**Study #4372**

**Contributing Projects:**
- P959 - Product Line 3.3.2: Improved management options for planted/cultivated forages and rangelands

**Part I: Public communications**

**Type:** OICR: Outcome Impact Case Report  
**Status:** Completed  
**Year:** 2021

**Title:** Adoption of spineless cactus pear by 7,000 smallholder farmers in Jordan and India as a multipurpose crop for enhanced resilience and increased household income

**Short outcome/impact statement:**
Research, advocacy and trainings on spineless cactus pear (Opuntia Ficus-indica) across South and West Asia by ICARDA and partners has led to rapid adoption by smallholder farmers, who are benefiting from greater income. Government, NARS, NGOs, private sector and universities support for the crop are amplifying efforts. Consumer demand for cactus pear products in Jordan is on the rise and farmer appreciation of the crop in India has shifted. In both countries, demand for cladodes (leaf-like stems) have surpassed availability.

**Outcome story for communications use:**  
<Not Defined>

**Links to any communications materials relating to this outcome:**
- https://hdl.handle.net/20.500.11766/13190  
- https://hdl.handle.net/20.500.11766/12312  
- https://hdl.handle.net/20.500.11766/10662  
- https://hdl.handle.net/20.500.11766/12373

**Part II: CGIAR system level reporting**

**Link to Common Results Reporting Indicator of Policies:** No

**Stage of maturity of change reported:** Stage 3

**Links to the Strategic Results Framework:**

Sub-IDOs:
- Increased resilience of agro-ecosystems and communities, especially those including smallholders  
- Closed yield gaps through improved agronomic and animal husbandry practices

Is this OICR linked to some SRF 2022/2030 target? Yes

**SRF 2022/2030 targets:**
- # of more farm households have adopted improved varieties, breeds or trees

**Description of activity / study:** <Not Defined>
Geographic scope:
- Multi-national

Country(ies):
- India
- Jordan

Comments: Cactus pear has high potential for use in Gulf countries and North Africa

Key Contributors:
Contributing CRPs/Platforms:
- Livestock - Livestock

Contributing Flagships:
- F3: Livestock Feeds and Forages
- F4: Livestock and the Environment

Contributing Regional programs: <Not Defined>

Contributing external partners:
- BAIF - BAIF Development Research Foundation
- AFESD - Arab Fund for Economic and Social Development
- unipa - Università degli Studi di Palermo
- ICAR-CAFRI - Indian Council of Agricultural Research - Central Agroforestry Research Institute
- NARC - National Agriculture Research Center
- CAZRI - Central Arid Zone Research Institute
- DCS Odisha - Directorate of Soil Conservation
- ICAR - Indian Council of Agricultural Research

CGIAR innovation(s) or findings that have resulted in this outcome or impact:
Promotion of cactus pear as a multipurpose crop to enhance the livelihood of poor farmers in dry areas of different countries resulted in high level of adoption.

Innovations:
- 1790 - Promotion of cactus pear as a multipurpose crop to enhance the livelihood of poor farmers in dry areas of Northern Africa and Western Asia (https://tinyurl.com/2jnf4h4s)
**Elaboration of Outcome/Impact Statement:**

Arid and semi-arid regions comprise approximately 41% of the total world land surface. Their productivity depends on sustainable agricultural systems solutions and the cultivation of appropriate species that can withstand the harsh conditions. The cactus pear (Opuntia ficus-indica) exhibits crassulacean acid metabolism, enabling it to successfully adapt to drought, erratic rainfall, and low soil fertility [1]. The crop has attracted global attention due to its capacity to grow with minimal cost and inputs and the multiple food, livestock feed and livelihood benefits generated from the fruit and cladodes [3, 4, 5]. The Indian Grassland and Fodder Research Institute estimates profitability per 1kg of fresh weight cactus feeding of 4.3 Rupees ($0.06) and production of an adult plantation (5 years old) at 60-70 tons/ha generating 280,000 Rupees ($3,600).

In collaboration with the FAO-ICARDA CactusNet, University of Palermo and national partners in India and Jordan, and with financial support from AFSED, ICAR and CGIAR, ICARDA conducted research on the sustainable and efficient cultivation of cactus pear, leading to global promotion of its wide range of uses, benefits and commercial opportunities [6].

ICARDA scientists developed a suite of best-bet agronomic practices and conducted extensive training initiatives on both a national and international scale [7]. In West Asia, productive cactus pear accessions that can tolerate low temperatures were identified and new fruiting types disseminated. A Google Earth Engine (GEE) map was developed and trialed by researchers to identify suitable cactus pear planting areas in India, considering land potential, climatic conditions and plant requirements [8]. Promotion of affordable small machines to process cladodes has helped reduce the workload of rural women [9].

The success of these efforts has resulted in: high adoption rates (450,000 cladodes were planted by 7,000 beneficiaries, and 5,000 people participated in training events); and numerous requests from stakeholders (international organizations, NGOs, private sector, and agricultural extension centers) for materials and technical backstopping. The Government of Odisha in India is funding projects to promote cactus plantations to enhance farmer livelihoods and the Jordanian National Agricultural Research Center is establishing new nurseries to meet the demand for cactus fruiting types [10].

Cactus pear is now recognized globally as essential to sustain the livelihoods of vulnerable smallholders in arid and semi-arid regions. The work by ICARDA on cactus pear was selected as one of the 50 top CGIAR innovations and will be adopted in the One CGIAR Livestock, Climate and System Resilience (LCSR) Initiative.
References cited:

•[1] PANORAMA solutions: Cactus pear, a drought-tolerant crop grown by millions of farmers in dry areas for nutritional and income generating purposes (https://tinyurl.com/ybyfncgx)


## Reporting 2021 Evidences

### Quantification:

<table>
<thead>
<tr>
<th>Type of quantification</th>
<th>Number</th>
<th>Unit</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Actual counts or estimates from a particular study (please provide reference)</td>
<td>450000.00</td>
<td>Cactus plants</td>
<td>450,000 cactus pear cladodes were disseminated planted in India and Jordan (Cactus Policy brief <a href="https://hdl.handle.net/10568/114695">https://hdl.handle.net/10568/114695</a>, donor report <a href="https://repo.mel.cgiar.org/handle/20.500.11766/12583">https://repo.mel.cgiar.org/handle/20.500.11766/12583</a>, internal reports: <a href="https://hdl.handle.net/20.500.11766/12395">https://hdl.handle.net/20.500.11766/12395</a>)</td>
</tr>
<tr>
<td>a) Actual counts or estimates from a particular study (please provide reference)</td>
<td>12000.00</td>
<td>Beneficiaries</td>
<td>12,000 beneficiaries from cactus pear cladodes dissemination and capacity development events (Cactus Policy brief <a href="https://hdl.handle.net/10568/114695">https://hdl.handle.net/10568/114695</a>, donor report <a href="https://repo.mel.cgiar.org/handle/20.500.11766/12583">https://repo.mel.cgiar.org/handle/20.500.11766/12583</a>, internal reports: <a href="https://hdl.handle.net/20.500.11766/12395">https://hdl.handle.net/20.500.11766/12395</a> and capacity development events: <a href="https://hdl.handle.net/20.500.11766/10973">https://hdl.handle.net/20.500.11766/10973</a>; <a href="https://hdl.handle.net/20.500.11766/12676">https://hdl.handle.net/20.500.11766/12676</a>; <a href="https://hdl.handle.net/20.500.11766/12339">https://hdl.handle.net/20.500.11766/12339</a>; <a href="https://hdl.handle.net/20.500.11766/12338">https://hdl.handle.net/20.500.11766/12338</a>; <a href="https://hdl.handle.net/20.500.11766/12373">https://hdl.handle.net/20.500.11766/12373</a>)</td>
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<tr>
<td>a) Actual counts or estimates from a particular study (please provide reference)</td>
<td>6000.00</td>
<td>Participants in training events</td>
<td>6,000 participants in training events (Cactus Policy brief <a href="https://hdl.handle.net/10568/114695">https://hdl.handle.net/10568/114695</a>, donor report <a href="https://repo.mel.cgiar.org/handle/20.500.11766/12583">https://repo.mel.cgiar.org/handle/20.500.11766/12583</a>, internal reports: <a href="https://hdl.handle.net/20.500.11766/12395">https://hdl.handle.net/20.500.11766/12395</a> and capacity development events: <a href="https://hdl.handle.net/20.500.11766/10422">https://hdl.handle.net/20.500.11766/10422</a>; <a href="https://hdl.handle.net/20.500.11766/10973">https://hdl.handle.net/20.500.11766/10973</a>; <a href="https://hdl.handle.net/20.500.11766/12676">https://hdl.handle.net/20.500.11766/12676</a>; <a href="https://hdl.handle.net/20.500.11766/12339">https://hdl.handle.net/20.500.11766/12339</a>; <a href="https://hdl.handle.net/20.500.11766/12338">https://hdl.handle.net/20.500.11766/12338</a>; <a href="https://hdl.handle.net/20.500.11766/12373">https://hdl.handle.net/20.500.11766/12373</a>)</td>
</tr>
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</table>
**Gender, Youth, Capacity Development and Climate Change:**

**Gender relevance:** 1 - Significant

Main achievements with specific Gender relevance: Gender relevance: 1 ? significant

Cactus pear chopping by knife is a risky, time-consuming, and labor-intensive practice and is usually done by women. To help women, manual choppers were disseminated.

*Feed and Forages? in Tunisia (Long version).* https://repo.mel.cgiar.org/handle/20.500.11766/10056

https://www.icarda.org/media/news/cactus-choppers-reduce-work-load-rural-women

**Youth relevance:** 0 - Not Targeted

**CapDev relevance:** 2 - Principal

Main achievements with specific CapDev relevance: Main achievements with specific CapDev relevance: Cactus pear program worked hand-in-hand with government partners, research institutions, non-governmental organizations and farmers to deliver field days and group training courses, arrange learning visits and other activities - significantly building their capacity.


**Climate Change relevance:** 1 - Significant

Describe main achievements with specific Climate Change relevance: Research studies and reviews have generated evidence on the potential to mitigate the effects of climate change. Cactus pear benefits include soil carbon sequestration, soil erosion reduction, combat desertification and wasteland improvement.

**Other cross-cutting dimensions:** NA

**Other cross-cutting dimensions description:** <Not Defined>

**Outcome Impact Case Report link:** Study #4372

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