

Increasing land productivity through crop variety and improved management

By

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General Facts

- ✓ The sound performance of agriculture warrants the availability of food crops.
- ✓ This accomplishment in agriculture does not only signify the adequate **acquisition of food crops** to attain food security, but also heralds **a positive aspect of the economy** (CSA, 2015)
- ✓ However, due to those listed production constraints, productivity of crops are very low compared with average world productivity
 - Variety selection
 - Nutrient utilization
 - Insect pest and disease
 - Weed infestation
 - Management techniques

Cont...

- The Gumara-Maksegnit watershed, North Gondar, Ethiopia, lies in the upper catchments of the Blue Nile River and Lake Tana.
- The watershed has an area of 56 km². Three-quarters of the watershed is cropland
- The main crops are **sorghum**, teff, wheat, barley, faba bean, **lentil**, chickpea, linseed, and fenugreek.

Cont...

Productivity---- t/ha

| Crop type | Productivity (Ethiopia) | Productivity (Amhara) | Productivity (North Gondar) | Productivity (Watershed) |
|----------------|-------------------------|-----------------------|-----------------------------|--------------------------|
| Sorghum | 2.36 | 2.1 | 2.1 | 1.6-1.8 |
| Tef | 1.96 | 1.58 | 1.6 | 1.0-1.5 |
| Wheat | 2.54 | 2.25 | 2.5 | 2.0 |
| Barley | 1.96 | 1.72 | 1.8 | 1.5 |
| Lentil | 1.38 | 1.3 | 1.6 | >1.0 |

Source CSA,2015 and interview

Cont...

- Improving sorghum and lentil crop productivity were our research priority
- Therefore the **objective** were
 - ✓ To determining appropriate weeding frequency of sorghum
 - ✓ To determine the best sorghum/faba bean combination
 - ✓ To evaluate and identify adaptive, high-yielding and disease resistant/ tolerant lentil varieties for main cropping season in Gumara-Maksegnit watershed

Tested Materials and results

A. Sorghum weeding trial

Treatments

1. HW1 -Hand weeding once (25 days after emergence/DAE/)
2. HW2-Two times hand weeding (25 and 55 days after emergence/DAE/)
3. HW3- Three times Hand weeding (25, 55 and 90 days after emergence/DAE/)
4. HW4- Farmers practice (weeding once at 80 days after emergence/DAE/)
5. HW5- Weed free plot
6. HW6- Control (Un weeded plot)
7. Shelshalo

Duration:-2014-2015

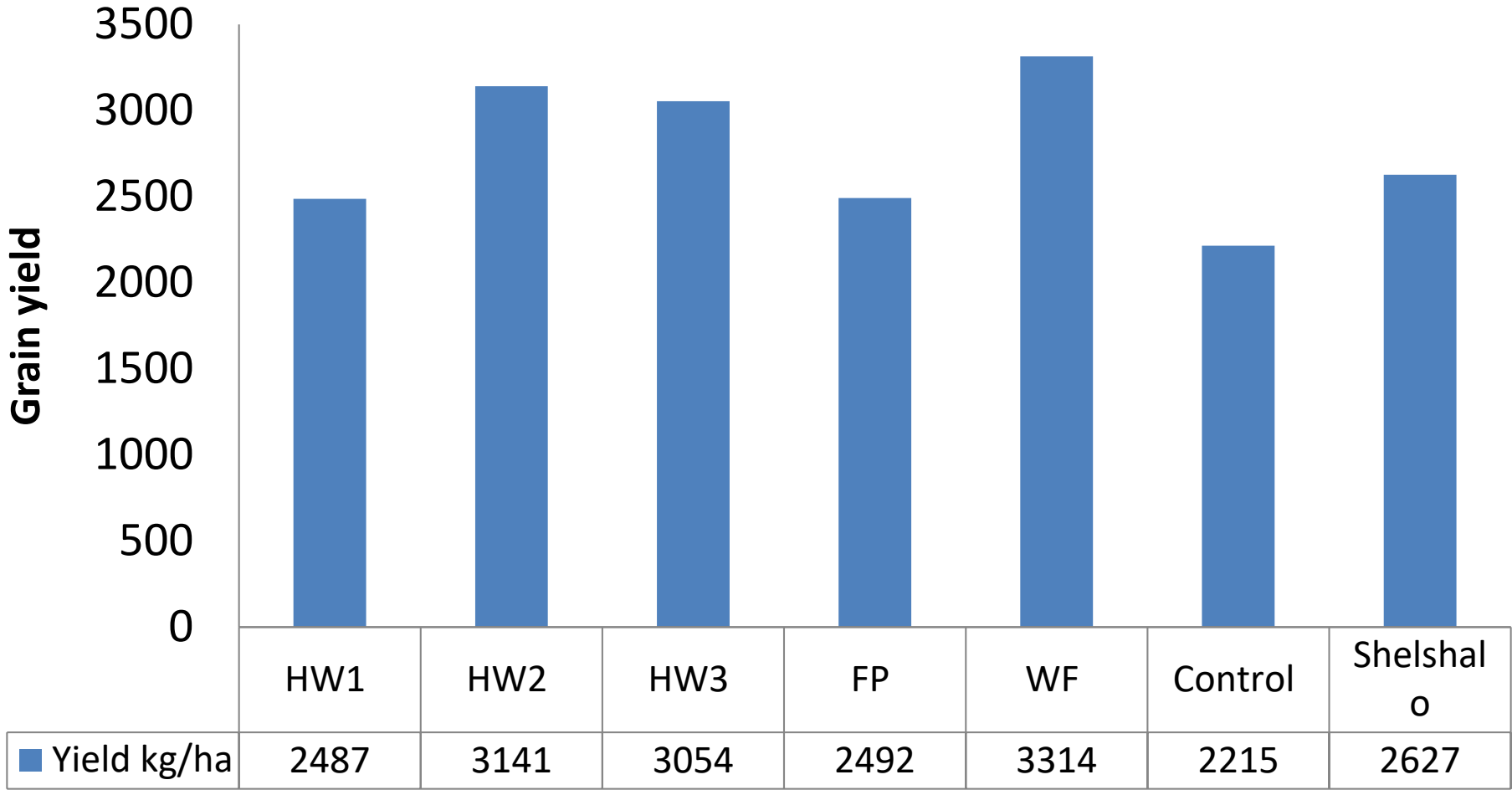
No. Sites:- 3

Variety:- Local



Cont...

HW2 has 649 kg/ha
yield advantage over FP



Cont...

B. Sorghum-Faba bean Intercropping trial

Treatments

1. Sole sorghum
2. Sole faba bean
3. Sorghum/faba bean in 1:1 row ratio, faba bean planted simultaneously
4. Sorghum/faba bean in 1:1 row ratio, faba bean planted 10 days after sorghum planting
5. Sorghum/faba bean in 1:3 row ratio, faba bean planted simultaneously (
6. Sorghum/faba bean in 1:3 row ratio, faba bean planted 10 days after sorghum planting

Duration:-2013-2014

No. Sites:- 2

Variety:- Local sorghum and Degaga faba bean



Biomass Yield (Kg/ha), Grain Yield(kg/ha) and LER in 2013 and 2014

| Treatment | Biomass Yield | Grain yield | Faba bean Grain yield | LER |
|---|----------------------|--------------------|------------------------------|------------|
| Sole sorghum | 12370 ^a | 3021 ^a | | 1 |
| Sole faba bean | | | 1519 ^a | |
| Sor/faba in 1:1 row ratio, faba bean planted simultaneously | 8620 ^{bc} | 2395 ^{bc} | 913 ^b | 1.39 |
| Sor/faba in 1:1 row ratio, faba bean planted 10 days after | 10630 ^{ab} | 2817 ^{ab} | 948 ^b | 1.56 |
| Sor/faba in 1:3 row ratio, faba bean planted simultaneously | 6514 ^c | 1834 ^d | 1113 ^b | 1.33 |
| Sor/faba in 1:3 row ratio, faba bean planted 10 days after | 8250 ^{bc} | 2073 ^{cd} | 1528 ^a | 1.69 |

Cont...

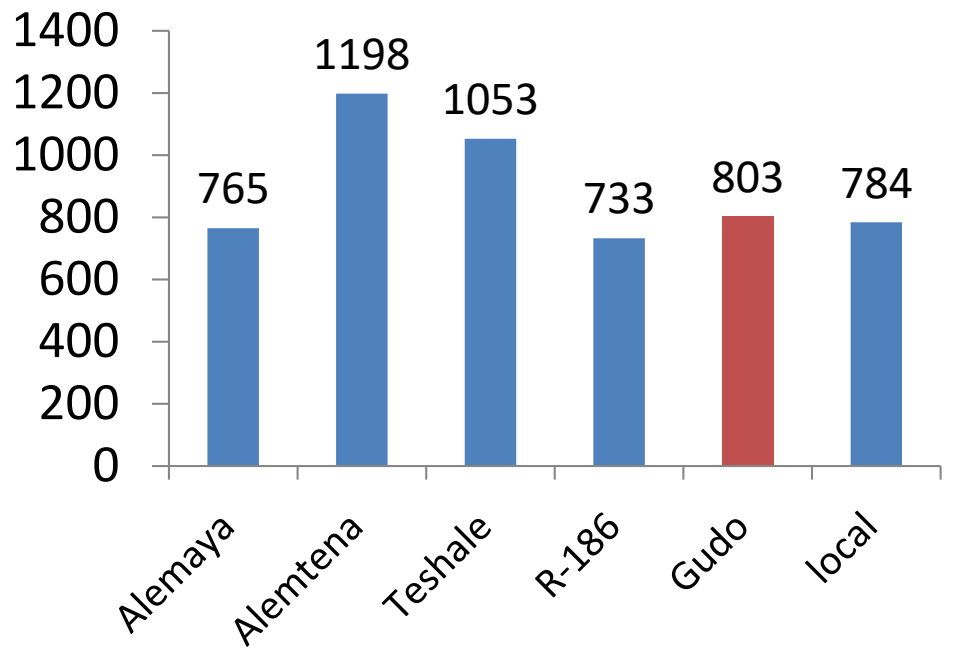
C. Lentil Variety Adaptation

Treatments

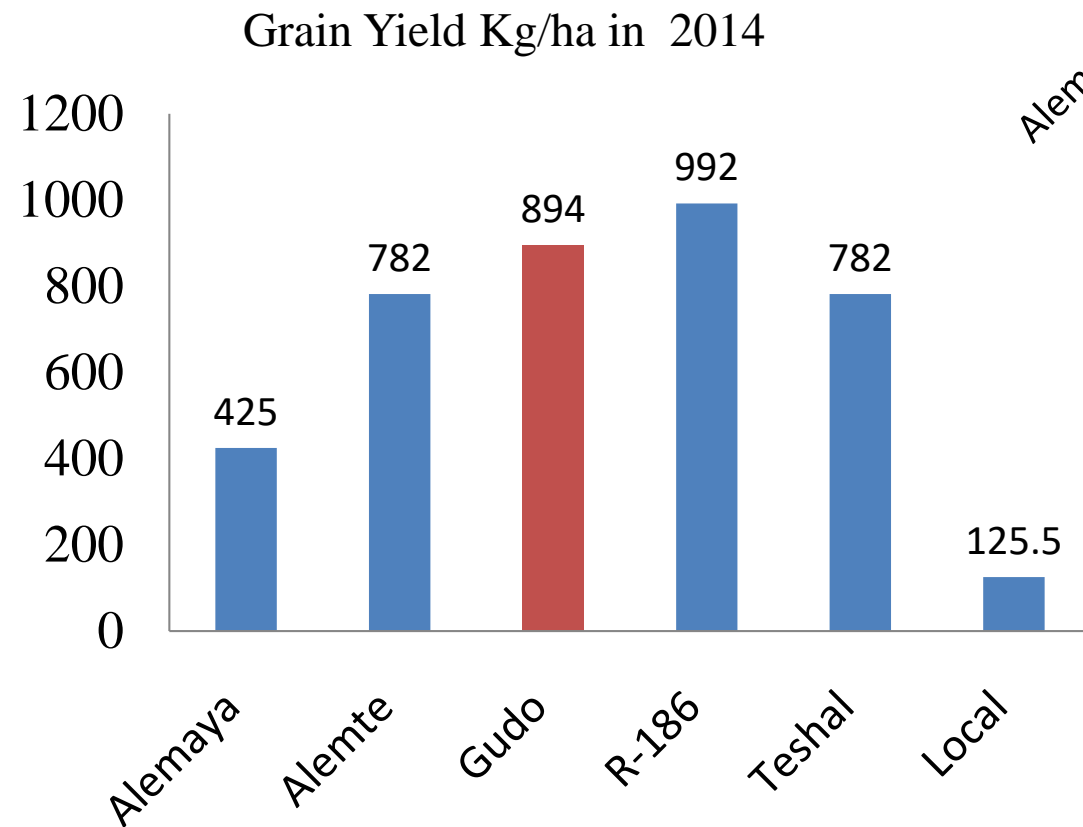
1. Alemaya
2. Alemtena,
3. Teshale
4. Derso
5. EL-142
6. R-186
7. Chalew
8. Chekole
9. Gudo
10. Ada'a

Duration:-2013-2014

No. Sites:- 2



Grain Yield Kg/ha in 2013



Farmers saying on varieties

- ✓ 80 farmers visited and evaluated the varieties
- ✓ There were two groups, in two groups
 - 1st. **Gudo** Good pod bearing capacity
 - large seed size
 - good in biomass
 - Good branching habit

Way forward

- Research results showed that, there is big potential of increasing yield even more through practicing the inclusion of all technologies at a time.
- Sorghum production in the watershed took the lion share of crop production, thus research on finding new varieties with short maturing date should take priority

Thank You