
Overview of CLCA Main Achievements

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Crop-Livestock Systems Transformation for more Sustainable Resources Use

**GOAL**
To sustainably increase production and enhance climate resilience of small farmers’ communities and their crop-livestock production systems in drylands

**OBJECTIVE**
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 agro-ecological principles and participatory action research approaches

01 Linking with and leveraging existing or upcoming IFAD projects (reference to investment projects) within the countries of engagement as well as developmental programs being undertaken by national governments or multilateral and international organizations

02 Introduction of more productive forage crops and enhanced practices for biomass management and livestock management

03 Development of contextually-relevant soil conservation and water use efficiency practices

[https://mel.cgiar.org/projects/clca2](https://mel.cgiar.org/projects/clca2)
Geographic Scope & Thematic (GST-1/2)

**LAC Countries: Bolivia & Mexico**

- **Nicaragua**: Maize & Red Beans – Cattle based farming system
- **Honduras**: Maize & Beans & Sorghum – Cattle based farming system
- **Mexico**: Wheat & Maize – Sheep based farming system
- **Bolivia**: Maize & Andean Cereals (Quinoa) – Camelid base farming systems

**NA Countries: Algeria & Tunisia**

- **Algeria**: Cereal – Livestock belt (Barley – Wheat & Barley & Fallow – Sheep)
- **Tunisia**: Cereal – Livestock belt (Barley – Wheat & Barley & Fallow – Sheep)

Different Production Systems

**LAC Countries: Bolivia & Mexico**

- **Maize** and Andean cereals (Quinoa or Amaranth) in Bolivia: **High** pressure on the land, extension of quinoa and competition with camelid production; **Subsistence** and mixed crop-livestock type (Maize & Small ruminants); **90%** rainfed areas in Mixteca Alta/Mexico; **Extended** maize fields mosaiced with pastures and forest ecologies (average maize yield of 1.1. t/ha); **Important** degradation of natural resources; **Erosion** is a major threat to the sustainability of the systems

**NA Countries: Algeria & Tunisia**

- **Cereal** – Livestock belt (Wheat – Barley – Fallow - Sheep); **Mixed** small to medium-scale holders; **Rainfall** 200 - 450 mm, very irregular; **Poor** soils, extremely low soil organic matter; **Very** high erosion risks; **Extended** practice of fallow; **Low** integration of forages; **Supplementary** irrigation of wheat in Algeria

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01 What technological alternatives allow to improve water use efficiency, soil fertility and productivity in specific regions of the drylands of NEN and LAC?

02 What are the best fit of CLCA alternatives to different types of mixed crop-livestock farming systems in the drylands of NEN and LAC and what are the trade-offs associated to those alternatives?

Mexico

What technological alternatives have the highest potential to improve the productivity and resilience of mixed maize-based systems in the Mixteca Alta of Oaxaca?

What are the most appropriate CLCA alternatives for different types of farming systems in the Mixteca Alta of Oaxaca and what are the trade-offs associated to those alternatives?

Bolivia

What kind of intensification strategies of llama-quinoa systems have the highest potential to, at the same time, improve the livelihood of farm households in the Bolivian highlands and preserve the natural resources?

What technological alternatives (i.e., combination of species and management practices) are the most effective and efficient for relay cropping, improved fallows and wind barriers to improve the performance for mixed crop-livestock systems in the Bolivian highlands?

What are the most appropriate CLCA alternatives for different types of farming systems in the Bolivian highlands and what are the trade-offs associated to those alternatives?

Has quinoa production expanded in the last 20-30 years? At what rate? In specific land qualities such as foothills or flatlands?

What is the average fallow length in the current quinoa production? Is there continuous cultivation? Is the cropping intensity different for specific land qualities?

Tunisia

What is the impact of enhancing barley production in mixed cereal-livestock production system on the use of crop-residues for summer grazing?

What are the environmental and economic costs and benefits of CA practices applied for the mixed cereal-livestock production systems in Zaghouan? A focus on erosion and soil fertility valuation.

What is the impact of the adoption of CLCA options, on the different farm types identified in the region of Zaghouan, in terms of soil fertility, farm income, and feed self-sufficiency?

What are the most suited socioecological contexts and locations where CA can be effectively promoted for long-lasting adoption?

What is the spatial profitability distribution of CA adoption (investments), and which costs and benefits can be the most relevant and feasible to consider for such a spatial distribution?

Algeria

What technological alternatives have the highest potential to improve the productivity and resilience of mixed cereal-sheep systems in Algeria CLCA target sites?

What are the enabling factors allowing for higher productivity of crops cultivated under CLCA systems?

To assess and track the evolution of the established knowledge hub in Algeria and Tunisia in terms of social dynamics and learning.

To track changes and dynamics within the production system which are due to the enhanced knowledge management and to the already established demonstrations implemented in 2020/2021. Changes of farmers behavior and decision making will be part of the changes the project aims to track in both NA
Engage Effective Partnership & Deliver at Scale

Gender Based Interventions for Innovative Solutions in NA reaching out 1,200 women farmers

Dissemination of the Integrated Improved Crop-Livestock Management Packages to 5,600 Mixed, Smallholder Farmers in NA and LAC Countries

20,000

5,600

20,000

6,000

A cost per beneficiary ratio of US$125 compared to the average of US$246 in IFAD’s 2016-2018 portfolio.

Hectares were Implemented under CLCA Farming Systems in NA and LAC Countries

125$

5,000

Private Public Partnerships

- ITGC – PMAT-CLCA in Algeria to Locally Produce Zero-till Seeders and Expand areas Under CA
- INRAT-Cotugrain-CLCA to scale forage crops and forage mixtures in Tunisia

Knowledge Hubs for Leveraging the democratization of knowledge and Communities Empowerment of Contextualized CLCA Systems (CA, Forage, Livestock) in Algeria and Tunisia

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Generating Evidences & Valid Innovations to Support National Program, IFAD Portfolio and Other Development Initiatives

01 Uptake of Small Machinery Business Models developed by CLCA & Financial Support to their Beneficiaries: PRODSUD Project (IFAD), PRODFIL Project (IFAD), VIABILITY Project (AFD)

02 Uptake of Forage-related technologies, Varieties, and Packages Developed within CLCA: PROFITS Project (IFAD), Siliana – Tunisia

03 Building on ICT2Scale Digital Innovations for scaling CLCA innovations

04 Uptake of Knowledge & Scaling Hub Concepts and CLIO’s developed and validated by CLCA: ICT4Irrigation & ProSol Projects (GIZ)

05 Production of Grass and Shrub Seedlings & Providing technical backstopping for the use of Quinoa husk for supplementary feeding of llamas, Bolivia: IFAD ProCamelidos Program

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CLCA Technologies
From Pilot to Scale

Piloting Phase

- Algeria: 36
- Tunisia: 50

2013-15

CLCA Phase-I

Adaptative Research

Scaling Phase

- 2018-19
  - 319
  - 477

- 2019-20
  - 982
  - 1,440

CLCA Phase-II

Demand-Responsive Research Supported by Ambitious R4D Partnerships

Self-Sustained Scaling Mechanisms

- 2020-21
  - Knowledge & Scaling Hubs
    - 2,355
    - 3,000

- 2021-22

https://mel.cgiar.org/projects/clca2
CLCA Socio-Technical Package for Agroecological System Transformation

NA Countries

Clustering Crop-Livestock Integration (CLI) Options Based on the Scale of Implementation (On-Farm, Landscape) and Resource-Orientations.

CLCA Options

No-till on Residues + Forage Diversification + Livestock Management Interventions

Minimum Tillage + Forage Diversification + Alternative Feed Options + Livestock Management Interventions

Conventional Till + Forage Diversification + Forage Crops Seed Production + Small-Scale Mechanization of feed production

Minimum Tillage + Forage Diversification + Alternative Feed Options

Cereal-Food Legumes Rotation + No-till on residues + Stubble Grazing Management

Phase-I: Adaptative Research & Options under Piloting

Phase-II: Scaling-Up Full CLCA Packages

Knowledge Hubs

Forage Diversification to Address Feeding Gap

Minimizing Soil Disturbance

LAC Countries

Landscape-Piloting Stage

Mexico

✓ Living Barriers
✓ Controlled Grazing of Stubble and Forage Mixtures
✓ Relay Cropping with Fodders Species

Bolivia

✓ Improved Fallow
✓ Improved Pastures
✓ Windbreak with Quality Species

https://mel.cgiar.org/projects/clca2
Show Cases of Poverty Alleviation and Food Security

### Impact of Different CLCA Agronomic Innovations on Improving Sustainability Indicators in Algeria and Tunisia under Rainfed Conditions

<table>
<thead>
<tr>
<th>CLCA Innovation</th>
<th>Indicator</th>
<th>With CLCA Innovation</th>
<th>With Farmer Practice</th>
<th>+/-</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tunisia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation Agriculture, Improved Variety, Crop Diversification</td>
<td>Wheat Yield (t/ha)</td>
<td>2.57 ± 0.82 (CV = 30%)</td>
<td>2.42 ± 0.78 (CV = 32%)</td>
<td>+ 6.2%</td>
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<tr>
<td></td>
<td>Forage Mixture</td>
<td>8.88 ± 1.66 (CV = 18%)</td>
<td>5.4 ± 1.02 (CV = 19%)</td>
<td>+ 64.4%</td>
</tr>
<tr>
<td>Conservation Agriculture</td>
<td>Net Return (US$/ha)</td>
<td>Wheat</td>
<td>168</td>
<td>158</td>
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<tr>
<td><strong>Algeria</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation Agriculture, Improved Variety</td>
<td>Wheat Yield (t/ha)</td>
<td>1.99 ± 0.5 (CV = 25.1%)</td>
<td>1.65 ± 0.38 (CV = 23%)</td>
<td>+ 20.6%</td>
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<tr>
<td></td>
<td>Vetch</td>
<td>1.23 ± 0.19 (CV = 16%)</td>
<td>1.07 ± 0.24 (CV = 23%)</td>
<td>+ 14.9%</td>
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<tr>
<td>Conservation Agriculture + Better Fertilizer &amp; Weed Management</td>
<td>Input cost (US$/ha)</td>
<td>Wheat</td>
<td>409.09</td>
<td>424.89</td>
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<tr>
<td>Conservation Agriculture</td>
<td>Benefit cost ratio</td>
<td>Wheat/Wheat/Lentil: 1.4 (+ 0.4)</td>
<td>Wheat/Barley: 0.4 (- 0.0)</td>
<td>+ 0.4</td>
</tr>
</tbody>
</table>

The values are average ± standard deviation (SD), values in bracket are coefficients of variance (CV)

Show Cases of Poverty Alleviation and Food Security

Engagement with Local/Small and Medium Enterprises, which Creates Local Economic and Social Dynamics (Employment, Encouraging Youth Entrepreneurship, women empowerment) in addition to services provision for natural resources management and conservation

Economic Transformation of Mixed Livestock-Crop Farmers: Improving Production Efficiency, Cost Saving, Enhancing Investment Capacity and Generating Additional Income

Small-Scale Mechanization for Better Crop-Livestock Integration

https://mel.cgiar.org/projects/clca2
Gender Based-Interventions for Innovative Solutions in North African Countries

Reaching out 1,200 Women Farmers

- Empowerment in Decision Making about Agricultural Production and Use of Productive Assets (SMS/Digital Activities)
- Enhancing Women Leadership in Communities
- Enhancing Women Access to Machinery, Reduce Workloads and Encourage Entrepreneurship for Youth and Women

https://mel.cgiar.org/projects/clca2
Private Sector Engagement for Natural Resources Management and Conservation

Public Private Partnership for Scaling Forage Crops and Forage Mixtures in Tunisia

INRAT-Cotugrain-CLCA

Contextualized Forage Mixtures

Forages for Better Soil, Feed, and Biomass

Forage Mixture Corridors Across the Steppe to Increase biomass, Provide High-Quality Feed, and Increase Soil Organic Matter

https://mel.cgiar.org/projects/clca2
Private Sector Engagement for Natural Resources Management and Conservation

Public Private Partnership for Enhanced Conservation Agriculture Practices: Boudour Zero-Till Seeder

ITGC-PMAT-CLCA

Scaling No-Till through Machinery Service Provision Enterprises

Local Production of Zero-till Seeders to Significantly Expand Areas under Conservation Agriculture

https://mel.cgiar.org/projects/clca2
>188 CLCA Knowledge Products

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of Products</th>
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<tbody>
<tr>
<td>Book Chapter</td>
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<tr>
<td>News Item</td>
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<tr>
<td>Dataset</td>
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<tr>
<td>Book</td>
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<td>Manuscript unpublished</td>
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<td>Blog</td>
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<td>Donor Report</td>
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<td>Conference Paper and Poster</td>
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<td>Video</td>
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<tr>
<td>Tool</td>
<td>10</td>
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<td>Brief</td>
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<tr>
<td>Journal Article</td>
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<tr>
<td>Other including Manual, MoU, Images, etc</td>
<td>28</td>
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<tr>
<td>Presentation</td>
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<tr>
<td>Technical Report</td>
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MEL DSpace/CLCA Web Site 125 Authors

426 Connections

Connected Authors Through Publications

https://mel.cgiar.org/projects/clca2
Top Almteometrics Attention Score


Image/Blog - Zied Idoudi, Udo Rudiger. 2019. Mobile seed cleaning and treatment unit designed and developed with support from ICARDA. Lebanon: International Center for Agricultural Research in the Dry Areas (ICARDA).


https://mel.cgiar.org/projects/clca2
CLCA South-South Knowledge Exchange Webinars

13 March to 19 May 2022

> 100 Participants from Algeria, Bolivia, Mexico, and Tunisia
To share and document learnings from Africa and Latin America.

Webpage: http://clca-exchange.org/
RECAP & Take a Way Points

- Raising demand for forages as a key leverage for system transformation in small mixed-crop livestock systems
- Local production of zero-till seeders to significantly expand areas under Conservation Agriculture
- Forage mixture corridors across the steppe to increase biomass, provide high-quality feed, and increase soil organic matter
- Contextualized, collective provision of machinery services are key for system transformation and farmers livelihoods
- Animal Health management is key entry point to stable and functional sustainable crop-livestock systems
- Knowledge Hubs are key platforms to share local knowledge and support capacity development, community empowerment, and sustainable scaling of innovations.
Thank You!

Nothing Makes us Happier than Seeing a Happy Farmers