

# Zainer: Low-cost Zai field preparation

## Zainer

The Zainer is a lightweight vertical soil drill mounted on a two-wheeled cart and powered by a 5 hp petrol engine. It drills Zai planting holes to a depth of about 25 cm in 4 seconds, producing up to 17 pits per minute and covering 1 hectare in approximately 40 working hours. The machine directs excavated soil to enhance runoff infiltration, is fuel-efficient, easy to operate by both men and women, and can be maintained locally, with a lifespan of about five years under minimal maintenance.



**International Water Management Institute**  
International Water Management Institute and PRACTICA

This technology is **pre-validated**.

Scaling readiness: idea maturity 9/9; level of use 9/9

Inclusion assessment **3**

Climate impact **3** **1**

### Problem

- **Manual labor is very strenuous:** Digging Zai pits by hand requires up to 300 hours per hectare, which greatly limits its adoption.
- **Low mechanization of land preparation:** The lack of suitable equipment hinders the spread of water conservation practices in arid areas.
- **High acquisition cost for individuals:** With its high price tag, the Zainer remains difficult to access without a collective approach or mechanized services.

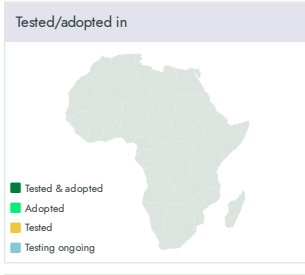
### Solution

- **Rapid land preparation:** The Zainer can create Zai holes at a rate of up to 17 holes per minute, significantly reducing the time required per hectare.
- **Reduced labor intensity:** Mechanization limits physical effort and facilitates the adoption of water conservation practices.
- **Better soil water management:** Zai holes improve runoff infiltration and moisture retention in dry areas.
- **Suitable for small producers and agricultural services:** Lightweight and easy to use, it can be operated by cooperatives or service providers.

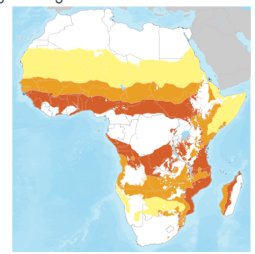
Commodities  
Sorghum/Millet, Maize, Tomato, Pepper, Onions

Sustainable Development Goals  
**2 ZERO HUNGER**

Categories  
Pre-production, Equipment, Water management



Where it can be used  
This technology can be used in the colored agro-ecological zones.



Target groups  
Farmers

### Key points to design your project

The Zainer mechanizes Zai pit creation, reducing labor from 300 hours to 5 days per hectare, improving soil moisture retention and crop resilience, and supporting SDGs on food security and sustainable agriculture.

- **Cost and Access:** Cooperative or service-provider ownership allows multiple farmers to benefit.
- **Supply and Maintenance:** Ensure reliable sourcing of machines, spare parts, and local petrol engine repair services.
- **Training and Operation:** Train farmers on safe use, correct pit depth (25 cm) and spacing (25–30 cm), and basic maintenance to ensure efficiency.
- **Awareness and Field Readiness:** Use demonstrations and guides to promote adoption and confirm fields are suitable for Zai pit drilling.

This approach enables timely, efficient land preparation, labor savings, and improved water-harvesting practices in smallholder farming.

<b>1600 USD</b> Cost per hectare	<b>1800 USD</b> Revenue per hectare	<b>200 USD</b> Net income per hectare	<b>13 %</b> ROI per hectare
IP No formal IP rights			



Zainer

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