Improving the date production chain in the Moroccan oases through small mechanization inputs to support the governmental development strategies

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### Traditional palm-based oasis ecosystem:

- Oasis agrobiodiversity
- Livestock
- Commerce
- Palm grove
- Water management
- Ksourien habitat
- Traditional knowledge

### Degraded oasis ecosystem:

- Water crisis: Structural hydric stress, inadequate hydraulic system, overpumping
- Biodiversity losses
- Youth involvement in agriculture decreased
- Agricultural crisis: Soil losses, salinization, plot subdivision, fam. agriculture abandoned
- Conflict between urban development and traditional management
- Demographic growth
- Rural exodus
- Traditional and familiar knowledge losses

Main oasis degradation factors:
- Land and water scarcity
- Salinity
- Soil losses, salinization, plot subdivision, family agriculture abandoned
- Conflict between urban development and traditional management
- Demographic growth
- Rural exodus
- Traditional and familiar knowledge losses

### Moroccan date production main problems:

<table>
<thead>
<tr>
<th>Farmers</th>
<th>Cooperatives/associations</th>
<th>Economic Interest Groups (GIE)</th>
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</thead>
<tbody>
<tr>
<td>- Lack of interest by young generation</td>
<td>- Poor marketing</td>
<td>- Equipment inadequate or insufficient</td>
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<td>- Lack of money</td>
<td>- Health certification (ONSSA) difficult to be obtained</td>
<td>- Infrastructure not fitting international certification criteria</td>
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<td>- No palm renovation</td>
<td>- HACCP principles rarely followed</td>
<td>- Lack of adequate formation</td>
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<td>- Informal agreement with brokers and buyers</td>
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<td>- Difficult relations with cooperative and producers</td>
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<td>- Poor logistic for transport and marketing</td>
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In Moroccan oases, date palm agricultural operations are mainly manual and seldom implemented, contributing to palm grove degradation.

The introduction of small mechanization may reduce drudgery, encourage/attract youths, increase labor productivity and safety.

### Proposed mechanization scheme:

- Small size tractor with trailer and multiple tools
- Small size transporter
- Small size excavator
- Motocultivator with multiple tools
- Motorhoe
- Small size self-propelled off-road aerial platform
- Metal ladder (adapted to date palm)
- Power scissors (pneumatic or electric)
- Chain saw (pneumatic, electric)
- Knapsack motorized sprayer
- Motorized static mulcher