequence is in progress</p> <p>Morocco</p> <p>Milestone in progress:</p> <ul style="list-style-type: none"> - WUE monitored at farmers' fields. - 3 farmers followed for N response in wheat. - 101 small grain cereals fields surveyed for root rot diseases. - Causal agents identified and characterized morphologically. - Suitable method for identifying resistant varieties developed. - 5 farmers' fields identified for measuring aggregate stability |

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| | | /productivity. | | <p>Tunisia</p> <ul style="list-style-type: none"> - Evaluation of main initial soil characteristics (texture, CaCO₃, salinity, pH, total organic matter, N, P, K); soil aggregate stability rate; organic matter biodegradability and nitrogen mineralization (60 days at optimal lab conditions) - Incidence and identification of fungi associated with poor emergence - Assessment of crop residues after harvesting - Incidence and severity of soil-borne diseases in the different rotation systems - Estimation of Fusarium species in soil determined by soil dilution technique in the different rotation systems - Estimation of soil-borne fungi and nematodes using the Predicta B test in the different rotation systems |
| 2.2.4 | Test and validate decision tools/models for crop monitoring and risk management | <p>Paper published on calibration, validation and testing of "APSIM" model involving scientists, extension workers and farmers for decision making and risk management</p> <p>Australian post-doc hired and posted in Tunisia for 2 yrs to adapt APSIM to NA conditions in collaboration with national scientists</p> | Yr1-4 | <p>Algeria, Morocco, Tunisia</p> <p>Will be implemented later after hiring the post-doc</p> |

Objective 2. Identify and test improvements in seeding machinery, and in weed and biomass management of CA systems.

Sub-objective 2.3. Optimize crop residue management and livestock feeding under CA systems.

| No. | Activity | Outputs/milestones | Due date of output/ milestone | Achievements, advances, problems and comments. |
|-------|--|--|-------------------------------|---|
| 2.3.1 | Technical and economic assessment of trade-off between surface cover and animal productivity | <p>Guidelines written and paper published on grazing trials with different levels of residue retention conducted with 3 farmers' flocks per platform</p> <p>-Above to incorporate technical and economic assessment of the trade-offs, including balanced crop-livestock integration and long-term</p> | Yr 1-4 | <p>Algeria</p> <p>Milestone in progress</p> <p>Four on farm trials for residue management (10 ha) were performed and monitored (implemented in December) This trials for control animal pressure on stubble (wheat and lentil) residues will evaluate different levels of residue retention on system productivity and soil quality.</p> <p>Monitoring field trials on field not yet started for:</p> <ul style="list-style-type: none"> - - Evaluation of soil moisture and soil compactly - - Evaluation of Residue coverage rate after grazing pasture - - Economic evaluation |

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| | | positive effects on soil properties | | <p>Morocco Milestone in progress:</p> <ul style="list-style-type: none"> - - 3 farmers' sites and one site at Ain Zagh experimental station selected. - - Cereals and forage mixture crop rotation established for residue management. <p>Problem: Residue management as suggested in the protocols is neither practical nor feasible under on farm Moroccan conditions. Comments: 2 on farm treatments of residue management experiment at farmers' fields conducted; grazing vs. no grazing.</p> |
| | | | | <p>Tunisia Milestone in progress:</p> <ul style="list-style-type: none"> - Trial installation : number of farmers : 4 - Wheat harvest - Grazing treatments implementation (imposed through fencing corresponding plots) <p><u>Comments:</u> The number of grazing treatments should be reviewed regarding to plot size, animal availability and farmer preferences. In fact, in the Fernana Region, each farm cereal stubble land is grazed by its own animals and those of its neighbours and that seems to be a matter of community informal agreement. So, fences length should be reduced to an acceptable level by farmers. Treatments to be maintained:</p> <ul style="list-style-type: none"> - Harvest normal, remove straw, no grazing - Harvest normal, remove straw, 50% grazing (half of normal grazing duration) - Harvest normal, remove straw, normal farmer grazing (100%, control) |
| 2.3.2 | Develop and test alternative integrated feeding options (forage crops, alley-cropping, by-products) | -Guidelines and paper published on alternative feed resources, covering adapted forage species, alley-cropping and feed blocks tested at 3 farms per platform | Yr1-4 | <p>Algeria Milestone in progress</p> <ul style="list-style-type: none"> - Five on farm trials were performed and monitored (10.8 ha) for Forage mixture (pea-triticale, barley- peas, Atriplex as alley-cropping) introduced to replace fallow - Trials are implemented in December while Atriplex crop is installed in March - Monitoring field trials on to evaluate forage biomass not yet started - Because of the availability of Atriplex the plantation has been achieved in 6.84 ha from the 10.8 ha area planned which would be finish next November <p>Morocco Milestone in progress:</p> <ul style="list-style-type: none"> - 3 farmers' fields conducted for forage mixture. - One alley cropping system conducted on farmer's field. <p>Problems: Feed blocks technology was tested and found not very suitable under Moroccan situation</p> |

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| | | | | <p>Tunisia</p> <p>Milestone in progress:</p> <ul style="list-style-type: none"> - trial installation - Forage option 1 (vetch-triticale mixture) - Cactus alley (ongoing) - Forage option 2 : triticale-alfalfa relay crop <p><u>Comments:</u></p> <p>Due to national CANA coordinator change, a lapse of three weeks of interruption in research activities occurred and prevented from accessing to the project funds and to get to the experimental sites. So, forage option 2 was abandoned and will be replaced next year by Sulla (<i>Hedysarum coronarium</i>) as it was discussed with Patrick Wall during the travelling workshop.</p> |
| 2.3.3 | Evaluate the profitability and productivity of integrated crop/livestock production systems under CA utilizing decision support and modelling tools | Paper published on identification, calibration-validation and use of an appropriate modelling tool for decision making and risk management at the farm level | Yr1-4 | <p>Algeria, Morocco, Tunisia</p> <p>Planned for the upcoming year as harvests are carried out and actual CA crop yields are known. Its methodology is going to be presented and discussed at the upcoming socioeconomics training (1-4 July 2013). Preliminary results should be in the annual report to be presented in September in Algiers 2013</p> |

Objective 3: To enhance the capacity of NARES staff and other stakeholders to practice and promote CA.

Operational coordinator: *Dr. Mohammed El Mourid (ICARDA)*

| No. | Activity | Outputs/ milestones | Due date of output/ milestone | Achievements, advances, problems and comments. |
|-----|---|--|--|---|
| 3.1 | Raise awareness on CA system potential benefits and shortcomings among farmers, private sector including manufacturers, NGOs, and decision-makers | 3 country workshops completed with participation of all stakeholders: the first at project startup, the 2 nd in mid-growing season through field visit, and the 3 rd is a field visit at end of season | Yr 1 thru 4 | <p>Algeria Milestone in progress</p> <ul style="list-style-type: none"> - Inception workshop was held in November 5, 2012 in Setif with the participation of all stakeholders involved (farmers, agricultural institutions and services, extension workers, farmers association university and research institution, industrial, seed and fertilizer company, local media).. Fifty two participants also attend the launch of the first site for on farm research managed trials at Dahel farmer. During this meeting: - The project was presented and discussed during the meeting. The focus of discussion is on the importance of extension and awareness through farmers networks and active participation of Chamber of Agriculture - A radio broadcast was diffused in the local SETIF radio and held about the CANA project its objectives impacts on the region - A field school day was held at Dahel farm for demonstrations on seeder equipment. - A Final workshop programmed initially for end of June is not yet realized (tests results not ready) <p>Morocco Milestone in progress:</p> <ul style="list-style-type: none"> - Inception meeting held with 28 farmers, Agricultural department services, seed and fertilizer local providers, some retailers and local media in Khouribga. - Workshop on ZT seeders held at INRA Settata with farmers' groups acquainted with SEMEATO, INRA and Syrian seeders. - Meeting with stakeholders and farmers from Oued Zem, Khouribga region. - Progress meeting with local partners; farmers and agricultural services. - On farm field day on weed control organized at ElBrouj, Settata with the participation of CANA farmers and extension services. - On farm field day on crop rotations under CA organized at Souaka, Sidi M'Hamed Ben Rahal, Settata with the participation of CANA farmers and extension services. - Annual and planning meeting with stakeholders at Oued Zem programmed. |

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| | | | | <p>Tunisia</p> <ul style="list-style-type: none"> - The National Inception workshop was held on December 23 (60 persons attended, field visits and poster presentations by scientific team members were given in the presence of farmers and all stakeholders, and informative leaflets disseminated) - Organized on April 1st during the visit of CANA/ACIAR project travelling workshop scientists (20 persons attended) |
| | | Informative leaflets disseminated and appropriate media events held | Yr 1 thru 4 | <p>Algeria Planned after harvest</p> <p>Morocco Planned after harvest</p> <p>Tunisia Planned after harvest</p> |
| 3.2 | Conduct on-job training of all stakeholders (farmers, extension, traders, scientists, NGOs) | 500 farmers, 100 extension staff, 25 scientists, 3 NGOs, and 2 traders trained per country | Yr 1 thru 4 | <p>Algeria Milestone in progress</p> <ul style="list-style-type: none"> - Meeting with farmer and researchers and training were conducted on CA seeder technology and tests seeder during Dr JackyDesbiolles visit to Algeria in December has been given for ITGC and PMAT/CMA company team - Travel workshop was conducted across the three countries (Morocco, Algeria and Tunisia) from 24 to 6 April, 2013. Also during the study tour, training on water efficiency was given by Australian experts. Three experts from ACIAR (Australia), an expert ICARDA, and two cadres from each country (two from ITGC participate in Algerian team). - Training with field visits among farmers practicing zero tillage was conducted in Tunisia from 8 to 11 April, 2013, for the benefit of the project team (two from ITGC and one from public company PMAT participate in Algerian team) <p>Morocco Milestone in progress:</p> <ul style="list-style-type: none"> - Introduction to CA seminar held for farmers and qualification school students in BirMezoui, Khouribga. About 80 participants. - Training on "Principles and concepts of CA" for partner extension services in the region organized in Settat. |

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| | | | | <p>Tunisia</p> <p>Milestone in progress:</p> <ul style="list-style-type: none"> - The first on-the-job training was about crop diversification & rotation and it was organized for 28-29 March 2013; 45 young scientists were trained - The second on-the-job training was about No till Machinery and it was organized from 8 to 12 April 2013; 25 young scientists, extensionists, NGOs and traders (from Algeria, Morocco and Tunisia) were trained - The third on-the-job training was about Water Use Efficiency under No-Till Systems and it was organized from 3 to 5 April 2013; 15 young scientists extensionists (from Algeria, Morocco and Tunisia) were trained <p>The fourth on-the-job training will be about No-Till Economic Benefits and it is programmed for 1-4 July participation of trainees from Tunisia, Algeria and Morocco is expected</p> |
| 3.3 | Use Australian experience to upgrade national expertise in CA through scientific and technical support, and exchange of visits and training that focus on systems analysis of longer term outcomes of CA | <p>Up to 15 scientists/ extensionists/ farmers from the region visit Australia; and 7 Australian scientists visit the region for scientific and technical support</p> <p>NARS visit to Australia:</p> <p>Yr1: 3 Yr2: 6 Yr3: 3 Yr4: 3</p> <p>Australian scientists to NA:</p> <p>Yr1: Yr2: 5 Yr3: 3 Yr4: 5</p> <p>One Australian post doc posted for 2 yrs in NA: Yr2 & Yr3</p> | Yr 1-4 | <p>Algeria, Morocco, Tunisia</p> <p>Milestone in progress:</p> <ol style="list-style-type: none"> 1. Participation of John Dixon, Patrick Wall, Jim Fortune and Jacky Desbiolles to the project Inception Workshop (Tunisia, 28-30 September, 2013) 1. Jacky Desbiolles: Technical support and training on ZT seeder design and technologies <ul style="list-style-type: none"> - Technical visits (Morocco, Tunisia, Algeria) 28 Nov-14 Dec 2012 - ii) Team training course (x4 days) on ZT seeder technologies and technical visit (Tunisia), 6-15 April 2013 3. Participation of Patrick Wall, Barry Mudge and Allan Mayfield to the regional travelling workshop (Algeria, Morocco, Tunisia/ 25 March to April 5) and training workshop on water use efficiency (Tunisia, 6 & 7 April 2013) 4. Visit of Dr David Doepel to Tunisia (22-28 May 2013) to investigate business opportunities related to CA. |
| 3.4 | Conduct farmer field schools to enhance stakeholder co-learning and farmer-to-farmer innovation | <p>5 farmer field school events per platform and per year held</p> <ul style="list-style-type: none"> - FFS1: ZT machinery and planting & crop establishment. -FFS2: IPM (weeds, diseases, insect pest) -FFS3: Crop & soil management , & risk management -FFS4: residue management & crop/livestock integration -FFS5: crop diversification & | Yr 1-4 | <p>Algeria</p> <p>Milestone in progress</p> <ul style="list-style-type: none"> - - A meeting on crop rotation management and a field day conducted on November 22, 2012 during the setup of the trials has been done at Smata on farm school for Sétif university students (more than 60 participants). - A field day has been organized in Sagrodev on farm school in May 13, 2013 for extension services and farmers (19 participants). The training held about weed management and on CANA project (activities and progress) - A field day is conducted in May 28, 2013 with all stakeholders to visits all trials on various themes and to present CANA project (activities and progress) |

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| | | rotation | | <p>Morocco</p> <ul style="list-style-type: none"> • Milestone not launched yet <p>Problems:</p> <ul style="list-style-type: none"> - Financial support delays as inception meeting programming. - Partners and beneficiaries identification. <p>Progress:</p> <ul style="list-style-type: none"> - Some of CANA farmers participated attended few sessions of Chaouia FFS. <p>Comments:</p> <ul style="list-style-type: none"> - Complementary work and activities between INRA on going AC project benefit to CANA farmers. |
| | | | | <p>Tunisia</p> <ul style="list-style-type: none"> - FFS1: ZT machinery and planting & crop establishment organized on 27 November 2013; 27 Farmer were trained - FFS2: IPM (weeds, diseases, insect pest): Cancelled and broomrape management was integrated in FFS3 - FFS3: No-till and soil fertility enhancement and broomrape management organized at 19 March 2013 and 64 Farmer were trained - FFS4: Residue management & crop/livestock integration programmed after harvesting - FFS5: crop diversification & rotation: changed to a training |
| 3.5 | Enhance knowledge sharing and dissemination through brochures, newsletters, website and media | At least 5 brochures covering different subjects, one bi-annual regional project newsletter, and one project website produced and widely distributed | Yr1-4 | <p>Algeria</p> <p>Five topical factsheets on ZT seeder technology aspects produced for the April ZT seeder training Brochure presentation and poster of CANA project at Sétif platform is in progress.</p> |
| | | | | <p>Morocco</p> <p>Will be implemented later</p> |
| | | | | <p>Tunisia</p> <p>Milestone in progress:</p> <ul style="list-style-type: none"> - Five topical factsheets on ZT seeder technology aspects produced for the April ZT seeder training - More than One hundred (100) flyers on CA (in Arabic and French) were distributed to farmers and stakeholders. |
| 3.6 | Promote CA networking in the region aiming at establishing CA hub in North Africa | At least 3 NGOs/associations reinforced in CA area; one regional inception and one regional final workshop held; intra-regional visits exchanged involving 15 scientists/extension and 12 farmers | Yr1-4 | <p>Algeria</p> |
| | | | | <p>Morocco</p> |
| | | | | <p>Tunisia</p> <p>Milestone in progress</p> <ul style="list-style-type: none"> - A core of a farmer association has been set up around the Tunisian platform. - 12 scientists and extension people from the project attended the regional inception meeting in Tunisia. - (02) Two Tunisian scientists visited Algeria and Morocco through the Agronomic constraints to trials implementation and management inter-Maghreb workshop. |

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| | | CA regional hub established in Tunisia (Yr3) | Yr 3 | Will be implemented the third year |
| | | Participation of NARES from Libya, Mauritania and Sudan to project training & relevant meetings in project core countries (Algeria, Morocco, Tunisia) | Yr2-4 | Planned for the next season |
| | | Linkages established with other CA projects & initiatives in the MENA region | Yr1 thru 4 | Linkages have been established with three projects coordinated by ICARDA, namely: "Food security in Arab countries", "IFAD-ICARDA Integrated Crop-Livestock Conservation Agriculture for Sustainable Intensification of Cereal-based Systems in North Africa and Central Asia " and the ACIAR Iraq project on conservation agriculture. |

2.2 Project contribution to the Australian Aid Program

As a result of your project in the reporting period:

| | Setif platform | Chaouia platform | Fernana platform |
|---|--|--|--|
| 1. Estimate approximately how many people gained access to and used improved agricultural technologies from your project? | 12 households, 4 manufactures, 1 importer, 2 industrial manufactures, 10 extension, scientists / technicians, 75 students, 90 farmers. | 11 households, 15 technicians and 250 farmers. | Farmers have had direct access to improved agricultural technologies through project activities (farm field days, workshops, trainings) are about 200. |
| 2. Estimate what percentage were women? | 20 % (technicians for most) | 3 technicians (20% of trainees) | Percentage of women gained direct access to improved agricultural technologies through this project is about 15% |
| 3. Estimate the additional agricultural production in USD? | Too early to estimate the additional agricultural production resulting from conversion to CA practices | | |

4. What are the sources of your estimates?

Setif platform: People participant in Setif (workshop, meeting, field days).

Chaouia platform: This is the first year and the lists of participants in the events are the only source of information.

Fernana platform: List of participants in different activities organized through the project

5. During the project's activities, do you expect to contribute to the results outlined above? Please comment.

Setif platform

The awareness of the project with its objectives would certainly be expected at the end of the first year. As it is in its beginning the project faces some issues, some objectives may be delayed and would reach the expected objectives at average rates. In our platform CA is not well known among the large part of farmers and even scientists. The CANA project deal with development of field crops sector and facilitates access for new technology especially for small farmers.

Chaouia platform

Indeed, the project is about adoption and we are aiming to boost the productivity and the production in the region and mainly smallholder farmers.

Fernana platform

Expected agronomic results could exceed project expectations as the climatic conditions have been somewhat favourable. Furthermore and in terms of training for example, the number of participants who were exposed to CA practices for this first year is about 85 young scientist and extension agents while the project plans only 25. Many of these participants were of the female gender.

3 Impacts

3.1 Scientific impacts

Setif platform

The project involved a large number of stakeholders who work together for the development of modern agriculture that respect the environment. A new approach will be adopted involving farmers themselves to disseminate their experiences in associations.

An increased scientific activity is seen and recorded after the project coming for the field crop institute ITGC and for the all stakeholders and an increasing interest to CA is felt

The university professors PhD teachers are now involved in many scientific researches in different topics in relation with the project, others intend to take part and contribute in the coming seasons.

Many students are accomplishing their final engineering theses in relation to the project activities

Chaouia platform

The innovation platform approach is new methodology and approach for the Moroccan team.

Fernana platform

Innovative platform approach is adopted by other projects such as food security in the areas of Kairouan and Fernana and it will be the methodology that the INGC will adopt in its CA dissemination work.

3.2 Capacity impacts

Setif platform

- There is a great need for training and professional development for the project team that they will transmit their knowledge to other through meeting and field days. The participation of our teams in Tunisia in various workshops (inception workshop and travel workshop) and training in various field (machinery and water use efficiency), with ACIAR expert allowed to raise their level of knowledge.
- Six scientists from Algeria participated in the inception workshop in Tunisia
- Five scientists from Algeria participated in the training on seed drill developments and test machinery in Tunisia
- Two scientists from Algeria participated in the travel workshop through three country and in water use efficiency training in Tunisia

Chaouia platform

- A course on "Principles and concepts of CA" for extension services partners in the region was organized for 15 technicians.
- Two scientists from Morocco attended the water use efficiency training in Tunisia.
- Five scientists from Morocco attended the training on seed drill developments and test in Tunisia.

Fernana platform

- 60 farmers have attended the inception workshop
- 20 farmers have attended the mid season workshop
- 45 young scientists and extensionists from public and private sectors were trained on Crop diversification & rotation under CA
- 25 young scientists and extension people from public and private sector were trained on No till seeding machinery
- 15 young scientists and extension people were trained on Water Use Efficiency under CA
- 27 Farmers were trained on No-Till Drillers: planting & crop establishment
- 64 Farmer were trained on No-till : soil fertility enhancement and broomrape management

3.3 Community impacts

Setif platform

This is the first year of the project and it is early to distinguish the change in community. Only it should be noted that there is a very active association of farmers who plays an important role in raising awareness and high adhesion of farmers to practice direct seeding mainly for economic reasons (cost reduction)

Fernana platform

Farmers are encourage to establish contacts with other farmers and members of their communities as to the likelihood of, and constraints, to the setting up local farm organizations for the sake of reducing the constraints they individually encounter in carrying out their farming activities.

3.3.1 Economic impacts

Chaouia platform

Most of farmers have concluded that one of the main advantages of No Till system is production cost reduction.

Fernana platform

Not yet evaluated, as the on-farm research managed trial results are not known yet

3.3.2 Social impacts

Chaouia platform

The awareness about the organization importance is raised. One CA association is created.

Fernana platform

A core of a farmer association has been created around the platform.

3.3.3 Environmental impacts

Chaouia platform

It is early to assess this impact. The farmers reported that they have noticed less erosion effects on their No Tilled fields.

Fernana platform

Not yet assessed but it's clear to the involved farmers that water erosion reduction is visible.

3.4 Communication and dissemination activities

Setif platform

- Fifty two participants (farmers and stakeholders) in the inception workshop representing different structure involved (farmers, agricultural institutions and services, extension workers, farmer's association university and research institution, industrial, seed and fertilizer company, local media).
- A radio broadcast was diffused in the local SETIF radio and held about the CANA project, its objectives and impacts on the region
- Explanation and clarification about the CANA project have been given to more than 100 farmers and extension during the implementation of the socio economic survey
- Twenty participants (farmers, scientists and other stakeholders) in meeting conducted during Dr Jacky Desbiolles visit to Algeria in Setif in December 9, 2013
- Twenty four participants (farmers, scientists and other stakeholders) in meeting conducted during travel workshop in Setif in March 29, 2013.
- More than sixty participants (students) during a meeting on crop rotation management and a field day at Smata on farm school, for Sétif university students in November 22, 2012
- 19 participants (7 extension and 12 farmers) during a field day to disseminate the project CANA and training on weed management organized in Sagrodev on farm school conducted in May 13, 2013.
- A platform of 12 on farm trials have been established in an area of 57 ha split in eight municipalities spread from north, centre and south parts of the district

Chaouia platform

- Six Moroccan scientists from the project attended the inception meeting in Tunisia.
- Twenty eight farmers and stakeholders (Agriculture, Seed and fertilizer company, some retailers, local media) from Oued Zem attended the national inception meeting.
- One scientist attended the CA agronomy meeting in India.
- Twenty five farmers attended the meeting on NT seeders held at INRA Settât with farmers and Jacky Desbiolles.
- More than one hundred farmers and students learned about the project and CA principles at BirMezoui, Khouribga region.
- Twenty five farmers, the regional agriculture director of Chaouia-Ouadigha and his staff, the provincial agriculture director of Khouribga and 2 local associations representative assisted the progress meeting held at the extension service facility in Oued Zem.
- Four farmers hosting the experiments attended the Weed control field day held at farmers' field in ElBrouj, Settât.
- Six farmers hosting the experiments attended the crop rotation under CA field day held at farmers' field in Souaka, Settât.
- About twenty farmers attended the meeting during the travelling workshop.

- Annual and planning meeting with stakeholders at Oued Zem is programmed for end of June 2013.
- One hundred flyers on CA were distributed to farmers and stakeholders at the platform.
- Field book for research follow up is developed and ready for use.
- For each event a report in French is produced and disseminated in INRA staff web.

Fernana platform

- 12 scientists and extension people from the project attended the inception meeting in Tunisia.
- Sixty farmers and stakeholders (administration, input providers, and service providers) attended the national inception workshop.
- 45 young scientists and extensionists from the public and private sector attended the training on Crop diversification & rotation under CA
- 25 young scientists and extensionists from public and private sector attended the training on No till seeding Machinery
- 15 young scientists and extension people attended the training on Water Use Efficiency under CA
- 27 Farmer attended farm field school on No-Till Drillers: planting & crop establishment
- 64 Farmer attended farm field school on No-till : soil fertility enhancement and broomrape management
- More than One hundred flyers on CA (in Arabic and French) were distributed to farmers and stakeholders.
- 50 stakeholders will attend a farm field school on Residue management & crop/livestock integration
- 100 stakeholders will attend the End season field visit
- 40 to 50 farmers and stakeholders will attend the end season meeting for results restitution

4 Training activities

Three training programs were organized:

- Crop diversification & rotation under CA: Organized from 28 to 29 March 2013 and 45 young scientists were trained
- No till seeding Machinery: Organized from 8 to 12 April 2013 and 25 young scientists and extension people (from Algeria, Morocco and Tunisia) were trained
- Water Use Efficiency under No-Till Systems: Organized from 3 to 5 April 2013 and 15 young scientists and extension people (from Algeria, Morocco and Tunisia) were trained
- A training program on No-Till Economic Benefits is planned for the month of July

5 Intellectual property

Not yet applicable

6 Variations to future activities

Setif platform

No variation

Chaouia platform

- For the Moroccan case, under the activity 2.1.2: Review the technical feasibility of upgrading selected conventional seeders and develop a plan of action for manufacturing kits, this solution seems not economically profitable. The purchase of a new seeder is subsidized at 50% for individual farmers and 60% for farmers grouped under aggregation projects. Moreover, the parts (kits) are taxed 20%. These political issues to encourage farmers' mechanization undermine this activity. It is proposed to not consider going through this activity.
- The activity 2.1.4: Undertake field performance assessment of a range of ZT drill options. The machinery team with Dr Jack Desbiolles has decided, after the inception meeting and steering committee, to not conduct this activity at farmers' fields. The new seeders to test should be first evaluated out of the platform and any problem that may occur harnessed under controlled conditions.
- The crop sequence introduced in the research managed trials is to meet the farmers' needs (market and use). We cannot introduce any crop that have no market or could not be valued in the farm.
- The activity 2.3 was already discussed in Tunisia and its feasibility at farmers' fields is cut normal with no grazing on a 10x10 m protected plots as one treatment compared to farmers' practice (cut normal and graze).
- We recommend that objective 2 to be entitled: "To identify and test improvement in weed, **pest** and biomass management of CA systems".

Fernana platform

Activity 2.1

Spraying equipment is not very common in the region so we suggest to introduce this technology in our plan of work for next season

Activity 2.3.1

The number of grazing treatments should be reviewed regarding plot size, animal availability and farmer preferences. In fact, in the Fernana platform, each farm cereal stubble land is jointly grazed by their own animals and those of their neighbours and that seems to be a matter of community informal agreement. So, the length of fences to be established should be reduced to an acceptable level by farmers.

Treatments to be maintained:

- Harvest normal, remove straw, but not grazing
- Harvest normal, remove straw, 50% grazing (half of normal grazing duration)
- Harvest normal, remove straw, normal farmer grazing (100%, control)

Activity 2.3.2.

Due to national CANA coordinator change, a lapse of three weeks of suspended research activities occurred and prevented from accessing to the project funds and to get to the experimental sites on time. Consequently, forage option 2 was abandoned and will be replaced next year by Sulla (*Hedysarum coronarium*) as it was discussed with Dr. P. Wall during the travelling workshop.

Activity 2.2.1

The weed management field trials must be set up in such a way as to manage the troublesome weeds identified during this year trials.

7 Variations to personnel

Setif platform

Recruitment of machinery engineer the next year

Chaouia platform

No changes.

Fernana platform

Following the resignation of the former project coordinator, a new coordination team was appointed. Its composition is as follows:

- Dr. Boubaker Thabet, Agricultural economics INAT Professor: Coordinator
- Mr. Houcine Angar, Chief Engineer at INGC, Assistant
- Mr. Hatem Ben Cheikh Mhamed, Research Associate at INRAT, Assistant

Furthermore, a number of researchers indicated the need to use occasional labour of different skills to better carry out their activities

8 Problems and opportunities

Setif platform

- The language restriction is an issue for some members of the team and training would be necessary.
- Oil crop seeds (Canola) were not available those we found had bad growth faculty we replaced the crop by forage association pea/triticale
- A delay of reception of seeds, fertilizers , herbicides and Atriplex plants at the beginning of the cropping season had affected the implementation and the establishment of the trials,
- Some herbicides had not been received at time eg Glyphosate and some had not been found eg: Fusilade which had been replaced by Agil
- Bad weather conditions (impracticable, inaccessible and wet fields) snowy, rainy and windy days delayed some operations (fertilization and weeding treatments)
- All the operations have been done only by the ITGC workers and the spread area made some difficulties in achievements of the cultural operation. Some times the failure and damage occurred to old mobility vehicle caused some delaying in different activities
- The only two available sprayers in the station were not sufficient for the entire project area a supply with others is needed.
- The conduct of residue management and pasture trials would be difficult to control mainly with small farmers (needs of personal supply, fencing materials and balances)

Chaouia platform

- Due to delay in the project financial support many activities were affected, therefore, Farmer Field School (FFS) was not undertaken. The FFS should be launched in September or as late as the beginning of October in order to schedule all the activities and program with beneficiaries before crops establishment.
- The main problem faced was unavailability of certified seeds. Beside, the wheat, we could not find certified seeds for food legumes and forage crops. Instead, farmers' seed were used. To alleviate this constraint, a seed production program was launched for multiplying seed food legumes and forage seeds at experimental station and with some farmers.
- Forage seeds multiplication may be a good business opportunity for the region and for CANA farmers if they get organized.
- Conducting pre-seeding herbicides, mainly the glyphosate, was a big problem in the region. There is no sprayer available for this operation and we had to hire one service provider from Settat to accomplish the task in Farmers' field trials.
- Spraying equipments are not very common in the region and that may be a good opportunity for developing and training a local service provider.
- There is a shortage in weed control knowledge. In contrast, farmers' perception of weeds as a free feed resource in the region is a main issue and concern in all the discussions. Weedy fallow is a main component in the production system, and any technology that may disturb this perception is still hardly accepted.
- To alleviate this constraint, field school should be organized with demonstration and economical assessment in collaboration with leader farmers and pioneers.

Fernana platform: No specific issues raised

9 Budget

Setif platform

- 1 Algerian Dinar = 0.0125 USD
- Seeds: 375 300 Algerian Dinar
- Fertilizers: 419 060 Algerian Dinar
- Herbicides: 443 050 Algerian Dinar
- Gaz oil: 82 200 Algerian Dinar
- Catering cost (workshop, field days): 174 096.51 Algerian Dinar

Chaouia platform

The ACIAR allocated budget was important to overcome many constraints. The availability of cash at ICARDA office in Rabat allowed; farmers' seeds purchase, cars maintenance and repair, labor payment, etc. We are grateful for that support.

INRA contribution supported mainly certified cereals seeds, personnel, vehicles.

Most of the expenditures were following the budget lines and no major changes were necessary for this season.

However, the allocated funds for the vehicle (\$ 25000) were insufficient to buy a reliable field truck that can transport personal and field tools. We are still waiting for a deal on the international market.

The scientific Kit for soil sampling/measurement is about \$ 3700 on the Moroccan market.

Fernana platform

The main problem that was encountered resulted from the discontinuity of some of the work following the resignation of the former project coordinator and the time that the Tunisian Administration took to proceed with the replacement.

Another inconvenience resulted from the particularly long procedure that the ICARDA Administration takes to authorise purchase of equipment and to make advance payments to cover activity expenses on time.