

**Grant Design Document submitted to IFAD by ICARDA/CIMMYT**

for the Programme on:

Use of conservation agriculture in crop-livestock systems (CLCA) in the drylands for enhanced water use efficiency, soil fertility and productivity in NEN and LAC countries

August 2017



## **ACRONYMS**

AWPB	Annual Work Plan and Budget
CAC	Consejo Agropecuario Centroamericano (CAC)
CANA	Conservation agriculture in North Africa
CBOs	Community based organizations
CLCA	Crop livestock and conservation agriculture
CSISA	Cereal Systems Initiative for South Asia
CGIAR	Consultative Group for International Agricultural Research
CIMMYT	International Maize and Wheat Improvement Center
CRP	CGIAR Research Programme
FAO	Food and Agriculture Organization
FGD	Focus group discussions
GDP	Gross Domestic Product
IASB	International Accounting Standards Board
ICARDA	International Centre for Agricultural Research in the Dry Areas
IFAD	International Fund for Agriculture Development
INGC	Institut National des Grandes Cultures, Tunisia
INRAT	Institut National de Recherche Agronomique, Tunisia
INIAF	Instituto Nacional de Innovación Agropecuaria y Forestal
ITELV	Institut Technique des Elevages, Algiers, Algeria
ITGC	Institut Technique des Grandes Cultures, Algeria
KAP	Knowledge, attitudes and Practices
KM	Knowledge Management
LAC	Latin America and the Caribbean
LMIC	Low middle Income Countries
MEL	Measurement and Evaluation Learning
NA	North Africa
NARES	National Agricultural Research and Extension Systems
NENA	Near East and North Africa
NGO	Non-governmental organization
NICAVIGA	Nicaraguan Dry Corridor Rural Family Sustainable Development Project
OEP	Office de l'Elevage et des Pâturages, Tunisia
OCS	One Corporate System
PROINPA	Fundación PROINPA
SARD-SC	Support to Agriculture Research Development from Strategic Crops in Africa
SC	Steering Committee
SDG	Sustainable Development Goals
SIMAS	Servicio de Información Mesoamericano sobre Agricultura Sostenible
SOE	Statement of Expenditure
SWC	Soil and water conservation
TOR	Terms of Reference
Upanic	Unión de Productores Agropecuarios
USAID	United States Agency for International Development
UN	United Nations
WOCAT	World Overview of Conservation Approaches and Technologies
ZT	Zero Till

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**OSC APPROVED CONCEPT NOTE**

<b>2. Division(s):</b> PTA, LAC, NEN and ECD	
<b>3. Title of the proposal:</b> Use of conservation agriculture in crop-livestock systems (CLCA) in the drylands for enhanced water use efficiency, soil fertility and productivity in NEN and LAC countries	
<b>4. Value of IFAD grant:</b> USD 2.5 Million	<b>5. Co-financing:</b> Will come from selected recipient and as such be a selection criteria in the competitive process (at least 20%)
<b>6. Implementation period:</b> 48 months	<b>7. GRIPs ID:</b> 2000001630
<b>8. Selected Strategic Priority:</b> 4. AR4D to sustainably increase production and productivity for food security, nutrition and income generation	
<b>9. Window:</b> Global/Regional	<b>10. Country/Countries:</b> Tentatively Peru, Bolivia, Nicaragua, Guyana, Iraq, Algeria, Tunisia
<p><b>11. Background/relevance:</b> Conservation Agriculture (CA - minimum tillage, soil coverage and crop rotation) is a popular approach promoted to support water harvesting and use efficiency, soil fertility management and the resilience of farming households in dry areas impacted by climate change. Despite many IFAD supported projects are in dry areas, CA has rarely been assessed and further developed in IFAD investment projects within the scope of farming systems, especially crop-livestock systems. In these systems one key challenge for CA is the competing needs for biomass for fodder and mulching for soil improvements. An IFAD supported grant with ICARDA on Integrated Crop-Livestock Conservation Agriculture (CLCA) systems has just been completed in 3 NEN countries, Tunisia, Algeria and Tajikistan. Research implemented in farmers' fields backed by more detailed experimentation and record keeping at research stations has indicated the long term profitability of CLCA systems compared to conventional systems if proper strategies for incorporation of forage crops and balanced management of biomass are developed and applied adjusted to local specificities of farming and agro-ecological systems. The results of the ICARDA CLCA grant, including CLCA system-level cost benefit analysis of different soil conservation and water use efficiency technologies, incorporation of forage crops and biomass management practices, have raised the interest of farmers, researchers and government in the potentials of CLCA despite initial scepticism among sheep farmers. This new proposed grant project will build on these pilot innovations and achievements and: i) expand the participatory research and development of local adapted CLCA systems for drylands to other areas in the NEN and LAC regions (both with important areas of drylands) to foster cross-region learning and exchange and reach a broader spectrum of farming- and agroecological systems; ii) expand the grantee partnership to a broader consortium of research and rural development partners (national, subregional and international) and further innovate in the integration of agro-ecological principles and use of genetic resources to enhance the productivity and resilience of CLCA systems in drylands; and iii) link the participatory research activities and development of context adapted guidelines for CLCA systems directly to on-going IFAD investment projects supporting small crop-livestock farmers in dry-lands. With this focus the grant project will contribute to the objective "promote innovative, pro-poor approaches and technologies with the potential to be scaled up for greater impact" of the IFAD Grant Policy and all three focus areas of the</p>	

2017 AR4D grant priority area (see point 8 above). In particular, it will contribute to the focus area “b) Increasing water management efficiency, mainly in arid and semi-arid regions”.

**12. Direct and indirect target group:** The direct target group will be an estimated 3,000 (at least 50% women and 30% youth (below 35 years)) small crop-livestock farmers in drylands in LAC (Andean drylands, Central American dry corridor and the northern South American savannah) and NEN participating in trials, action research and training for the development and adoption of local adapted technologies and practices for CLCA systems increasing production. Through the IFAD investment projects and project partners it is estimated that the training and adoption of technologies and practices for CLCA systems will reach an additional 10,000 small crop-livestock farmers. Other beneficiaries will be NARES (National Agricultural Research and Extension Services) and R&D partners and policy makers who will have access to innovative technologies and practices and knowledge on proven benefits of CLCA systems for climate resilience and sustainable intensification of production for crop-livestock farmers in drylands.

**13. Goal, objectives and expected outcomes:** The project **goal** is to sustainably increase production and enhance climate resilience of small farmers’ communities and their crop-livestock production systems in drylands. The **objective** is to develop local adaptable soil conservation and water use efficiency technologies as well as forage crops and biomass management practices for different CLCA systems in the drylands using agroecological principles and participatory action research approaches. The expected **outcomes** are: 1) 2,100 (70% of beneficiaries) farmers have adopted CLCA farming systems with increased production and improved cost-benefits compared to conventional systems; and 2) Local adapted guidelines for CLCA technologies and practices are used by at least 8 participating NARES and IFAD investment project partners in their advisory services or promoted in their outreach to private input and service providers.

**14. Key activities by component:**

**Component 1: Participatory research and development of CLCA technology packages and guidelines for different farming and agroecosystems.** Main activities: 1.1 inventory of experiences with CLCA technologies and practices in drylands beyond the ICARDA IFAD experience including work done by FAO and others in SSA and Asia to inspire and inform the development the research activities; 1.2 Ex-ante identification of main production constraints for small crop-livestock farmers in the selected IFAD investment project areas and barriers for the adoption of CLCA systems; 1.3 participatory research and cost-benefit analysis for the development of different soil conservation and water use efficiency technologies and integration of forage crops, biomass and livestock management practices to address constraints and barriers identified under 1.2; and 1.4 preparation of farming and agroecological system specific technology packages and guidelines for CLCA practices.

**Component 2: Knowledge management (KM) and dissemination of guidelines for CLCA practices.** Main activities: 2.1 Development of farmers videos and training material on CLCA systems and practices and linking project KM products to the WOCAT and other sustainable farming practices knowledge platforms; 2.2 organisation of capacity building, learning, exchange and dissemination events at: a) local level for the wider IFAD investment project beneficiaries and stakeholders; b) national level for NARES, policy makers and private inputs and service providers; and cross-region south-south level for project beneficiaries and partners and other partners supporting development of small crop-livestock farmers in drylands.

**15. Recipient:** To be selected competitively through an open call

**16. Rationale for recipient selection and recipient capacity:** A consortium of local, subregional and international research institutions and other development partners will be preferred to ensure experience from the NEN as well as the LAC region. Criteria that will be used to select the recipient competitively are: i) Proven expertise in CLCA or other agroecological practices relevant for small holder farmers in arid and semiarid areas in LAC and NEN; ii) proven experience in participatory research approaches with small farmers and farmers organizations; iii) Experience in working with government partners and investment project implementers; iv) good track record in financial management of grant resources and timely reporting on project progress and results; v) provision of co-financing to the grant project activities.

**17. Project cost:** Preliminary rough estimate of breakdown of costs:

Expenditure category	IFAD grant	Grantee co-financing	Total
Personnel	650 000	200 000	850 000
Travel	350 000	50 000	400 000
Equipment and goods	400 000	50 000	450 000
Training/workshops	500 000		500 000
Publications	250 000		250 000
Operational	350 000	200 000	550 000
<b>Total</b>	<b>2 500 000</b>	<b>500 000</b>	<b>3 000 000</b>

**18. Risks:**

Potential risks	Mitigation measures
Resistance to the CLCA approach by NARES and R&D partners	CLCA has unexploited potentials for enhanced productivity in drylands if adapted to local farming system conditions in terms of balancing competing biomass needs and incorporating forage crops, which the grant aims at achieving. Working through a consortium and national IFAD investment project partners involving them in cost-benefit analysis and the development of local adapted technological packages and guidelines will support their buy-in.
Poor adoption of the CLCA practices by farmers	Participatory assessments of crop-livestock farming systems productivity constraints adoption barriers and addressing these through participatory research and involvement of service providers will be a vehicle for awareness raising and insure the development of local accepted and adapted technologies and practices. South-South cooperation through exchange and interaction with farmers who have adopted will also support adoption.
Lack of the support from private input and service providers	Equipment, seeds and TA needs which should be met by private or public service providers will be identified as part of the development of the technological packages awareness raising and linkages will be sought to support input markets.

**19. Monitoring & Evaluation, KM and Learning:** M&E indicators will be developed by the selected grantee together with the national implementing partners once the proposal has been prepared. Indicators used will be harmonized with the indicators of the IFAD investment projects. The national and subregional members of the grantee consortium will be responsible for collection of data for monitoring on progress in achieving the indicators and reporting in progress reports. Through action research farmers will be involved in data collection and monitoring activities. KM and learning will be done through component 2 as described above.

**20. Supervision modalities:** The grant activities will be executed following AWPB to be prepared in close consultation with the project management units of the IFAD investment projects involved. PTA, ECD regional climate change and environment specialists for LAC and NEN and the CPMs of the countries involved will jointly supervise the implementation of the grant and PTA and ECD will

provide technical guidance. PTA/FS2 will cost-share and combine the supervision missions with mission for other IFAD grants. Likewise; CPMs and the ECD regional specialists will take advantage of supervision missions to the involved investment projects to follow up on progress in and effectiveness of the grant activities in contributing to the objectives and beneficiaries of the investment project.

**21. Linkages:** The grant will directly support the objectives and beneficiaries of IFAD investment projects through improved access to innovative production technologies and practices. The grant project will as such be implemented in close collaboration with the investment project partners and project management units. The preliminary identified investment projects are: Pro-Camelidos (Bolivia); Sustainable Territorial Development (Peru); NICAVIDA (Nicaragua); Hinterland (Guyana); Agropastoral Value Chains (Tunisia); Smallholder Agriculture Revitalization (Iraq); and farming communities from the project area of the now closed Rural Development Project for the North of the Wilaya of M'Sila (Algeria). A final selection of IFAD projects will be done in consultation with project partners in the further development of the grant proposal.

**22. Scaling up:** The project builds on piloted technologies and practices for CLCA systems developed under the previous ICARDA CLCA project. These will be further adopted to other areas and scaled up by the new grant project through participatory research in different farming and agroecological systems and involving new research and development partners in the LAC and NEN regions. Working with IFAD investment project partners and government institutions will open pathways for adoption by a greater number of smallholder farmers. Scaling up will also be supported by the KM products and Learning events supported by component 2. These will also be used in support for policy processes in participating countries and internally in IFAD to engage with other IFAD investment projects which could benefit from applying CLCA technologies and practices developed by the project. Finally the partners in the grantee consortium will be another pathway for scaling up through their further work with other government and investment partners.

**23. Sustainability:** Applying a participatory research approach will insure the CLCA technologies and practices developed have relevance for and is adapted to local farming and agroecological systems and conditions which will underpin a high adoption rate. Involving NARES and R&D partners and IFAD investment project partners will facilitate that the developed technology packages and guidelines for CLCA for different farming and agroecosystems are incorporated and used by these institutions in their activities supporting the development of small crop-livestock dryland famers.

**24. Other aspects:** The public goods from the grant will be Local adapted guidelines for CLCA practices



## SUMMARY TABLE

Grant title	Use of conservation agriculture in crop-livestock systems (CLCA) in the drylands for enhanced water use and soil fertility in NEN and LAC countries
Recipient/Recipient address	International Center for Agricultural Research in Dry Areas (ICARDA, Beirut-Lebanon) with subcontracts provided to International Maize and Wheat Improvement Center (CIMMYT, Mexico); NARES in Algeria, Tunisia, Bolivia and Nicaragua.
GRIPS ID	2000001630
IFAD grant originator	Rikke Olivera, Senior Technical Specialist, NRM, PTA
Originating Division(s)	PTA, LAC and NEN
Proposed IFAD grant US\$	US\$ 2,500,000
Co-financing US\$	US\$ 500,000 as in-kind contributions from NARES
Total programme cost US\$	US\$ 3,000,000
Duration	4 years, 2018-2021
Grant goal, objectives and outcomes	<p><b>Goal:</b> To sustainably increase production and enhance the resilience of smallholder crop-livestock production systems to climate variability in drylands in NEN and LAC countries.</p> <p><b>Objective:</b> To develop in participation with smallholder crop-livestock producers contextually relevant and gender sensitive processes for enhancing the broad uptake of CA within integrated crop livestock systems in drylands in LAC and NEN regions.</p> <p>This objective will be achieved through: (i) the development of contextually relevant soil conservation and water use efficiency practices; (ii) the introduction of more productive forage crops and enhanced practices for biomass management; and (iii) linking with and leveraging existing or upcoming IFAD projects within the countries of engagement, as well as developmental programmes being undertaken by national governments or multilateral and international organizations.</p> <p><b>Outcomes:</b></p> <p><u>Outcome 1:</u> 3,000 smallholder farmers reached (at least 40% women and 20% youth below 35 years) and 2100 have directly adopted CLCA farming systems (in 4 target countries) with increased production and improved cost-benefits that are optimized by filling research and development gaps;</p> <p><u>Outcome 2:</u> At least 6 NARES, in addition to decision makers, NGO's and IFAD loan project partners in the 4 target countries of engagement have adopted tools and methodologies for reliable decision making and guide investments on contextually appropriate CLCA systems;</p>

	<p><u>Outcome 3:</u> At least 4 effective agricultural innovation systems - 1 in each implementation area of the 4 target countries - are coalesced in order to foster broad uptake of conservation agriculture practices within integrated dryland crop-livestock production systems.</p>
Themes addressed (see GRIPS)	Agriculture in arid and semi-arid areas, climate change, NRM, soil and water conservation
Links to grant policy and DSWP, and to corporate priorities	<p>The proposed grant project focuses on the continued and growing challenges of food security, climate change, and land and natural resource degradation encountered by mixed smallholder farmers in dry areas in Near East and North Africa (NA) and Latin America and Caribbean (LAC) countries. The grant also contributes to the strategic objectives of the IFAD Grants Policy. With its focus on filling research and development gaps for context adapted practices for CLCA systems and develop contextually relevant processes for enhancing their broad uptake, it will in particular contribute to the strategic objective to “promote innovative, pro-poor approaches and technologies with the potential to be scaled up for greater impact”. Within the 2017 priorities for grant financing the grant will contribute to all three focus areas of the AR4D priority area “to sustainably increase production and productivity for food security, nutrition and income generation”. In particular it will contribute to the focus area “b) Increasing water management efficiency, mainly in arid and semi-arid regions”.</p>
Grant target groups and number of beneficiaries	<p>The main target groups are 3,600 households of small crop-livestock producers in NA and LAC, whose livelihoods are dependent on crop production (barley and wheat-based systems in NA, and maize, wheat and Andean cereal-based production systems in LAC) that has a livestock component. Processes and practices developed will be made available for national innovation systems to expand adoption to other areas outside of the project implementation area through processes and approaches developed within the project lifetime. Specific strategies will be used to integrated women from both women headed households and men headed households in participatory trial activities and their needs and priorities will be included in the development of the adapted CLCA practices to insure benefits for women. Likewise, specific strategies for reaching women will be included in the development of processes for promoting the wider uptake. An effort will be made to involve young farmers and capture their innovative ideas and potential role as change agents.</p>
Main components	<p>The project consists of two main components. The first component is further divided into two subcomponents:</p> <p><b>Component 1.</b> Participatory adaptive research with integrated capacity development of farmers and other key partners to fully implement and evaluate CLCA systems</p> <ol style="list-style-type: none"> <li>a. <i>Subcomponent 1.1:</i> CLCA system optimization (filling research gaps and the full implementation and integration of technologies developed supported by both centres for the two regions);</li> <li>b. <i>Subcomponent 1.2:</i> Appropriate system development</li> </ol>

	<p>methodology to support wider adoption and decision-making.</p> <p><b>Component 2.</b> Accelerate adoption through the development of delivery systems/participatory farmer-led extension systems and inform the development of contextually relevant CLCA technologies and practices.</p>
<p>Countries where activities will be implemented</p>	<p>Algeria and Tunisia in NEN, and Bolivia and Nicaragua in LAC.</p>
<p>Implementation arrangements (including links to other IFAD interventions)</p>	<p>The implementation of project activities will be ensured by ICARDA and CIMMYT with NARES, farmer organizations and private enterprises for agricultural service provision in target countries. Both CGIAR Centers have a long and productive history in the development and promotion of conservation agriculture (CA) in NA and LAC.</p> <p>In Tunisia, the grant will link to the newly approved IFAD investment project on the “development of agricultural value chains for local development in Siliana”. Spill-overs in the area of alternative feeding systems and livestock enterprises are expected within the IFAD investment project “Agro-pastoral value chains in the governorate of Medenine”. Since there are no IFAD loan projects in Algeria, the participatory research and development activities of the current project will be linked to a national programme for fallow resorption in the cereal-livestock belt of the country’s North Central and North Eastern regions.</p> <p>In LAC, the project will link with the IFAD project NICAVIDA (Nicaraguan Dry Corridor Rural Family Sustainable Development Project) that aims to strengthen the resilience of rural families and indigenous people by promoting links between economic diversification, productive transformation, environmental protection, and family nutrition. In Bolivia, the project will be linked with the IFAD funded “Integral Strengthening Programme for the Camelid Value Chain in the Bolivian High Plateau” (Pro-Camélidos) that aims to reduce rural poverty and child malnutrition, increase the incomes of rural families, and promote practices that are conducive to sustainable natural resource management.</p>
<p>Supervision and knowledge management</p>	<p>IFAD will undertake field supervision missions combined as much as possible with the supervision missions for the related loan projects, participate in project inception and review meetings, and provide recommendations as needed to insure intended results are achieved. ICARDA will be responsible for the overall coordination and technical and financial management of the project through its offices in Amman, Cairo and Tunis, and its headquarters in Beirut. The project’s progress will be monitored by a Steering Committee (SC), which will meet once a year. The SC will consist of ICARDA and CIMMYT representatives, as well as National Coordinators and representatives from farmers’ organisation and other key stakeholders in the participating countries. IFAD representatives (PTA and CPMs from the participating countries) may be included as observers.</p> <p>The project’s Knowledge Management (KM) component will develop a</p>

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<p>process of generating information and closing adoption gaps through developing, testing and disseminating CLCA information packages to smallholders (men and women) via participatory instruments and processes. It will support upscaling field successes, best practices and lessons learned through producing evidence-based recommendations for farmers, policy briefs for decision makers, and CLCA guidelines to innovation systems, including extension and advisory services. The KM approach will be based on the principles of innovation systems, including formative research, capacity building, e-learning, and exchange and dissemination events. The initiative will also prioritize efforts to identify the constraints undermining women's decision-making power and CLCA adoption (related to women in both women-headed households and women in male-headed households). Likewise, efforts will be made to identify constraints for youth involvement and activities particularly attractive for youth engagement in CLCA systems.</p>
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## I. BACKGROUND

Low and Middle Income Countries (LMIC) in North Africa (NA) and Latin America and the Caribbean (LAC) are confronted with growing populations, increased urbanization, and changing food demands and preferences. The food and livelihood security of rural populations in these countries depend largely on crop-livestock (CL) production systems characterized by the inter-dependence of crop production and livestock husbandry (Valbuena et al., 2012). Many poorer smallholder farmers in these regions live in drylands where their CL systems are rainfed making them vulnerable to the limited and increasingly unpredictable and variable rainfall. Crop productivity and biomass are typically low under limited rainfed conditions because of abiotic stresses and reduced levels of input use. Moreover, an increased frequency of droughts and climatic risks further exacerbate abiotic stresses. Indeed, environmental threats related to climate change and water scarcity, weak socioeconomic policies, and demographic and technological drivers constrain agricultural productivity. Conservation agriculture (CA) principles, including minimum tillage, crop residue cover, and crop rotation/intercropping, have been proven to be key interventions for enhancing crop productivity and improving resource-use efficiency and soil health (Verhulst et al., 2010). For medium- and small-sized farms, the lack of technical options, such as suitable farm implements (manual, animal powered, and small tractor powered), compounded by the need to use crop residues as animal feed, are considered major constraints to the adoption of CA (Govaerts et al., 2009; Turmel et al., 2015). In addition to meat, milk and hides, livestock has important functions regarding farm power, nutrient cycling, and soil improvement, and plays a critical role as a capital-saving mechanism and risk mitigation strategy in case of crop failure (Kazianga and Udry, 2006).

Despite complementarities between crop and livestock farming, the limited availability of fodder in dryland systems often results in internal competition for the use of crop residues (ICARDA, 2016), leading to increased market dependence and related risks. Crop residues can be used as feed to sustain livestock productivity, as a mulch/soil amendment to sustain crop productivity, and in some cases, as a fuel or construction material. Addressing competition for the use of crop residues is at the heart of developing integrated, sustainable CL systems under CA for smallholders in arid and semi-arid rainfed areas where biomass production could be a limiting factor. Within this context, it is challenging for resource-poor and vulnerable smallholder farmers to adopt the retention of crop residues due to strong competition for these residues from livestock and other uses (Affholder et al., 2010; Alary et al., 2016; Giller, Witter, Corbeels, & Tittonell, 2009; Kassam, Friedrich, Shaxson, & Pretty, 2009). This constraint has been identified as a major challenge for the large scale adoption of CA principles at the level of small mixed crop-livestock farms in North Africa (El Gharras 2017; ICARDA, 2016), Sub Sahara Africa (Corbeels et al., 2014; Giller et al., 2009), and some Latin American countries (Alary et al., 2016). Moreover, this cropping practice induces profound changes in farm management, especially related to labour and cash requirements (Alary et al., 2016; Erenstein, 2003)

In the NA context, the recently completed project entitled “*Integrated Crop-Livestock Conservation Agriculture for Sustainable Intensification of Cereal-based Systems in North Africa and Central Asia (CLCA: January 2013-January 2016; IFAD GRANT # I-R-1393-ICARDA)*” made significant progress towards the development of productive, functional, and integrated Crop-Livestock-Conservation Agriculture (CLCA) systems for smallholder farmers in NA and Tajikistan. The project was implemented as an integrated program seeking to develop strategic practical options for integrating cropping and livestock systems in small and medium size farms under conservation agriculture farming systems. It sought to reconcile the demand from livestock with residue retention under CA in semi-arid conditions. A key output of this evidence-based research was that the full implementation of a CLCA system is feasible and can contribute to addressing existing water-related (rainfed) yield gaps of both cereals and legumes, by increasing crop water use efficiency/yield potential by as much as 50% and small ruminant offtake rates by 30% in both rainfed and irrigated systems. In both targeted NA countries, farmer acceptance of zero tillage (ZT) as an alternative technology for the rainfed crop-livestock system is already a reality. Areas under CA in Tunisia have progressed to reach 14,000 ha in 2015 while in Algeria – where the technology is more recent – there are approximately 6,000 ha reported to be under CA farming practice. The CLCA project has been successful in generating momentum and proof of concept on reducing natural resource degradation, and increasing the productivity, profitability and sustainability of the crop/livestock systems through the improvement and adoption of CA agricultural practices and fodder production. This has improved and addressed the socioeconomic and environmental realities that are evident on the ground. The project was innovative

in developing and testing effective flexible scenarios of integrated CLCA systems, which respond to the challenges and the realities of each of the sites while turning them into opportunities. In this regard, the project enhanced the capacity and resilience of farmers, rural communities, NGOs, machinery service providers, agricultural institutions, and NARES project staff by providing a key focal point for developing an integrated CLCA system that serves as a catalyst for extending the system to other regions outside of the immediate project focus areas of participant countries.

Across Algeria and Tunisia in North Africa and Tajikistan in Central Asia, the development of site-specific crop–livestock integration practices as part of CLCA packages has made substantial progress. The commitment and engagement of the farming communities and the NARES in the three countries has allowed the project to make significant progress towards the development, adoption and spillover of non-rigid CLCA systems. While building conservation agriculture packages – particularly in Tajikistan, where conservation agriculture was newly introduced by the project – and optimizing stubble management without impeding the flocks' performance, the project has succeeded in introducing new fodder sources into cropping systems by transforming relatively unproductive weedy fallows into productive forage-producing pastures (vetch and vetch-oat mixture in Algeria and Tunisia) and replacing summer fallow with mungbean production in Tajikistan (mungbean residues provide high-quality fodder), thus providing significant economic benefits for smallholder farmers and increased regional food security. In relation to irrigated cereal production in the steppes of North Africa, the project has also revealed a huge opportunity for significant reductions in irrigation water through a combination of conservation agriculture and improved irrigation systems. This offers the opportunity to reverse the depletion of scarce groundwater reserves and help maintain regional water and food security. Skills and capabilities enhancement through a range of capacity-building and training experiences, as well as the participation of post-graduate (Masters and PhD) students, has contributed significantly to the long-term capabilities of participant countries. Furthermore, the *ex ante* baseline adoption survey has collected a significant amount of socio-economic information that has proved invaluable in terms of researching the obstacles, other than livestock competition, for conservation agriculture adoption by mixed small farms in North Africa and Central Asia. Nevertheless, it was not possible to provide conclusive results on the environmental benefits because of the short duration of the project.

In the Latin American and Caribbean region (LAC), long-term trials as well as on-farm adaptive trials, reviewed by Verhulst et al. (2012) have shown that conservation agriculture (zero tillage with at least partial residue retention and crop rotation) has the potential to mitigate and adapt to climate change. Long-term rain-fed trials show that conservation agriculture results in high physical, chemical, and biological soil quality that favours larger yields and reduces the net global warming potential compared to traditional agricultural systems (tillage, residue removal and monoculture of maize). The high physical soil quality properties ensure that the cropping system is optimized to cope with both heavy rainfall events and prolonged drought, events that are likely to increase in frequency due to climate change. Residue retention under zero and conventional tillage induces greater microbial diversity, especially higher total bacteria, fluorescent pseudomonas and actinomycetes, both for maize and wheat cropping systems. This diversity allows an ecosystem to remain stable when facing changes in environmental conditions. Conservation agriculture has been widely successful in the Southern Cone region of South America. In other regions of Latin America, however, such as Central America and the Andean region, CA adoption has proven to be more difficult. The development of effective CA innovation systems in countries such as Brazil and Mexico has been instrumental in overcoming factors limiting CA adoption and reflects the importance of collaboration between public and private sectors, including machinery manufacturers, as well as the need for positive incentives and low interest loans to make technology affordable for farmers (Speratti et al., 2015). Complex, multi-component technologies, such as CA, can be successfully scaled out through an innovation systems approach (Camacho et al., 2016) as shown by past and ongoing projects in Mexico (MasAgro) and Guatemala (BuenaMilpa-USAID). Those projects have shown the advantages of CA practices on wheat- and maize-based production systems for improved productivity, increased resource use efficiencies, decreased costs of production, and the reduced impact of abiotic stresses.

These projects, and the wide experience of CIMMYT in the region, have generated a large knowledge base for the design and assessment of CA systems, including the important role of livestock within the LAC context. These projects have put in place innovative scaling approaches through innovation hubs that have reached thousands of farmers and technicians, and generated the local capacity building and communication tools and materials for the promotion of CA-based systems in LAC. These projects have in parallel generated invaluable insights into the management of CLCA-based systems under diverse contexts, with a significant focus on the development of sustainable practices for both

the livestock and the crop components. These included the development of fully integrated technical and institutional innovation packages for different production contexts, in addition to a comprehensive evaluation of the social, economic and ecological impacts of the developed technical options (Deschamps et al, 2016).

Nevertheless, the below listed CLCA themes remain under-investigated and need further efforts to fill research and development (R&D) gaps:

- Expanding CA practices into traditional crop-livestock production systems requires site-specific adaptation of these practices to farmers' conditions. This needs to occur along with the development of alternative feeding and livestock enterprises. Further to this, the development of CLCA packages is relatively complex, and needs to take into consideration a wide range of interacting components, including sustainable practices that integrate agronomic and livestock management;
- Integrated pest, weed, and disease management (across crop rotations and extended for a number of years);
- Risk management and decision support frameworks for farmers (including simple, but realistic, economic analysis that minimize production risks and provide clear market signals from a market chain approach);
- Adapting and modifying CLCA practices according to local physical, social, and economic conditions (including those related to gender inequality).

To address these R&D topics at scale ICARDA and CIMMYT, will build on their CLCA initiative in NA and research efforts in LAC respectively. The current project has been designed to combine an adaptive research program, including integrated capacity development, with the active development of a delivery mechanism for CLCA systems to serve as impact accelerators in both targeted regions. The adaptive research component will include a subcomponent, which involves extensive socioeconomic and market data collection to be used for optimizing adapted CLCA packages for different agroecologies and socioeconomic contexts. Farm-level optimizations for target farm types will be conducted to ensure full integration between the different system components and subcomponents, taking into account relevant economic and technical indicators. The second component aims at the development of a delivery system/participatory farmer-led extension system to accelerate adoption, which will include contextually-relevant CLCA technologies and practices.





## II. RATIONALE: RELEVANCE AND LINKAGES

### A. Link to outputs of Grants Policy and corporate priorities

The proposed grant is aligned with IFAD corporate priorities. The project focuses on the continuing and growing challenges of food security, climate change, and land and natural resource degradation faced by mixed smallholder farmers in drylands. The grant reflects different rural development priorities in NA and LAC countries where food security, climate change and natural resource degradation are of outmost importance for the low end of the wealth gradient and marginal households, notably for rural women and youth. In line with global strategic priorities (with a particular reference to the UN's SDGs), the grant project addresses as such the issues related to risks and vulnerability of the rural poor. The project will contribute to the three strategic objectives (SO) of IFAD's current Strategic Framework (2016-2025). It will in particular contribute to SO1, "Increase poor rural people's productive capacities" and SO3, "Strengthen the environmental and climate resilience of poor rural people's economic activities". The ICARDA CLCA project (*IFAD GRANT # I-R-1393-ICARDA*) proved that these objectives are achievable at the farm level in NA, and need to be scaled-up through more efficient and effective national innovation systems. The MasAgro project in Mexico has also shown the importance of CA in the achievement of the above SOs in the LAC context, and has developed a successful delivery system through innovation hubs where farmers, technicians and researchers work towards developing and testing site-specific alternatives for CA.

The grant also contributes to the strategic objectives of the IFAD Grants Policy. With its focus on filling research and development gaps for context adapted practices for CLCA systems and develop contextually relevant processes for enhancing their broad uptake, it will in particular contribute to the strategic objective to "promote innovative, pro-poor approaches and technologies with the potential to be scaled up for greater impact".

### B. Alignment to Priority Area (for Global/Regional grants)

Within the 2017 priorities for grant financing the grant will contribute to all three focus areas of the AR4D priority area "to sustainably increase production and productivity for food security, nutrition and income generation". In particular, it will contribute to the focus area "b) Increasing water management efficiency, mainly in arid and semi-arid regions".

Strong linkages with IFAD-supported investment projects and government-funded programs in NA and LAC countries, with a focus on CA, livestock, and sustainable use of land and water resources, will further contribute to key objectives and programs within participating countries. This project complements other IFAD-funded CA grants implemented by our consortium and other CGIAR Centers in East, South and West Africa, and South Asia.

### C. Rationale for grant financing, for selected implementing agency and for recipient selection and recipient capacity

Mixed crop-livestock smallholder farmers in dry areas around the world are in a perpetual search for biomass and feeding resources for their livestock, especially during dry seasons. In Near East and North Africa (NENA) countries, livestock contributions to agricultural GDP is higher than 30%. Livestock numbers have more than doubled over the past 40 years - increasing from 185 million head in the late 1960's to over 411 million in 2009. Meat production in the region increased accordingly, from 2,570 to 7,111 thousand tons. The livestock sector encompasses feed production, animal production, and in some cases, a manure management chain. These are all activities that need high levels of integration with crop production systems. Barley, straw and stubble are commonly introduced in the diets of stall-fed and grazing animals, and are used to bridge the long summer and autumn feeding gap. In 2011, barley represented 10.7%, 11.5%, and 20.5% of total animal consumption in Algeria, Morocco and Tunisia, respectively (FAOSTAT, 2011). The NA region is considered a net importer of staple food, mainly cereal grains (27% of cereal grain requirements). The grazing of other cereal stubble is also a common practice, especially during the summer period because of the lack of alternative biomass feed resources. In addition, the region is characterised by low agricultural productivity, high and volatile prices, and the uncertain availability of principal food commodities, which affect the livelihoods of the region's poor. The agro-pastoral communities are increasingly

exposed to climate change, leading to high levels of food insecurity, conflict, and environmental degradation. The prolonged drought lasting for two decades in the NENA region has had a severe effect on the livelihoods of agro-pastoral communities, which have limited local coping strategies and constrained alternative income-generating opportunities (IPCC, 2014).

Climate change, land degradation, and water scarcity are the three main biophysical constraints that increasingly impair agricultural development in Latin America. For example, the 2016 El Niño phenomena resulted in severe drought and crop losses for small-scale farmers in the Dry Corridor of Central America. This impacted an estimated 3.5 million people and caused FAO to declare a state of emergency (FAO 2017). In the highlands of LAC countries, maize, wheat and other Andean cereals, together with potato and beans, support the livelihoods of millions of small-scale resource-poor farmers that are especially vulnerable to climate change and the degradation of soils.

The capacity of women and men to adapt to climate change differ according to their roles, needs and limitations. As such, any adaptive measures need to account for these gender differentials, in accessing, for example, extension services and inputs such as fertilizer and herbicides. Regional CA practices represent an opportunity to improve productivity, enhance gender equity in terms of access to extension services, decrease production variability and production costs, and diversify production systems for improved livelihoods (Verhulst et al., 2012; Jat et al., 2016).

The potential exists for a sustainable and fairer development of NENA and LAC agro-pastoral communities (Nori et al., 2009; Speratti et al 2015). The proper mix of interventions that address the enabling environment, the efficient use and recycling of natural resources, diversification and the options of value addition, as well as gender equality and youth opportunities, have been demonstrated to be feasible. Crop-livestock integration under CA practices is an example of a highly efficient transformative intervention, leading to higher opportunities for natural resources conservation, reduction of production costs, yield fluctuations, and associated risks. Thus, this project addresses the dynamic transformations of small integrated crop-livestock farming systems through improved and adapted technical options and delivery systems to empower agro-pastoral communities within the considered regions. The project aims to accelerate the adoption, appropriation, and impact of crop-livestock conservation agriculture systems, by mixed small farms in NA and LAC to reduce natural resource degradation, and to increase the productivity, profitability and sustainability of this CLCA system in the two regions. It will benefit resource-poor communities in NENA and LAC agro-pastoral systems by generating opportunities for empowering local communities and enhancing their technical, institutional, and organizational capacities.

**ICARDA (in consortium with CIMMYT) has been selected** as the grant recipient for the project through a competitive process using an open call for proposals evaluated by a selection panel. The dryland geographies of the NENA region have been the focus of ICARDA's efforts for the past 40 years, and consequently, the centre has developed a comprehensive understanding of the challenges facing the agricultural sector in the region and potential solutions for representative agro-ecologies. In collaboration with NARES, ICARDA has introduced integrated packages for rainfed wheat farming that increased water productivity by 40% and yields by 30%, innovations targeting multiple aspects of crop-rangeland-livestock systems, and tools for empowering local rural communities. It also established national genebanks to enable conservation and the sustainable use of crop genetic resources. ICARDA has offices, research facilities and staff in Morocco, Tunisia and Egypt. CIMMYT, with over 50 years of presence in the LAC region, has supported countries with conservation and exchange of local maize landraces through its international genebank in CIMMYT HQ, as well as building local capacity in the conservation of countries' genetic diversity. In addition, support to LAC countries has allowed joint development of new maize varieties, a strong technical foundation for sustainable CA systems, and adapted approaches for integrated farming systems in different agro-ecological contexts.

[ICARDA](#) and [CIMMYT](#) will implement project activities with NARES, farmer organizations, and private enterprises for agricultural service provision in target countries. Both CGIAR Centers have had a long and productive history in the development and promotion of CA in NA and LAC. In NA, ICARDA has implemented a number of projects ranging from the introduction of CA focused on zero tillage systems that include wheat/temperate pulses through to the development of inexpensive locally-manufactured seeders ([CANAS](#)). The recently completed IFAD-funded (*IFAD GRANT # I-R-1393-ICARDA*) Crop-Livestock-Conservation Agriculture ([CLCA](#)) project extended the CA framework to include the introduction of a small ruminant component into these systems, which has resulted in the potential emergence of an integrated farming system that is diverse and resilient to shocks (i.e. climate and economic). Under the completed CLCA project, detailed adoption profiles, as well as

social and economic constraints for the adoption of integrated CACL systems in both Tunisia and Algeria, have been successfully completed. ICARDA has also successfully promoted CA in Syria and Iraq ([Development of Conservation Cropping Systems in the Drylands of northern Iraq](#)), including the development of [practical guidelines](#). In the West Asia North Africa (WANA) region, ICARDA implemented through three consecutive phases (1994-2008) a participatory research for development project (Mashreq and Maghreb project<sup>1</sup>), which was IFAD funded (Grant No. 698-ICARDA, Grant 385-ICARDA) and led to significant transformation and technology transfer within the crop-livestock systems of several target countries. ICARDA has also had previous experience in LAC in terms of implementing crop-livestock integration. This included a 6-year engagement (2003-2008; IFAD grant TAG 659) in small ruminants and crop integration in selected dry areas of Latin America (Mexico-Venezuela-Brazil), and its research portfolio encompassed all components of a CLCA system.

CIMMYT has been successful in promoting the development of CA in maize and wheat-based production systems across LAC, SSA and South Asia. This has included the introduction of legume and livestock components into maize-based systems, and the development of zero-till seeders to meet the prevailing diverse contexts that face smallholder farmers. CIMMYT and its partners have a solid record of accomplishment in developing, testing, and scaling CA based practices for the sustainable intensification of cereal-based systems in LAC and South Asia. The long-term presence of CIMMYT in India, Nepal, Bangladesh, and Pakistan, and its work through multi-stakeholder approaches, has led to significant impact on the ground (i.e. [CSISA project](#)). Knowledge, approaches, technologies, and lessons learnt in that region are relevant to the joint work of ICARDA and CIMMYT in North Africa, as recently demonstrated in the CRP WHEAT Phase II proposal and One Global Wheat Program.

**The Consortium will bring methodological expertise** in farming systems analysis that include placing technologies in context, understanding constraints to adoption, and site/farm specificities adoptability issues (i.e. ILRI/CIMMYT Pan Americana project in Nicaragua, presently funded by CRP MAIZE) associated with biomass use trade-offs in cereal cropping systems ([2015 Agricultural Systems Special Issue](#)) that is of relevance to this call. These analyses will consider the technical and economic performance of CLCA systems, supported by accurate investigations of costs, benefits, and market viability of the different identified practices in each concrete context. Other projects that are relevant to the current grant include the BMZ-funded and ICARDA-implemented project in Tunisia '[Mind the Gap 2016-2019](#)', which aims to improve dissemination strategies, as well as their gender equitability, to increase technology adoption by smallholders in the sheep-barley belt of semi-arid Tunisia. As far as advocating alternative feeding systems and livestock enterprises integrated to CLCA systems, another BMZ-funded project implemented by ICARDA - 'Provision of Proven Feed Resource Technologies to Improve the Red Meat Value Chain in Tunisia; 2015-2017' - aims to improve the red meat value chain by focusing on eliminating feed gaps and providing adaptation strategies to drought and climate change.

**The consortium will facilitate south-south exchange and learning.** Benefits from knowledge exchange among NA countries are expected due to the overall similarities of small farm agricultural systems and their related contexts in Tunisia, Algeria, and Morocco. In addition, south-south exchange will also be facilitated between NA and Near East countries. Exchange between Algeria and Tunisia, is already happening around CLCA systems started during the previous IFAD financed CLCA project and will be further strengthened by the current grant project to further involve farmer-led extension services. During the first phase, the exchange was materialized through: exchange of visits between NARES involved staff; participation of NARES scientists and extension officers in joint training cycles and field workshops; and exchange of developed tools such as stubble grazing tools and forage options as an alternative to stubble grazing.

In addition to the direct synergies and linkages created with on-going IFAD loan projects, particularly in Tunisia, it is expected that newly approved or under final design IFAD grant and loan projects in Jordan and Palestine can directly benefit from the tools, technologies, and methodologies that the current grant will generate facilitated through south-south exchange and learning. It is anticipated that

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<sup>1</sup>MM Phase III - Programme for Developing Sustainable Livelihoods of Agro-pastoral Communities of West Asia and North Africa). MM Phase II - Programme for the Development of Integrated Crop-Livestock Production in Low Rainfall Areas of Mashreq and Maghreb. Phase I - Participatory Validation of Integrated Systems Technology Packages to Improve Adaptability under Favorable Policy Environments

these tools and methodologies can also reduce reliance on stubble grazing among the IFAD project beneficiaries in these countries, using alternative livestock feeding systems, while integrating all available feeding resources at the landscape level (agro-industrial by-products, communal rangeland resources, and purchased feed), and introducing more effective feedlot systems.

Because of a similar context and history, LAC countries have much to share and learn from similar experiences, in either the scientific, technical or organizational spheres. Exchange between participating countries will be strengthened. CIMMYT has developed several CA courses in which, besides the technical aspects of CA research and development, a Latin American community of practice has been developed in which partners in Bolivia and Nicaragua share and learn from other experiences in similar contexts. Furthermore, in the current grant exchange of visits between NARES involved staff, the participation of NARES scientists and extension officers in joint training cycles and field workshops and exchanges will be stimulated. CIMMYT has, and is currently developing, several farm-level models and promoting the exchange of experiences so that new elements or ways of using such models are shared to improve local applications. Finally, in particular settings, technical options can be shared and tested in new sites, and results will also be shared, in order to better understand local adaptation challenges and opportunities (e.g. for Bolivia highlands, technical aspects in the use of Lupinus and the test of different amaranth options developed in Mexico and Guatemala can be useful to set up and narrow research and technical gaps. In Nicaragua, maize residue management options tested in Mexico and Guatemala can provide elements to fine-tune research and technical options).

CIMMYT participates actively in regional learning and exchange platforms generated by the Inter-American Institute for Cooperation on Agriculture or IICA, which will benefit the project in facilitating regional south-south exchange. IICA is the organization of the inter-American system specializing in agriculture, and its mission is to stimulate, promote and support its member countries' efforts to achieve agricultural development and rural welfare. IICA's mechanisms specialize in research and innovation in the agrifood sector through learning platforms (FontAgro, ForAgro, InnovAgro), as well as through experts in the IICA offices in the countries of the Americas. Starting with MasAgro, CIMMYT has intensified its linkages with IICA offices. The Center also plans to repeat this strategy in Central America with the support of IICA offices and of the Council of Agriculture Ministers of Central America (CAC). IICA and CIMMYT have in 2015 signed a cooperative framework agreement to have academic exchanges and develop and disseminate information on common agricultural problems. The framework also exchanges scientific staff, develops, trains and updates human resources, as well as supports a joint effort to help governments in improving the implementation of public policies aimed at rural population development.

Regarding inter-regional exchange, the project should not appear as two distinct segments implemented in NA and LAC. South-south collaboration between LAC and NA will be operationalized at the scientific and development levels. Scientifically, because similar approaches and tools (e.g. farming and cropping systems analyses) will be used in different contexts, NA-LAC scientists will exchange on the genericity and adaptation of tools through workshops and seminars, resulting in methodological insights on the way to tackle the complexity of crop-livestock interaction and CA. For example, NA-LAC scientists will collaborate on the development of generic guidelines to, among others, i) characterize the diversity of farming systems, identify the most marginal and fragile farming households, and target coherent interventions, and ii) develop and apply generic farm level models that can be adapted to take into account the specific local challenges related to crop-livestock optimization. At the development level, NA-LAC countries will exchange methodologies and learning from the scaling approaches. The grant will facilitate NA-LAC country exchanges through conceptualization of the establishment of innovation systems and the knowledge management plans towards upscaling and sustainability, as further discussed in the KM section. Yearly South-South e-learning events will be organized, including within the target countries to analyse and compare country specific approaches and case studies.

**The Consortium have significant experience in participatory and demand-driven research facilitating adoption by farmers.** This stems from a clear understanding and acknowledgement that smallholder farmers have diverse needs and livelihood strategies that requires flexibility in CA approaches. The design, implementation, and assessment of potential CA interventions in projects undertaken in this area of research for development include farmers, farmer organizations, and various stakeholders. ICARDA and CIMMYT have assisted NARES in NA in human capacity development, as well as supporting infrastructure development. More than 5,000 scientists, engineers and technicians have attended ICARDA short-, medium- and long-term (i.e. degree) trainings, and

CIMMYT has promoted local champions through international training courses on CA and related integrated farming systems analysis. Through an innovation systems model, an effective instrument in linking stakeholders along the entire value chain, ICARDA and CIMMYT have demonstrated the role of this participatory approach in optimizing the adoption of technologies through inputs from end users ([SARD-SC](#), Deschamps et al 2016). The model includes a strategy for creating, validating and scaling sustainable agrifood systems, based on networks that promote innovation, technology transfer and the adoption of improved seeds of maize, wheat and associated crops, as well as sustainable agronomic practices among small-scale farmers. It gives special emphasis to the local context and local actors by promoting a regional focus through innovation hubs, which are spaces for meeting and knowledge exchange, technology, agronomic practices and information through action-oriented and participatory research, and which foster interaction among the different actors that make up the agrifood chain.

In the implementation of all projects undertaken by both Centers, the **involvement of farming communities, NGOs, National Agricultural Research and Extension Systems (NARES)**, and in most cases, combinations of the three are crucial. In NA, ICARDA has had a long and enduring engagement with the NARES of Morocco, Algeria and Tunisia, with offices and infrastructure embedded within the national systems. In the recently completed CLCA project, ICARDA partnered with [ITGC](#), [Trait d'Union](#) and [ITELV](#) in Algeria, and with [INRAT](#), [APAD](#) and [OEP](#) in Tunisia. CIMMYT collaborated recently with national systems in Bolivia, Peru and Nicaragua on nutrition, sustainable agriculture, and institutional improvement of the national agricultural system, taking advantage of long-standing collaboration on CA, especially in Bolivia. Secured and envisaged partnerships with local research institutes (e.g. INTA in Nicaragua and INIAF in Bolivia), large NGOs, and farmer organisations (e.g. SIMAS and the CAC in Nicaragua, and PROINPA in Bolivia) will be essential in the implementation of the project in LAC, always in close collaboration and guidance from IFAD in-country representatives, and in coherence with IFAD loans (NICAVIDA in Nicaragua and ProCamelidos in Bolivia). Moreover, in order to ensure long-term scientific and technical capacity, collaborations with local universities will be pursued (e.g. Universidad Nacional Agraria, UNA in Nicaragua and Universidad Autonoma Tomas Frias, UATF in Bolivia), with special emphasis on methodology development and application for integrated assessment of CLCA systems and their components.



### III. THE PROPOSED PROJECT

#### A. Target Group

The main target groups directly reached by the project are 3,000 households of small crop-livestock producers in NA and LAC regions whose livelihoods are dependent on crop production (barley and wheat based systems in NA and maize, wheat and Andean cereal-based systems in LAC countries) and livestock (sheep and goats in NA, and small ruminants, llamas, and to some extent, extensive cattle production in LAC) of which 70% (200) will adopt CLCA farming systems with increased production and improved cost-benefits compared to conventional systems. Considering that CL systems form the basis of the livelihoods of two-thirds of the population in developing countries (Herrero et al., 2010), there is a good potential for upscaling of the project's results. Through the support to innovation systems supporting adoption, the involvement of NARES and linking to IFAD investment projects, the spill-overs are expected to reach 20,000 households, who will indirectly benefit from the project.

Specific strategies will be used to integrated women from both women headed households and men headed households in participatory trial activities and their needs and priorities will be included in the development of the adapted CLCA practices to insure benefits for women. Likewise, specific strategies for reaching women will be included in the development of processes for promoting the wider uptake. An effort will be made to involve young farmers and capture their innovative ideas and potential role as change agents.

Farming system typologies will be used to develop and target coherent interventions for specific types of farming systems, under specific socioeconomic, gender, and biophysical conditions. Through such typologies, most vulnerable groups (including aspects related to gender and youth) will be identified and targeted with tailored CLCA alternatives. The particular focus will be on smallholder farmers and farmer cooperatives, who are the target IFAD beneficiaries and resource persons for innovative suggestions of modification and better adaptation of CLCA agricultural practices and techniques to different local contexts.

National systems of innovation, inclusive of NARES, civil society, regulatory systems and policy, are also targeted in terms of participatory processes for technology development and approaches to scaling. Upscaling (through an enabling environment for sustained innovation) and outscaling (geographically), both in terms of uncovering processes and practical experience in implementation, will be fostered within countries of engagement and shared regionally, as well as internationally, through effective knowledge management channels and South-South exchange.

The project in NA will focus on Algeria and Tunisia. It will build on the invaluable findings of the CLCA project (*IFAD GRANT # I-R-1393-ICARDA*) to develop management strategies of these integrated systems under different contexts, and will aim to reach the wider adoption of adaptable CLCA systems within both relevant IFAD loan projects and government programs. The project will target mixed small farmers in the districts of M'Sila, Setif and Oum El Bouaghi; a region characterized by an arid to semi-arid Mediterranean climate, with rainfall ranging from 200 to 450 mm. Soils are medium textured, mainly loamy with erosion risks on roughly 60% of the land. The majority of the farmers are cereal-livestock producers under rainfed conditions, while others have access to water and practice supplementary irrigation of their wheat fields. As there are no IFAD loan projects in Algeria, the participatory research and development activities of the current project will be linked to the national program for fallow resorption in the cereal-livestock belt of the North Central and North Eastern parts of Algeria. This government-funded project aims to resorb 500,000 ha of fallow by 2020, promote pulses and forages in rotation with wheat and barley, create a seed system for pulses and forages, establish 100,000 jobs, and enhance research in pulses and forage cropping. In four years, the current grant will aim to target approximately 1,500 farmers owning a total sheep population of 207,000 heads, with a total area of 50,325 ha, of which 11,000 ha are under supplementary irrigation. Strong linkages are also expected with the Haut Commissariat pour le Développement de la Steppe in Algeria, which is responsible for rangeland and agro-forestry rehabilitation in the target project area.

Similar to Algeria, Tunisia has a Mediterranean climate, with seasonally variable and generally low rainfall that may be further exacerbated by climate change and a North-South precipitation-decreasing gradient. The country is elongated, north to south, with a small fraction of the Northern region arable. Over 45% of the agricultural land has experienced some form of degradation. Most soils are shallow, nutrient and organic matter deficient, with a low water holding capacity, and are highly vulnerable to erosion. The focal region will be the semi-arid region of Siliana, Zaghouan and South Beja in Northern

Tunisia, where variable rainfall fluctuates between 300 and 400 mm. Topography is marked by a mix of plains and hilly areas where most soils are light textured and low in organic matter. The farming system is mainly based on cereals (durum wheat and barley) grown in an integrated cereal-livestock (sheep and goat) system, exclusively under rainfed conditions. The grant can be linked to the newly approved IFAD investment project on the 'development of agricultural value chains for local development in Siliana. Spill-overs in the area of alternative feeding systems and livestock enterprises are strongly expected within the IFAD investment project 'Agro-pastoral value chains in the governorate of Medenine' which is situated further South to the project's main target area. In addition, cross collaboration, co-learning and synergies are expected by linking to the following CA-based projects in the country such as:

- Conservation agriculture-Maghreb (2014-2017); FERT-Agri Agence Funding;
- PAPS-eau/conservation agriculture under rainfed condition (2015-2017); EU Funding;
- The Global GEF/FAO Project on Decision Support for Scaling up and Mainstreaming Sustainable Land Management (DS-SLM) (2016-2018); FAO Funding;
- Agriculture de conservation: moyen d'amélioration de la productivité des céréales et des caractéristiques du sol dans les pays arabes (2017-2020) ; ACSAD Funding;
- Appui au développement de l'Agriculture de conservation (2012-2018) ; INGC (Tunisia) Funding.
- ICARDA-Morocco Initiative for the expansion of CA in Morocco.

Based on the aforementioned, our selection of the target areas and target farmers are aligned with the current National Strategy to expand CA in Tunisia. [Based on joint ICARDA and Tunisian research partners, this strategy prioritized 260,000 ha](#) of smallholdings in the North and the Centre of Tunisia where CA offers strategic opportunities to restore soil health and protect vulnerable biophysical environments. Within this context, the current grant aims to integrate, under the CLCA system, 10,000 ha belonging to 715 mixed small farmers owning around 15,000 heads of sheep, which is in line with the short-term objectives of policy makers in Tunisia who discussed this particular CLCA integration with [ICARDA in a round table organized 16<sup>th</sup> of March 2017](#).

The project in LAC will target small-scale farmers in Bolivia and Nicaragua. Rainfed agriculture occupies a prominent place in rural livelihoods in Bolivia and Nicaragua: it is spread over more than 90% of the net cultivated area, and supports over 90% of a regional population that totals some 15 million people, playing a vital role in food security. The highlands of Bolivia and Nicaragua's 'Dry Corridor' regularly suffer from drought, soil degradation, and pest incidence. Under such fragile agroecosystems, livestock plays a critical role in livelihoods as a source of nutritious products for self-consumption, income, and a strategy for risk management and savings. Through the use of farming system typologies, including age and gender disaggregated information on household composition, the availability of resources, main crop and livestock activities, as well as livelihood strategies, most marginal farm households will be identified and characterised to develop, target, and promote appropriate CLCA systems and practices. The project will be linked to IFAD loans and implemented in regions with ongoing operations and contribute to their overall objectives through efficient crop and livestock components, their integration, and the overall increased sustainability of small scale farming systems farmers through CLCA systems.

Activities in Nicaragua will focus on the Dry Corridor. In the Dry Corridor, maize-based systems dominate with livestock used for milk, meat and draft power, as well as a saving and risk mitigation strategy. The area is historically known for its low productivity due to low rainfall, and approximately half its soils are overused and/or degraded (IFAD 2017). The impacts of drought during recent decades have accentuated, and the Unión de Productores Agropecuarios (Upanic) has reported between 50% and 75% crop losses, and the deaths of an estimated 1.2 million cows.

The project will link with the IFAD project NICAVIDA (Nicaraguan Dry Corridor Rural Family Sustainable Development Project) that aims at contributing to rural families' and indigenous people's resilience, by promoting the links between economic diversification, productive transformation, environmental protection, and family nutrition. NICAVIDA aims to ensure that small farmers have access to nutritious food and an adequate diet, and strengthens their capacity to manage natural resources effectively and adapt to climate change. More specifically, the project will support the NICAVIDA Component 2 (Family, territorial and competitive business investments) that will finance and implement investments at the level of families, groups, organizations and territories to promote

the productive transformation of rural families and promote links between the diversification of their income sources, environmental protection, adaptation to climate change, and food and nutritional security. Our activities in the region, based on CIMMYT experience in the highlands of Guatemala and Mexico (where similar systems facing similar challenges exist), will provide technical guidelines for increased efficiency, resilience, and sustainability of diversified mixed crop-livestock systems based on CA, and promote alternative technologies, practices and business models for soil preparation, crop residue and manure management, and the diversification of cropping and farming systems with nutritious crops, cash crops, as well as fodder and cover crops. More specifically, improved crop residue and manure management, as well as diversified crop rotations, will need to be optimised for specific agro-ecological conditions and farming systems to, on the one hand, improve soil quality for greater efficiency and resilience of cropping systems, and on the other, maintain and improve the performance of the livestock component. CIMMYT has great experience in the intensification of such kind of maize-based CLCA systems to tackle specific research and technical gaps, including gender-equity dimensions of CA access, adoption, and benefits.

In Bolivia, the project will focus on the highland areas of the western departments of La Paz, Oruro, and Potosí. The region is characterised by low rainfall and low temperatures, and the experiences of CIMMYT in the highlands of Mexico and Guatemala can greatly contribute to improving the productivity of the region's main cereals using CA, including maize, wheat, and Andean cereals that include quinoa or amaranth. CIMMYT has a historical presence in this region. Activities in the region will be linked, as much as possible, with the Integral Strengthening Programme for the Camelid Value Chain in the Bolivian High Plateau (Pro-Camélidos), which aims to reduce rural poverty and child malnutrition, increase the incomes of rural families, and promote practices that are conducive to sustainable natural resource management. Notably the project will contribute to Pro-Camélidos Component 1 (Primary production and management of natural resources) which aims at improving primary production at the farm household level, community and micro-watersheds level for better natural resource management and food security by improving the productive environment, reduce negative environmental impacts and provide conditions for competitive entry into markets. More specifically, the project will contribute to Subcomponent 1.2 (Sustainable use of natural resources) which aims at improving livelihoods and ecosystems through activities related to efficient management and conservation of water and soil and strengthening local institutions for natural resource management and systematization of experiences.

In this region, the area expansion of quinoa and other Andean cereals has increased dramatically in the last years, often with poor agronomy and consequent degradation of the resource base, resulting in increased pressure on land at the expense of grazing areas for camelid production. Camelid production plays a crucial role in the Bolivian highlands as a source of income and food (besides the cultural values attached to llamas). Moreover, manure application is essential for the successful establishment of quinoa, and therefore the camelid component of the farming system plays a key role in the intensification of the cropping system. Activities in the project will aim at the sustainable intensification of Andean cereal production through CA principles, and improve productivity, strengthen gender equity, and enhance the efficiency, resilience, and conservation of the resource base, as well as the optimisation of resource allocation (e.g. land, manure, crop residue) for improved performance of the farming system as a whole. The project will benefit from CIMMYT experiences in improving Amaranth production in Mexico and Guatemala through variety selection and improved agronomic management, including rotations, cover crops and improved fallows to ensure feed requirements for livestock are met, healthy soils are conserved, and water use efficiency is increased.

## **B. Overall Goal, Objectives, and Outcomes**

**Goal:** To sustainably increase production and enhance the resilience of smallholder crop-livestock production systems to climate variability drylands in NEN and LAC countries.

**Objective:** To develop in participation with smallholder crop-livestock producers contextually relevant and gender sensitive processes for enhancing the broad uptake of CA within integrated crop-livestock systems in drylands in LAC and NEN regions.

This objective will be achieved through: (i) the development of contextually-relevant soil conservation and water use efficiency practices; (ii) the introduction of more productive forage crops and enhanced practices for biomass management; and (iii) linking with and leveraging existing or upcoming IFAD



projects within the countries of engagement as well as developmental programmes being undertaken by national governments or multilateral and international organizations.

**Indicators:** For evaluating the progress in achieving these objectives, a list of aggregated project indicators has been developed (see also the logical framework in the annexes for a more detailed list of indicators):

- Beneficiaries of existing and new IFAD as well as other government initiatives have been exposed and have applied technologies and practices promoted by the project through four country-based formative research and interactive KM models, tools and products.
- Regulatory systems and policies in four countries have been informed on newly gained knowledge via evidence based policy briefs and bottom-up information flow.
- Four innovation systems (one in the implementation area of each target country) have been engaged in developing avenues for enhancing an enabling institutional and economic environment to facilitate broad uptake of CLCA technologies.
- Farmers, men and women, have adopted agronomic and biomass management practices resulting in a better management of natural resources for more productive and sustainable use (relative increase of 3 to 5% of soil organic matter depending on soil type and aridity conditions and 10-20% and 30-40% increase in water use efficiency in rainfed and irrigated-based systems, respectively).
- Farmers, men and women, have adopted fodder, cover crops, and alternative feed resources leading to increased feed availability with ultimate increases in livestock productivity.
- Farmers, men and women, in the intervention areas of NA and LAC are exposed to an efficient, integrated and economically viable CLCA system achieving increased productivity, and most importantly, stabilization in cereal yields, as well as reduction in production costs (20 to 40% reduction in energy cost, 15-20% reduction in other production costs).

The project objectives and indicators are expected to be achieved through three major outcomes:

**Outcome 1:** 3,000 smallholder farmers reached (at least 40% women and 20% youth below 35 years) and 2100 have directly adopted CLCA farming systems (in 4 target countries) with increased production and improved cost-benefits optimized by filling research and development gaps;

**Outcome 2:** At least 6 NARES, in addition to decision makers, NGOs and IFAD loan project partners in the 4 target countries have adopted tools and methodologies for reliable decision making and guide investments on contextually appropriate CLCA system;

**Outcome 3:** At least 4 effective agricultural innovation systems - 1 in each implementation area of the 4 target countries - are coalesced in order to foster broad uptake of conservation agriculture practices within integrated dryland crop-livestock production systems.

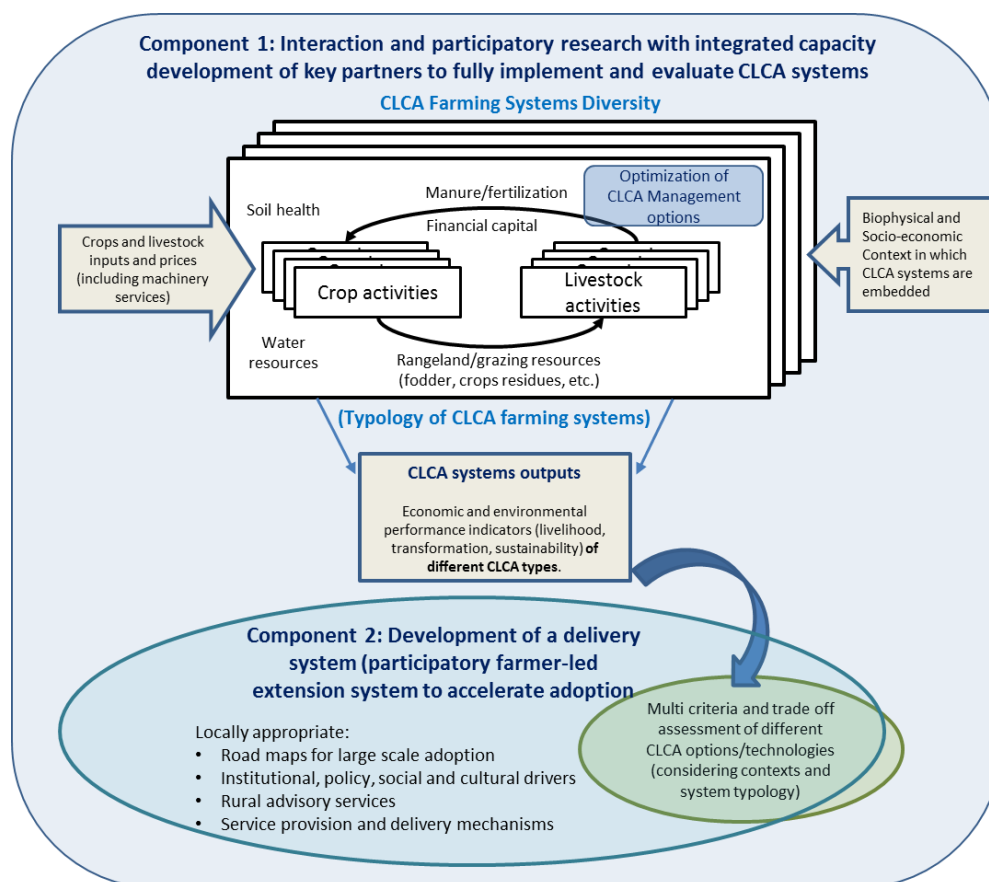
### C. Project Conceptual Framework and Components.

The project consists of two main components (see Figure 1 for conceptual framework). The first component is further divided into two subcomponents as follows:

**Component 1.** Participatory adaptive research with the integrated capacity development of farmers and other key partners to fully implement and evaluate CLCA systems.

- Subcomponent 1.1: CLCA system optimization (filling research gaps and full implementation and integration of technologies developed supported by both centres for the two regions);
- Subcomponent 1.2: Appropriate system development methodology, including evaluations of costs, benefits and market viability, to support wider adoption and decision-making.

**Component 2.** Accelerated adoption through the development of a delivery system/participatory farmer-led extension systems and inform the development of contextually relevant CLCA technologies and practices.



**Figure 1.** Conceptual framework for CLCA systems analysis and dissemination

Taking a more contemporary innovation systems perspective, we firmly embed component 2 into component 1 activities, through interaction and participatory research, in order to embrace the need for inclusivity and participation in process. Innovation systems are social systems as they deal with a multiplicity of human actors coming together to prioritize challenges, and to jointly uncover opportunities for mutually beneficial outcomes through resolution of these challenges. Rural advisory services encompass extension services, but engage in much broader aspects of nutrition, access to finance, issues of labour, etc. Rural advisory services form an important set of actors within an innovation system, as well as local collaborators, NGOs and other stakeholders who are intended to interact, in order to enhance mutually beneficial interactions, through joint assessment of trade-offs, and in the development of avenues for mitigating challenges which are difficult to resolve individually. Scaling out (geographically) and scaling up (through an enabling economic, regulatory and policy environment) occur through the interactions of innovation system actors, within the network's infrastructure (Testing platforms, demonstration modules and extension/impact areas), as well as through dialogue and influence outside of the innovation systems (or platform (IP)) model. This goes beyond a traditional research-led transfer of technology process, which is underpinned by the demonstration of technologies within field days, associated training and hand over to national extension systems. To facilitating development-oriented outcomes based on joint action, with full commitment, a comprehensive analysis of trade-offs, and a well-defined road map for broad uptake of agricultural technologies and effective production practices.

## D. Project Outputs and Activities

### A. Project Activities

#### **Component 1: Participatory adaptive research with integrated capacity development of farmers and other key partners to fully implement and evaluate CLCA systems**

##### **Subcomponent 1.1: CLCA system optimization (filling research gaps and full implementation and integration of technologies developed supported by both centres for the two regions)**

**Output 1.1:** An extended technical CLCA framework (to include crop production, stubble management, forage production, livestock and manure management) resilient to shocks is developed and applied. The development of the framework will take into consideration farming systems and agro-ecological specificities, as well as gender-specific farmer needs for sustainable livelihood development.

This output is mainly devoted to the development and packaging of technical CLCA options that can be disseminated through appropriate delivery systems. It will either address the CLCA research gap (as it will be the case in NA), or initiate the understanding of the CLCA systems in the LAC countries. Activities under this output are as follows:

#### **Activities:**

- Ac. 1.1.1. Engage stakeholder and conduct rapid appraisal.
- Ac. 1.1.2. Develop integrated improved crop management systems. Through the generation of empirical evidence (especially on-farm) and its discussion with the different actors within the innovation system, improved crop management systems will be developed based on minimum soil disturbances, crop residue and manure management and cropping systems diversification.
- Ac. 1.1.3. Fine-tune crop residue use in different geographies and socioeconomic environments Crop residue is a key element in CLCA systems and locally adapted improved crop residue management in relation to soil fertility and livestock feeding will be developed with special attention to be paid to both women in male-headed households and women in women-headed households.
- Ac. 1.1.4. Advocate alternative feeding systems and livestock enterprises. The first phase in North Africa came up with alternative feeding systems solely based or integrating forages at the farm level. However, grazing strategies need to be put within the system by looking at the outside farm (rangeland-forests- agro-industrial by-products). In addition, Phase 1 of the project has identified the opportunity to increase feed availability for livestock, primarily through sown fodder (such as oats and vetch in North Africa). This presents significant opportunities to increase the carrying capacity of livestock. Rather than animals wasting energy through the open grazing of pastures (under a labour intensive shepherding system), the further development and promotion of small-scale farm feedlots needs to be examined. Under this system, livestock are predominantly fed conserved fodder (such as the high quality oats-vetch mix in NA) strategically supplemented with concentrates and/or agro-industrial by-products, whilst periodic grazing occurs at strategic periods (such as strip grazing of sown oat-vetch pastures during the early to mid-growth stages of fodder crops, and for short intensive periods in stubbles following the cereal harvest).
- Ac. 1.1.5. Develop financially viable business models for no-till service provision enterprises. The objective of this activity is to support the development of innovative business models and business plans suitable for small entrepreneurs willing to invest in machinery service delivery. Given that one of the major problems of CA in North Africa is related to the high costs of speeders, an effective and profitable business model where both service providers and farmers can respectively achieve motivating benefits and reduced costs will certainly be of great support for the rural CA communities in the study areas.

**Output 1.2.:** Increased water use efficiency in rainfed and irrigated systems, and reduction of erosion in soils with steep slopes. This output consists of a suite of pertinent soil and water conservation practices (SWC) (including no-till and residue management), identified and promoted for different agro-ecologies in LAC and NA countries, and appropriate for different types of farming systems.

This output relates mainly to the long term benefits of integrated CLCA systems on natural resources, in particular soil health and water use efficiency. The efficient use of these resources is extremely important in ensuring the productivity and sustainable intensification of these CLCA systems. Activities under this output can be listed as follows:

**Activities:**

- Ac. 1.2.1. Reduce irrigated water use in CLCA systems; optimizing *in-situ* water use in rainfed systems. The objective of this activity is to ensure that the developed CLCA packages in the framework of this project would also have strong potential to improve the use of irrigation water in the areas where supplementary irrigation is used by farmers to support their crops. This includes research on possible CLCA practices which allow to better manage soil moisture over time, and generate enhanced results in terms of crop yields. Some preliminary work about this issue was done in Algeria in the framework of the CLCA system. More focus on this issue will be considered under this activity in the relevant countries.
- Ac. 1.2.2. Reduce erosion in soils with steep slopes. The objective of this activity is to quantify the soil runoff and other erosion parameters of the different CLCA options which will be investigated in the framework of the current project. In order to be able to conduct a fair assessment of the economic vs environmental trade-offs of the suggested CLCA techniques, information about environmental externalities (mostly erosion) will need to be generated and shared as an input for other modelling activities.

**Subcomponent 1.2: Appropriate system development methodology, including evaluations of costs, benefits and market viability, to support wider adoption and decision-making**

**Output 1.3:** Comprehensive trade-off models between competing uses for crop residue biomass developed and simplified for wider use.

This output aims at developing comprehensive modelling tools which allow for integrated assessment of the different CLCA options proposed for uptake. The tools will take into consideration the different components of the CLCA system as well as the types of interactions existing among them. Both socioeconomic (including gender implications) and environmental consequences, and opportunities of CLCA systems will be considered. Based on these comprehensive models, the project will also provide simplified tools for wider use and analysis of CLCA trade-offs by local NARES. This output will have the following activities:

- Ac. 1.3.1. Develop and apply comprehensive trade-off models and tools to assess the technical feasibility, economic viability, and environmental performance of integrated CLCA farming systems. The objective of this activity is to capitalise on the socioeconomic and technical outputs issued from the other technical activities and use the available information to build a bio-economic model which can be used to simulate both farmers behaviour and effects of the different CLCA techniques (scenarios of crops-livestock integration) on the economic farm performances as well as on the environmental degradation (or remediation). Both economic theory models and biophysical (crop growth and livestock) models will be deployed in the framework of this activity.
- Ac.1.3.2. Analyse costs and benefits as well as the market viability of the proposed CLCA practices. Costs and benefits of the different CLCA practices will determine their potential for large-scale adoption. The objective of this activity will be to develop comprehensive costs and benefits sheets providing accurate estimates of the different financial implications of the generated CLCA practices in the framework of this project. These will also provide CBR under different scenarios of crops and livestock integration, in order to determine equilibrium points financially achievable by different categories of farmers.
- Ac. 1.3.3. Discuss results from farm-level trade off models with local partners and simplification of models for wider use. Results from both previous activities needs to be validated and cross checked with farmers and other actors within the innovation system in order to verify their accuracy and robustness. In this activity, a series of meetings and focus groups with farmers will be organized to present the results of our modelling and consider further inputs from farmers (and other relevant stakeholders) to improve the quality of our CLCA scenarios, as well as the overall objective of the modelling exercise. Farm modelling is usually based on the optimization of a set of farmers' objectives. Such

focus groups will help us to define these objectives in an accurate manner and ensure relevance of our research outputs.

- Ac. 1.3.4. Identify women's (both women-headed households and women in male-headed households) decision making constraints and develop opportunities to effective CLCA adoption in order to develop gender-sensitive large-scale adoption strategy (which can be used as an input to the KM strategy). How women are affected by CA adoption remains largely unknown, particularly in terms of decision-making, integration into extension networks, and labour deployment (Beuchelt and Badstue, 2013; Farnworth et al. 2015). The project activities will address this gap. As such, efforts will be made to simultaneously target women farmers and inform the extension system and policy makers, as well as other NGO and civil society partners on the best approaches for targeting women farmers through context-specific interventions (Birner et al. 2008)

**Output 1.4:** Appropriate monitoring and evaluation frameworks are established.

- Ac.1.4.1. Establish appropriate monitoring and evaluation frameworks which will be used across the different project activities (under both components 1 and 2).

***Component 2: Development of a delivery system/participatory farmer-led extension system to accelerate adoption***

Outputs and activities within this component deal with the implementation of the innovation system model and a KM strategy in a way to ensure the design, development, and use of an effective delivery system for locally-adapted CLCA systems and practices. Building on the long and productive history of ICARDA and CIMMYT in the development and promotion of CA in NA and LAC, and on the recent experience of ICARDA in terms of developing management practices of CLCA systems, this component aims at defining clear milestones for the upscaling of existing CLCA knowledge.

**Output 2.1:** Contextually relevant processes for enhancing broad uptake of conservation agriculture – different from traditional (linear) processes of technology transfer - are refined in Tunisia (from a previous engagement), adapted and fine-tuned in both Algeria and Latin America (Bolivia and Nicaragua), through participatory processes for agricultural innovation.

**Activities:**

- Ac. 2.1.1. Develop and implement a road map –based on previous CLCA initiatives by ICARDA and CIMMYT– for large-scale adoption of CA within dryland crop livestock environments

**Output 2.2:** Effective delivery systems for machinery, agronomic and livestock services through facilitation of access to finance, private investment and public-private partnerships.

**Activities:**

- Ac. 2.2.1. Develop and test a framework for effective rural advisory and service provision for machinery, agronomic and livestock services with special emphasis on participation of rural youth n.
- Ac.2.2.2 To fine-tune and implement a gender/youth sensitive KM strategy of the project by developing a network of on-field, multiscale testing and validation sites, and multi-level capacities to manage interventions from field to food through the integration of scaling partners.

More description of the activities under this component can be found in the KM strategy; annex 5 of this document.

## IV. PROJECT IMPLEMENTATION ARRANGEMENTS

### A. Implementing Organisations

In-field implementation of research activities within NA will be undertaken by ICARDA, while CIMMYT will lead on activities in LAC. Activities in-country will be undertaken through collaborative agreements with local, national and regional organizations, as well as private actors and civil society institutions including, but not limited to:

*Institut Technique des Grandes Cultures (ITGC, Algeria)* is a public administrative institution (établissement public à caractère administrative – EPA) under the Ministry of Agriculture and Rural Development (MADR). With a focus on scientific and technical work, ITGC is responsible for the development of the field crop sector, in order to meet the country's food needs in the face of food crises and climate risks.

*Institut National des Grandes Cultures (INGC, Tunisia)* is a non-administrative public institution that sits under the supervision of the Ministry of Agriculture and Water Resources and Fisheries. INGC's work focuses on improving the yields of arable crops in terms of production quality and changing needs. In particular, the work focuses on: applied research in the field crop sector; technical supervision of producers; defining new cultivation practices and techniques adapted to the cultivation of irrigated cereals; registration of cereal varieties and pesticide production and management; training and information days; and the preparation of technical documentation.

*Office de l'Elevage et des Pâturages (OEP, Tunisia)* is a public non-administrative enterprise (entreprise publique à caractère non administrative – EPNA) under the aegis of the Ministry of Agriculture. OEP is responsible for the development and promotion of the livestock and pastoral sector, and provides an advisory and technical support role for public authorities.

*Institut National de Recherche Agronomique (INRAT, Tunisia)* is a public institution under the aegis of the Ministry of Agriculture and Environment and is affiliated to the IRESA (Institution of Agricultural Research and Higher Education). The work undertaken at INRAT includes research and program development for crop and livestock production, including the gathering of genetic resources; development of plant varieties and improving animal breeds; improving production systems; and undertaking research into the conservation, processing, and use of agricultural products. The Institute also contributes to technology transfer and extension.

*Institut Technique des Elevages (ITELV, Algiers, Algeria)* has an overall mission for the implementation of national programs in order to support agricultural development and the production of high-quality biological plant and animal materials. In particular, ITELV is responsible for supporting technical development and implementing work related to breeding techniques; valorization of livestock production; the establishment and growth of genetic improvement in animal species; the development of food and feeding systems; the implementation of technical performance monitoring models; and management of the national mandate related to this work.

*Instituto Nacional de Innovación Agropecuaria y Forestal (INIAF, Bolivia)* is a decentralized institution of public law and is the national guiding authority for the National Agricultural and Forest Innovation System (SNIAF), which regulates and implements research, extension, technical assistance, transfer of agricultural, livestock and forestry technology, management of genetic resources of agrobiodiversity, and seed certification services.

*Fundación PROINPA, (Bolivia)* promotes the conservation and sustainable use of natural resources, sovereignty and food security, and the competitiveness of agricultural products for the benefit of producers, the agricultural sector and society as a whole through research and technological innovation.

*Consejo Agropecuario Centroamericano (CAC)* is an organization within the Central American Integration System (SICA), composed of the Ministries of Agriculture from the following countries: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama and the Dominican Republic. CAC is governed by a council of Ministers, a Regional Technical Committee and Regional Technical Subcommittees on specific issues, as well as a Technical and Administrative Support Secretariat based in Costa Rica. CAC also serves as an institutional mechanism for dialogue between regional organizations in the private sector and for coordination with regional and international technical and financial cooperation organizations that support the sector at the regional level.



*Servicio de Información Mesoamericano sobre Agricultura Sostenible (SIMAS, Nicaragua)* a non-profit civil association committed to building democratic and sustainable livelihoods for the rural world. The organization helps to strengthen the processes of innovation and communication for the development learning capacities of rural communities, helping to strengthen sustainable agriculture and rural human development, as well as improved gender and generational equity.

To facilitate this work, as the lead recipient and grant holder for this work, ICARDA will undertake a sub-contract with CIMMYT and will also be responsible for the sub-contracting to partners in Algeria and Tunisia, while CIMMYT will directly sub-contract partners in Bolivia and Nicaragua. This sub-contracting arrangement will be undertaken in a way that effectively reflect the needs of the national partner institutions in both regions. These contracts will be developed in accordance both with internal institutional procedures (ICARDA and CIMMYT), best practice from the CGIAR and IFAD recommended sub-granting procedures.

## **B. Project Management and Implementation Period**

The proposed duration for this initiative is four years, with inception in January 2018 and a project end-date of December 2021. This proposed work will be managed by a steering committee (SC) that will oversee the operational, strategic and financial progress of the project and provide guidelines and support for improvement of project work on a yearly basis.

**TORs of the Steering Committee:** The steering committee will be responsible, year-on-year, to support the preparation of project work and implementation, technical and financial monitoring and evaluation. Following Y1 of implementation, the Steering Committee meeting will also serve as an opportunity for reflection on the previous year(s)' work and realignment of project work as required. Prior to the project inception workshop, TORs will be drafted for the SC and its participants with the expectation of them being ratified and implemented as a first or second item on the meeting agenda. These TORs will be reviewed on a yearly basis to ensure both the SC, and its members, respond to the needs of project work.

**Composition:** The proposed work will be undertaken by a steering committee comprised of representatives from ICARDA and CIMMYT (Chair and Co-chair, respectively), Representatives from NARES, farmer's organizations and other key project stakeholders from partner countries. IFAD representatives (PTA and CPMs from the participating countries) may be included as observers. The Chair and Co-chair will also serve as the focal point persons for the partners in NEN and LAC respectively.

**Work plan:** The work plan for the SC is reflected in the program management framework, with yearly project work plans and budgets being developed and confirmed in the first quarter of each calendar year. The SC will also lead the regional workshops (two to take place at the start of the project), to ensure cohesion across project regions. Throughout each project year, the SC will also meet virtually frequently to ensure the close following and integration of project work across the two regions.

## **C. Monitoring, Evaluation and Reporting**

Building on previous work undertaken in this area, similar mechanisms for monitoring and evaluation will be put into place. Underpinning the Monitoring and Evaluation work will be the monitoring, evaluation and learning (MEL) system that sits within the broader mandate of the CGIAR results-based management strategy. The tool is available here [<https://mel.cgiar.org/user/login>].

Building on work accomplished in the first phase of this project, and in addition to CIMMYT's work in long-term trials and on-farm adaptive trials, monitoring and evaluation will be underpinned by key success indicators underpinning the outputs outlined in this proposal. Key moments of reflection on outcomes and outputs of the work will be integrated into the yearly regional steering committee workshops to ensure that the work remains on target and moving towards positive outcomes for our stakeholders.

ICARDA and CIMMYT will undertake two external reviewing processes, at midway and final completion of the project.

## D. Indicative Work plan (including table showing timing of key activities)

The project activities with relation to the grant management or field implementation are spread over four years as shown in the following tentative work plan:

Program Management		2018				2019				2020				2021			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Steering Committee Formation and 1st Year Work plan and Budget SC Meeting		x															
Regional Inception Workshop		x									x						
Second Year Work plan and Budget SC Meeting						x											
Third Year Work plan and Budget SC Meeting										x							
Fourth Year Work plan and Budget SC Meeting														x			
Yearly Reports, M&E						x				x				x			
Final Project Report																	x
Analysis of program adoption and impacts conducted and reported																	x
<b>Component 1: Interaction and participatory research with integrated capacity development of key partners to fully implement and evaluate CLCA systems (mainly linked to outcomes 1 &amp; 2)</b>																	
<b>Output 1.1: An extended technical CLCA framework - to include crop production, stubble management, forage production, livestock and manure management resilient to shocks is developed and applied, taking into consideration farming systems and agro-ecological specificities as well as farmers' needs for sustainable livelihood development</b>																	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Ac.1.1.1.	Engage stakeholders and conduct rapid appraisal	x	x	x	x												
Ac.1.1.2.	Develop integrated improved crop management systems			x	x	x	x	X	x	x	x	X	x	x			
Ac.1.1.3.	Fine-tune crop residue use in different geographies and socioeconomic environments			x	x	x		X	x	x		X	x	x			
Ac.1.1.4.	Advocate alternative feeding systems and livestock enterprises			x	x		x	X	x		x	X	x			x	x
Ac.1.1.5.	Develop financially viable business models for no-till service provision enterprises		x	x	x	x						X	x	x		x	
<b>Output 1.2: Increased water use efficiency in rain fed and irrigated systems reduction of erosion in soils with steep slopes.</b>																	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Ac.1.2.1.	Reduce irrigated water use in CLCA systems; optimizing in-situ water use in rain fed systems		x	x	x		x	x	x		x	X	x		x	x	x
Ac.1.2.2.	Reduce erosion in soils with steep slopes			x	x	x		x	x	x		X	x	x		x	x
<b>Output 1.3: Comprehensive trade-off models between competing uses for crop residue biomass developed and simplified for wider use</b>																	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Ac.1.3.1.	Develop and apply comprehensive trade-off models and tools to assess the technical feasibility, economic viability and environmental performance of integrated CLCA farming systems.		x	x	x	x					x	X	x				
Ac.1.3.2.	Analyse costs and benefits as well as the market viability of the proposed CLCA practices				x	x	x				x	X	x	x		x	x
Ac.1.3.3.	Discuss results from farm level trade off models with local partners and simplification of models for wider use										x	X	x	x		x	x
Ac.1.3.4.	Identify women's (both women-headed households and women in male-headed households) decision-making constraints and develop opportunities to effective CLCA adoption in order to develop gender-sensitive large-scale adoption strategy	x	x	x	x	X	x	x	x	x	x	x	x	x	x	x	
<b>Output 1.4: Appropriate monitoring and evaluation frameworks are established</b>																	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Ac.1.4.1.	Establish appropriate monitoring and evaluation frameworks	x	x	x	x	X	x	x	x	x	x	x	x	x	x	x	x
<b>Component 2: Development of a delivery system/participatory farmer-led extension system for accelerating of adoption (mainly linked to outcome 3)</b>																	
<b>Output 2.1: Contextually relevant processes for enhancing broad uptake of conservation agriculture – different from traditional (linear) processes of technology transfer - are refined in Tunisia (from a previous engagement), adapted and fine-tuned in both Algeria and Latin America (Bolivia and Nicaragua), through participatory processes</b>																	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Ac.2.1.1.	Ac.2.1.1. Develop and implement a road map –based on previous CLCA initiatives by ICARDA and CIMMYT– for large-scale adoption of CA within dryland crop livestock environments		x	x	x	X	x	x	x	x	x	x	x	x	x	x	x



Output 2.2: Effective delivery systems for machinery, agronomic and livestock services through facilitation of access to finance, private investment and public-private partnerships.																	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Ac.2.2.1.	Ac.2.2.1 Develop and test a framework for effective rural advisory and service provision for machinery, agronomic and livestock services with special emphasis on young rural			x	x	X	x	x	x	x	x	x	x	x	x	x	x
Ac.2.2.2.	Ac.2.2.2 To fine-tune and implement a gender/youth sensitive KM strategy of the project by developing a network of on-field, multiscale testing and validation sites, and multi-level capacities to manage interventions from field to food through the integration of scaling partners.			x	x	X	x	x	x	x	x	x	x	x	x	x	x

## V. SUPERVISION, KNOWLEDGE MANAGEMENT AND SCALING UP

### A. Supervision Arrangements

IFAD will undertake field supervision missions combined as much as possible with the supervision missions for the related loan projects, participate in project inception and review meetings, and provide recommendations as needed to insure intended results are achieved.

ICARDA would be responsible for overall coordination and technical and financial management of the project through its offices in Amman, Tunis and Cairo, and its headquarters in Beirut. The project's progress will be monitored by a Steering Committee (SC), which will meet once a year. The SC will consist of donors' and ICARDA's representatives, as well as national coordinators.

Annual regional technical coordination meetings will be held in one of the participating countries during which the scientists (including those of ICARDA), extension agents and growers will review the results of the past year and finalize the work plan for the next year.

Although ICARDA is responsible for the project's activities, ensuring an efficient implementation, resolving performance problems and obstacles as they arise and enhancing the achievement of development objectives, impacts and sustainability will be the shared concern of all partners. In this respect, ICARDA and CIMMYT ensure a coordination function under flagship 4 of CRP Wheat to which the project is aligned and this is a forum where interactions between the 2 regions (NA and LAC) can be debated.

The project outcomes, findings and success stories will be published through a series of publications including booklets, leaflets, posters, articles, as well as ICARDA annual reports and the Center's website. Moreover, all project outputs will be published in open access (<https://cgspace.cgiar.org/>) to enhance their dissemination among stakeholders. All these publications will provide visibility to IFAD investment projects in the project target areas (North Africa and Latin America and Caribbean), to other national initiatives regarding expansion of conservation agricultures in livestock production areas and to policy makers in target countries. ICARDA and CIMMYT will work together to involve IFAD CPM's and IFAD technical officers in generating joint publications.

### B. Summary of Knowledge Management plan

The objective of the project's Knowledge Management (KM) Component is to develop a process of generating relevant information and closing adoption gaps through developing, testing and disseminating CLCA information packages to smallholders (men and women) via participatory instruments and processes. KM products will also support the upscaling of field successes, best practices and lessons learned through the production of evidence-based recommendations for farmers, policy briefs for decision makers, and CLCA guidelines to innovation systems, including extension and advisory services. The KM approach will be based on principles of the innovation systems model (see section V C) including participatory research, capacity building, knowledge exchange, and dissemination events. Special attention will be paid to identify women's (both women-headed households and women in male-headed households) decision-making constraints and obstacles preventing effective CLCA adoption.

Interaction and participatory research, through the innovation system model, will help to: define and understand needs and aspirations of smallholder farmers and agro-pastoralists in the project target areas; and create KM models, products, and tools for data gathering, analysis and dissemination of CLCA KM products that are culturally adapted, specific to the needs of the target populations and able to fill information gaps. Differences in CLCA technology uptake and benefits between female and male or young and old smallholders will be integrated in the knowledge products of this project. Printed material, online tools for data collection, analysis and sharing and E-learning will be used to generate and disseminate regionalized and relevant knowledge. Gender responsive guidelines for extension and advisory services will be developed into online training modules and uploaded to relevant online portals, such as WOCAT (World Overview of Conservation Approaches and Technologies), or the Global Forum for Rural Advisory Services, an IFAD supported organization focused on advocacy for an enabling policy environment and appropriate investments in rural advisory services globally.

Since KM plays a supportive role in the scaling-up process, this component also includes the development of a plan for documenting progress, lessons learned, and impacts of scaling-up efforts, and will ensure that the added-value information is fed back to key stakeholders (small farmers, farmers' groups, rural women institutions, local researchers, and public and private partners) and used to support decision making towards both CLCA practices and project management/agrifood system corrections. In all participating countries, the project will compare the different KM models, products and tools, and carefully document results in terms of cost-effectiveness and scalability and build recommendations and guidelines to decision makers and facilitators of CLCA in the participating countries and beyond. Also, in terms of KM, South-South interactions will be formalised in order to share experiences and strengthen locally adapted KM systems for different project sites. For full details on the south-south exchange and collaboration to be facilitated by the project as part of the KM Plan see section II C above.

The project will also use the evidence generated in the project to ensure all project stakeholders are knowledgeable on the latest research findings, and link it to policy recommendations and frameworks via policy briefs to decision makers in participating countries, using institutional publishing and editorial lines to integrate CLCA topics on- and off-line, and by involving CIMMYT/ICARDA management and science leaders in policy events.

### C. Scaling up and sustainability

Following IFAD's operational framework for scaling up result, this project will implement a scaling strategy where evidence-based results will be adapted through participatory research embedded in the innovation system model. This model is based on networks that promote innovation, technology transfer and the adoption of CLCA sustainable agronomic practices among small-scale farmers. It gives special emphasis to the local context and local actors by promoting a regional focus through innovation hubs, which are spaces for meeting and knowledge exchange, technologies, agronomic practices and information through action-oriented and participatory research, and which foster interaction among the different actors that make up the agrifood chain.

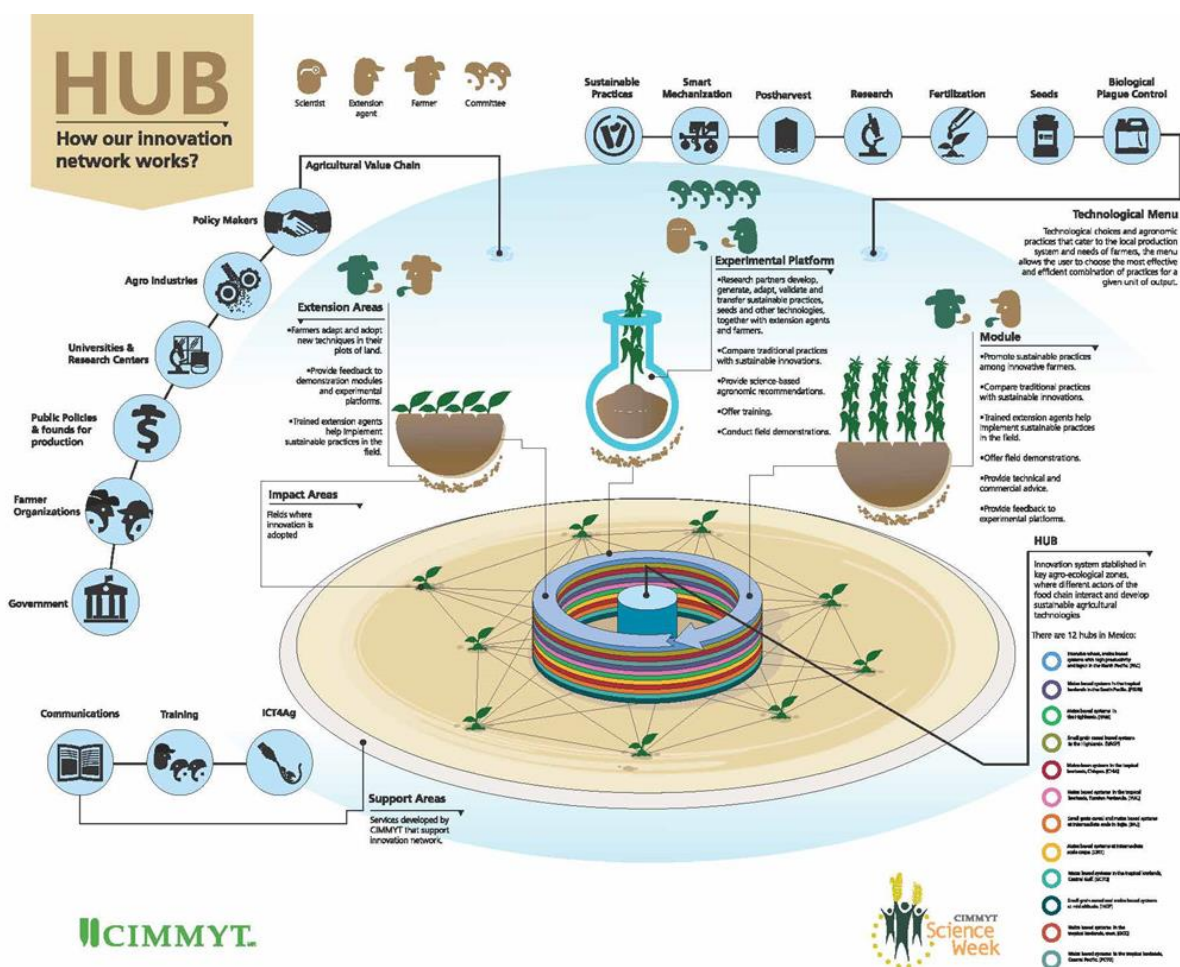
One first pathway for scaling up will be these innovation hubs. The word hub refers to the center that holds together the spokes of a wheel; it also refers to the central connection for managing digital information, as well as the center of an activity or network. A hub can be defined as "an innovation system comprised by different actors in an agrifood chain of an agroecological region who work together to promote sustainable agriculture in maize- and wheat-based production systems." This concept includes three key components: the agro-ecological region, the actors' network, and the network's infrastructure.

At least 1 hub will be implemented in each country through the following steps: (i) evaluation of the region, the existing networks, its infrastructure and its actors; (ii) identification of key stakeholders, interview potential collaborators and hold strategic meetings with local actors; (iii) selection of priority areas and identification of organizations and farmers who will work with the hub; and (iv) development of a joint work plan (Martínez-Cruz, 2014). These steps include the design and planning, installation and establishment of hub operations. Hub operations imply three stages: (i) establishing and following up on the network infrastructure; (ii) training extension agents and farmers; and (iii) creating, promoting and strengthening local innovation systems.

The network infrastructure includes on-station trials or testing platforms, demonstration modules, and areas of extension and impact. **Testing platforms** are for conducting research, developing regional knowledge, data and information, as well as developing and adapting production systems, cropping practices and the most appropriate technologies for a given agro-ecological area. They have the support of a group of scientific organizations that are responsible for conducting research, such as universities, research centers or institutions that have the necessary human, technological, financial resources and infrastructure to ensure research continuity over time (5-10 years). **Demonstration modules** are representative spaces established on the farm of an innovative farmer or collaborative leader. They include an innovation plot where innovative farmers, along with certified technical advisors, implement an innovation or recommended a practice that is developed, adapted and confirmed by the testing platform, and a check plot where the crop is conventionally managed using practices representative of the agro-ecological area where the module is located. These modules allow farmers to compare the results of the new technologies with those obtained using conventional practices. At the modules, cooperating farmers share their experiences with neighboring farmers during demonstrations, exchange tours or through information bulletins or farmer-to-farmer

communications to encourage them to adopt the new technologies and generate extension and/or impact areas. Demonstration modules constantly provide feedback to the testing platforms to confirm and/or adapt the technologies they develop and, in some cases, they help conduct experiments and research that cannot be conducted by the platforms. **Extension areas** are all the areas where farmers practice, on their own plots, best practices and innovations they learned at the demonstration modules. **Impact areas** are farms where the farmers, through some type of contact with the project (demonstrations, exchange tours, information bulletins, farmer-to-farmer communications, etc.), have implemented and adopted some innovation or technology.

In addition to the physical infrastructure, each hub will establish links with local actors and interact with them by providing a range of services, including: (i) training activities for extension agents and farmers; (ii) communication and dissemination strategies to introduce the program, its methodologies and technologies; (iii) pilot projects in collaboration with the private and public sectors; and (iv) information and communication technologies, such as an Electronic Logbook, video and SMS content for data gathering, analysis and sharing. The following figure shows the model including different stakeholders, processes, technologies and supporting tools.



This scaling strategy will enable the project to adapt, expand, and support successful practices, models and knowledge, so that they can leverage resources and partners to deliver larger results for a greater number of rural poor in a sustainable way, this project will implement a scaling strategy where evidence-based results will serve as an incentive in engaging development partners and rural communities, and obtaining additional resources from governments and/or the private sector. It will also focus on the notion that country programmes will use their leveraging capacity to ensure that impact continues beyond project life, and will seek to ensure that the needed policy framework, and in order to demonstrate that the financial/fiscal resources are in place to bring results to a larger scale in a sustainable manner, an innovation system strategy will be put in place. National programs, forthcoming IFAD investment projects, and empowered and federated community institutions that

reach sufficient scale, will also be engaged to support the knowledge generation strategy in order to pursue scalability.

The scaling pathways for locally adaptable, more sustainable, CLCA systems and practices will be based on the physical infrastructure and the capacity building with actors and institutions. This means, initially, making improved systems and practices available, testing them in regional platforms or trials, and promoting them to extension agents, who in turn, will disseminate them to rural communities through pilot on-farm demonstration/validation plots. Further dissemination will be achieved through farmer-to-farmer practices and will be materialized through extension and impact areas. Additionally, the sustainability of the initiative will be assured through the strengthening of local innovation systems, which represent a continuum of actors, including civil society organizations (NGOs, CBOs, cooperatives, etc.), as well as private service providers (e.g. machinery service providers, as well as agents along the value chain that provide integrated services; better described in Annex 5). Efforts will also include capacity building of, and collaboration with, other projects, working with the government, NGOs, and local Institutions in the target regions. Moreover, a participatory approach which results in co-learning, co-ownership and selection of appropriate and profitable CLCA systems and practices will ensure sustainability. Involving such a broad variety of actors will help mitigate any unforeseen risks.

The figure below describes the planned scaling pathway based on IFAD’s scaling up framework, its key drivers, and the expected dynamic. It has been designed as a horizontal replication, where knowledge, models and practices can be adapted and replicated from one geographical area to another, specifically, aiming to address south-south cooperation. This pathway also contemplates a vertical scaling up, by moving from local engagement to nationwide commitments, through existing efforts in each targeted area.

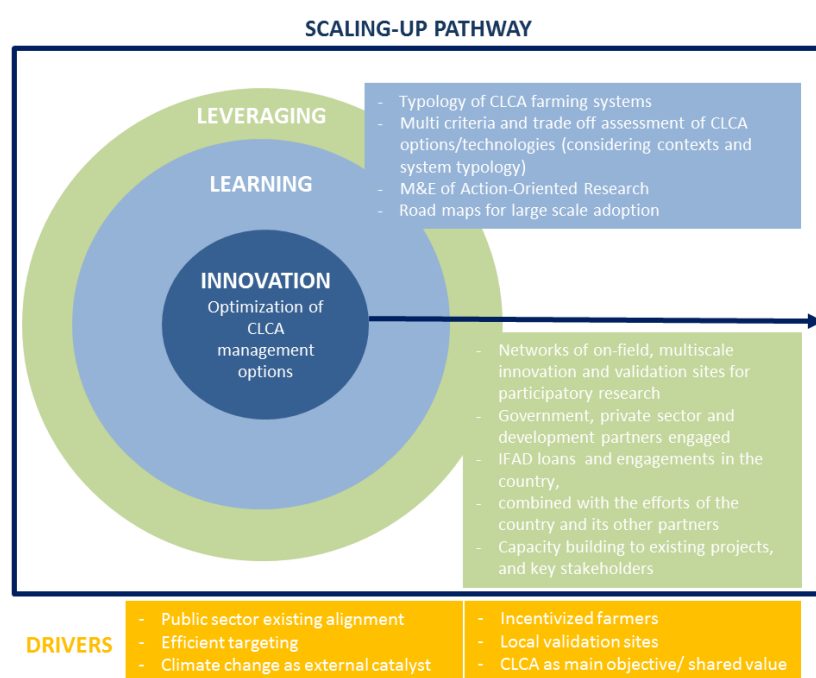


Figure 2. Planned scaling pathway, drivers, and expected dynamics.

A systematic review of the relevance, effectiveness, efficiency, and impact of the project and its scaling pathway will be conducted, mainly to ensure that the generated knowledge can support decision-making processes for both farmers and key stakeholders regarding the adoption of technologies and innovations, and for scaling up strategies. Some of the topics that will be addressed along the systematic review for scaling will be clarity and credibility of the model, ownership and relevance for local needs, the effectiveness and efficiency of innovation in terms of sustainable agriculture, funding opportunities, and alignment and linkages of policy and investments with government and development agency agendas.



## VI. PROJECT COSTS AND FINANCING

The overall cost of the project is estimated at US\$ 3 million, over four years (2018-2021), of which IFAD will finance US\$ 2.5 million, disbursed over tranches based on minimum expenditure thresholds of the advances being met governed by performance-based tranches. It is proposed that IFAD funding is supplemented by a contribution of US\$ 0.5 million from NARES in the form of in-kind contributions. Budget distribution by component shows a good balance between Component 1 (biophysical field work; 1.2 million) and component 2 (the scaling tools and KM; 1 million). A detailed excel file, showing how the mentioned budget will be distribution by activity, has also been prepared.

The counterpart financing refers here to the in-kind contributions from NARES only. It is difficult for participating CG centers to have in-kind financial contributions because of the reform and establishment of CRP's in 2011 when core funding contributions of CGIAR member countries and organizations were mostly shifted to W1/W2 contributions i.e. funding the CRP's and no longer as core funding to centres. Nevertheless, both CIMMYT and ICARDA have projects and activities in the target project geography which could benefit the current project. Several scientists, who will be involved in this project, work on developing tools, methodologies and technologies within other projects and initiatives, which could be directly relevant to the current CLCA project. As a result, although not included in the budget table, part of the staff time of these scientists, as well as some of the products, methodologies and tools prepared and developed through other projects, could be considered as a form of contribution to the overall resources of this proposal. Some of these examples relate to:

- Work on identifying fragile areas where CA could generate maximum impacts and gain public support in Tunisia, within the framework of Global Futures and Strategic Foresights; CRP PIM (involving ICARDA Economic modeller).
- Testing the best extension delivery systems of technologies in the barley-sheep belt in Central Tunisia, including feed options and barley cropping (involving ICARDA livestock scientist and agronomist).
- The Moroccan government – ICARDA initiative to promote CA in Morocco (involving an ICARDA agronomist and a Soil Conservation/Land Management Specialist).
- Development of research protocols and locally adaptable CA interventions have been developed and consolidated in the context of Mexico and Guatemala. Such work will speed the establishment of research platforms and extension areas in Nicaragua and Bolivia.
- Training tools and knowledge products in Spanish have been developed for different typologies of farmers that can be immediately reproduced and used in the project off-setting creation and production costs. CIMMYT's current work on farm level models, including crop and livestock interactions and multi-criteria assessments of alternatives (in Mexico and Guatemala, but also in South Asia and Eastern and Southern Africa), will be expanded and adapted to local conditions in Bolivia and Nicaragua, speeding up the process of data collection and analysis.
- Yield gap analysis is currently being undertaken in Guatemala, Honduras, El Salvador and Nicaragua that will generate information directly relevant for the project.
- CIMMYT's work on the development and application of generic M&E ICT-based tools, as well as analytical protocols, will be expanded and swiftly implemented in the Nicaragua and Bolivia sites.

The project includes co-financing contributions from NARES which in the experience of ICARDA and CYMMIT are substantial and often underestimated. The contribution include staff salaries, the presence of staff in the field to follow up and monitor implementation of activities, access to vehicles, and access to laboratories and experimental land. As this project is a phase II continuation of the recently terminated CLCA project, participating NARES in NA have already received equipment (machinery, field and lab experimental equipment), which will be redeployed to implement phase II.

Nevertheless, this second phase is (i) a scaling project reaching out much higher numbers of farmers over a larger geographic area in both North African countries which means that further support to the national implementing centres in terms of equipment and machinery is yet needed and (ii) will address in greater detail the interface between cropping and livestock which raises the need for new types of field equipment. As also was the case in Mexico and Guatemala, CIMMYT will make the project activities sufficiently useful and attractive to NAREs so that similar investments can be expected (e.g. trial sites, vehicles and staff time).

It is acknowledged that innovation systems are relatively expensive to set-up and maintain. As a result, efforts will be made to attract additional funding to support the innovation system through small

scale grants, linking with IFAD projects and investment initiatives within the countries of engagement, as well as through private investments from members within the platform (predominantly actors along the value chain, as well as accessing working capital through linkages with financial institutions). Furthermore, ICARDA will continue its efforts to raise funding supporting the crop-livestock producers in the fragile areas of North Africa. Facilitation of activities within the innovation system will play an important role in this regard, and both ICARDA and CIMMYT will leverage learning that has been accumulated through experience from the first round of the CG research programmes, wherein a number of innovation platforms have been set-up and piloted (Schut et al., 2017).

The financing plan by component and category of expenditure is reported in the following two tables.

## Budget distribution by Component.

Components		Year 1	Year 2	Year 3	Year 4	Total IFAD Grant Amount (in US\$)	Total co-financing amount (in US\$)	Total project amount
							National partners in 4 countries (NARES)	
Component 1: Adaptive research with integrated capacity development of key partners to fully implement and evaluate CLCA systems	Subcomponent 1.1: CLCA system optimization (filling research gaps and full implementation and integration of technologies developed by both centres for the two regions)	267,554	259,230	205,227	151,827	883,838	248500	1,132,338
	Subcomponent 1.2: Appropriate system development methodology to support adoption and decision-making	85,645	105,967	106,264	85,214	383,090	84700	467,790
Component 2: Development of a delivery system/participatory farmer-led extension system for accelerating adoption		133,213	123,509	143,899	99,954	500,575	78800	579,375
Cross-cutting knowledge management component		134,573	140,943	112,753	112,747	501,016	88000	589,016
Sub-totals		620,985	629,649	568,143	449,742	2,268,519	500,000	2,768,519
Overheads		49,679	50,372	45,392	36,038	181,481		181,481
CSP		13,688	13,878	12,506	9,928	50,000		50,000
<b>Totals</b>		<b>684,352</b>	<b>693,899</b>	<b>626,041</b>	<b>495,708</b>	<b>2,500,000</b>	<b>500,000</b>	<b>3,000,000</b>



**Budget distribution by category of expenditure: Project Financing Plan for IFAD Grant with Co-financing<sup>2</sup>, US\$**

<b>Allowed category of expenditure</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>IFAD</b>	<b>Co-financing</b>
Salaries and allowances	158,000	157,000	150,000	154,000	619,000	293,000
Consultancies	8,000	20,000	10,000	12,000	50,000	
Travel and allowances (incl. hotels)	47,000	58,000	60,000	34,000	199,000	43,000
<a href="#">Workshops[4]</a>	65,000	19,000	42,000	62,000	188,000	3,000
Training	21,000	30,000	63,000	18,000	132,000	
<a href="#">Operating costs[1]</a>	63,000	58,000	53,000	53,000	227,000	48,000
<a href="#">Equipment and materials[2]</a>	106,000	77,000	45,000	7,000	235,000	61,000
<a href="#">Goods, services and inputs[3]</a>	153,000	211,000	144,000	110,000	618,000	52,000
<b><a href="#">Total of Direct Cost</a></b>	<b>621,000</b>	<b>630,000</b>	<b>567,000</b>	<b>450,000</b>	<b>2,268,000</b>	<b>500,000</b>
Management fees/overheads	50,000	50,000	46,000	36,000	182,000	
2% CSP	14,000	14,000	12,000	10,000	50,000	
<b>Total</b>	<b>685,000</b>	<b>694,000</b>	<b>625,000</b>	<b>496,000</b>	<b>2,500,000</b>	<b>500,000</b>

[1] Operating costs: includes rentals, utilities, cleaning, repairs and all that is used to 'operate' the project. Please define kinds of underlying expenditures foreseen in this category to be incl. in Schedule 2 of IFAD's Grant Agreement.

[2] Equipment & Material could include: PCs, phones, machinery for the use of the project.

[3] Could include seeds, fertilizers.

[4] Includes dinners, meeting room rentals and equipment exclusively for the workshop.

<sup>2</sup> The co-financing is coming from NARES in the 4 participating countries

## VII. FINANCIAL GOVERNANCE

### A. Procurement Procedures for Goods, Services and Human Resources

ICARDA's procurement procedures follow the policies and [procedures laid out in the CGIAR Procurement of Goods, Works, and Services Guidelines](#).

### B. Financial Management System, including accounting specifications

ICARDA has a Finance Department, which is responsible for all financial transactions and records and for financial reporting to donors. ICARDA operates according to the CGIAR Accounting Policies and Reporting Practices, which comply with the International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB). Each grant received by ICARDA is managed through a separate internal budget account. ICARDA uses the One Corporate System (OCS) for controlling all accounts, and maintaining records of all transactions (invoices). Monthly reports are provided to the project managers for review. All reports to donors are prepared and signed by an ICARDA authorized Finance Officer.

Certified interim financial reports will be submitted to IFAD on a semi-annual basis within 45 days of the reporting period, and include the expenditure transaction lists due to the implementing agencies involved (both CIMMYT and NARES/implementing partners).

In regards to project auditing, a project-specific audit report will be submitted to IFAD following prior agreement to an audit TOR. This is in response to the substantial sub-granting (to CIMMYT and then to NARES/implementing partners) that will be undertaken as a part of agreed grant activities.

To further support the requirement for effective project auditing, a fixed assets register will be prepared upon project approval. This will also outline the distribution of equipment purchased with project funds upon project completion.

### C. Disbursements, Financial Reporting, and Audit Arrangements

The Center employed an internal auditor and an external auditor (currently Ernst and Young), which conducts an annual audit and report which is submitted to ICARDA's management and Board of Trustees. ICARDA's financial year is the calendar year (1 January-31 December). The external audit report is normally completed by April of the following year. Annual audit reports for individual projects can be prepared separately if required.

Disbursements will be made through the World Bank acting as Trustee for this grant. In this regard, the initial advance payment will be 75% of the Annual Working Plan and Budget (AWPB). Following this, subsequent disbursements will request 25% of the previous year (remaining 25%, if applicable) and 75% of the following year's advance upon approval of relevant AWPB and subject to the provision of a Statement of Expenditure (SOE) justifying at least 75% of the previous year's advance

## VIII. IMPLEMENTATION RISKS AND MANAGEMENT

Project implementation may face a number of challenges that are enumerated below as potential risks to implementation.

*Risk 1: Resistance of NARES, farmers and R&D partners to the CLCA approach.* Planning for the dissemination of the CLCA approach will be carefully undertaken, with ICARDA and CIMMYT working closely with national IFAD country programmes and investment projects partners to ensure support at the national policy level. Science-based evidence and lessons' learned from the previous CLCA project in North Africa and other similar initiatives will be used as a basis for effective communication of the approach and to ensure country buy-in. Participatory approaches will be applied early on in the project to develop and involve farmers,

local extension services, and other relevant stakeholders to reduce the risk of low adoption of CLCA packages. The project team will organize a series of virtual consultations with the stakeholders listed above in order to identify clear target audience, goals, objectives, and potential risks.

*Risk 2: Lack of support from private sector and service providers.* To deal with this risk, this constraint will be considered during the development and optimization of the CLCA systems, in such a way that service providers will be identified and mobilised as part of the development of the technological packages and awareness rising.

*Risk 3: Political instability hampering project implementation.* Selected countries were chosen based on several criteria related to the overall objectives of the project (ease of scaling-up in Algeria and Tunisia where a first phase has already been implemented; the highly marginal systems in Bolivia and Nicaragua where the CLCA system has a great potential to positively impact NRM), including the selection of politically stable countries. Nevertheless, the CLCA project team will develop an alternative implementation strategy in case of major political instability and social unrest which could occur during the period of the project implementation (although not expected).

*Risk 4: Extension support for tested good practices cannot be established and cannot be sustained without continuous support from external sources.* To mitigate this risk, the project will be strongly linked to on-going IFAD investment projects that provide strong support and strengthen existing extension services. Furthermore, the project will adopt community-based and community-driven processes with the aim to strengthen local governance (through innovation systems) over natural resources and components of the CLCA system.

*Risk 5: Natural disasters or disease outbreaks can affect crops and flocks negatively.* Although possibilities to mitigate these natural risks are limited, if they occur the incurred losses and impacts will be integrated in the ex-post impact assessment and the system modelling approaches. This system approach will also highlight unintended consequences.

*Risk 6: Financial risk due to exchange rate fluctuation:* Financial risks related to exchange rates and other relevant financial fluctuations are well under control since both ICARDA and CIMMYT already have adequate personnel and mechanisms to manage such events.

To ensure a collective understanding of risks to the project, and implications, a risk mitigation plan will be developed during the project inception phase in consultation with the relevant stakeholders to ensure a collective understanding. This will facilitate that any risks, that could impact on the planned cost, schedule and performance parameters of the project, are acknowledged from the start, and measures taken to track and monitor the progress, alongside appropriate mitigation actions.

## **ANNEXES**

1. Annex 1. Results-based logical framework
2. Annex 2. Literature cited
3. Annex 3. Supporting documentation to grant design document
4. Annex 4. Financial management questionnaire
5. Annex 5. KM extended strategy
6. Annex 6. Procurement Plan for the field equipment of the project

## Annex 1. Results Based logical framework

	Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
<b>Goal</b>	To sustainably increase production and enhance the resilience of smallholder crop-livestock production systems to climate variability in drylands in NEN and LAC countries.	Yield gaps of cereals, legumes and livestock are reduced by increased resources use efficiency (e.g. water and nutrients). Crop yield gaps reduced by as much as 40% and livestock offtake rate by 30% in both rain fed and irrigated systems.	Database. Project generated data and reports; results of the IFAD loans and government programmes; national statistics.  Agreement. Collaborative agreements signed between consortium and NARES for strengthening local technical capacities and scaling activities.	Normal weather patterns and absence of calamities along the duration of project.  Political stability of countries where the project is implemented.  Continued funding from other linked projects (matching funds).
<b>Objectives</b>	To develop in participation with smallholder crop-livestock producers contextually relevant and gender sensitive processes for enhancing the broad uptake of CA within integrated CL systems in drylands in LAC and NEN regions	Beneficiaries of existing and new IFAD as well as other government initiatives have been exposed and have applied technologies and practices promoted by the project through 4 country-based formative research and interactive KM models, tools and products.  Regulatory systems and policies in four countries have been informed on newly gained knowledge via evidence based policy briefs and bottom-up information flow.  Four national innovation systems (one in each target countries) have been engaged in developing avenues for enhancing an enabling institutional and economic environment to facilitate broad uptake of CLCA technologies.  Farmers, men and women, have adopted agronomic and biomass management practices resulting in a better management of natural resources for more productive and sustainable use (relative increase of 3-5% of soil organic matter depending on soil type and aridity conditions and 10-20% increase in water use efficiency).  Farmers, men and women, have adopted fodder, cover crops, and alternative feed resources leading to increased feed availability with ultimate increases in livestock productivity.  Farmers, men and women, in the intervention areas of NA and LAC are exposed to an efficient, integrated and economically viable CLCA system achieving increased productivity, and most importantly, stabilization in cereal yields, as well as reduction in production costs (20-40% reduction in energy cost, 15-20% reduction in other production costs).	Report. Reports identifying the presence and participation of IFAD project representatives and key officials from local, regional and national government organs at key meetings, consultations, workshops and policy dialogue events.  Report. Capacity development and training reports on partners' and beneficiaries' participation in formative research activities.  Database and related narrative report. Project data from on-farm trials and long-term on-station trials; NARES project reports; technology adoption assessment and participatory video.  Report. Records of effective innovation systems, with installed infrastructure and members who meet regularly and who jointly uncover opportunities for enhancing equitable access to machinery services and to technical knowledge (project reports and testimonials) through private investment potential and/or public-private partnerships in the provision of machinery services and technical support.	Normal weather patterns and absence of calamities along the duration of project.  Political stability of countries where the project is implemented.  Public support to the strategic plans promoting CA and red meat value chain are no longer maintained.  Economic environment and market situations allow profitable private investment in machinery acquisition and service provision; and public-private partnerships are strong and with public resources.
	<b>Outcome 1:</b> 3,000 smallholder farmers reached (at least 40% women and 20% youth below 35 years) and 2100 have directly adopted CLCA farming systems (in 4 target countries) with increased production and improved cost-benefits that are optimized by filling research and development gaps;			Targeted farmers open to innovate in land and their flocks management under CLCA

<p><b>Output 1.1:</b> An extended technical CLCA framework (including crop production, stubble management, forage production, livestock and manure management resilient to shocks) is developed and applied, taking into consideration farming systems and agro-ecological specificities as well as farmers' needs for sustainable livelihood development.</p>	<p>In NA, 20% increase in barley and wheat yields across a total area of 60,000 ha (11,000 irrigated) through effective integrated CA packages; 30 % increase of forage biomass which will support small-scale farm feedlots.</p> <p>In NA at least 25% increase in live weight growth and 20% increase in fertility of sheep directly and indirectly impacting 220,000 heads.</p> <p>In LAC grain and straw yield of cropping systems increased by 15% through CA management, including agroforestry and soil and water conservation practices. Fodder and cover crops adopted by farmers leading to 25% increased fodder availability with ultimate increase of livestock productivity by 15%.</p> <p>In both regions, 25% of total beneficiaries (900 farmers), 50 extension staff, and 30 scientists participate in knowledge sharing on CLCA practice management.</p>	<p>Databases and related narrative reports. Project data from on-farm trials and on-station trials; NARES project reports; results of the IFAD loans and government programmes.</p>	<p>system and collaborate with the project team for on-farm trials and data collection.</p> <p>Public institutions for the development of CA and livestock as well as farmers-led extension services welcome extension of integrated CLCA system into the cereal-livestock systems of NA and LAC.</p> <p>At least 2 average rainfall years during the project period to achieve meaningful measures.</p>
<p><b>Output 1.2:</b> Increased water use efficiency in rainfed and irrigated systems and reduction of erosion in soils with steep slopes.</p>	<p>A suite of pertinent soil and water conservation practices (SWC) (including no-till and residue management) identified and promoted for different agro-ecologies in LAC countries and appropriate for different types of farming systems.</p>		
<p><b>Outcome 2:</b> At least 6 NARES, in addition to decision makers, NGO's and IFAD loan project partners in the 4 target countries have adopted tools and methodologies for reliable decision making and guide investments on contextually appropriate CLCA systems.</p>			
<p><b>Output 1.3:</b> Comprehensive trade-off models between competing uses for crop residue biomass developed and simplified for wider use</p>	<p>Detailed analysis of costs, benefits, and market viability of CLCA options.</p> <p>Farm level models for multi-criteria assessment and trade off analysis for different farm types and agro-ecologies, one in each target countries of NA and LAC developed, calibrated and available for use by NARES.</p> <p>Simplified simulation tools of optimised CLCA systems for wider use by IFAD loan projects and local development partners.</p>	<p>Database and models. Project generated data, national statistics, CLCA farms typology and manuals for model calibration and use.</p>	<p>NARES capabilities and support are available for integrated assessment of CLCA systems Institutional will within NARES and collaborators to embark in integrated assessment of CLCA and robust M&amp;E&amp;L strategies</p>
<p><b>Output 1.4:</b> Appropriate monitoring and evaluation frameworks are established</p>	<p>ITC-based M&amp;E tools developed and used by NARES and collaborators. Algorithms for data storage, classification and analysis developed.</p> <p>4 qualitative studies on farmers' (men and women) existing knowledge, attitudes and practices are carried out with 150 participants in each country.</p> <p>4 participatory evaluations are conducted with 150 farmers (men and women) in each country.</p> <p>Feedback indicators from decision makers and private market actors are collected via survey monkey on a national level and shared between the countries.</p>	<p>Training report. Collaborators and NARES appropriation of M&amp;E and qualitative research tools.</p> <p>Database. Project generated data.</p> <p>Protocol. FGD protocols and transcripts.</p> <p>Report. FGD content analysis report.</p> <p>Report. Use/stakeholder survey report.</p>	
<p><b>Outcome 3:</b> At least 4 effective agricultural innovation systems - 1 in each implementation area of the 4 target countries - are coalesced in order to foster broad uptake of conservation agriculture practices within integrated dryland crop-livestock production systems</p>		<p>Local manufacturers willing to collaborate in the design of alternative mechanization and</p>	

	<p><b>Output 2.1:</b> Contextually relevant processes for enhancing broad uptake of conservation agriculture – different from traditional (linear) processes of technology transfer - are refined in Tunisia (from a previous engagement), adapted and fine-tuned in both Algeria and Latin America (Bolivia and Nicaragua), through participatory processes</p>	<p>Context relevant knowledge and learning centred structures are facilitated (innovation systems, learning centres, multi-stakeholder workshops) – at least two in each country of engagement – within which IFAD’s toolkits on household methodologies (HHMs) are tested for proof of concept and adaptation in context.</p>	<p>Manual involving CPM's and IFAD country technical staff. CLCA technologies guidance/manual (for management and implementation of CLCA practices in different agro-ecologies).</p> <p>ISI paper (with IFAD collaboration) One cross country/ cross region synthesis paper on approaches and process uncovered in coalescing innovation systems for CLCA within marginal production environments.</p>	<p>business models for broad uptake of CLCA practices and technologies.</p> <p>Political will to allow local manufacturers and service providers to perform their business.</p> <p>Local institutional infrastructure and will to host knowledge repositories on CLCA.</p>
	<p><b>Output 2.2:</b> Effective delivery systems for machinery, agronomic and livestock services through facilitation of access to finance, private investment and public-private partnerships.</p>	<p>Extension/advisory services providing efficient and effective support to the beneficiaries allowing for a successful implementation of the framework.</p> <p>CLCA guidelines for extension and advisory services are developed with partner organizations.</p> <p>Private machinery service providers are supported through facilitation in access conventional finance sources, and where required through public-private partnerships in order to foster investment in machinery required to facilitate broad uptake of CA.</p> <p>500 farmers, 50 extension staff, 20 scientists, 2 NGOs, and 2 traders per country participating in courses, workshops and field days in relation to CLCA</p> <p>At least 1 training platform and 10 validation sites and 10 scaling partners using methodologies and knowledge generated in the project per country.</p> <p>At least 2 research questions per country formulated that feed back to Component 1.</p>	<p>Database and related narrative reports. Project documents, survey tools and data generated including field books per site and lists of participants</p> <p>Training report. Number of farmers and stakeholders receiving training and services</p> <p>Policy brief. CLCA adoption rates indicator</p>	
<p>Key Activities</p>	<p><b>Ac. 1.1.1.</b> Engage stakeholders and conduct rapid appraisal</p>	<p>Setup and facilitation of learning/knowledge centres (2 in each country).</p> <p>Identification of the initial entry point for the learning/knowledge centres to engage, agreement on the facilitator for the centres, roles and responsibilities clearly identified and pledges made on contributions (resources, time, etc.).</p> <p>Key actors within the innovation system (private, public, research, civil society) identified and engaged.</p> <p>Rapid assessments (surveys if applicable) in countries which were not part of the previous CLCA engagement.</p>		<p>Public support to CLCA is maintained and advantageous conditions for farmers and farmers’ cooperatives to adopt ZT technologies and practices.</p> <p>Continuous commitment of the national partners.</p> <p>Continuous funding of the project activities (matching funds).</p>

	<b>Ac. 1.1.2.</b> Develop integrated improved crop management system	<p>Integrated weed management packages combining seeder type, rotations and grazing fine-tuned and out-scaled.</p> <p>Screening of best adapted cereal varieties for different agro-ecologies and CLCA systems in sites of NA and LAC.</p> <p>Deployment of scale appropriate mechanization options and planting platform trials with collaborators and NARES.</p>	<p>Reports and protocols. Established project on-farm and on-station trials.</p>	<p>Private sector collaborates and strongly involve in the project.</p> <p>Machinery service providers invest in scale appropriate mechanization.</p> <p>Farmers collaborate.</p> <p>Governments invest in CLCA institutionalization and training, and enact favourable policies.</p> <p>Policy makers are responsive to new innovations and technologies; private sector becomes interested in investing.</p> <p>Local and national stakeholders understand and fully cooperate in the implementation of the effective rural advisory services framework plan.</p>
	<b>Ac. 1.1.3.</b> Fine-tune crop residue use in different geographies and socioeconomic environments	<p>At least 3 stubble grazing tools to optimize stubble grazing in the cereal-sheep belts in NA are developed and utilized by mixed crops-livestock small farmers.</p> <p>2 field experiments per country in LAC established standardize amount of residue retention to achieve 30% residue cover or cover crop growing depending of soil fertility and moisture conditions</p> <p>Within the centres for knowledge and learning, options sought for introducing non-traditional forms of ground cover (tree pruning waste, compost, etc.) in areas where there is intense competition for crop residue as ground cover with livestock feeding needs (linked to activities 3.1.2, 3.2.2, 3.2.3).</p>	<p>Database. Project data from on-farm trials and on-station long-term trials.</p>	
	<b>Ac. 1.1.4.</b> Advocate alternative feeding systems and livestock enterprises	<p>Feeding systems to support livestock enterprises during the feed-scarce seasons integrating stubbles, forages, alternatives feed sources and concentrates are developed using a participatory research and development approach (linked to activities 3.1.2 and 3.2.1).</p>	<p>Review paper. Flocks management protocols owned by farmers adopting CLCA systems.</p> <p>Review paper. Feeding systems alternatives documented in research articles, manuals and other communication materials.</p>	
	<b>Ac. 1.1.5.</b> Develop financially viable business models for no-till service provision enterprises	<p>CIMMYT's scale appropriate mechanization prototypes tested/validated in Target countries in LAC.</p> <p>Financially viable business plans for machinery service delivery tailored to small farmers in NA developed and shared with project partners.</p>	<p>Database. Key informant interviews, project surveys. Report. Business plans for no till service provision.</p>	
	<b>Ac. 1.2.1.</b> Reduce irrigated water use in CLCA systems; optimizing in-situ water use in rain fed systems	<p>Water use efficiency (WUE; kg/m<sup>3</sup>) in rain fed systems is increased by 20% in the project intervention areas in NA and LAC. In the irrigated areas of the project intervention sites in Algeria water is reduced by 30%.</p>	<p>Report and protocols. Established project on-farm and on-station long term trials.</p>	
	<b>Ac. 1.2.2.</b> Reduce erosion in soils with steep slopes	<p>Soil erosion and run-off is reduced by 50% through no-till, residue management and other soil and water conservation practices.</p>	<p>Database and related narrative report. Established project on-farm and on-station trials.</p>	
	<b>Ac. 1.3.1.</b> Develop and apply comprehensive trade-off models and tools to assess the technical feasibility, economic viability and environmental performance of integrated CLCA farming systems.	<p>At least one decision making model/tool based on multi-criteria and trade off analysis for CLCA systems (one in each country in NA and LAC) parametrised and available for use by NARES and collaborators.</p>	<p>ISI research paper (with collaboration of IFAD). Project documents, manuals and models/tools deployed.</p>	
	<b>Ac. 1.3.2.</b> Analyse costs and benefits as well as the market viability of the proposed CLCA practices	<p>Cost and benefit sheets developed for the identified CLCA options with clear emphasis on their respective financial and market viability for smallholder farmers.</p> <p>Value chain analysis of different CLCA products and by-products and market opportunities and constraints for integrated and sustainable CLCA farming systems</p>	<p>Database and narrative report. Project documents including cost and benefit sheets of different CLCA options.</p>	



<p><b>Ac. 1.3.3.</b> Discuss results from farm level trade off models with local partners and simplification of models for wider use.</p>	<p>The developed model for trade-off analysis shared and tested with local partners (including farmers, NARES, local extension services, etc.), and potential feedbacks considered for further improvements.</p>	<p>Short technical note. Project documents, manuals and models/tools tested, improved, and re-deployed.</p>
<p>Identify women's (both women-headed households and women in male-headed households) decision-making constraints and develop opportunities to effective CLCA adoption in order to develop gender-sensitive large-scale adoption strategy</p>		
<p><b>Ac. 1.4.1.</b> Establish appropriate monitoring and evaluation frameworks</p>	<p>Annual M&amp;E reports developed in each country.</p>	<p>Report. Project documents, manuals and models/tools, technical reports, publications, etc. are deployed.</p>
<p><b>Ac.2.1.1.</b> Develop and implement a road map – based on previous CLCA initiatives by ICARDA and CIMMYT– for large-scale adoption of CA within dryland crop livestock environments.</p>	<p>Drivers identified to inform the road map definition for scaling out technologies and processes developed within the life of the project initiative.</p> <p>4 CLCA practices and technology inventory reports (one in each country).</p> <p>Guidelines for appropriate CLCA best practices and technology use for different agro-ecologies.</p> <p>Policy notes (one per country) on recommendations for fostering a more enabling policy and economic environment for broad uptake of CLCA.</p> <p>Briefing notes on production CLCA practices and technologies developed within the life of the initiative (English and in each of the local languages within the countries of engagement).</p> <p>One yearly face-to-face learning event is organized per country and per year.</p> <p>One online learning event is organized virtually for all four participating countries.</p>	<p>Report. Inventory reports per country.</p> <p>Briefs. Policy and briefing notes.</p> <p>Report. CLCA road map progress and final reports including technical report on best bet CLCA technologies (one in each country).</p> <p>Report. Learning events reports.</p>

<p><b>Ac.2.2.1</b> Develop and test a framework for effective rural advisory and service provision for machinery, agronomic and livestock services with special emphasis on young rural</p>	<p>Diagnosis of actual rural advisory services in the respective countries.</p> <p>Framework for designing, analysing and implementing effective pluralistic agricultural advisory services co-developed with stakeholders in each country.</p> <p>Extension/advisory services providing efficient and effective support to the beneficiaries allowing for a successful implementation of the framework.</p> <p>CLCA guidelines for extension and advisory services are developed with partner organizations.</p> <p>Private machinery service providers are supported through facilitation in access conventional finance sources, and where required through public-private partnerships in order to foster investment in machinery required to facilitate broad uptake of CA.</p> <p>NARES and advisory services participate in formative research activities.</p> <p>Two web based five-day training on CLCA guidelines for NARES and advisory services, one in French/Arabic for three NARES in Tunisia and Algeria, and one in Spanish for two NARES in Bolivia and Nicaragua are implemented.</p>	<p>Report. Rural advisory services diagnostic document</p> <p>Report. Rural advisory services framework document</p> <p>Report. Progress and final reports on rural advisory services per country</p>	
<p><b>Ac.2.2.2</b> To fine-tune and implement a gender/youth sensitive KM strategy of the project by developing a network of on-field, multiscale testing and validation sites, and multi-level capacities to manage interventions from field to food through the integration of scaling partners.</p>	<p>500 farmers, 50 extension staff, 20 scientists, 2 NGOs, and 2 traders per country participating in courses, workshops and field days in relation to CLCA At least 1 training platform and 10 validation sites per country installed and operating Participatory research on CLCA is implemented throughout the delivery process.</p> <p>CLCA trainings take place for farmers, extension agents and stakeholders.</p> <p>Farmers' feedback indicators available and shared with different project stakeholders.</p> <p>Knowledge products generated for different stakeholders disseminated through relevant channels-</p> <p>Exchange visits from non-beneficiary farmers' groups, extension staff, and interested stakeholders.</p> <p>Three NARES researchers trained for MSc degree during project implementation in respective countries.</p> <p>Identified plan to integrate efforts and knowledge of the project into the existing IFAD scaling-up methodology.</p> <p>At least 10 scaling partners using methodologies and knowledge generated in the project.</p> <p>At least 2 research questions per country formulated that feed back to Component 1.</p> <p>At least 10 scaling partners using a system for field-based data generation.</p> <p>Project evidence for success stories, best practices and lessons learnt available ICT-based survey tools and data analysis within an M&amp;E framework developed and used by collaborators including women involvement in CLCA systems as well as the effect of enhanced integration between crop and livestock on women and other marginal groups.</p> <p>A strategy for empowerment of women under CLCA systems is developed, and disseminated.</p>	<p>Database and related narrative reports. Project documents, survey tools and data generated including field books per site and lists of participants in courses.</p> <p>Database and related narrative reports. Evidence of each knowledge product generated including SMS, video, printed material and online dissemination tools.</p> <p>MSc thesis. MSc degree/thesis obtained within the activities of the project.</p> <p>Report. KM and scaling-up progress and final reports.</p> <p>Report. Report on projects funded by complementary investment from IFAD loans at the country level using methodologies and knowledge generated in the project.</p> <p>Brief. CLCA adoption rates indicator</p>	<p>Projects funded by complementary investment from IFAD loans at the country level are willing to interact and collaborate with the project.</p>

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### **Annex 3. Supporting Documentation.**

See appended files.

## Annex 4. SUPPORTING FINANCIAL AND LEGAL DOCUMENTATION

1. *Legal documentation*, including evidence of legal status and capacity, registration and good standing, evidence of the authority of the person who will sign the agreement for the recipient. The recipient must demonstrate that it has been registered and that its registration is current (evidence of good standing no more than 90 days old), that it has the corporate capacity to enter into the Grant Agreement, accept the Grant and carry out the Project, and that the person signing the agreement has the necessary authorization. Different jurisdictions have different laws, so the actual documentation required may vary. As a rule, the recipient must be registered in an IFAD Member State. Legal documentation is not required for United Nations agencies or CGIAR institutions.

X Yes                       No                       Not applicable

2. *Financial documentation*, including the name/address of independent auditors, institutional audited financial statements and audit reports. Audit reports must be signed and dated on Auditor's letterhead. For recipients that have not previously received an IFAD grant, two years' audited financial statements and audit reports will be required. Otherwise, one year is sufficient. Financial documentation is not required for UN agencies or CGIAR institutions. For those recipients that have not been required to prepare audit reports, or whose audit reports have been qualified, the financial management questionnaire must be submitted (attachment 8 of the Grant Procedures).

X Yes                       No                       Not applicable

3. *Recipient's procurement procedures*. If the recipient does not have its own procedures, a declaration that it will use IFAD's Procurement Guidelines or other procedures acceptable to the Fund will suffice

X Yes                       No                       Not applicable

4. *Procurement Plan*. The Procurement Plan, defined in paragraph 6.1(xiii) of the IFAD General Provisions, should be prepared where goods and services worth more than US\$ 200,000 are to be procured under the project (attachment 16 of the Grant Procedures). The Grant Sponsor should review the Procurement Plan to ensure, among other things, that the grant is not used to purchase equipment or other durable goods if it would be economically appropriate to lease the equipment instead and that such goods or equipment are suitable and required for the effective implementation of the project.

X Yes                       No                       Not applicable

5. Declaration by the recipient (email is acceptable) that it has read and accepted the Project Description and Project Budget. It is mandatory that the recipient has reviewed the Project Description and Project Budget before the Grant Package is submitted for Approval.

X Yes                       No                       Not applicable

6. Declaration by the recipient (email is acceptable) that it has read and accepted IFAD's Standard Large/Small Grant Agreement. The model Grant Agreement is available on the IFAD website, in attachment 14 of the Grant Procedures.

X Yes                       No                       Not applicable

CFS Clearance: \_\_\_\_\_ Date: \_\_\_\_\_

1. LEG Clearance: \_\_\_\_\_ Dates: \_\_\_\_\_

## **Annex 5. Knowledge Management (KM) and dissemination of guidelines for CLCA practices**

### **Executive Summary**

The objective of the project's Knowledge Management (KM) Component is to develop a process of generating relevant information and closing adoption gaps through developing, testing and disseminating CLCA information packages to smallholders (men and women) via participatory instruments and processes, as well as upscaling field successes, best practices and lessons learned through the production of evidence-based recommendations for farmers, policy briefs for decision makers, and CLCA guidelines to innovation systems, including extension and advisory services. The KM approach will be based on principles of the innovation systems model described along this project, including participatory research, capacity building, knowledge exchange, and dissemination events. Special attention will be paid to identify women's (both women-headed households and women in male-headed households) decision-making constraints and obstacles preventing effective CLCA adoption.

Interaction and participatory research, through the innovation system model, will help to define and understand farmers, smallholders and agro-pastoralists in the project target areas, and to create KM models, products, and tools for data gathering, analysis and dissemination on CLCA knowledge, that is culturally adapted, specific to the needs of the target populations and able to fill information gaps. Differences in CLCA technology uptake and benefits between female and male or young and old smallholders will be integrated in the knowledge products of this project. Printed material, online tools for data collection, analysis and sharing and E-learning will be used to generate regionalized and relevant knowledge. Gender responsive guidelines for extension and advisory services will be developed into online training modules and uploaded to relevant online portals, such as WOCAT (World Overview of Conservation Approaches and Technologies), or the Global Forum for Rural Advisory Services, an IFAD supported organization focused on advocacy for an enabling policy environment and appropriate investments in rural advisory services globally.

Since KM plays a supportive role in the scaling-up process, this component also includes the development of a plan for documenting progress, lessons learned, and impacts of scaling-up efforts, and will ensure that the added-value information is fed back to key stakeholders (small farmers, farmers' groups, rural women institutions, local researchers, and public and private partners) and used to support decision making towards both CLCA practices and project management/agrifood system corrections. In all participating countries, the project will compare the different KM models, products and tools, and carefully document results in terms of cost-effectiveness and scalability, so we would be able to develop, analyse and compare interactive forms of low-cost scalable KM models and build recommendations and guidelines to decision makers and facilitators of CLCA in the participating countries and beyond. Also, in terms of KM, South-South interactions will be formalised in order to share experiences and strengthen locally adapted KM systems for different project sites.

The project will also use the evidence generated in the project to ensure all project stakeholders are knowledgeable on the latest research findings, and link it to policy recommendations and frameworks via policy briefs to decision makers in participating countries, using institutional publishing and editorial lines to integrate CLCA topics on- and off-line, and by involving CIMMYT/ICARDA management and science leaders in policy events.

## **1. Background and Situational Analysis**

### **1.1 Justification**

Research on innovative agricultural technologies for the crop-livestock conservation agriculture (CLCA) in semi-arid MENA countries has been implemented successfully in the IFAD/ICARDA CLCA project phase I and by CIMMYT in Mexico (MasAgro) and Guatemala (BuenaMilpa-USAID).



However, the adoption of the innovative CLCA management and technology tools remains low. The adoption gap is not only observed in the case of CLCA innovation adoption in the MENA region, but is typical for agricultural system innovations and natural resource management technologies in developing countries in general (Noltze et al. 2012; DFID 2014; Syngenta Foundation 2015). The KM approach will intend to bridge this information and adoption gap via appropriate technology, knowledge products, and innovation systems, embedded in participatory research approaches and scaling', which will **enable beneficiaries to actively participate in the knowledge sharing and adoption process** with key local stakeholders. .

## **1.2 Analysis of relevant current research and review of literature on adoption**

For more than two decades, the dominant questions related to agricultural extension and advisory services were **focused on organizational and financial aspects** of agricultural extension or cross-cutting issues like gender participation or empowerment (IFPRI 2006, Nagel 2003). There is also some research that has analyzed the impacts of specific extension approaches in particular contexts (Noltze et al. 2012; Davis et al. 2012; Gildemacher and Mur 2012).

While such analysis helps to evaluate whether or not a specific approach was successful in a particular context, it does not include **how the approach could be further improved** or how alternative approaches would have performed in the same situation. They also do not link successful adoption processes to other regions or look into South-South learning.

In Tunisia and Algeria, research on agricultural extension and advisory approaches has hardly been carried out. The situation in the LAC countries is traditionally a bit different, as enabling policy environments have allowed smallholders to develop organizational levels for enhanced cooperation and **knowledge sharing from farmer to farmer, as well as from farmer to decision makers**. CIMMYT had carried out research on the scaling of complex, multi-component technologies, such as conservation agriculture in Mexico and Guatemala (Camacho et al., 2016; Hellin et al., 2016; Diaz-Jose et al., 2016); and successfully documented it via organizations such as IICA and the OECD Strategic Agenda (Getting it Right).

In the MENA region, individual extension approaches are sometimes evaluated in terms of their effectiveness (Davis et al. 2012; Gildemacher and Mur 2012), a comparative assessment of different approaches in a cross-regional approach, but as a result, the question of how to **design low cost scalable technology transfer strategies** has not yet been sufficiently addressed in the contemporary research.

Given past experiences, **widespread adoption of new technologies among smallholders will not happen without improved agricultural innovation models and knowledge management**. This is especially true for system technologies that are often quite knowledge-intensive. Unless we critically analyse and carefully manage the implementation of approaches that are presently being favoured, we will simply repeat mistakes from the past at the expense of the farming communities (Nagel 2003).

## **1.3 Innovation Systems as an option for participatory research, knowledge sharing and scalability**

CIMMYT has developed a strategy for creating, validating and scaling sustainable agrifood systems, based on networks that promote innovation, technology transfer and the adoption of improved seeds of maize, wheat and associated crops, as well as sustainable agronomic practices among small-scale farmers, which is ready to be applied to several value chains. The model gives special emphasis to the local context and local actors by promoting a regional focus through innovation hubs, which are spaces for meeting and knowledge exchange, technology, agronomic practices and information through action-oriented and participatory research, and which foster interaction among the different actors that make up the agrifood chain.

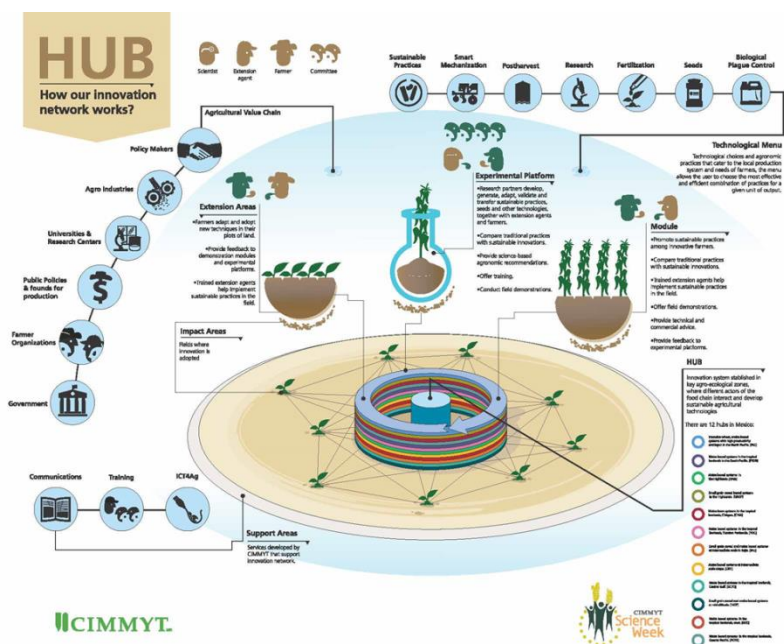
The word hub refers to the center that holds together the spokes of a wheel; it also refers to the central connection for managing digital information, as well as the center of an activity or network. A

hub can be defined as “an innovation systems comprised by different actors in an agrifood chain of an agroecological region who work together to promote sustainable agriculture in maize- and wheat-based production systems.” This concept includes three key components: the agro-ecological region, the actors’ network, and the network’s infrastructure.

This concept was developed during the 2000s by CIMMYT researchers looking for a solution to the low adoption of conservation agriculture; however, it has evolved to align with innovation systems theories. To implement a hub in a particular region, these steps are followed: (i) evaluate the region, its infrastructure and its actors; (ii) identify likely collaborators, interview potential collaborators and hold strategic meetings with local actors; (iii) select priority areas and identify organizations and farmers who will work with the hub; and (iv) develop a joint work plan (Martínez-Cruz, 2014). These steps include the design and planning, installation and establishment of hub operations. Hub operations imply three stages: (i) establishing and following up on its components; (ii) training extension agents and farmers; and (iii) creating, promoting and strengthening local innovation systems.

Each hub has its own physical infrastructure that includes on-station trials and testing platforms, demonstration modules, and areas of extension and impact. **Testing platforms** are for conducting research, developing regional knowledge, data and information, as well as developing and adapting production systems, cropping practices and the most appropriate technologies for a given agro-ecological area. They have the support of a group of scientific organizations that are responsible for conducting research, such as universities, research centers or institutions that have the necessary human, technological, financial resources and infrastructure to ensure research continuity over time (5-10 years). **Demonstration modules** are representative spaces established on the farm of an innovative farmer or collaborative leader. They include an innovation plot where innovative farmers, along with certified technical advisors, implement an innovation or recommended a practice that is developed, adapted and confirmed by the testing platform, and a check plot where the crop is conventionally managed using practices representative of the agro-ecological area where the module is located. These modules allow farmers to compare the results of the new technologies with those obtained using conventional practices. At the modules, cooperating farmers share their experiences with neighboring farmers during demonstrations, exchange tours or through information bulletins or farmer-to-farmer communications to encourage them to adopt the new technologies and generate extension and/or impact areas. Demonstration modules constantly provide feedback to the testing platforms to confirm and/or adapt the technologies they develop and, in some cases, they help conduct experiments and research that cannot be conducted by the platforms. **Extension areas** are all the areas where farmers practice, on their own plots, best practices and innovations they learned at the demonstration modules. **Impact areas** are farms where the farmers, through some type of contact with the project (demonstrations, exchange tours, information bulletins, farmer-to-farmer communications, etc.), have implemented and adopted some innovation or technology.

In every innovation hub links with local actors are established by providing a range of services, including: (i) establishing hub infrastructure for local and participatory research; (ii) training activities for extension agents and farmers; (iii) communication and dissemination strategies to introduce the program, its methodologies and technologies; (iv) pilot projects in collaboration with the private and public sectors; and (v) information and communication technologies, such as an Electronic Logbook, video and SMS content sharing. The following figure shows the model including different stakeholders, processes, technologies and supporting tools.



Following IFAD's operational framework for scaling up result, this project will implement a scaling strategy where evidence-based results will be adapted through participatory research embedded in the innovation system model. As stated before, the model is based on networks that promote innovation, technology transfer and the adoption of CLCA sustainable agronomic practices among small-scale farmers. It gives special emphasis to the local context and local actors by promoting a regional focus through innovation hubs, which are spaces for meeting and knowledge exchange, technology, agronomic practices and information through action-oriented and participatory research, and which foster interaction among the different actors that make up the agri-food chain.

## 2. CIMMYT/ICARDA experiences in technology and knowledge sharing in the target regions

In everyday practice, the CGIAR and NARES technology dissemination activities are often limited to the "field day approach", without having evidence-based approaches available on what else could be done to promote technology adoption for men and women. Working very closely with NARES represents an advantage for CGIAR Centers for enabling and sustaining knowledge sharing with scientists and smallholders. In the past, however, the CGIAR did not focus much on improving extension and advisory services, as it was primarily considered the task of the national systems (Nagel 2003). This has changed more recently in the CGIAR reform process with demonstrated impacts for smallholders and local communities being important M&E criteria. These changes within the CGIAR system have led to a larger focus on technology outreach. ICARDA uses the ADOPT software tool (CSIRO 2013) in order to evaluate and predict the likelihood level of adoption. CIMMYT has developed the "take it to the farmer" initiative, using the innovation system model, regional technology hubs and intensified partnerships with extension providers and agricultural services. The proposed project research is complementary to such initiatives, with rigorous inclusion of smallholders, men and women, and compares different approaches and evaluating their impacts with smallholders.

ICARDA has developed innovative agricultural technologies well adapted to Tunisia for the past 15 years (Haddad et al. 2007), together with INRAT (one of the NARES partners of the project). ICARDA has further started to work on improving technology transfer by analyzing and clarifying the roles of research, development services and smallholders' associations for improving technology transfer in WANA region (Nefzaoui et al. 2014).

In the AFESD/KFAED/BMGF-funded Arab Food Security Program, ICARDA has channelled information, besides traditional dissemination approaches, via smallholders' growing use of cell phones. In Tunisia and Sudan, information was disseminated via **text messages and WhatsApp applications** to allow smallholders to access technical information on appropriate production practices in real time and manage agronomic operations, such as water irrigation timely. Results recorded during the 2015-2016 cropping season in Tunisia showed that smallholders who followed the SMS technology in managing their irrigated **wheat crop increased their yield by more than 50%**.

CIMMYT, in collaboration with Universidad Autonoma de Chapingo, has undertaken a study comparing innovation system extension approaches in 20 different states of Mexico. The results showed that extension connected to innovation systems were around 10 times more effective in their reach. This research will be deepened to generate more understanding and influence the CLCA KM strategy.

In the same context, CIMMYT has developed digital technology transfer in Mexico, and estimates that this experience could be replicated in Bolivia and Nicaragua as well. CIMMYT has developed MasAgro Móvil, an agricultural information service for mobile devices, which was launched in 2012 with the support of the Mexican Ministry of Agriculture (SAGARPA). MasAgro Móvil provides subscribers with advice from a network of nearly 2,500 extension workers to promote sustainable farming practices based on conservation agriculture techniques. At present, CIMMYT is preparing the technicians for the task in hand through a train-the-trainer approach, whereby 100 extension workers are training 2,500 agronomists. This workforce will give specific advice to some 80,000 smallholders that are currently participating in MasAgro. The aim is to offer banking services and use mobile devices as tools for precision agriculture that help enhance sowing, irrigation, fertilizing, and harvesting procedures. Knowledge Management (KM) and dissemination of guidelines for CLCA practices activity plan.

### 3. CLCA KM strategy: Capacity building, M&E, learning and exchange

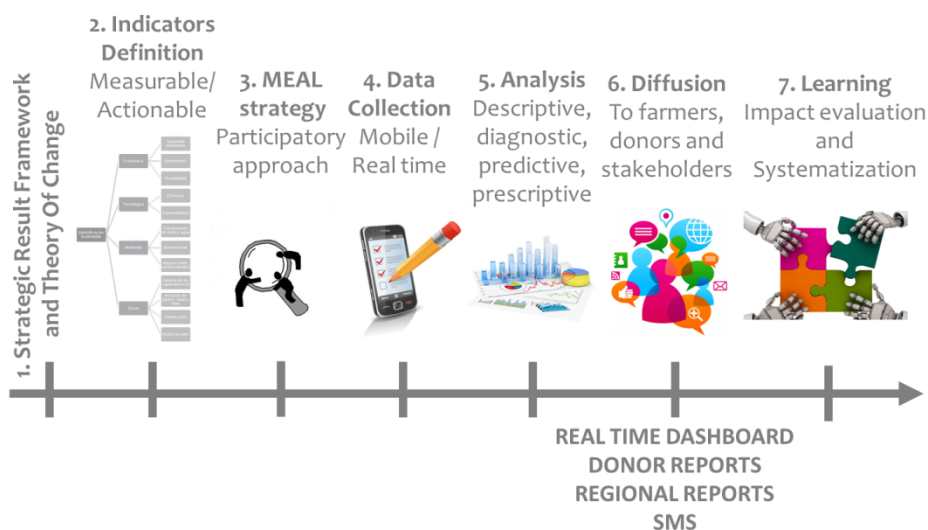
The agricultural extension systems of Tunisia, Algeria, Nicaragua and Bolivia have been in existence for decades. While elaborate in their administrative structure, they suffer from a number of conceptual weaknesses, in addition to limited working facilities and infrastructure. Advisory services by the private sector are still in a very early development stage.

The project will use a participatory capacity building approach that would bring closer relations between the beneficiaries, NARES, advisory services and other project facilitators, by **using a multiple-way knowledge exchange methodology leveraging from the network's infrastructure (Testing platforms, demonstration modules, and extension and impact areas)**.

Gender stereotyping in agricultural policy-making, innovation and knowledge sharing still persists. Extension services often view men as the "real smallholders" and relegate women to farm assistants and housekeepers. This means that there exists a **gender specific barrier in getting access to information and farming technology innovations** (Augustin 2012). Less than 10% of the extension agents in Tunisia are females (Augustin 2012). The project will use a gender sensitive approach, and the KM feedback channels will use gender disaggregated data and **implementation processes favouring gender equity** throughout the project implementation.

Within this context, Monitoring, Evaluation, Accountability and Learning (MEAL) strategies as well as innovative data analysis methods acquire significant relevance: **Effective data collection, analysis and diffusion contributes to achieving KM objectives**. Since traditional MEAL systems in agricultural projects are not understood as knowledge management systems yet, they still tend to measure indicators related to increased production and productivity with little attention to institutional, environmental, contextual and social issues, i.e. systemic questions.

In order to evaluate impact of the interventions through the innovation system model, any knowledge product, considered, as an output of the project will be measured in terms of the effectiveness for decision making at all scales (actors, processes, sites). The next figure shows the main processes that will be conducted in order to implement M&E in this project.



### **3.1 Main activities:**

#### **A. Analyse the baseline findings of the ICARDA/GIZ project ‘Mind the Gap: Improving Dissemination Strategies to Increase Technology Adoption by Smallholders and adapt it to the CLCA Phase 2 Project**

The University Goettingen (UGOE), in close cooperation with ICARDA, is carrying out a representative baseline study on agro-pastoral farming communities in Tunisia. The study will be available for the project and covers household demographics, farming and other income sources, production costs, agricultural technology adoption indicators, and household decision-making, including gender aspects, and can be used for better understanding gender-specific roles in farming, gender-specific decision-making power in technology adoption, and gender-specific decision-making power in controlling assets (e.g. land and livestock) and income expenditures as a basis for the content and dissemination of the specific CLCA KM products.

Similar baseline work in Bolivia and Nicaragua will be set up by CIMMYT in different countries of the LAC region and feed into the project’s KM strategy.

#### **B. Partner with local IFAD investment projects on a joint Knowledge Management approach**

We propose to develop a joint action research approach with NARES, advisory services and local partners, and conduct qualitative formative research with the aim to generate a better understanding on smallholders’ (men and women) existing knowledge on CLCA, attitudes towards applying conservation agriculture on their lands, and the current practices that would enable or prevent them from using CLCA tools.

This Knowledge, Attitudes and Practices (KAP) approach is also carried out in close collaboration with beneficiaries of IFAD investment projects and will use a training-on-the-job component in the collection of qualitative feedback indicators. Capacity development will, in particular, benefit the IFAD investment project ‘Agro-pastoral Value Chains in Tunisia,’ members of farming communities in the North of the Wilaya of M’Sila in Algeria, Pro-Camelidos in Bolivia, and NICAVIDA in Nicaragua.

As the qualitative KAP study is embedded in the project’s action research approach, the FGDs with the farming communities would also be a tool to monitor the outcome of the project’s knowledge management and dissemination component, if carried out by the end of the project in form of a participatory evaluation with smallholders, men and women. The participatory evaluation would also

enable the project's innovation systems participants to gain an in-depth understanding on smallholders' increased knowledge, changes in attitudes and practices by smallholders, and the root causes that might have motivated them to apply CLCA technologies or prevented them from doing so.

**C. Foster capacity building and training for key actors to facilitate the testing and implementation of CLCA practices and technologies with farmers through the local innovation systems**

A capacity building strategy helps deploy human resources with the ability to articulate innovation system model processes that lead to the construction of a hub's physical infrastructure and, as a result, to the development of an innovation network aimed at improving the agrifood chains through CA. Therefore, specific training will be conducted through theoretical and practical workshops lectured by national and international experts to promote the use of CLCA practices and technologies. These courses will mainly cover the following:

1. **Access to technologies:** will involve extension services and advisory services on CLCA production and include guidelines on seed and feed production.
2. **Access to inputs for efficient and effective CLCA farming:** will consist of improved CLCA technology packages and other key technologies that ICARDA/CIMMYT and NARES currently promote. The intention of the project is to understand the best modes of dissemination to improve the adoption of these technologies.
3. **Access to sustainable farming:** will include linkages to generate better understanding for smallholders on CLCA's impacts on water use efficiency, soil fertility and farm productivity;
4. **Access to market information:** will involve linking smallholders to seed and fertilizer sellers and lamb retailers through institutional support. Smallholders will also receive meat market price information via mobile SMS.

An examination of the factors influencing the CLCA adoption processes and local contexts and the continued use of best CLCA practices by smallholders will be the basis for further content development in the CLCA information packages, as they need to be tailor-made to needs and integrated in the clusters the smallholders are interested in.

The four main clusters will be developed further into a precise content strategy, based on the dialogue with smallholders during the formative research process.

**D. Design and implement data collection tools and analysis processes for agricultural management, socio-economic (including gender and youth) variables and impact evaluation of the project**

Trials' and farmers' data describing the management of crops, yields, costs, dates and crop status will be captured through field books designed by CIMMYT using two data collection tools: an in-house developed system (BEM <http://bem.cimmyt.org/>), and GeoODK Collect (<http://geoodk.com/>). Both allow form logic, entry constraints (i.e. ranges in the answers-input), sub-structures repetitions and geo-referenced information. Data collectors will be local stakeholders and their extension agents who can work online and offline in the field, save submissions at any point and –once they are finished– send them to the project servers. Currently, GeoODK Collect uses the Android platform and supports a wide variety of question types: text, number, location, polygons, multimedia, and barcodes.

Data analysis has been defined as the process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. For this project, collected data will be cleaned through several scripts developed in R-language (<https://www.r-project.org>), which automatically will obtain data from an Excel file, identify and separate outliers, and then graph specific variables for interpretation per region, system type, or technology (ex. yield variation and net income per crop, region and production type).



**E. Design and implement effective tools for data dissemination in order to support smallholder farmers' decision making through SMS, video strategies, printed material and online communication.**

When successfully implemented, knowledge sharing can influence and shape skills, attitudes, and activities of personnel in achieving organizational goals (Collins and Clark 2003). Sharing can be done directly via personal communication or indirectly using an intermediary tool (Bock et al. 2005). Particularly for this project, tools and content will be developed based on the results of **focus group discussions** (FGDs), which would include **questions linked to the smallholders' information needs and media use**. The content analysis of the FGDs will be done by ICARDA/CIMMYT social scientists in close collaboration with local partners and will serve as the basis for defining the precise information needed for the farmer video and training materials and the inherent dissemination strategy to men and women.

The qualitative KAP studies will be carried out in all four countries, and, although not representative, will **cover at least enough samples to indicate the content** and tonality of the CLCA information packages and the best dissemination strategies and media use, in particular when it comes to **involving women as beneficiaries**. In practical terms, the study will comprise Focus Group Discussions (FGDs) with at least 18 groups per country, including men and women in three different age groups as well as two control groups, which would bring the survey sample with an average of eight people participating in each FGD group up to almost 150 smallholders, men and women, per country.

Based on the data collected in KAP studies in the target zones, the tendency would be to **develop a set of KM Products** disseminated by individual and group media. Printed pocket guidelines for smallholders, as well as video, SMS or radio micro-programmes in different formats in French, Arabic and Spanish will be developed for men and women, depending on the needs and infrastructure of each region. Some examples are described below:

**Video**

One of the most convincing ways of **delivering information** on how to apply the CLCA management and technology packages is by letting smallholders **see good examples** of what other smallholders have produced. In particular, as ongoing ICARDA baseline in the region indicates, the literacy levels for participating smallholders in Tunisia and Algeria are very low - **30% for men and less than 10% for women** - and for this reason audio-visual media represents an important tool.

**Participatory video**, however, is more than a linear production process. It involves a range of video production and screening activities, which drive a process of exploration and dialogue on shared issues, as part of the project's overall action research approach. The participatory video production provides an **accessible way for agro-pastoralists to take action on their own concerns and interests**, through deepening their understanding, engaging and motivating the wider community, and also shaping and creating their own messages and perspectives to decision-makers and the public in **a bottom-up approach**.

Participatory video production is also a powerful way for smallholders, men and women, to explore their situation, and reflect on experiences together, in order to deepen understanding about their reality and forge **ways forward based on the knowledge that emerges**.

The CLCA on-farm research will therefore be embedded in the production of a participatory video with smallholders, which will be **disseminated via different channels**, such as community video clubs, extension services (tablets), and community screenings during farmer field days.

Assuming the rapidly changing access to information and media use in the four countries will continue, further dissemination methods of video and other audio-visual products will include direct communication with smallholders via **mobile phones** and mass communication via digital television.

The participatory video can be edited in English, French, Spanish and Arabic and uploaded on the Youtube channels of the ICARDA, CIMMYT, WOCAT and GFRAS web portals.

## **Geographical Information Platform**

GeoODK and Conservation Earth (<http://gismaps.cimmyt.org/CE/MasAgro/GTO>) –both open source platforms– provide a way to store geo-referenced information, as well as a suite of tools to visualize, analyse and manipulate ground data in order to map field activities (monitoring), dynamically interact with historic/regional/thematic layers, and support decision making processes for key stakeholders.

## **Printed material**

Based on the content generation process described, particular printed material can be generated, including:

- Teaching materials that facilitate communicating information to strengthen technicians' capacities, promote the adoption of CLCA practices and enhance the attitudes or abilities of technicians and farmers.
- Cartoon character called Don Crecencio and field thematic flip charts.
- Enlace magazine - a bimonthly publication on conservation agriculture and the MasAgro program in Mexico; it is edited, published and distributed by CIMMYT
- Infographics and information bulletins for extension agents to be used in demonstration events, training courses and informative meetings.

## **SMS**

SMS services in each country will make it possible to send text messages containing information on prices, weather and general advice on CLCA practices to network technicians and farmers.

## **4. National level for NARES, policy makers and private inputs and service providers**

The KM uptake to NARES, policy makers, private input and service providers will be integrated in the innovation system models established in each country. As the engagement of the different stakeholders is described in a different chapter of this proposal, our knowledge management approach aims to **develop the capacities of the stakeholders involved in the systems**.

Facilitation, scientific advice and capacity development will be the task of ICARDA/CIMMYT, NARES and other local partners. The ICARDA/CIMMYT team will ensure, together with their partners, that all concerned stakeholders, especially smallholders, are actively participating in the discussion (men and women). As unofficial estimations suggest that, for example, in Tunisia up to 80% of the farming work related to animal husbandry is undertaken by women (GIZ 2015) and gender stereotyping in (agricultural) policy making still persists, the consideration of gender equity aspects are crucial during the set-up of the Innovation Systems.

The Knowledge Management Specialist, in close collaboration with focal points in the NARES and advisory services, will conduct an institutional assessment to generate a better understanding on the extension, knowledge management and networking capacities and training needs of the NARES with respect to CLCA management and technologies.

The CLCA knowledge products, developed with the smallholders will be integrated in a web based e-learning training module for NARES, governmental extension workers and private advisory services.

**A two web based five-day training on CLCA guidelines for NARES and advisory services will be conducted in each country.** Web trainings can be created through making use of a free open source



Learning Management System (LMS) called Moodle. It allows for a variety of formats for e-learning possibilities that can be offered to a broad audience using PCs, tablets or mobile phones. Limitations might lie in internet access, when it comes to huge amounts of data by images and especially video and lack of technology proficiency, depending on the experience of using computer and internet capabilities.

Depending on the target audience and zone, the project will adopt an appropriate technical solution to deliver the e-learning and web based training in time.

The content of the e-learning modules will focus on thematic skills on CLCA, technologies, inputs and research findings on water use efficiency, land, productivity and agro-pastoral value chains, as well as enabling skills to activate and coordinate networks and to include women, youth and marginalized groups into the process. Skills development related to governance of common natural resources is also part of the process. Courses can easily be created and simple applications might be authored by any person. However, when it comes to creating complex e-learning solutions, experts might have to be consulted. ICARDA and CIMMYT both have dedicated e-learning staff in-house, which would be accessible for the project. Moodle also recommends certified Moodle experts that can provide support with the use and technical aspects of the platform.

**Finally, policy engagement tools via science-based advocacy and policy communication products will be developed.** In order to establish the project's relevance and authority, among policy and decision makers, in all participating countries and beyond, the project will provide science-based policy briefs, presentations and other materials that advocate for investments (political and financial).

## 5. Cross-region South-South support for project beneficiaries and partners supporting the development of smallholder crop-livestock production in drylands

The methodology, successes, best practices and the lessons learnt through the uptake of the KM products via the Innovation System Model will be published on the WOCAT platform and other websites, in the form of blogs and policy briefs. Because the systems in NA and LAC are technically very different, south-south collaboration will focus on the development of generic analytical and capacity building tools to understand and improve CLCA systems. In the different countries of action, these products (e.g. publications, blogs and policy briefs) will be developed and promoted by ICARDA/CIMMYT, with support of CRP-WHEAT and in collaboration with IFAD colleagues throughout both regions. The knowledge management component, central to this proposal is to serve as a model for other countries in the MENA and LAC region that are currently discussing similar policy processes

### A. Integration of KM strategy in South-South project stakeholder platforms

Throughout the project's implementation, the stakeholder process will be transparent and cyclic, taking into account the process of increasing knowledge and sharing potentials. In practical terms, the project will embed the CLCA findings in a set of clear implementation steps.

At the start of the contract, the project team will review the CLCA KM strategy and work plan. This review will take into account the **evaluation of the CLCA Project Phase I** with respect to knowledge management outcomes and needs, as well as other programmes such as the **CIMMYT comparative study on extension work via innovation platforms** or the **ICARDA/GIZ baseline report on adoption processes** in Tunisia (available in the second quarter 2017).

It will also consider CLCA related policy and strategy documents. A series of key findings outlining gaps, opportunities for improvement and lessons learnt will be identified leading to recommendations for a new, updated KM strategy. It will be undertaken by the knowledge management offices in ICARDA and CIMMYT.

### B. Identification of South-South KM task force

Within this process, the team will identify a series of stakeholder groups, which will be invited to participate on **objectives, goals, audiences and targets** of CLCA South-South knowledge management efforts. These groups will include IFAD investment projects in the four participating countries, private market actors, advisory services, NGOs, focal points in MoAs. This listing will be prepared in collaboration with IFAD.

### C. **Virtual meetings of the South-South KM taskforce**

The project team will organize a series of virtual consultations with the stakeholders listed above in order to identify clear target audience, goals, objectives, and potential risks, as well as lessons learnt from the CLCA phase 1. These reflections will take into account the different regional expectations, evolution of the programme, of CLCA best practice, and of KM technologies.

### D. **Developing feedback indicators from the field**

The CIMMYT/ICARDA knowledge management offices in close collaboration with local partners and beneficiaries will undertake a qualitative KAP study based on **Focus Group Discussions** (FGDs) in the four participating countries. The findings deriving from the KAP study and an analysis of the farmers' responses will be compared with the baseline from the previous CLCA strategy. This will provide a **basis to assess the extent of changes** to be made to the existing strategy in the four different countries, as well as proposed and implemented activities to date.

### E. **Integrating feedback indicators into defined KM strategy**

The findings from reassessment and reappraisal of the KM strategy will be presented and shared with the managing stakeholders for their review and comment. Based on these exchanges, an amended version of the strategy will be prepared and finalized by the ICARDA/CIMMYT knowledge management offices. This strategy **will list products and features** (such as videos, pocket guides, radio micro-programmes, e-learning modules, policy recommendations, and briefs) and include a tentative timeline and calendar.

### F. **Designing dissemination and distribution in the CLCA network via WOCAT**

Once finalized, the strategy will be made available to all stakeholders on the CLCA group via the WOCAT portal.

### G. **Revising KM strategy annually**

The strategy will be reviewed on an **annual basis**, repeating the steps outlined above and comparing the updated assessment against the current version of the strategy.

### H. **Organizing annual South-South e-learning events**

The project will organize **annual South-South e-learning events** with the aim to exchange on successes achieved, best practices, and lessons learnt to feed into the wider project dissemination and KM strategies.

### I. **Participation in High Level Policy Events and Think Tanks**

While ICARDA/CIMMYT scientists will establish an integration of CLCA topics in scientific conferences and trades, it will also be useful to involve ICARDA/CIMMYT top management and facilitate their participation in policy events. The World Economic Forum on the Middle East and North Africa would be such an event as well as several climate change think tanks established by IFAD, UN systems, and the European Union. Other policy events and think tanks are set up by implementing countries, and provide an ideal forum to advocate for political and financial investments in CLCA.

### J. **Publishing of CLCA topics in ICARDA/CIMMYT institutional publications and social media**

The current thinking on CLCA will need to be embedded in broader thinking on improving food security in the target regions. ICARDA/CIMMYT will use CLCA topics as part of their editorial lines institutional publications. Once published, the institutional content will be supported by a thematic online campaign, using social media, such as Facebook, Twitter, and LinkedIn. Embedding thematic discussion groups in the already well-established CGIAR research organizations social media platforms would reach more people than setting up and maintaining social media for the project.

ICARDA and CIMMYT will publish **two policy briefs yearly** and organize publications and related campaigns. This is in addition to frequent dissemination of KM projects among the identified project stakeholders.

### K. **Op-eds, written by the Director General of CIMMYT and ICARDA**

**Op-eds by, and interviews with, high-profile policy makers and business leaders** make the strongest impact in terms of sharing knowledge on CLCA. These formats have a great agenda-setting power as they often stimulate highly visible reactions and responses. ICARDA and CIMMYT will both place one op-ed in international media by the end of the project.

## Annex 6. Procurement Plan for the field equipment of the project.

Procurement Plan for the field equipment of the project														Expected usage life (years)	Rate of depreciation (% per year)
	Tunisia			Algeria			Bolivia			Nicaragua			Total		
	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3			
Seeders	17000			17000			17000			17000			68000	5	20
Sprayers	8000			8000			8000			8000			32000	5	20
Electric fences and other livestock/manure management equipment		6000			6000			8000			8000		28000	5	20
Scales for animal weighting		4000			4000								8000	5	20
Field equipment for crop and erosion monitoring	6000	2000		6000	2000		8000	2000		8000	2000		36000	5	20
Laboratory equipment (soil analysis / feed analysis)	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	63000	10	10
<b>Total</b>	<b>36250</b>	<b>17250</b>	<b>5250</b>	<b>36250</b>	<b>17250</b>	<b>5250</b>	<b>38250</b>	<b>15250</b>	<b>5250</b>	<b>38250</b>	<b>15250</b>	<b>5250</b>	<b>235000</b>		

## Application form (overview information)

<b>A. SUMMARY</b>
1. Name of the organization: International Center for Agricultural Research in the Dry Areas (ICARDA)
2. Abstract (approximately 250 words). The food and livelihood security of rural populations in Low and Middle Income Countries (LMIC) in North Africa (NA) and Latin America and the Caribbean (LAC) are largely dependent on crop-livestock production systems. In arid and semiarid areas (drylands), where many IFAD investments are supporting poor smallholder farmers, these systems are often characterized by nutrient depleted soils with low soil moisture retaining capacity and poor physical health increasing the vulnerability to climate risks. To address the low productivity and improve resilience of these systems Conservation Agriculture (CA - minimum tillage, soil coverage and crop rotation) is a popular approach promoted to support water harvesting and use efficiency, soil fertility management. However, one key challenge for CA in these systems in drylands is the competing needs for biomass for fodder and mulching for soil improvements. Building on a previous project funded by IFAD, this initiative will enhance the broad uptake of CA in NEN and LAC, to sustainably increase production and enhance the resilience of smallholder crop-livestock production systems in the face of continued climatic variability. This will be achieved through the development and expansion of locally developed soil conservation and water use efficiency technologies, as well as forage crop and biomass management. Outcomes will include: increased knowledge and changed attitudes towards the adoption of crop-livestock-conservation-agriculture (CLCA) farming systems for improved production and profitability; uptake and scaling-up of tools and methodologies to support the adoption processes of NARES, decision makers, private market actors, and civil society; and support for the integration of CA practices within crop livestock production systems beyond the field-level through effective knowledge management and capacity development for stakeholders. Critically, this will be accomplished through the collaboration with on-going IFAD projects, active participation and engagement of stakeholders, , advocacy, and the development of business models to support the long-term outscaling of the CLCA systems and the impacts of the IFAD investments in dry areas. Meanwhile, partner institutions in target regions will enhance technical and policy capacities for the longer-term promotion of CLCA for food security and resilient livelihoods.
3. Total budget (USD): US\$ 3,000,000 of which US\$ 2,500,000 is requested from IFAD and US\$ 500,000 as in-kind contributions from NARES in target countries <i>(specifying the amount to be covered by IFAD and the amount to be covered (in-kind and/or in-cash) by the applicant institution and/or other partners, if envisaged)</i>
<b>B. APPLICANT INSTITUTION</b>
4. Legal status. <a href="#">International Organization</a>
5. Audited Financial statements covering the past two years. <a href="#">See attached for years 2014 and 2015</a>
6. List of record and references to financial co-operatives projects specifying the role actually played by the applicant. <a href="#">Please see list attached of on-going projects.</a>
7. Current operations and presence in developing countries (e.g. offices), if applicable The applicant institution (ICARDA) has offices in Tunisia and will conduct the work in Algeria from its office there. The work to be undertaken in Bolivia and Nicaragua will be undertaken by the co-applicant institution (CIMMYT) and be based from its offices in Mexico and Colombia respectively.
<b>C. IMPLEMENTATION ARRANGEMENTS</b>

8. Bodies/divisions or offices that will participate in the management of the programme  
 For ICARDA, the project will be managed by the Sustainable Intensification and Resilience of Production Systems Research Program which currently focuses on biophysical topics (agronomy, livestock, rangeland and forage production as well as the socioeconomic research portfolio) in coordination with other strategic research programs within the centre: Biodiversity and Integrated Gene Management, as well as Integrated Water and Land Management. Regional offices in Tunisia, Cairo, and Rabat will play a major role in establishing strong linkages between ICARDA science teams and NARES, and these regional offices will also be in charge of the administrative and financial transactions with NARES in Algeria and Tunisia.

For CIMMYT, the project will be managed by the Sustainable Intensification Program (previously named Global Conservation Agriculture Program), in coordination with the Socio-Economic program and the Maize and Wheat programs. CIMMYT's headquarters in Mexico will handle the administrative and financial transactions, with collaborators in Nicaragua and Bolivia.

9. Principle staff who will manage the programme and will be the point of contact with IFAD, specifying her/his current job position and contact information

a. Programme Manager (ICARDA)	Name:	<b>Mourad Reik</b>
	Job title:	Senior Livestock Scientist in Sustainable Intensification and Resilience of Production Systems research program.
	Contact:	<a href="mailto:M.Rekik@cgiar.org">M.Rekik@cgiar.org</a>
	CV attached	YES
	Main Responsibilities	Overall coordination of the project and in charge of the livestock research activities.
b. Collaborating Scientists (ICARDA)	Name:	<b>Mohamed El Mourid</b>
	Job title:	Senior Agronomist
	Contact:	<a href="mailto:M.ElMourid@cgiar.org">M.ElMourid@cgiar.org</a>
	CV attached	YES
	Main Responsibilities	Field agronomy and resource use efficiency analysis.
	Name:	<b>Aymen Frija</b>
	Job title:	Agricultural Economist (Economic Modelling)
	Contact:	<a href="mailto:a.frija@cgiar.org">a.frija@cgiar.org</a>
	CV attached	YES
	Main Responsibilities	Farm systems analysis and modelling. Trade-off analysis.
	Name:	<b>Shinan Kassam</b>
	Job title:	Social Scientist
	Contact:	<a href="mailto:s.kassam@cgiar.org">s.kassam@cgiar.org</a>
	CV attached	YES
	Main Responsibilities	Innovation systems and socioeconomic analyses
Name:	<b>Forage Scientist (recruitment in process).</b>	
Job title:	Forage Scientist (CIM Position)	
Contact:	-	
CV attached	Will be appointed in 2017 to start in Jan.2018	
Main Responsibilities	Field forage production systems.	

	Name:	Jack Durrell
	Job title:	Acting head of CODIS at ICARDA
	Contact:	<a href="mailto:jackdurrell@outlook.com">jackdurrell@outlook.com</a>
	CV attached	(Will be soon provided)
	Main Responsibilities	Development and implementation of the Knowledge Management Plan of the project.
	Name:	<b>Boubaker Dhehibi</b>
	Job title:	Agricultural and Resource Economist.
	Contact:	<a href="mailto:b.dhehibi@cgiar.org">b.dhehibi@cgiar.org</a>
	CV attached	YES
	Main Responsibilities	Econometric analysis of adoption behavior. Value Chain analysis.
	Name:	<b>Dina Najjar</b>
	Job title:	Gender Specialist
	Contact:	<a href="mailto:d.najjar@cgiar.org">d.najjar@cgiar.org</a>
	CV attached	YES
	Main Responsibilities	Gender analysis of the different project components and interventions.
	Name:	<b>Bonaiuti, Enrico</b>
	Job title:	Monitoring and Evaluation Specialist. Project Administrator.
	Contact:	<a href="mailto:E.Bonaiuti@cgiar.org">E.Bonaiuti@cgiar.org</a>
	CV attached	YES
	Main Responsibilities	Knowledge management and monitoring, evaluation and learning
	Name:	<b>Claudio Zucca</b>
	Job title:	Soil Conservation/Land Management Specialist, Integrated Water and Land Management and Ecosystems Program (IWLMEP)
	Contact:	<a href="mailto:C.Zucca@cgiar.org">C.Zucca@cgiar.org</a>
	CV attached	YES
	Main Responsibilities	Monitoring water use efficiency and erosion.
b. Main collaborators (CIMMYT)	Name:	<b>Santiago Lopez-Ridaura</b>
	Job title:	Senior Scientist, Sustainable Intensification Program, CIMMYT
	Main responsibilities:	Farming systems analysis and CIMMYT project coordination.
	CV attached	YES
	Name:	<b>Ravi Gopal Singh</b>
	Job title:	Senior Scientist, Sustainable Intensification Program, CIMMYT
	Main responsibilities:	Field agronomy and resource use efficiency analysis.
	CV attached	YES
	Name:	<b>Andrea Gardeazabal</b>

Job title:	Monitoring, Evaluation and Learning manager, Sustainable Intensification Program, CIMMYT
Main responsibilities:	Knowledge management and monitoring, evaluation and learning.
CV attached	YES
Name:	<b>Bram Govaerts</b>
Job title:	Senior scientist and Strategic Leader, Sustainable Intensification Program, Latin-America, CIMMYT
Main responsibilities:	Institutional relationships, scaling activities and scientific production.
CV attached	YES
Name:	<b>Bruno Gerard</b>
Job title:	Program Director, Sustainable Intensification Program, CIMMYT
Main responsibilities:	Project oversight and scientific advice.
CV attached	YES

#### D. PARTNER INSTITUTIONS

10. Name of the partner organization(s):

- Institut Technique des Grandes Cultures (ITGC), Algeria;
- Institut National des Grandes Cultures (INGC), Tunisia;
- Office de l'Élevage et des Pâturages (OEP), Tunisia ;
- Institut National de Recherche Agronomique (INRAT) Tunisia ;
- Institut Technique des Elevages (ITELV). Algiers, Algeria;
- Instituto Nacional de Innovación Agropecuaria (INIAF), Bolivia;
- Fundación PROINPA, Bolivia;
- Consejo Agropecuario Centroamericano (CAC), Nicaragua
- Servicio de Información Mesoamericano sobre Agricultura Sostenible (SIMAS), Nicaragua

11. Team leader(s) in the partner organization(s):

Names, job title and contact of partner institutions in North Africa:

- Mr. Omar Zaghouane, DG of ITGC, Algeria ([zaghouaneo@yahoo.fr](mailto:zaghouaneo@yahoo.fr));
- Mr. Oussama Kheriji, DG of INGC, Tunisia ([oussamkh@gmail.com](mailto:oussamkh@gmail.com));
- Mr. Lamine Ben Hammadi, DG of Institut National de Recherche Agronomique (INRAT), Tunisia ([Benhamadi.lamine@iresa.agrinet.tn](mailto:Benhamadi.lamine@iresa.agrinet.tn));
- Mr. Mohamed Nasri, DG of Office de l'Élevage et du Paturage (OEP), Tunisia ([contact@oep.nat.tn](mailto:contact@oep.nat.tn));
- Dr. GHEZAILI Abdelkrim, Director General, Institut Technique des Elevages (ITELV). Algiers, Algeria ([conservation\\_itelv@yahoo.fr](mailto:conservation_itelv@yahoo.fr))

Names, job title and contact of partner institutions in LAC:

- Mr Cresencio Calle Cruz, Regional Coordinator, South, Fundación PROINPA, Bolivia ([c.calle@proinpa.org](mailto:c.calle@proinpa.org));
- Ing. MSc Carlos Osinaga Romero, Director General Ejecutivo Instituto Nacional de Innovación Agropecuaria (INIAF), Bolivia ([coriniaf@gmail.com](mailto:coriniaf@gmail.com));
- Julio Calderon Artieda, Secretario Ejecutivo CAC ([secretaria.cac@iica.int](mailto:secretaria.cac@iica.int)); and
- Martin Cuadra, Generente Nacional SIMAS Nicaragua ([manejo-informacion@simas.org.ni](mailto:manejo-informacion@simas.org.ni))

12. Brief description of the role to be played by the partners in the programme

IFAD will supervise the project providing recommendations as needed. ICARDA will be the grant recipient responsible for the overall coordination and technical and financial management of the project. ICARDA and CIMMYT will provide backstopping on technologies and innovation systems,

and develop conceptual frameworks, methodologies and tools to be used across regions and beyond the identified target countries. In each region we have secured a strong group of partner institutions that will be responsible for the implementation of the project activities on-farm. They will provide local knowledge to adapt technical and institutional interventions to the different agro-ecologies and socio-economic contexts of the target locations.

The major partners in North Africa are development-oriented institutes with the mandates and capacity to outscale. Research institutes like INRAT (Tunisia) and universities in Algeria will continue to help fill research gaps. CIMMYT has also secured and envisaged partnerships with local research institutes (e.g. INTA in Nicaragua and INIAF in Bolivia).

A close collaboration with IFAD loan projects will ensure the wider applicability of results by addressing specific knowledge gaps identified by these projects.

13. Budget to be sub-contracted.

ICARDA will subcontract US\$ 1,205,000 to CIMMYT. Both Centers (ICARDA and CIMMYT) will subcontract a total of US\$ 390,000 to NARES in the four target countries (Tunisia, Algeria, Bolivia and Nicaragua).



## Appendix B

### FINANCIAL MANAGEMENT CAPACITY ASSESSMENT QUESTIONNAIRE – GRANTS (FMAQ)

<b>Project #</b> , GRIPS ID 2000001630  Name: <b><u>Use of conservation agriculture in crop-livestock systems (CLCA) in the drylands for enhanced water use and soil fertility in NEN and LAC countries</u></b>	
<b>Recipient</b> <u>ICARDA (International Center for Agricultural Research in the Dry Areas)</u>	
<b>Self-assessment completed by</b> <u>Erwin Lopez (Director of Finance), Imelda Silang (Financial and Management Reporting Manager), Antonio Villamor (Internal Auditor), Mourad Rekik (Lead Small Ruminant Production Specialist and Lead Project Developer), Mary Margaret McRae (Resource Mobilization Officer)</u>	<b>Date</b> : 6 August 2017
<b>Review completed by</b> _____	<b>Date</b> :

#### **GUIDANCE: NOTES**

The FMAQ provides an indicative list of issues and questions to be considered in the financial management assessment. It is clearly difficult for a single questionnaire to adequately cover the diversity of IFAD's operating environment and projects. The FMAQ should be customized to better address specific project circumstances by adapting the questions (adding, deleting, or modifying) to better suit the assessment objectives.

If there is more than one implementing agency<sup>4</sup>, an FMAQ should be completed for each entity that will receive and disburse project funds.

<sup>3</sup> If the Recipient is different from other agencies who will implement activities and handle funds, please state names and locations of these agencies here if their financial management capacities were assessed.

<sup>4</sup> As above.

**Implementing Entity:**

Topic		Response	Remarks
<b>1.</b>	<b>Organization and Staffing</b>		
<b>Recipient / Implementing Entity Profile</b>			
1.1	What is the entity's legal status and relevant national legislation under which they are registered?	<p>ICARDA is an autonomous not-for-profit, non-stock, international agricultural research center governed by a Board of Trustees and under the auspices of the CGIAR.</p> <p>ICARDA was established in 1977 as an international organization based on an agreement between the Government of Lebanon the International Development Research Center (IDRC) acting as Executing Agency on behalf of CGIAR.</p> <p>ICARDA is registered as a 501(c)(3) organization in the USA.</p>	
1.2	<p>What is the ownership and governance structure<sup>5</sup>?</p> <p>Is there a clear distinction between ownership, management and governing bodies?</p>	<p>ICARDA is an autonomous not-for-profit, non-stock, international agricultural research center governed by a Board of Trustees and under the auspices of the CGIAR.</p>	
1.3	<p>Will financial management of the project be the responsibility of a the grant Recipient? Or will this be undertaken wholly / partially by Sub-grantee(s) / other agencies?</p> <p>If by sub-grantees, indicate nature of contractual relationship between Recipient and sub-grantee.</p>	<p>The financial management of the project will be the responsibility of ICARDA. Funds disbursed to sub-grantees or partners will be accounted for as ICARDA's own expenses.</p> <p>The nature of contractual relationship between ICARDA and the sub-grantee/s will be like a donor-recipient.</p>	
1.4	<p>Has the Recipient entity/(ies) implemented a donor financed project in the past - if so, please provide details<sup>6</sup>?</p> <p>Is the Recipient currently implementing donor financed projects? If so, please give details<sup>7</sup>.</p>	<p>Please see attached pdf document outlining donor financed projects from 2010 onwards</p> <p>Please see attached pdf document outlining donor financed projects from 2010 onwards</p>	

<sup>5</sup> e.g. oversight authorities, audit committee, regulators, governing board, executive body

<sup>6</sup> Donor name, project name, amount, start date and actual completion date.

Topic		Response	Remarks
1.5	What is the total size of Recipient (most recent date available <sup>8</sup> ): <ul style="list-style-type: none"> <li>- Total assets</li> <li>- Total revenue</li> <li>- Net profit / loss</li> <li>- Total full time employees</li> </ul>	Please see the 2016 audited financial statements of ICARDA.  Based on the 2016 audited FS, ICARDA had as of 31 December 2016 the following: Total Assets - US\$ 28.891M Total Revenues - US\$ 41.36M Net Profit - US\$ 53K Total Full Time Employees - 295	
<b>Staffing</b>			
1.6	What is the (proposed) organizational structure of the accounting department? Attach an organization chart.	Please see the ICARDA Finance Structure.	
1.7	Identify the (proposed) accounts staff, including job title, responsibilities, educational background and professional experience. Attach job descriptions and CVs of key accounting staff.	Please see the CV of the ICARDA Finance staff who will oversee the project.	
1.8	Are written position descriptions that clearly define duties, responsibilities, lines of supervision, and limits of authority for all of the officers, managers, and staff?	Yes.	
1.9	Is the finance and accounts staff adequately qualified and experienced?	Yes.	
1.10	Are the project accounts and finance staff trained in IFAD and donor EC procedures?	Yes.	
1.11	Are any Finance Staff appointed on contract What is the duration of the contracts Indicate key positions not contracted yet, and the estimated date of appointment	Yes.  All essential positions are filled-up.	
1.12	Is there evidence that finance staff are regularly transferred to other departments At what frequency are personnel transferred/turned over?	None.	

<sup>7</sup> Donor name, project name, amount, start date and expected completion date.

<sup>8</sup> Attach audited financial statements for preceding 2 years.

Topic	Response	Remarks
1.13	Is the project finance and accounting function staffed adequately to handle proposed project transactions?	Yes.

Topic	Response	Remarks
<b>2.</b>	<b>Budgeting</b>	
2.1	Who is responsible for preparation and approval of project budgets?	The Project Leader, with support from Finance, is the overall responsible for the preparation and approval of the budget.
2.2	Are project budgets prepared for all significant project activities in sufficient detail to provide a meaningful tool with which to monitor subsequent performance?	Yes. ICARDA follows activity-based budgeting. This allows proper monitoring of expenses against the activities.  Clear program of work and budget is prepared where activities, output and budget are defined.
2.3	Are procedures in place to plan project activities, collect information from the units in charge of the different components, and prepare the budgets?	Yes, consistent with activity-based budgeting.  Clear program of work and budget is prepared where activities, output and budget are defined.
<b>3</b>	<b>Funds Flow/Disbursement Arrangements</b>	
3.1	Does the Entity have previous experience of using revolving funds and donor funding Withdrawal / Statements of Expenditure (SOE) procedures?	Yes.
3.2	Does the Entity have experience in the management of disbursements from IFAD or other donors?  Have there been the major problems in the past in receipt of funds by the entity?	Yes.  None.
3.3	Does the entity have/need to develop capacity to manage foreign exchange risks?	Yes. ICARDA has adequate personnel to manage this.

Topic		Response	Remarks
3.4	<p>Are the beneficiaries required to contribute to project costs?</p> <p>Is the Recipient / entity contributing with its own funds? If counterpart funds are to be contributed in kind (in the form of labour), are proper guidelines formulated to record and value this contribution?</p>	<p>No, beneficiaries not required to contribute to project costs.</p> <p>Both ICARDA and CIMMYT will indirectly benefit from the in-kind contributions of their partners and the budget table represents by budget item, the contribution of the partners in the 2 regions (North Africa and Latin America). The contributions of national partners are in the form of staff salaries, presence of staff in the field to follow up and monitor implementation of activities, access to vehicles and access to laboratories and experimental land. Indeed, our vis-à-vis public institutions have the needed monitoring tools to record and value their contribution.</p>	
3.5	<p>Is part of the project implemented by communities or NGOs?</p> <p>Does the entity have the necessary reporting and monitoring features built into its systems to track the use of project proceeds by such agencies?</p>	<p>Yes. Farmers' communities and professional organizations will be an important pillar of the implementation of the project activities.</p> <p>Their involvement will be under the direct responsibility of main national partner (NARES) which will hold a sub-contract from ICARDA or CIMMYT. The reporting and monitoring tools of the NARES institutions are more of relevance to this work than those of the communities and NGOs. The NARES are public institutions and therefore they have a long standing experience in running projects with all the required monitoring and reporting tools.</p>	

Topic	Response	Remarks
<p>3.6 Will the project require funds to be transferred to other locations / countries for incurring eligible expenditures? If so, indicate to whom and where?</p> <p>Describe (proposed) project funds flow arrangements; (attach flow chart and explanation of the flow of funds from IFAD, the entity and other financiers for the proposed project).</p>	<p>Yes. The project will transfer funds to our national partners for the implementation of the project activities. Funds will be transferred to NARES in Algeria, Tunisia, Nicaragua and Bolivia. ICARDA will transfer funds to NARES in North Africa while CIMMYT will transfer funds to countries in Latin America</p> <p>IFAD transfers funds to ICARDA HQ bank account, then ICARDA transfers funds to the relevant ICARDA Country Office/s. The ICARDA Country Office/s will administer the use of the funds.</p>	
<p>3.7 In which bank will the Advance Account be opened?</p>	<p>Account Name: International Center for Agricultural Research in the Dry Areas (ICARDA)</p> <p>Bank Account No.: 0190-3347-14</p> <p>Account Currency: US Dollar</p> <p>Bank Name: Commercial International Bank (CIB)</p> <p>Branch: Giza Branch</p> <p>Bank Address: Nile Tower Building, 21/23 Charles De Gaulle St., Giza</p> <p>Bank SWIFT Code: CIBEEGCX001</p> <p>Branch ID: 001</p>	
<p>3.8 Are the (proposed) arrangements to transfer the proceeds of the financing from IFAD to the Recipient / Entity satisfactory?</p>	<p>Yes.</p>	

Topic		Response	Remarks
<b>4.</b>	<b>Internal Controls</b>		
4.1	Segregation of duties - are the following functional responsibilities performed by different units or persons: (i) authorization to execute a transaction; (ii) recording of the transaction; and (iii) custody of assets involved in the transaction?	Yes. The Project Leader as fund manager authorizes transactions on the project, and is separate from the Finance Department.	
4.2	Are the functions of ordering, receiving, accounting for, and paying for goods and services appropriately segregated?	Yes. Procurement function is separate from the Finance Department.	
4.3	Are bank reconciliations prepared by someone other than those who make or approve payments?	Yes.	
<b>5.</b>	<b>Accounting Systems, Policies and Procedures</b>		
5.1	Does the entity have an automated accounting system that allows for the proper recording of project financial transactions, including the allocation of expenditures in accordance with the respective components, disbursement categories, and sources of funds? Will the project use the entity accounting system?	Yes. ICARDA uses UBW System that allows for separation of funding for the project by budget code.	
5.2	Are controls in place concerning the preparation and approval of transactions, ensuring that all transactions are correctly made and adequately explained?	Yes.	
5.3	Is the chart of accounts adequate to properly account for and report on project activities and disbursement categories?  Can complete transaction lists be easily generated from the general ledger when requested by IFAD?	Yes.  Yes.	
5.4	Can cost allocations to the various funding sources be made accurately?	Yes.	
5.5	Are the General Ledger and subsidiary ledgers reconciled and in balance?	Yes.	

Topic		Response	Remarks
5.6	Are all accounting and supporting documents retained on a permanent basis in a defined system that allows authorized users easy access?	Yes.	
5.7	What is the basis of accounting (e.g., cash, accrual)?	ICARDA follows accrual accounting.	
5.8	What accounting standards are followed?	CGIAR Financial Guidelines No. 2 (moving to IFRS in 2018)	
5.9	Does the project have an adequate policies and procedures manual to guide activities and ensure staff accountability?	Yes.	
5.10	Is there a written policies and procedures manual covering all routine project financial management activities?  Are manuals distributed to appropriate personnel?  Do procedures exist to ensure that only authorized persons can alter or establish a new accounting principle, policy or procedure to be used by the entity?	Yes.  Yes.  Yes.	
5.11	When expenditures will be incurred by other implementing entities / partners / sub-grantees, explain how these will be recorded in the accounting system.	These will be accounted for as Goods and Services Expenses of the project.	
<b>Payments</b>			



Topic		Response	Remarks
5.12	<p>Are all invoices stamped PAID, dated, reviewed and approved, and clearly marked for account code assignment?</p> <p>Are payments authorized only after verification of invoices against contracts and documentary evidence of delivery of contracted goods, works, services?</p> <p>If expenditures are incurred by other implementing entities / partners / sub-grantees, indicate where accounting evidence for expenditures are / will be retained.</p>	<p>Yes.</p> <p>Yes.</p> <p>The ICARDA retains the original settlement reports.</p>	
<b>Cash and Bank</b>			
5.13	Does the organization maintain an adequate, up-to-date cashbook, recording receipts and payments?	Yes.	
5.14	Are bank and cash reconciled on a monthly basis?	Yes.	
5.15	Indicate names and positions of authorized signatories of project bank accounts.	<p>Aly Abousabaa - Director General</p> <p>Erwin Lopez - Director of Finance</p> <p>Francesco Finocchio - Director of HR and Administration</p> <p>Kamel Shideed - ADG for International Cooperation</p> <p>Alaa Hamwieh - Country Manager, Egypt</p>	
<b>Safeguard over Assets</b>			
5.16	<p>Is there a Fixed Asset accounting system, with a Fixed Asset Register, fully implemented - as part of an integrated accounting system</p> <p>Is the system maintained up to date ?</p>	Yes.	
5.17	Are there periodic physical reconciliation of fixed assets and stocks?	Yes.	

Topic		Response	Remarks
	<b>Other</b>		
5.18	Has the project advised employees, beneficiaries and other recipients to whom to report if they suspect fraud, waste or misuse of project resources or property?	Yes.	
5.19	Do policies and procedures clearly define conflict of interest and related party transactions (real and apparent) and provide safeguards to protect the organization from them?	Yes.	
5.20	Do controls exist for the preparation of the project payroll and are changes to the payroll properly authorized	Yes.	
<b>6.</b>	<b>Reporting and Monitoring</b>		
6.1	Does the reporting system need to be adapted to report on the expenditures per project components?	The UBW System facilitates this.	
6.2	Does the project have established financial management reporting responsibilities that specify what reports are to be prepared, what they are to contain, and the frequency of production.?	Yes.	
6.3	What is the frequency of preparation of financial statements? Are the reports prepared in a timely fashion so as to useful to management for decision making?	Monthly financial reports are prepared.	
6.4	Do the financial reports compare actual expenditures with budgeted and programmed allocations?	Yes.	
6.5	Are financial reports prepared directly by the automated accounting system or are they prepared by spreadsheets or some other means?	Directly from the UBW System.	
6.6	(In case of need of consolidated financial statements) Is the accounting system sufficiently equipped to ensure proper consolidation of entities' financial data?	Yes.	

Topic		Response	Remarks
	<b>Information Systems</b>		
6.7	Is the financial management system computerized?	Yes.	
6.8	Can the system produce the necessary project financial reports?	Yes.	
6.9	Is the staff adequately trained to maintain the system?	Yes.	
6.10	Are adequate systems in place to “back up” financial records? Indicate the frequency at which such backups are made.	Yes.	
<b>7.</b>	<b>Internal Audit</b>		
7.1	Are the Recipient’s operations subject to internal audit? Is there an internal audit department in the Entity?	Yes. Yes.	
7.2	What are the qualifications and experience of internal audit department staff?	ICARDA’s Internal Auditor is an international hire with broad international experience in Internal Auditing.	
7.3	To whom does the internal auditor report?	The Board Audit Committee and Director General.	
7.4	Will the internal audit department include the project in its work program?	This is part of the Internal Audit routine work program.	
7.5	How frequently does the internal auditor issue a report? Are follow up actions taken on the internal audit findings?	Based on the audits carried out. Yes	
<b>8.</b>	<b>External Audit</b>		
8.1	Indicate the name of the external auditor of the entity for the last 2 years and the current year.	Ernst and Young, Sri Lanka	
8.2	Are there any delays in completing audit of the entity? When are the audit reports expected to be issued?	None. The 2016 Audited Financial Statements are available.	
8.3	Is the audit of the entity conducted according to the International Standards on Auditing?	Yes.	

Topic		Response	Remarks
8.4	<p>Were there any major accountability issues brought out in the audit report of the past three years?</p> <p>Were there any issues noted in prior audit reports related to the operation of project revolving accounts or use of SOE procedures for donor financed projects?</p>	<p>None.</p> <p>None.</p>	
8.5	Will the entity auditor audit the project accounts or will another auditor be appointed to audit the project financial statements?	Same external auditors i.e. Ernst and Young, Sri Lanka.	
8.6	Has the project prepared acceptable terms of reference for an annual project audit? If yes, please submit a copy.	Not yet. This will be developed subsequently although it follows a standard ToR.	

### Supporting Documents

**GUIDANCE:** The supporting documents may include the following items.

- Financial regulations, standards or pronouncements used by the project/entity.
- Evidence of consideration of the work of the Internal Auditor (if applicable)
- Chart of Accounts.
- Project or entity Financial Management Manual.(Index page)
- External Audit terms of reference.
- Terms of reference and curriculum vitae for key financial and accounting personnel.
- Copy of most recent audit report and audited financial statements