

Low Rainfall Maize Trial— Long Rain Season, Kenya (2014)

Farmers First

PHASE:	<u>Research Station</u>	50 – 500 farmers	1,000 – 20,000 farmers	Full Scale
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Introduction

Maize is the primary staple grain for most of East Africa. However, most maize varieties have been bred for higher productivity areas with rainfall levels greater than 1000mm per year. Yet millions of subsistence famers grow maize in areas with less than 1000mm of rain. Maize production in these areas is highly vulnerable to climate change and inadequate rainfall. One Acre Fund has identified and tested low-rainfall tolerant maize varieties and maize planting techniques. These varieties and techniques were trialed on our low-rainfall research station during the long-rain season (March-August) of 2014.



Hailey Tucker/One Acre Fund

\$447	Average profit impact per hectare	12,000	One Acre Fund farmers in low-rainfall areas
No change	Average yield improvement per hectare	4 million	Number of African farmers in low rainfall areas

Context and Trial Rationale

- Maize is the most widely crop grown in western Kenya and is the primary source of household calories. Despite lower adaptation of maize to drought than other crops, farmer demand is so high that maize is often planted in un-ideal agroecological zones.
- Identifying high-performing, drought tolerant maize varieties and drought resilient maize production systems could substantially impact current One Acre Fund farmers and open new avenues for the One Acre Fund model in drought-prone areas of Kenya and other countries.

Major Intervention Configurations

- **Research:** One Acre Fund consulted a range of experts to identify promising water conservation agronomic techniques for maize. The organizations included The International Maize and Wheat Breeding Center (CIMMYT) and the International Center for Research in the Semi-Arid Tropics (ICRSAT). From this consultation One Acre Fund identified the Zaï and contour ridge system from West Africa.
- **New Varieties:** One Acre Fund identified a locally produced hybrid maize seed, WE2106, that was bred to be tolerant to drought stress.

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- *Input and plant population:* Independent trials were conducted with the Zaï and contour ridge systems, and with WE 2106. These varieties were compared to the One Acre Fund core maize offering of variety WE1101. All plants received 124 kg/ha DAP at planting and 124 kg/ha CAN at topdress.
- *Test Configurations:*
 - 1) **Zaï:** WE1101 with and without the Zaï methodology
 - 2) **Contour ridges:** WE1101 with and without the contour ridge methodology
 - 3) **Drought tolerant variety:** WE2106 (drought tolerant) and WE1101 (drought tolerant control).

A. Yield and Profit: The below table summarizes agronomic results

Trial	Configuration	Location / Date	Yield (t/ha)	P-value	Profit (USD/ha)	Profit Change vs. Trial Control
1. Zaï: WE1101, 123.5kg DAP and 123.5kg CAN, 222,300 plants / hectare	Research Station*	Western Kenya, Long Rains 2014	1.7	0.25	\$518	+ \$220
2. Contour ridges: WE1101, 123.5kg DAP and 123.5kg CAN, 222,300 plants / hectare	Research Station	Western Kenya, Long Rains 2014	1.5	0.54	\$407	+ \$111
3. Drought tolerant variety: WE2106, 123.5kg DAP and 123.5kg CAN, 222,300 plants / hectare	Research Station	Western Kenya, Long Rains 2014	0.7	0.13	\$76	- \$431

*For all research station trials, n=6.

B. Adoptability: *Low – Medium adoptability*

- While more work will be done in 2015 to refine the power of the data, both the Zaï and the contour ridge techniques are labor intensive. The benefits of these systems would have to clearly be greater than the labor requirements.
- Multi-season data would also be required to effectively evaluate adoptability. As both of these systems are semi-permanent physical and structural changes to the landscape, the labor requirements are highest in the first year.

C. Operability at Scale: *Low operability*

- There are few obstacles to moving the drought tolerant seed varieties to scale. However, the high initial labor requirements and knowledge intensity of the other management tools, Zaï and contour ridges, pose significant hurdles to moving to scale.

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Next Steps

In 2015, One Acre Fund will:

- 1) Evaluate the combined effect of the Zaï and contour systems in other drought-prone areas of western Kenya both in the research station and in farmer level trials.
- 2) Evaluate the drought tolerant maize variety in other drought-prone areas in the absence of striga and MLND pressure.