Best Management Practices for Small-Holder Irrigated Maize Producers in Somalia

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Project Background

In March 2014 the Agri-Business Incubation Centre (ABIC) was established near the Shabelle River at Afgoi, Somalia (Fig. 1), to conduct research on best management practices for irrigated maize production. This USAID-funded "Partnership for Economic Growth (PEG)" project represented the first development project in southern Somalia following over two decades of emergency aid efforts. The Somali Agricultural Technical Group (SATG www.satg.org) was the on-the-ground implementer of the project.

The ABIC location was near where the former Central Agricultural Research Station once existed prior to the collapse of the Siad Barre government in 1991. This poster reports the results the Gu2014 and Deyr2015 on-farm comparisons between two irrigated maize treatments: A) the practices commonly used by small-scale subsistence farmers (*Farmer trt*), and B) the practices promoted by SATG (*SATG trt*).

Protocol and Methods

During the Gu and Deyr seasons of 2014, the ABIC selected lead farmers from villages in the Lower-Shabelle region of Somalia. In Gu14 , a total of 81 farmers participated in the research trial, and 77 farmers participated in the subsequent Deyr14. Each of these farmers was then presented with an SATG agronomic package, as well as an ABIC-trained extension operator in order to assist with the implementation of their trial. The farmers were then instructed to farm a portion of their land according to their normal agricultural practices and a portion of their land according to the specifications of the SATG agronomic package. These two different practices are designated *Farmer trt* and *SATG trt*. The *SATG trt* consisted of a higher plant population with uniform row and plant spacing; a nitrogen fertilizer application; an application of Buldok insecticide; and timely irrigation and weeding events.

Plot size was at least 10m² for the *SATG trt*. In Gu14, plant spacing was 0.75m between rows with 0.25m between plants within a row, and, in Deyr14 it was 0.75m between rows and .30m between plants. Nitrogen fertilizer rates, in the form of Urea, also differed between seasons. In Gu14, a rate of 150kg/ha of N was used. In Deyr14, that rate was reduced to 75kg/ha of N. The *SATG trt* also received a pre-planting application of DAP at a rate of 200kg/ha, because of the known phosphorus deficiency of soils in this region; as well as the insecticide Buldock at a rate of 5kg/ha applied at the five-leaf stage, in order to combat stem borer. The *Farmer trt* area was maintained by the farmers with their usual practices. Measurements were obtained by hand harvesting the ears and stover from two 3m² subsamples. The stover was then weighed at harvest conditions. The ears were threshed and the grain was then weighed after drying.

Results

There was a drought in Gu14, resulting in no yields on unirrigated farmland, while In Dery14 rainfall was above normal (Fig. 2). Both seasons the *SATG trt* yielded more than the *Farmer trt*, with maize grain yields averaging 63% more in Gu14 (4,464 vs 2,748 kg ha^{-1}) and 128% more in Deyr14 (3,873 vs 1,697 kg ha^{-1}) (Table 1). Farmers in certain villages had higher yields than other villages (Table 2). This observation needs further analysis to see if this was due to soil fertility or other agronomic practices. The plant population recommended with the *SATG trt* appears to be too low when comparing the grain yield on a given farm with the corresponding plant population (Fig. 3). These farmers typically plant on 0.75m row spacings, and after the Gu14 season they requested that the plant spacing between plants within a row be increased (from 0.25m to 0.30m) for ease of weeding. This decrease in plant population may have been a contributing factor to the lower yields in observed in Deyr14.

Overall Summary

The project began with field training "extension operators" on the importance of quality seed, timely planting, pest control, appropriate plant stand density, and weed management was demonstrated. In Gu14 and Deyr14 these operators assisted over 150 "lead farmers" withdemonstration plots on their land, which compared their own farming practices with those recommended by SATG. The results of these on-farm trials showed significant increases in both grain and stover yield with the SATG practices. Farmer education is a key component of the ABIC mission. During the project, over 2000 "contact farmers" visited the ABIC and the lead farmer's fields. This allowed the lead farmers to act as extension operators in their own right and extended the ABIC's outreach capabilities. Attending ABIC field days were community elders, agro-dealers, members of government ministries and agricultural students and faculty from several universities including Benadir, City, and Zamzam and Plasma University. Another key component of this project was to proactively involve female farmers, and it succeeded in this by involving women in multiple capacities: as extension workers, as lead farmers, and as contact farmers. Through the efforts of SATG, maize farmers in the lower-Shabelle region gained a strong appreciation for good agricultural practices.

Funding sources:

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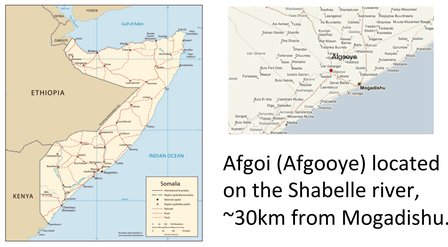


Afgoi (Afgooye) located on the Shabelle river, ~30km from Mogadishu.

Fig 1. On-farm research results 81 and 77 farmers In Gu14 and Deyr14, respectively.

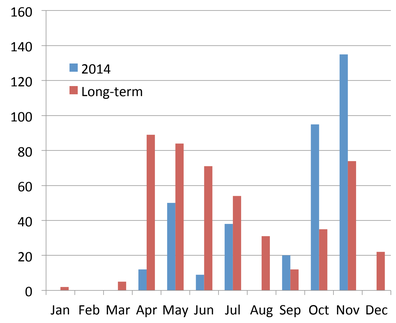


Fig 2. Afgoi rainfall. Gu2014 rains were well below the long-term average, whereas the Dery2014 rains were above average. Annually, rain totals 479mm, with more typically occurring during the Gu season.

Table 1. Grain Yield for Gu14 & Deyr14.

	----Grain Yield----		---Stover Yield---	
Treatment	Gu14	Deyr14	Gu14	Deyr14
	---------- kg ha^{-1} ----------			
SATG trt	4,464	3,873	12,460	13,490
Farmer trt	2,748	1,697	8,310	6,970
% increase	*63%*	*128%*	*50%*	*94%*

Table 2. ANOVA for Grain and Stover for Gu14 and Dery14.

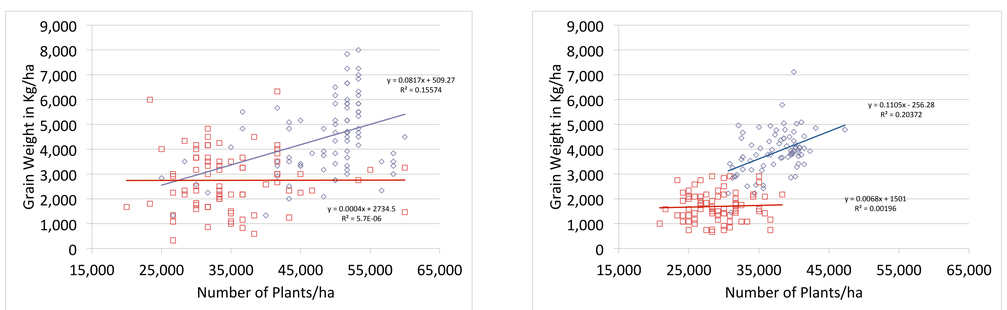
ANOVA for Gu14

Source	df	Grain Pr>F	Stover Pr>F
Treatment	1	<0.001	<0.001
Village	16	<0.001	<0.001
Trt X Village	16	0.087	0.025
Farmer w/in Village	64	0.207	<0.001
Error	64	--	--
TOTAL	161		

ANOVA for Deyr14

Source	df	Grain Pr>F	Stover Pr>F
Treatment	1	<0.001	<0.001
Village	13	<0.001	<0.001
Trt X Village	13	0.005	<0.001
Farmer w/in Village	63	0.077	0.028
Error	63	--	--
TOTAL	153		

Fig 3. Relationship between Grain Yield and Plant Population.



Measuring stover fresh weight.

SATG and extension workers assisting a lead farmer in a village near Afgoi.

Measuring maize ear weight.

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