FRG II Research Inventory

October 2013
Foreword

Since 2010, FRG (Farmer Research Group) II Project has been implemented in Ethiopia under the consortium of Ethiopian Institute of Agricultural Research (EIAR) and Japan International Cooperation Agency (JICA).

The FRGII Project has conducted a number of research activities with researchers, farmers, extension workers, and stakeholders in various disciplines from crop, livestock, natural resource, farm implements to marketing through participatory research method.

We hope this issue be of good help for the readers to understand 41 FRG research topics at glance.

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Map of FRGII based research sites

2013 FRG Based Research Sites

- Green Circle: Quality Seed Production
- Light Blue Circle: Seed Treatment
- Red Circle: Farmer Saved Seed Quality
- Orange Circle: Forage
- Dark Blue Circle: Irrigated Vegetables
- Yellow Circle: Rice
- Black Circle: FRG@FTC
- Pink Circle: Others
1. Rice
Participatory Variety Selection with Farmers in Rainfed Rice Condition

**Adet ARC (Amhara region)/ Completed**

**Duration:** May 2010-December 2012  
**Budget:** 40,000 Birr

**Background:**  
The national rice research project tests varieties for different ecosystems following conventional breeding approach. Farmers’ participation is little in the process. Many varieties cultivated in farmers’ field are not registered, while many registered varieties are not cultivated by farmers.

**Objective:**  
- To identify farmers’ selection criteria for rice varieties  
- To introduce farmers newly improved varieties  
- To weigh selection criteria according to gender preferences  
- To enhance the capacity of farmers to multiply and diffuse seeds of varieties selected by them

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>3 (RCBD)</td>
<td>1</td>
</tr>
</tbody>
</table>

[Location] South Gonder Zone, Fogera Woreda, Kuhar Michael Kebele, Kuhar Abo Kebele, Tiwuha Zakena Kebele, Libokamkam Woreda, Bura Kebele, Shina Tison Kebele, Metekel Zone, Pawe Woreda, 14 Kebele and 17 Kebele  
[Treatment]  
Control: AD01, AD048 and IAC164  
[Data collected] Evaluation of rice at the stage of 65% maturity stage  
[Stakeholders] Farmers (137 farmers in 7 FRGs), DAs, Extension officers, Private rice mill owners

**Results:**  
- Farmers have started to multiply some of the released varieties following community based seed multiplication system approach.

**Farmers’ participation:**  
- Evaluation of different varieties at the maturing stage and post harvest.  
- Farmers identified their pre and post selection criteria.

**Research team:**  
Agronomist, pathologist, entomologist, weed scientist, economist, extension researcher

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Contact farmer:  
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Tel: 0918028182
Participatory Evaluation of Time and Frequency of Different Hand Weeding Levels on Lowland and Upland Rice at Fogera

Adet ARC (Amhara region)/ Completed
Duration: May 2010-December 2011
Budget: 25,000 Birr

Background:
Rice production and weed control are often synonymous. Well planned weed control is essential for producing rice economically. Rice farmers’ weeding practice in Fogera plain is by hand and a laborious work and need to identify critical and economical timing and frequency of weeding. Hand weeding is economically feasible and environmentally sound compared to chemical weed control for small scale farmers.

Objective:
- To evaluate timing and frequency of hand weeding for their relative advantage.
- To create awareness among farmers and development experts on weeding at different times and frequency levels.

Methods:
2 independent studies are performed at lowland and highland. Numbers of treatment, replications and trial sites for each study are as indicated below.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

[Location] South Gonder Zone, Fogera Woreda, Quar Kebele, Abau Kebele, Tihaa Kebele

[Treatment]
Weed free, hand weeding at 20 and 50 days after emerging (DAE), 35 and 50 DAE, 20, 35, and 50 DAE. (Control: weedy)

[Plot design]
RCBD replications with farmers variety (lowland: X-jigna, upland: Nerica-4), plot size (10m x 6m), spacing between plots (1m), seed rate (100 kg ha⁻¹), broadcast seeding, fertilizers (46/23 N-P kg ha⁻¹).

[Data collected]
Effective tiller count /m², plant height, grain yield

[Stakeholders]
Woreda office of Agriculture,

Results:
- Different time and frequency of hand weeding showed significant difference in effective tillers and grain yield, but not in plant height for both upland and lowland rice.
- Weeding at 20, 35, and 50 DAE gave the highest effective tillers and grain yield for both rice varieties followed by weed free check (complete weeding).
- Weeding at 20, 35, and 50 DAE gave the highest net benefit in both upland and lowland rice. (for lowland, see Table 1)

Remarks:
- Most of the cases, farmers’ selections matched with the scientific approach.

Table 1. Partial budget analysis on different method of hand weeding levels on low land rice

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Marketable yield (t/ha)</th>
<th>Cost of labour (birr/ha)</th>
<th>Gross benefit (birr/ha)</th>
<th>Net benefit (birr/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weedy check</td>
<td>4</td>
<td>0</td>
<td>3200</td>
<td>3200</td>
</tr>
<tr>
<td>Weed free check</td>
<td>43.9*</td>
<td>10000</td>
<td>35112</td>
<td>25112</td>
</tr>
<tr>
<td>Weeding at 20 and 35 DAE</td>
<td>26.81*</td>
<td>2000</td>
<td>27448</td>
<td>19444</td>
</tr>
<tr>
<td>Weeding at 35 and 50 DAE</td>
<td>36*</td>
<td>2000</td>
<td>28800</td>
<td>20800</td>
</tr>
<tr>
<td>Hand weeding at 20, 35 and 50 DAE</td>
<td>37.45*</td>
<td>10000</td>
<td>29996</td>
<td>26996</td>
</tr>
</tbody>
</table>

*Means within the column followed by same letter(s) are not significantly different
*Birr/kg of rice

Farmers’ participation:
- Weeding and evaluation of the treatments.

Research team:
Weed, breeder, socio-economist, extension researcher

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Birhan Abebe (Farmer), Quar Michael Kebele, Tel: 0931859123
3 [RT03]

Demonstration of Rice Transplanting and Seed Pre-germination Technologies in Fogera Plain

Adet ARC (Amhara region)/ Completed

Duration: May 2010-December 2012
Budget: 25,000 Birr (2010), 30,000 Birr(2011), 40,000Birr (2012)

Background:
Fogera plain contributes 32% of rice production in Ethiopia. However, farmers use dry seed broadcast seeding method, whereas, in many other countries, transplanting is the most common method of planting rice as it has higher yield advantage. Similarly, rice seed pre-germination is known to be significantly increases yields.

Objective:
- To test transplanting and seed pre-germination technologies of rice against farmers’ dry seed broadcasting method in Fogera plain.
- To enhance the knowledge of farmers and extension agents on transplanting and seed pre-germination technologies of rice.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

[Location] South Gonder Zone, FogeraWoreda, Kuhar Michael Kebele, TiwehaZalenaKebele
[Treatment]
- Transplanting of 4-leaf stage seedlings
- Seed soaked for 48h and incubated for 24h before planted in nursery (Control: Dry seeds)

[Plot design]
Variety (X-jigna), plot size (10m x 10m (gross), 8m x 8m (net)), 32 rows of 8m length, fertilizer (N/P2O5 69/23kg/ha

[Data collected]
Effective tiller count /m², plant height, grain yield

[Stakeholders]
3 FRG (20-30 farmers each), extension agents

Results:
- Significant difference among replications in days to heading, but not for plant height, days to maturity and grain yield.
- Higher heights and grain yields for transplanted compared to dry seed sowing.
- Transplanted rice headed 11 days earlier than dry seed sowing
- Labor cost was higher for transplanted rice than that of dry seeds and soaked seeds, but the cost compensates by less labor cost for weeding. (Table1)

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Labor requirement/ha</th>
<th>Cost per man (birr)</th>
<th>Grain yield (kgha)</th>
<th>Field variable cost (birr)</th>
<th>Gross benefit (birr)</th>
<th>Net benefit (birr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transplanting</td>
<td>30</td>
<td>100</td>
<td>44</td>
<td>114</td>
<td>20</td>
<td>1.0</td>
</tr>
<tr>
<td>Seed soaking</td>
<td>--</td>
<td>50</td>
<td>165</td>
<td>215</td>
<td>20</td>
<td>4.5</td>
</tr>
<tr>
<td>Dry seed planting</td>
<td>--</td>
<td>50</td>
<td>165</td>
<td>215</td>
<td>20</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Price of rice grain = 6.5 birr/ kg

Farmers’ participation:
Site selection, nursery development, planting, trial management, 3 field-days and feed-back about technologies.

Research team:
Agronomist (2), socio economist, extension researcher, breeder, pathologist, entomologist, and weed scientist.

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Mobile: 0931859123
4 [RT04(1)]

Participatory Evaluation of Effect of Different Levels of N Fertilizer on Yield and Yield Component of Upland Rice (*Oryza sativa L*). Nerica-1 at Gode District in Somali Region

Gode ARC (Somali Region)/ Completed
Duration: May 2010-December 2012
Budget: 33,500 Birr (2010)

Background:
Rice is becoming a high potential crop in the Somali Region, but as the crop is new to the region, there is a lack of fertilizer recommendations that could help maximize the productivity of the cultivation techniques in the region. In some cases, unfavorable condition of the plants or soil causes low efficiency of absorption of nitrogen, thus judicious use of fertilizers depend on the various growth stages according to the type of variety grown, is crucial.

Objective:
- To evaluate the effect of Nitrogen application on yield and yield component of NERICA-1.
- To determine the optimum nitrogen level for production of upland rice NERICA-1 at Gode.
- To increase farmers participation on rice research to identify and adopt appropriate techniques of rice cultivation in the areas.

Methods:
Independent studies are performed in three different locations.
Below is the information for each study.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

[Location]Gode Zone, HilagududKebele, BarsanKebele, and MidnimoKebele
[Treatment] Nitrogen fertilizer in the level of 23, 46, and 69 kg ha⁻¹(Control: no fertilizer)
[Plot design] Variety (NERICA-1), plot size (10m x 10m), spacing (20 x 10 cm), fertilizer (constant phosphorus application of 60 kg ha⁻¹, N/P2O5 60 kg ha⁻¹), irrigation
[Data collected] days of 50 % heading, days of 75 % physiological maturity, plant height at maturity, 1000-seeds weight, number of seeds per panicle, number of panicle per hill, number of hills per m², grain yield per plot, and biomass yield per plot at harvesting.
[Stakeholders] FRG farmers

Results:
- Application of higher levels of nitrogen fertilizer significantly made better results for all of the factors of the data collected.

Farmers’ participation:
Provide land for trial, manage trials, weeding, discuss progress among FRG member farmers, and sharing info with non-FRG farmers.

Research team:
Agronomists

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Participatory Evaluation of Effect of Irrigation Intervals on Yield and Yield Components of Nerica-1 Rice at Gode District in Somali Region

**SoRPARI ARC (Somali region)/Discontinued in 2012**

**Duration:** May 2010-December 2012

**Budget** 25,000 Birr (2011)

**Background:**
Irrigation depends on the ability of rice plant to adapt to natural conditions combined with the ability of farmers to manage conditions within the boundaries. Water is a limiting factor for the rice production in the region, but no specific recommendations on irrigation interval and frequency effects on upland rice production.

**Objective:**
- To determine the optimum irrigation intervals for production of upland rice NERICA-1 at Gode
- To evaluate the effect of irrigation levels on yields and yield component of NERICA-1
- To increase farmers participation on rice research to adopt the appropriate techniques of rice cultivation to those areas

**Methods:**
Independent studies are performed in three different locations. Below is the information for each study.

<table>
<thead>
<tr>
<th>Treatments</th>
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</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>


[Treatment]
Irrigation intervals 4, 6, 8 and 10 days

[Plot design]
Variety (NERICA-1), Plot size (20m x 20m), Spacing (plots 0.5m), fertilizer (constant phosphorus application of 60 kg ha⁻¹ N/P₂O₅ 60 kg ha⁻¹)

[Data collected]
50 % heading, days 75 % physiological maturity, plant height at maturity (cm), number of tillers/plant, 1000-seeds weight (g), number of seeds per panicle, number of panicle per hill, number of hills per m², 1000 grain weight, grain yield per plot (kg), and biomass yield per plot (kg), and harvest index.

[Stakeholders]
3 FRGs (3 trial farmers each), extension workers.

**Results:**
To be notified.

**Farmers’ participation:**
Site selection, providing land, managing trials, weeding, discuss progress among FRG member farmers, sharing info with non-FRG farmers.

**Research team:**
Agronomist

**Contacts**
**Principle investigator:** Abdikader Haybe, SoRPARI,
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Enhance Rice Production through Improved Seed Production on Agro-Pastoral's Field in Afar Region

Werer ARC (Afar region)/ Completed
Duration: May 2010-December 2011
Budget: 27,000 Birr (2010)

Background:
Most of the fertile land found at both banks of Awash River in Afar region is unused and currently covered with weeds. On the other hand, rice is a staple food for most of the Afar people, but they consume imported rice produced in Asian countries. Rice breeders have identified well-adapted rice variety (NERICA-4) to the irrigated agriculture, but the promotion of NERICA-4 has been limited due to the limited seed available.

Objective:
- To multiply sufficient quantities of genetically pure NERICA-4 seed on agro pastoral’s field in the Amibera District with agro-pastoral’s field management practices and improved management.
- To train the agro-pastoral, development agents and agricultural experts about pure rice seed production techniques and post-harvest technologies.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>1 per farmer</td>
<td>4</td>
</tr>
</tbody>
</table>

[Location] Zone 3, Amibera Woreda, Serkamo Kebele, Ambash Kebele, Gidaro Kebele, Dirk Kebele.

[Treatment] evaluation on the adoption of NERICA-4 in each farmer field

[Plot design]
Total land area (800m², 600m², 400m², 400m²), fertilizers (UREA 4kg and DAP2kg), 10kg of seed, irrigation every 4-5 days interval, weeds removal using hand weeding whenever needed.

[Data collected]
Date of seedlings emergence, initial tillering, initial panicle emergence, flowering, maturity, number of seeds/panicle, 1000 seed weight, yield per plot, and quintal per hectare.

[Stakeholders]
DAs

Results:
- The performance of NERICA-4 varied among three FRGs that were not damaged.(See Table 1)
- Main reason for field difference was variation in crop management practices and irrigation of water availability.

-Crops in Dirk Kebele was damaged by water shortage and attack by wild animal.

Table 1 The results of each trial location

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of the FRG</th>
<th>Sowing Dates</th>
<th>Date of Seedlings Emergence (Mean)</th>
<th>Days to Initial Tillering after seeding (Mean)</th>
<th>Days to Initial Panicle Emergence after seeding (Mean)</th>
<th>Days to 50% Flowering after sowing (Mean)</th>
<th>Days to Maturity after sowing (Mean)</th>
<th>No. of Seed/ Panicle (average of five panicles)</th>
<th>1000 seed wt (g)</th>
<th>Crops condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Serkamo</td>
<td>July 20</td>
<td>25</td>
<td>65</td>
<td>75</td>
<td>95</td>
<td>210</td>
<td>31.67</td>
<td>12.41</td>
<td>Lost by water shortage</td>
</tr>
<tr>
<td>2</td>
<td>Ambash</td>
<td>July 15</td>
<td>26</td>
<td>65</td>
<td>76</td>
<td>96</td>
<td>223</td>
<td>31.49</td>
<td>12.51</td>
<td>Not damaged</td>
</tr>
<tr>
<td>3</td>
<td>Gidaro</td>
<td>July 18</td>
<td>25</td>
<td>67</td>
<td>78</td>
<td>98</td>
<td>194</td>
<td>29.76</td>
<td>12.54</td>
<td>Not damaged</td>
</tr>
<tr>
<td>4</td>
<td>Dirk Kebele</td>
<td>July 29</td>
<td>25</td>
<td>Totally lost by water shortage and wild animal attack</td>
<td>25</td>
<td>67</td>
<td>78</td>
<td>194</td>
<td>29.76</td>
<td>Damaged</td>
</tr>
</tbody>
</table>

Farmers’ participation:
Managing seed multiplication process, harvesting rice crops, threshed the rice with stick, and separated the seed from the straw.

Remarks:
Lack of rice milling machine to remove the rice grain cover is a challenge.

Research team:
Rice breeder, Crops production technology expert, Research extension researcher, Agricultural expert

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Participatory Rice Seed Rate Determination for Broadcasting Method of Sowing under Irrigated Ecosystem

Werer ARC (Afar Region) / Completed in 2012

**Duration:** May 2011 - December 2012

**Budget:** 40,000 Birr (2012)

**Background:** Rice is the staple food for Afar peoples and one of the potential crops suitably grow in the region. Team research approach can have great influence in exploiting abundant natural resource for rice production. Hence, the purpose of this particular topic was to enhance participatory research with Agro-pastorals at Amibara district of Afar Region.

**Objective:**
- To develop/improve rice technology recommendation package
- To evaluate the effect of different seed rates on yield and yield components of rice and;
- To recommend the best seed rate for optimum rice production under irrigated condition

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location]
Afar Region, 3 Zone, Amibara Woreda, Bonta Kebele

[Treatments]
50, 60, 70, 80 kg/ha seed rate

[Plot design]
Randomized complete block (RCBD)

[Data collected]
Day to (emergence, 50% flowering and 75% maturity), plant height, number of effective tillers, panicle length, number of grains/panicle; total sterility (%), biomass weight/net plot, grain yield/net plot and TSW

[Stakeholders]
Woreda Pastoral Office, Kebele office, corporative

**Results:**
This experiment was conducted for two years with different number of seed rates. The two cropping years responded differently for seed rates. 2011 result suggested sowing 60 kg ha⁻¹ gave the highest grain yield (Table 1). However, based on the 2012 data, increased seed rate (80 60 kg ha⁻¹) have yield advantage and uniformity (Table 2).

**Farmers’ participation:**
3 Groups, 32 female farmers, 8 male farmers

**Remarks:**
Broadcasting method of planting easily affected by uncontrollable factors that could inherently make decision difficult. Moreover, broadcasting method is not to be encouraged to those who newly start rice production. Hence, another experiment is to be conducted to identify appropriate seeding rate for drilling including broadcasting as local check.

**Research team:**
Agronomy, Breeding, Plant protection, Extension and socioeconomic

**Contacts**

**Principle investigator:** Berhanu, Woldu, Werer ARC,
Tel: +251(0)221140272 Mobile: +251(0)913266495
Fax: +251(0)221140278 E-mail: bernawol@gmail.com

**DA:** Ephrem, Bonta Kebele

**Tel:**

**Farmer:** Anselei, Bonta Kebele

**Tel:**

---

**Table 1** Effect of different seed rates on grain yield and different agronomic traits of rice, 2011

<table>
<thead>
<tr>
<th>Seed rate (kg/ha)</th>
<th>Plant height (cm)</th>
<th>No. eff. tiller/plant</th>
<th>Grain yield (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50Kg/ha</td>
<td>69.13</td>
<td>4.67</td>
<td>1.79</td>
</tr>
<tr>
<td>60Kg/ha</td>
<td>69.93</td>
<td>3.87</td>
<td>2.05</td>
</tr>
<tr>
<td>70Kg/ha</td>
<td>69.97</td>
<td>4.53</td>
<td>1.68</td>
</tr>
<tr>
<td>80Kg/ha</td>
<td>64.65</td>
<td>4.47</td>
<td>1.63</td>
</tr>
<tr>
<td>90Kg/ha</td>
<td>67.53</td>
<td>5.00</td>
<td>1.58</td>
</tr>
<tr>
<td>100Kg/ha</td>
<td>62.73</td>
<td>4.13</td>
<td>1.60</td>
</tr>
<tr>
<td>110Kg/ha</td>
<td>60.47</td>
<td>3.73</td>
<td>1.49</td>
</tr>
<tr>
<td>120Kg/ha</td>
<td>60.90</td>
<td>3.53</td>
<td>1.38</td>
</tr>
<tr>
<td>130Kg/ha</td>
<td>59.00</td>
<td>3.60</td>
<td>1.43</td>
</tr>
<tr>
<td>140Kg/ha</td>
<td>66.00</td>
<td>4.47</td>
<td>2.16</td>
</tr>
<tr>
<td>Mean</td>
<td>66.11</td>
<td>4.18</td>
<td>1.68</td>
</tr>
<tr>
<td>LSD 0.05</td>
<td>6.13</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>CV%</td>
<td>5.49</td>
<td>16.76</td>
<td>20.87</td>
</tr>
</tbody>
</table>

---

**Table 2** Effect of different seed rates on grain yield and different agronomic traits of rice, 2012

<table>
<thead>
<tr>
<th>Seed rate (kg/ha)</th>
<th>Plant height (cm)</th>
<th>No. eff. tiller/plant</th>
<th>Grain yield (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50Kg/ha</td>
<td>84.00</td>
<td>7.10</td>
<td>1.20</td>
</tr>
<tr>
<td>60Kg/ha</td>
<td>70.00</td>
<td>6.90</td>
<td>1.60</td>
</tr>
<tr>
<td>70Kg/ha</td>
<td>74.00</td>
<td>5.90</td>
<td>1.70</td>
</tr>
<tr>
<td>80Kg/ha</td>
<td>77.00</td>
<td>6.10</td>
<td>2.00</td>
</tr>
<tr>
<td>Mean</td>
<td>78.70</td>
<td>6.40</td>
<td>1.60</td>
</tr>
<tr>
<td>LSD 0.05</td>
<td>5.00</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>CV%</td>
<td>6.00</td>
<td>15.90</td>
<td>36.80</td>
</tr>
</tbody>
</table>
Participatory Rice Seed Rate Determination for Row Method of Sowing under Irrigated Ecosystem in Afar region

Werer ARC (Afar Region) / Completed in 2012  
Duration: May 2013- January 2013  
Budget: 50,000 Birr (2013)

Background: Given to the fact that rice is a recently cultivated crop in Ethiopia, there is great gap with regard to optimum seed rate recommendations for the rice producing areas of Afar region particularly in Middle Awash. Therefore, it is necessary to determine optimum seed rate for row planting of rice with reasonable yield and economic return to be recommended and disseminated to farmers.

Objective:
-To identify the effect of different seed rates on yield and yield components of rice and;
-To identify the best seed rate for rice production under irrigated condition at AmibaraWoreda
-To improve existing rice production technology package

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] AfarRegion, 3 Zone, AmibaraWoreda, Beduloale and wererKebele

[Treatments] Four different seed rates of rice (50, 60, 70 and 80 kg ha-1) will be planted in a row method of planting and additional 60 kg ha-1 will be broadcasted as a local practice

[Plot design] Randomized complete block design (RCBD)

[Data collected] Day to emergence, 50% flowering date and days to 75% physiological maturity, plant height, number of tillers and effective tillers, panicle length, number of grains/panicle; total sterility (%), biomass weight/net plot, grain yield/net plot and 1000 grain wt)

[Stakeholders] AmibaraWoreda Pastoral Office, Kebele representatives, Women coorporative

Results:
To be notified

Farmers’ participation: 3 Groups, 7 female farmers, 13 male farmers

Research team: Agronomy, Breeding, Plant protection, Extension and socioeconomics

Contacts
Principle investigator: Berhanu Woldu, Werer ARC  
Tel: +251(0)221140272 Mobile: +251(0)913266495  
Fax: +251(0)221140278 E-mail: bernawol@gmail.com  
contact DA: Wondeson, BeduloaleKebele  
Tel: +251(0)913358635  
contact farmer: Hussein, BeduloaleKebele  
Tel:
Popularization and Seed Multiplication of Upland NERICA Rice for Livelihood Improvement of Small Scale Farmers in Jimma Zone

Jimma University (Oromia Region)/Discontinued in 2011
Duration: May 2010-December 2011
Budget: 27,000 Birr (2010)

Background: Two year on station trial of upland NERICA varieties shows a good performance (six tons per hectare). However, the research process have not involve clients yet. Through participatory research, farmers conduct on-farm verification trials to prove candidate varieties for their yield and agronomic merits. Farmers also implement on-farm seed multiplication on promising varieties to solve seed shortage, minimize cost of production, develop farmer-to-farmer seed exchange.

Objective:
- To evaluate and select the best performing NERICA varieties with participatory research approach.
- To verify candidate NERICA varieties on farmers’ field for release.
- To multiply released NERICA variety seeds on farmers’ field.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

[Location]
Shebe and Gomma (and Limmu Sekkaweredas for seed multiplication).

[Treatment] (Step 2)
Three NERICA varieties, X-Jigna and N-3

[Plot design]
Simple comparison

[Data collected]
Agronomic data

[Stakeholders]
DAs, woreda experts, kebele leaders

Results:
to be notified

Farmers’ participation:
Six farmers groups, each containing 20 members, are established.

Remarks:
The researchers cancelled the research at the end of the first year (2010/11) due to difficulty of managing the trial site in far distance.

Research team:
Agronomist, breeder, pathologist, agri. Economist

Contacts
**Principle investigator:** Mulugeta Seyum, Jimma Univ.
Tel: 0910449484 Fax: 0471110934
e-mail: mulugetaseyum@yahoo.com
Participatory evaluation and selection of improved rice varieties in Gambella Region

Abobo ARC (Gambella region)/ Completed
**Duration:** May 2011-December 2013
**Budget:** 120,000 Birr

**Background:**
Gambella farmers have tried to cultivate rice traditionally using their own seed, or seed obtained from neighboring farmers for decades. However, rice production consists of only 0.33 % and 0.23 % of the total area covered and production recorded from all cereals in the region, due to lack of improved varieties and other management practices.

**Objective:**
- Evaluate and recommend better yielding, good quality, pest tolerant / resistant rice varieties for Gambella Region.

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3(RCBD)</td>
<td>3</td>
</tr>
</tbody>
</table>

[Location] Aguna Zone, Abobo Woreda, Okuna Kebele, Gambella Zuria Woreda, Kareme Kebele, Nuere Zone, Lare Woreda, Lare Kebele

[Treatment]
8 varieties (control: 1 local variety)

[Plot design]
Plot size (1.2m x 5m x 6 rows), all agronomic parameters applied as national recommendation.

**Results:** To be notified.

**Farmers’ participation:**
Site selection, provide land, preparation, planting, field management, evaluation, recording.

**Research team:**
Pathologist, Research extension researchers (2), Breeder, Entomologist, Agronomist

**Contacts**
**Principle investigator:** Yonas Kefialew, Abobo ARC,
Tel: 047-551-0014 Mobile: 0913-16-7623
Fax: 047-551-2020 Email: yongraza@yahoo.com
Participatory evaluation and selection of improved rice varieties in Gambella Region

Abobo ARC (Gambella region)/ Completed
Duration: May 2012-December 2012
Budget: 50,454.00 Birr

Background:
Weed infestation is one of the main causes of low rice yield in Gambella, which may reduce yield by 25 -30%. Besides quantitative effects on yield, weeds deteriorate the quality of produce through the physical presence of their seeds and debris. Weed density, type of the weeds, their persistence and crop management practices determine the magnitude of yield loss. So, effort must be made to eliminate weeds and minimize their competition with rice plants by using less labor for effective weed control methods. Weed control helps to enhance the production environment, thereby allowing more of the inherent capacity of the plant to express itself in higher yields than otherwise would not occur. Therefore, it is essential to control weeds in rice fields for the greater utilization of growth factors by the crop to get higher yield for Gambella farmers.

Objective:
- To determine the effect of different weeding methods on yield and yield components of recommend rice varieties

Methods:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Replication/ site</th>
<th>Trial farmer site</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

[Location] Agnuak zone, Gambellazuriawereda, Karemikebele
[Treatments] 7 weeding time: (1) 15 DAE (days after emergence), (2) 15 and 45 DAE, (3) 15, 30 and 60 DAE, (4) 30 DAE, (5) 45DAE
[Plot design] single plot size of 2m x 4m accommodating of 8 m². arranged in RCBD with 3 replications

Stakeholders
JICA, GARI, Gambella regional state government, Researchers, Farmers, Wereda experts and DAs

Results
Grain yield was found superior in the weed free control and three times weeding on 15, 30, 1nd 45 days as compared to the control and there was no significant difference between weed free control and three times weeding on 15, 30, 1nd 45 days. The number of effective tillers was significantly higher on three times weeding on 15, 30, 1nd 45 days as compared to the control. Weeding time has also affected other parameters including 1000 grain weight, panicle length and dry mater production. In all these factors three times weeding was found to have a statistically similar effect as compared to the weed free control. The lowest lodging was found from weed free check followed by three time weeding and there was no statistical difference between the two. Significantly highest gross and net profit was found on weed free check followed by weeding on 15, 30 and 60 days after emergence and there was no statistically significant difference was found between these two treatments. Cost benefit ratio showed that three times weeding was found to be more profitable. The result was presented to farmers and chance of selection was given to farmers based on their own observation and the result. All farmers selected to practice 3 times weeding (15, 30 and 45 days after emergence) practice as part of their rice production. In general, this study showed that the suitability and profitability of three times weeding as well as the interest of farmers towards this practice to include it in their future rice production effort.

Farmer’s participation
Provide land and labor, engaged in planting and monitoring, record keeping and visual observation, and actively participate in the whole field management activities, technology prioritization and selection, training and experience sharing. 1 Group, 10 male farmers 5 female farmers

Research team
Crop Protection (2), Plant Breeding (2), Agronomy (1), Socioeconomics and research extension (2)

Contact
Principal Investigator: Yonas Kefialew, Abobo ARC, Tel: 047-551-0014 Mobile: 0913-16-7623 Fax: 047-551-2020 Email: yongraza@yahoo.com
Muluken Abebe (DA), Gambellazuriaworeda, Karmikebele, Tele: 091-20-73717
Obang Oman (Farmer), Gambellazuriaworeda, Karmikebele,
Nitrogen and phosphorus rate determination for rice

**Organization(Region) / ongoing from 2013**

**Duration:** May 2013-December 2014

**Budget:** 49,998.00 Birr

**Background:**
Farmers grow rice without fertilization in Gambella region, which results in low yield. Because of this, rice has been generally considered to be unsuitable for the intensive management practices aimed at high yields. Rice requires certain quantities of some elements, e.g. N, P, and K for maintaining good yield levels. High yields of rice have been obtained in the tropics mainly through the use of improved genotypes, fertilizers and good cultural practices. The low yields obtained in the traditional sector in Gambella were mainly attributed to low soil fertility particularly N and P, moisture content and poor management.

**Objective:**
- The general objective of this project is to improve productivity of rice in order to increase income and improve farmers’ livelihoods in Gambella region
- The specific objective is to determine the effect of different fertilizer rates on growth, grain yield and yield components of recommend rice varieties

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>3/3</td>
<td>3</td>
</tr>
</tbody>
</table>

[Location] Agnuak Zone, LareWoreda, LareKebele, Nuer Zone, GambellaZuriaWoreda, KaremKebele

[Treatment]
N and P fertilizers at different rates will be used as treatment. Nitrogen Fertilizer( N) will be all applied as urea at 5 rates (0 , 25, 50, 75, and 100 kg/ha) and Phosphorous will be applied as single super phosphate at 5 rates (0, 20, and 40 kg/ha).

[Plot design]
Design will be RCBD with 3 replication. Experimental plots will be each 4 3 × 2 m, with 30 cm row spacing

[Data collected]
Crop phenology, Yield and yield components, 50% flowering, Dry matter of above ground parts, Cost and revenue of fertilizer application, Percent seed, germination, Pest and disease occurrence

[Stakeholders]
GARI, EIAR, JICA FRG II project, Regional state, Researchers, Farmers, Wereda experts (SMS) and DAs

**Results:** to be notified

**Farmers participation:**
Farmers will provide land and labor, will also engaged in field monitoring, record keeping and visual observation of own observations, actively participate in the whole field management activities

**Research team:**
Rural Development, Seed Science, Pathology, Agronomy, Breeding, Agro-Economic and Extension

**Contacts**
**Principle investigator:** Mr. OchanChol(0912173468) and Mr. YonasKefialew(0913167623), GARI,
Tel: +251475510014 Fax: +251475512020
E-mail: Ochan.chuol@yahoo.com or yongraza@yahoo.com
MulukeneAbebe(DA), Karmi Kebele
Tel: +251912073717
Obang (Farmer), KarmiKebele
Tel: +251912073717
Participatory Varietal Selection of Improved Rice Varieties at Central and North Western Zones of Tigray

Aksum ARC (Tigray Region)/Discontinued in 2012
Duration: May 2011-December 2013
Budget: 40,000 Birr

Background:
The amount of rice production has increased from 150 tons to 286 tons from 2006 to 2008 in Tigray region. There are still a lot of arable vertisols in the region which remains waterlogged for most of the year, preferable for water loving rice. However, little knowhow on the rice technologies are available which restricts farmers to produce rice and stay producing low productive teff and local sorghum cultivars.

Objective:
- To introduce and evaluate the adaptability of improved upland rice varieties at M/Lekhe.
- To introduce alternate crop technology (i.e. rice) which has high market demand.
- To determine the selection criteria of farmers.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4 (RCBD)</td>
<td>1</td>
</tr>
</tbody>
</table>

[Location]
Central Zone, M/Lakhe Woreda, Medhin Kebele, Mayweiny Kebele (Mother trial has been done in at M/Lekhe res. station)

[Treatment]
6 different varieties of rice (control: local variety)

Plot design
Research station: plot size (3m x 3m), 2m and 1m spacing (rows 2m, plots 1m), seed drilled at 3cm depth, and fertilizer is applied as recommended.
Farmer site: Plot size (5m x 5m), spacing (rows 20cm, plots 1.5m), seeding rate (60 kg ha^-1), germination percentage >=85%, sowing by drilling at 3 cm depth, Urea and DAP 100/100 kg ha^-1 was used.
12 farmers, each will be given 2 rice varieties.

[Data collected]
Agronomic data, farmers’ selection criteria collected by questionnaire.

[Stakeholders]
12 households farmers, Extension experts and DAs

Results: To be notified.

Farmers’ participation:
Provide land, management practices of the trials, evaluation, data recording, encourage visits by non-FRG members.

Research team:
Agronomists (2), Breeder, Entomologist, Weed scientist, Pathologist, Irrigation expert, (Socio-economist)

Contacts
Principle investigator: Eyob Kehsay, Aksum ARC,
Tel: 034-775-2274 Mobile: 0914-733-422
Fax: 034-775-8020 Email: ek_golla14@yahoo.com
Enhancing Production and Productivity of Upland Rice through Quality Seed Production in North Western and Western Tigray

MayTsebri ARC (Tigray region)/Discontinued in 2012
Duration: May 2011-January 2013
Budget: 40,000Birr

Background:
The MayTsebri ARC identified NERICA-3 and NERICA-4 improved upland rice varieties to North Western Zone, but since rice is still new to the region, both basic and certified seed productions are not yet addressed either by public or private sectors. Farmers acquire seeds themselves or neighboring farmers, thus lack of desired variety with appropriate quality discouraging farmers to produce rice.

Objective:
- To produce adequate amount of quality rice seed locally. (under farmer’s condition)
- To improve quality seed access to non-FRG members.
- To aware farmers and other stakeholders (DAs, Extension workers and others) about quality seed production techniques and post harvest handling

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1 per farmer</td>
<td>12</td>
</tr>
</tbody>
</table>

[Location]North Western Zone, TselemtiWoreda, MedhanalemKebele, MezekirKebele,
[Treatment]
NERAICA-3 and NERICA-4
[Plot design]
N-3 and N-4 seed varieties will be provided from the center. Fertilizer (100 kg Urea and 100 kg DAP), all other cultural practices will be applied uniformly to all plots.
[Data collected]
Days to 50% emergence, flowering, heading and physiological maturity, grain yield, farmers’ perception, disease and insect pest reaction, collection and comparison of different characteristics of seed quality of the different seeds from different sources (FRG trial member, non-FRG members, and seeds produced from center)

Results: To be notified.

Farmers’ participation:
Provide land, management practices of the trials, evaluation, data recording, encourage visits by non-FRG members.

Research team:
Agronomist, Entomologist, and Agricultural economics and research extension researcher

Contacts
Principle investigator: Berhanu Arbissie, MayTsebri ARC,
Tel: 034-662-0317 Mobile: 0914-731-625
Fax: 034-662-0371 Email: b_arbissie@yahoo.com
Participatory Evaluation and Selection of Rice (upland) Varieties at Bambasi District in Benishangul-Gumuz Regional State

**Assosa ARC (Ben.Gumuz region)/ Ongoing**

**Duration:** May 2011-December 2012

**Budget:** 50,000 Birr

**Background:**
Benishangul-Gumuz is one of the most important potential region among other rice producing areas in Ethiopia, but the scientific approach of rice production is not well developed. Especially, there is a gap of introducing and evaluating the promising varieties (namely NERICA-3, NERICA-4, FKRS, Cukit1) on farmer field condition.

**Objective:**
- To evaluate and identify the best performing rice varieties using farmers selection criteria
- To participate farmers in rice research activities and to apply their indigenous knowledge
- To create awareness about different types of rice varieties to farmers, DAs and others relevant stakeholders.

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1 per farmer</td>
<td>4</td>
</tr>
</tbody>
</table>

[Location]
Assosa Zone, BambasiWoreda, KeshemandoKebele

[Treatment]
NERICA-3, NERICA-4, FKRS, Cukit1 (control: local variety)

[Plot design]
Plot size (10m x 10m), spacing (rows 20cm), seeding rate (60 kg/ha-1), drilled at depth of 3-4cm, fertilizer (DAP 100 and Urea 160kg/ha-1 each), weeding is practiced 3-4 times.

[Data collected]
Days to 50 % heading, to maturity, plant height at maturity, disease, number of tillers per plant, plants and capsules aspect, number of panicle per bill, number of seeds per panicle, number of hill per m², thousand seed weight, grain yield (kg/plot), and farmers observation/comments.

[Stakeholders]
4 FRG farmers, DAs, MoA experts

**Results:**
The result was showed that NERICA-4 out yielded 33.94 Q/ha and followed by FKRS (29.57 Q/ha) and NERICA-3 (24.84Q/ha). The check gave 24.15 Q/ha so that the yield advantage over Nerica-4 is about 9.79Q/ha.

<table>
<thead>
<tr>
<th>variety</th>
<th>Days to maturity</th>
<th>Panicle length (cm)</th>
<th>No.of grain /panicle</th>
<th>Grain yield (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NERICA-3</td>
<td>133.5bcd</td>
<td>20.4b</td>
<td>160.2a</td>
<td>2484b</td>
</tr>
<tr>
<td>NERICA-4</td>
<td>130.75c</td>
<td>19.8b</td>
<td>158.35a</td>
<td>3394.8a</td>
</tr>
<tr>
<td>kokit</td>
<td>135.35bc</td>
<td>20b</td>
<td>123.55bc</td>
<td>2336.8b</td>
</tr>
<tr>
<td>FKRS</td>
<td>147.5a</td>
<td>22a</td>
<td>137.15bc</td>
<td>2957ab</td>
</tr>
<tr>
<td>Local</td>
<td>140.5ab</td>
<td>20.8ab</td>
<td>119.25c</td>
<td>2415b</td>
</tr>
<tr>
<td>CV %</td>
<td>4.204</td>
<td>4.385</td>
<td>7.674</td>
<td>14.96</td>
</tr>
<tr>
<td>LSD 5%</td>
<td>8.9</td>
<td>5.17</td>
<td>16.51</td>
<td>6.22</td>
</tr>
</tbody>
</table>

**Farmers’ participation:**
Whole agronomic practices such as preparation of lands, planting, weed management, and harvesting.

**Research team:** Plant scientist, pathologist, and Agricultural economist

**Contacts**

**Principle investigator:** Getahun Dereje, Assosa ARC, Tel: 057-775-2577 Mobile: 0912-070-745 Email: hailemariamsolomon55@yahoo.com Ayalewu Tadesse (DA), Keshmendo Kebele Mobile: 0917178262 Hailu Gelawu (farmer), Keshmendo Kebele Mobile: 0922216503
2 Quality Seed
Farmers’ Participatory Evaluation of Lower Seeding Rates on Teff Using Seed Spreaders in Wolaita Zone, South Ethiopia

Wolaita Sodo University (SNNR region) / Completed
Duration: May 2010-December 2012
Budget: 39,670 Birr

Background:
The recommended seed rate for teff is 25 to 30 kg ha⁻¹ in Ethiopia, but farmers often use 40-50 kg ha⁻¹ due to the difficulty of distributing the seed evenly and to suppress weeds at early stages. Seed spreaders (seed mixers) are materials which are used to improve the performance of tiny seeds during planting, by establishing an even plant stand with better impacts on growth, nutrient use efficiency and crop yield.

Objective:
- to evaluate growth and productivity of teff in response to lower seed rates mixed with seed spreader
- to identify the most suitable seeding rate for the study area, and
- to enhance knowledge utilization and transfer to farmers through farmers participation in research activities

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4 (RCBD)</td>
<td>1</td>
</tr>
<tr>
<td>During 2013</td>
<td>Verification trail</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4 (RCBD)</td>
<td>1</td>
</tr>
</tbody>
</table>

[Location] Edo kebele in Duguna Fango Woreda,
[Treatment] 2010-2011
5kg ha⁻¹, 10kg ha⁻¹, 15kg ha⁻¹, 20kg ha⁻¹ mixed with dry sand/soil, 30 and 35kg ha⁻¹ without sand/soil.
[Treatment] 2012
5kg ha⁻¹, 10kg ha⁻¹, 15kg ha⁻¹

[Plot design]
Teff variety (DZ-Cr-37), size of plot (3m x 3m), spacing (plots 0.75m), fertilizer (Urea 50kg ha⁻¹, DAP 125kg ha⁻¹), other agronomic practices are uniformly applied.

[Data collected]
-10 random plants within each plot will be used as data collection. Plant height, panicle length, average number of tiller per plant, number of productive tillers per plant, days to 50% heading and physiological maturity, biological yield, grain yield, straw yield, and harvest index.

[Others]
-Soil analysis of the study site was performed by analyzing soil texture, pH, available P, total N, and Organic Carbon.

[Stakeholders]
1 FRG (16 farmers (12 male and 4 female), Ministry of Agriculture and Rural Development officers, DAs.

Results:
-No significant influence of seeding rate on biomass, straw and grain yield of teff, and harvest indices.
-FRG members preferred lower seedling rates, preference order of 5, 10, 15 kg ha⁻¹.
-Lower seed rates did not resulted in greater weed problem in this area.

Farmers participation:
Site selection, land preparation, sowing, stand evaluation and final stand evaluation, sharing the experience to non-participant farmers during farmer’s field day.

Research team:
Agronomist, Soil scientist, and Plant pathologist.

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Mobile: 0916116268 (c/o Markos)
**12 [QS02]**

Farmers’ Participatory Seed Quality Assessment on Smallholder Farmers Saved Seed on Major Grain Crops in Wolaita Zone, Southern Ethiopia

**Wolaita Sodo University (SNNP region)/ ongoing**

**Duration:** May 2011-November 2013

**Budget:** 39,800 Birr

**Background:**
The formal seed sector in Ethiopia has not met the needs of vast majority of small farmers. Informal seed system is a common crop production practice by Wolaita farmers. There are concerns about seed quality which could be major reason for low productivity of haricot bean.

**Objective:**
- To assess farmers perception on seed system
- To evaluate the quality of farmers’ seeds under laboratory and compare with quality seed standards.
- To evaluate seed quality improvement practices under field conditions.

**Methods:**

**Experiment 1: Survey**
A total of 59 farmers (16 FRG members and 43 non FRG members) were interviewed regarding seed and other farming practices.

**Experiment 2: Seed Quality test (Laboratory)**
[Data collected] Physical purity, germination test, speed of germination, moisture content, vigor index I.

**Experiment 3: Field Experiment**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4(RCBD)</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] Wolaita Zone, DugunaFangoWoreda, Edo Kebele

[Treatment] Farmers’ practices without seed sorting, farmers’ practices after seed sorting, recommended practices without sorting and recommended practices after sorted seed.

[Plot design] Plot size (3m x 3m), spacing (rows 40cm, plants 10cm, plots 0.75m, blocks 0.75m), fertilizer (DAP 100kg ha⁻¹)

[Data collected] Stand count, plant height, number of branches per plant, pods per plant, seeds per pod, grain yield, total biomass, and harvest index.

[Stakeholders] Ministry of Agriculture and Rural Development officers, DAs.

**Results:**
Majority of haricot bean growing farmers in the study sites were getting below 800kg/ha. Seed quality analysis during 2011 indicated that except seed moisture content, farmers’ seed meets the minimum quality standards for purity and germination percentages set in Ethiopia. During 2012, moisture contents and germination percentage values were below the minimum quality standards. The field experiment during 2011 and 2012 revealed the better field performance of physical seed sorting over non-sorted seeds.

**Farmers participation:**
- Participate in sample collection, site selection, land preparation, sowing, regular evaluation and final stand evaluation
- Seed quality evaluation before and after experiment
- Sharing their experience to non-participant farmers during field day
- 1 FRG (16 farmers (12 male and 4 female),

**Research team:**
Agronomist, Plant pathologist, Soil expert

**Contacts**
**Principle investigator:** Fanuel Læke Mariam, Wolaita Sodo Univ.
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Tel: 0916116268 (c/o Markos)
Participatory Evaluation of Seed Treatment Techniques to Improve Seed Quality and Yield in Tomato (Lycopersicum esculentum)

Wolaita Sodo University (SNNP region) / ongoing
Duration: May 2011-December 2013
Budget: 40,000 Birr

Background:
In Wolaita, the office of agriculture and rural development each year provides tomato seeds which can be purchased from any supermarkets. However, these seeds do not always meet the quality and the varieties are not well identified. Also, they are not well stored, and not adaptable to local environment which causes farmers fail to produce the crop.

Objective:
- To identify the best seed treatment technique that improves seed quality and subsequent yield in tomato.
- To disseminate knowledge and skill of seed treatment techniques for farmers and other stakeholders.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>3 (RCBD)</td>
<td>1</td>
</tr>
</tbody>
</table>

[Location] Wolaita Zone, Sodo Zuria Woreda, Mante Gerera Kebele
[Treatment] HCL (5%, 10%), H2SO4 (5%, 10%), Sodium Carbonate (5%), Wood Ash, Hot water treatment, Fermentation
[Plot design] Plot area (4.5m x 3.0m), Spacing (rows 90cm plots, 50cm, plants 30cm, blocks 1m)
[Data collected] Both vegetable and yield data will be collected.
[Others] - Preliminary germination test was performed in WSU laboratory to find out germination rate and percentage before conducting the field work.
- Field soil was analyzed for soil texture, pH, available P, total N, and organic carbon.
[Stakeholders] 1 FRG (12 farmers), Zonal Experts, DA, and peasant association.

Results:
The fast germination (2.33 days) was observed in seeds treated with 10% HCl, 5% H2SO4 and hot water where as the most delayed one was wood ash treated seeds (4.20 days). In case of germination percentage, the highest germination was obtained by seeds treated with 5% H2SO4 (96.67%) and the lowest (63.33%) was that of seeds treated with wood ash.
The highest fruit yield (59,362 kg/ha) was recorded by 10% H2SO4 followed by 10% HCl whose value recorded was 59,156 kg/ha. The lowest yield (46,194 kg/ha) was recorded by fermentation.

Farmers participation:
Participate in seed extraction, awareness creation and on the job training. Involve in site selection, land preparation, sowing, and other agronomic practices. Identify the effect of treatments, yield evaluation during harvest, and share the experience to other non-member farmers.

Research team:
Horticulturist, Soil scientist, and Plant protectionist.

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Tesema Tanga (Farmer), Mante Gerera Kebele
Tel: 0910661492
Participatory Development and Promotion of Quality Seedling Production Technology for Stevia (*Stevia rebaudiana Bertoni*) and Lemon Verbena (*Alloysia triphylla L*)

**Wondo Genet ARC (Oromia region) / Discontinued in 2012**

**Duration:** May 2011- November 2012  
**Budget:** 39,980 Birr

**Background:**
The ArsiNegeleworeda is endowed with suitable climatic conditions for Stevia and lemon verbena, which already have open profitable market of a kilo of fresh leaf Stevia sold by 20 Birr, and lemon verbena by 15 Birr. However, the existing information for proper cultivation and exploitation of the crop is very limited in the focus area.

**Objective:**
- To identify the economical condition for the development of quality seedlings of stevia and lemon verbena, as well as evaluating the agronomic and chemical traits of them under farmer field condition.  
- To induce Stevia and lemon verbena quality seedling production technologies to the farmers, and give chance for them to select and validate the best technologies based on their own criterion.  
- To diversify the income source of farmers by introducing new commodity technologies to cope up the possibility of the risk comes from single cropping.

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>3 (RCBD)</td>
<td>2</td>
</tr>
</tbody>
</table>

*Location* West Arsi Zone, ArsiNegeleworeda, SemboroRogicha Kebele, DaweKebele

*Treatment*
Tree levels of part used (top, middle, and bottom), four levels of node number (3, 5, 7, 9) in factorial combination, for two seasons (wet and dry)

*Plot design*
Twenty pots were considered per treatment in each replication. Best seedlings will be multiplied and planted on 10x10m plot size at a spacing of 40cm x40cm for stevia and 60 cm x 60cm for lemon verbena.

*Data collected*
- Data on survival rate was collected every week  
- Plant height, leaf number/plant, fresh and dry leaf yield/plant, fresh and dry leaf yield/plot will be collected at harvest.  
- Essential oil and crude extract content will be calculated.

*Others*
- Six months old stevia and one year old lemon verbena grown at Wondo Genet ARC are used.  
- 4 demonstrations are done (start of nursery seedling raising, final stage of nursery raising, field evaluation, and displaying of the result) for FRG farmers and non-FRG farmers in the surrounding areas.

*Stakeholders*
2 FRGs (10 farmers each)

**Results:** Top cutting position with 3 nodes for stevia and bottom cutting position with 3 to 5 nodes for lemon verbena could be recommended for the development of quality seedlings under good nursery management

**Farmers participation:**
- Providing land for experiment  
- Management of trial site  
- Experience sharing with other non-FRG members

**Research team:**
Beemnet Mengesha (Breeding in horticulture), Muluken Philipos, and Hassen Nurhussain (Socio-economics and extension), Solomon Abate (Agronomist), H/Slassie G/Meskel (Horticulture), Mihret Mekonnen (Crop protection)

**Contacts**
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Participatory Selection of superior genotype, determination of optimum spacing and harvesting age for high biomass and essential oil yield of Rosemary (*Rosmarinus officinalis* L.)

**Wondo Genet ARC (Oromia region) /Discontinued in 2012**

**Duration:** May 2012- March 2013

**Budget:** 39,980 Birr

**Background:**
Rosemary (*Rosmarinus officinalis* L.) is an aromatic, evergreen and highly branched shrubby herb that belongs to the family *Labiatae*. The leaves and essential oils are the economical products of rosemary. Dried and fresh leaves are directly used as a culinary herb and essential oils extracted from leaves are extensively used in food flavoring and fragrance industries. Essential oil of rosemary is also used in perfumery industry for the production of soaps, detergents, household sprays, shampoo, toilet soaps and medicine.

**Objectives:**
- To identify superior genotype of rosemary to be used for the production of herbal biomass and essential oil
- To determine optimum spacing requirement of rosemary for maximum and quality biomass production
- To identify the optimum harvesting age requirement of rosemary for maximum biomass and essential oil production

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 varieties</td>
<td>3 (RCBD)</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] West Arsi Zone, Arsinegeleworeda, Sembero Rogicha Kebele, Dawe Kebele

[Treatment]
5 improved varieties and one local check

[Plot design]
Plot size (3.6m x 2.7m), plant/row spacing at 60 cm

[Data collected]
- plant height
- branch number/plant
- fresh leaf yield/plant
- above-ground biomass yield/plant
- fresh stem weight/plant
- fresh leaf to stem ratio
- fresh leaf yield/ha
- disease score
- essential oil (EO) content
- EO yield

[Stakeholders]
2 FRGs (10 farmers each), DAs at woreda level

**Results:** to be notified.

**Farmers’ participation:**
2 FRGs, 10 male farmers for each group

**Research team:**
Beemnet Mengesha (Breeding in horticulture), Muluken Philipos, and Hassen Nurhussain (Socio-economics and extension), Solomon Abate (Agronomist), H/Slassie G/Meskel (Horticulture), Mihret Mekonnen (Crop protection)

**Contacts**

**Principle investigator:** Beemnet Mengesha, Wondo Genet ARC,
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E-mail: mengeshbeemnet@yahoo.com
Seed Multiplication Rate Study of Different Cultivars of Wheat for Optimizing Seed Quality and Productivity

Bahir Dar University (Amhara region) / completed

Duration: May 2011-Mar 2013
Budget: 40,000 Birr

Background:
Amhara Region is 2nd contributor of wheat total production of the country. Different wheat agronomic practices were recommended for different regions. There was no evidence of seed rate study and recommendation in northwestern Ethiopia. It is assumed that the current rate is national blanket recommendation. Farmers use higher seed rate for grain production which affects seed quality, production and productivity, though lower seed rates lead to higher multiplication factors.

Objectives:
- To determine the optimum seed rate for higher seed quality and productivity.
- To improve the skills of FRG farmers in producing high quality seed (pre-basic to certified classes of seeds) for surrounding market.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 seed rates and 2 varieties</td>
<td>3 (RCBD)</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] West Gojam Zone, YilmanaDensa Woreda, DebremaiKebele, GeregeraKebele

[Treatment]
2 varieties (Dinkinesh, Gasay) of 5 seed rates (75, 100, 125, 150, 175 kg ha⁻¹)

[Plot design]
* Plot size (4m²), 8 rows at 20 cm spacing and 2.5 m row length, fertilizer (N 100 kg ha⁻¹, P₂O₅ 161 kg ha⁻¹)

[Data collected]
- Agronomic and seed quality traits
- Genetic (field level) and physical seed purity (lab analysis)
- Farmers evaluation scores at different growth stages (1-4)

[Stakeholders]
2 FRGs (25 farmers each), DAs at woreda level, Researchers at BDU and Adet ARC from various disciplines

Results: The result showed that lower seed rates of 100-125 kg/ha could be used than farmers practice of 150-175 kg/ha. Training farmers to produce quality seed at FRG level has an advantage to improve the dominant informal seed system.

Farmers’ participation:
Joint evaluation at emergence, tillering, heading, maturity and post harvest seed characteristics

Research team:
Breeder (2), Protection (1), Socio-economist/extension (2), Crop agronomy (1), animal science (1), natural resource (1), Mechanization (1).

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Fax: 058-220-06-02 E-mail: tadesseyfb@yahoo.com
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Farmer: Tewachew Alebachew, Debremawi Tel: 0918425919
DA: Hymanot G., Geregera Tel: 0920510059
Farmer: Wodaje L., Geregera Tel: 0918510663
Participatory Evaluation and Demonstration of Animal Drawn Compactor for Teff Seed Production

**Bahir Dar AMFSRC (Amhara Region)/ completed**

**Duration:** May 2011-December 2012  
**Budget:** 75,000 Birr

**Background:**  
West and east Gojjam zone, one of the dominant crops is Teff, but the farmers cannot utilize new technology due to lack of appropriate technology in the region as well as in the country. To produce teff, trampling is one of the crucial operation and done by huge amount of animals. Nowadays, most farmers decrease their number of animals due to lack of animal feed and grazing land, which could be a serious challenge for trampling.

**Objective:**  
- Increase smallholder productivity with timely and proper land operation  
- To evaluate animal drawn compactor for Teff production under farmers’ circumstances.  
- To demonstrate these technologies to farmers, extension personnel and stakeholders.

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>West Gojjam Zone, AdetWoreda, DebreMawiKebele, BurieWoreda, WadraKebele, Bahir Dar KetemaWoreda, WerebKebele</td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>Local practice (trampling with animal), compactor, non-trampled</td>
<td></td>
</tr>
<tr>
<td>Plot design</td>
<td>Plot size (minimum10m x 20m)</td>
<td></td>
</tr>
<tr>
<td>Data collected</td>
<td>Field condition, agronomical data, quality of Teff seed (germination %, 1000 seed weight (g), farmers’ perception)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Cost benefit analysis</td>
<td></td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Zonal, Woredas and kebeles agricultural office experts, DAs</td>
<td></td>
</tr>
</tbody>
</table>

**Results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Grain yield Average (kg/ha)</th>
<th>Total cost of Production in ETB</th>
<th>Gross Benefit in ETB</th>
<th>Net benefit in ETB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal trampled</td>
<td>1735.20</td>
<td>1386.25</td>
<td>17352.00</td>
<td>15965.75</td>
</tr>
<tr>
<td>Compactor</td>
<td>1742.80</td>
<td>1187.85</td>
<td>17428.00</td>
<td>16240.15</td>
</tr>
<tr>
<td>Non trampled</td>
<td>1233.60</td>
<td>584.66</td>
<td>12336.00</td>
<td>11751.34</td>
</tr>
</tbody>
</table>

- In terms of yield animal trampling and compactor has significant difference over non trampled  
- Total cost of production was high on animal trampling and compactor than non trampling, but the highest net profit was on compactor and animal trampling than non trampling.

**Farmers participation:**  
Delivering testing field, preparation of testing plots as traditional practice, contribution of human and animal power in each farming practice (ploughing, harrowing, weeding, harvesting and threshing), and evaluation of the technology. 2 FRGs (16 male/2 female and 15 male/3 female farmers),

**Research team:**  
Agriculture mechanization (2), Mechanical engineer, and Economist.

**Contacts**  
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Contacts DA: At Burie ,Wadra,AmanuBitew (tel:0912747039); at BahirdarZuria,Woreb ,Mohammod tel:0912801299  
Farmers: At Burie ,Tesfaw, tel;0922445171  
At Bahirdarzuria ,Asmare,Tel:0918010551
3. Seed Treatment
Participatory Evaluation of Seed Treating Fungicide Against Bulb Rot of Onion at Fogera

Adet ARC (Amhara region) / Completed
Duration: January 2011-March 2011
Budget: 14,910 Birr

Background:
Onion has been a major cash crop of the small scale farmers in Fogera plain. However, the productivity of onion has yield loss of up to 40% in the area due to the spread of pathogen which can destabilize food security. At the moment, majority of farmers do little or nothing to control diseases, and have very little or no knowledge of onion bulb rot control.

Objective:
In order to insure the sustainability of onion production in Fogera plain,
- identify and demonstrate effective fungicide against basal rot of onion.
- promote farmers awareness on causes, symptoms, epidemiology and management of bulb of onion.

Methods:
<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] South Gonder Zone, Fogera Woreda, Quar Kebele
[Treatment] See table 1 (control: no treatment)
[Plot design] size of the plot (3mx3m), spacing (rows 40cm, ridges 20cm, plants 10cm), fertilizer rate (61kg ha⁻¹ of DAP and UREA)
[Data collected] Plant height, diseases incidence %, and total yield q/ha
[Others] Economic analysis was performed.
[Stakeholders] Farmers' participation:
- Treating of chemicals
- Evaluation of treatments (plant vigor, leaf color, population size as the criteria of selection)
- Participation for field day to demonstrate the effect of treatments.
- 2FRGs (6 female, 44 male)

Research team:
Pathologist, Crop breeder, Socio-economist/extension researcher, and Allium crop agronomist

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Results:
- Chemical Agixyl 407 showed the best effect of plant treatment, giving the lowest diseases incidence and the highest total yield of onion followed by Iprodione.
- Agrixy 407 gave the highest net benefit. (Table 1) Farmers agreed that Agrixy 407 showed the best effect for plant treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total Marketable yield (q/ha)</th>
<th>Costs of chemical (birr/ha)</th>
<th>Gross benefit (birr/ha)</th>
<th>Net benefit (birr/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agrifos 600</td>
<td>132.2</td>
<td>525</td>
<td>39660</td>
<td>39135</td>
</tr>
<tr>
<td>Iprodione 50%</td>
<td>145.7</td>
<td>470</td>
<td>43710</td>
<td>43240</td>
</tr>
<tr>
<td>Agrixy 407</td>
<td>146.4</td>
<td>520</td>
<td>43920</td>
<td>43400</td>
</tr>
<tr>
<td>Manosyl 72 WP</td>
<td>132.8</td>
<td>395</td>
<td>39540</td>
<td>39145</td>
</tr>
<tr>
<td>Victory 72 WP</td>
<td>137</td>
<td>440</td>
<td>41100</td>
<td>40660</td>
</tr>
<tr>
<td>cruzate</td>
<td>85.18</td>
<td>600</td>
<td>25554</td>
<td>24954</td>
</tr>
<tr>
<td>Control</td>
<td>128.15</td>
<td></td>
<td>38445</td>
<td>38445</td>
</tr>
</tbody>
</table>
Effect of Chemical Seed Dressings for the Management of Cutworm on Pepper

Adet ARC (Amhara region) / Completed
Duration: December 2010-March 2011
Budget: 14,980 Birr

Background:
Pepper is widely grown in north western Ethiopia by large scale as well as small scale farms. However, its production and productivity has been decreased due to cutworm. Judicious use of chemicals is preferred for cutworms, and Cruser 350FS, Dynamic 400FS, and Gauch 350FS are some of the known seed dressing chemicals tested for the control of soil insects and some foliar insects in different areas

Objective:
To determine the effect of seed dressing chemicals against cutworm on pepper under FRG based research approach

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>3 (RCBD)</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location]
West Gojjam Zone, MechaWoreda, KudmiKebele, South Gonder Zone, Fogeraworeda, AvuanaKokitKebele

[Treatment] Cruser 350S, Dynamic 400FS, and Gauch 350FS of company recommendation (5ml/kg of seed) and half of it of the three chemicals.

(Control: no treatment)

[Plot design] Plot size (3m x 2m), Spacing (row 10cm, plots 100cm), fertilizers (Urea and DAP), weeding, and other agronomic practices.

[Data collected] Seeding height, seedling weight, damaged seedling in the nursery, damaged plant in the field.

[Others]
- Preliminary germination test of both treated and untreated seeds are done in the lab.
- Seeds produced by local farmers are used.

[Stakeholders]
Woreda agricultural extension experts, DAs and farmers

Results:
Seed dressing chemicals caused significant reduction in cumulative damaged seedlings at the time of transplanting over the untreated control in both locations (Table 1 and Table 2)

Farmer participation:
- Site selection, Material preparation and Follow up and evaluation
- 2FRGs (Male: 48, Female: 3)

Research team:
Horticulturist, Plant scientist, Crop protectionist, and Economist

Contacts
Principle investigator: Bayuh Belay, Adet ARC
Tel: 0583-380591 Mobile: 0913-134569 Fax: 0583-380235 Email: bayuhb@yahoo.com

Table 1: Effect of seed dressing chemicals on pepper seedlings against cutworm at Kudmi

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Seeding height</th>
<th>Seedling weight</th>
<th>Damaged seedling</th>
<th>Reduction in seedling damage over control (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cruiser 5 ml/kg</td>
<td>19.56a</td>
<td>13.57a</td>
<td>38.00a</td>
<td>63.92</td>
</tr>
<tr>
<td>Cruiser 2.5 ml/kg</td>
<td>18.39a</td>
<td>12.32a</td>
<td>53.33a</td>
<td>49.37</td>
</tr>
<tr>
<td>Dynamic 5 ml/kg</td>
<td>20.63a</td>
<td>13.63a</td>
<td>40.63a</td>
<td>61.39</td>
</tr>
<tr>
<td>Dynamic 2.5 ml/kg</td>
<td>19.00a</td>
<td>13.37a</td>
<td>53.33a</td>
<td>49.37</td>
</tr>
<tr>
<td>ApronStar 5 ml/kg</td>
<td>19.69a</td>
<td>13.56a</td>
<td>37.33a</td>
<td>64.56</td>
</tr>
<tr>
<td>ApronStar 2.5 ml/kg</td>
<td>18.58a</td>
<td>12.83a</td>
<td>56.67a</td>
<td>46.20</td>
</tr>
<tr>
<td>Untreated Control</td>
<td>17.96a</td>
<td>11.83a</td>
<td>105.33a</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2: Effect of seed dressing chemicals on pepper seedlings against cutworm at Ayuana

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Seeding height</th>
<th>Seedling weight</th>
<th>Damaged seedling</th>
<th>Reduction in seedling damage over control (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cruiser 5 ml/kg</td>
<td>19.70a</td>
<td>13.10a</td>
<td>29.33a</td>
<td>64.23</td>
</tr>
<tr>
<td>Cruiser 2.5 ml/kg</td>
<td>20.25a</td>
<td>14.33a</td>
<td>17.33a</td>
<td>78.87</td>
</tr>
<tr>
<td>Dynamic 5 ml/kg</td>
<td>19.72a</td>
<td>11.50a</td>
<td>26.67a</td>
<td>67.48</td>
</tr>
<tr>
<td>Dynamic 2.5 ml/kg</td>
<td>20.40a</td>
<td>14.10a</td>
<td>22.67a</td>
<td>72.35</td>
</tr>
<tr>
<td>ApronStar 5 ml/kg</td>
<td>19.63a</td>
<td>11.80a</td>
<td>23.33a</td>
<td>71.55</td>
</tr>
<tr>
<td>ApronStar 2.5 ml/kg</td>
<td>17.55a</td>
<td>10.70a</td>
<td>82.00a</td>
<td>-</td>
</tr>
</tbody>
</table>

- Preliminary germination test of both treated and untreated seeds are done in the lab.
- Seeds produced by local farmers are used.
Demonstration of Apron Star 42WS Seed Dressing Chemical Against Cutworm (Agrotis segetum) on Chickpea at Dembia Woreda, North Gondar

University of Gondar (Amhara region) / Completed
Duration: December 2010-March 2011
Budget: 15,000 Birr

Background:
Ethiopia is the biggest chickpea growing country in Africa with a share of 48% production, but its average grain yield has remained extremely low. This mainly resulted from farmers using indigenous/local chickpea that are nonresistant to insect pests. Most lately sown crops are exposed to cutworm damage, but farmers are adapted to late planting for escaping of water logging, physiological wilting, and occurrence of Fusarium wilt-root complex problems. Chemical Apron Star has the property to prevent wilt-root complex disease as well as controlling cutworm.

Objective:
To evaluate and determine the efficacy of Apron Star 42 WS against cutworm.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

[Location] North Gonder Zone, Dembia Woreda, Guramba Michael kebele
[Treatment]
Seeds treated with Apron Star 42 WS (control: no treatment)
[Plot design]
Paired plot or simple comparison, Variety (Arerti), Plot size (100 m²), Spacing (plots 2m), Seed rate (150 kg/ha⁻¹), Chemical rate of 250 g/100 kg of seeds, Equal frequency of weeding.
[Data collected]
Number of plants per plot/ Stand counting at emergence, time of emergency of seedlings, number of plants damaged by cutworm per plot, wilted/dried plants per plot, farmer perception about the chemical and the crop.
(collected by 1 m² sized quadrant)
[Stakeholders]
Debre Zeit ARC, Gonder ARC, North Gonder Zone Seed Laboratory Office, Dembia Woreda Agricultural and Rural Development Office (Experts and DAs).

Results:
- Early seedling emergency, faster growth of seedlings, less damaged/infested by cutworm was found with the seeds treated with Apron Star 42 WS.
- No significant difference in number of plants attacked by Fusarium wilt-root rot.
- FRG indicated that improved variety, seed dressing chemical, and techniques used for conducting and evaluating the research were very attractive and useful.
- Manuals were distributed for FRG and development agents (DAs) on chickpea production and protection.

Remarks:
- Majority of FRG indicated that this type of research approach and technology should be undertaken for other crops (e.g. fenugreek and grass pea) and in the main growing season of chickpea.

Farmers participation:
Site selection up to evaluation of the research.

Research team:
Agricultural Entomologist and Agronomists (2)

Contacts
Principle investigator: Eshetu Agegnehu, Univ. of Gondar
Office tel: 0581141236 Mobile: 0918786450
E-mail: eshetuagegnehu@yahoo.com
Effect of Pre-sowing Fungicides Seed Treatment on Seed Germination, Emergence and Seedling Vigor in Maize (Zea mays)

Wolaita Sodo University (SNNP region) / Completed
Duration: November 2010- January 2011
Budget: 14,800 Birr

Background:
Maize is accounting for 21% of cropland and contributing about ¼ of the cereal production in Ethiopia. However, the national average yield of crop is far below the average figure for the world, and one of the biggest constraints among the biotic stresses is disease.

Seed treatment is known to be one of the cheapest and safest methods for direct control of seed/soil-borne diseases.

Objective:
- To evaluate the effect of chemical seed treatment on germination, emergence and seedling vigor of maize under laboratory and field condition
- To identify the effective fungicides used for pre-sowing seed treatment of maize
- To facilitate knowledge transfer and enhance the skill of the farmers about pre-sowing seed treatment technology.

Methods:

**Experiment 1:** Laboratory experiment
Trial location: Wolaita Sodo University
[Data collected] Germination rate up to 8 days (daily), mean germination rate and germination percentage

**Experiment 2:** Pot trial
Trial location: Wolaita Sodo University research and demonstration site on sterilized soil and soil from maize field
[Data collected] Seed emergence, Fresh weight of shoot and root, seedling shoot length and shoot dry weights of 45 days after seedling emergence.

**Experiment 3:** Field trial

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4 (RCBD)</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] Wolaita Sodo University research and Wolaita Zone, Duguna Fango Woreda, Edo Kebele
[Treatment]
Mancozeb, Metalaxil, Redomil (control: no treatment)
[Plot design]
Plot size (3.6m x 3m), Spacing (rows 30cm?, plots 1m), fertilizer (DAP 100kg ha\(^{-1}\), Urea 46kg ha\(^{-1}\)), other agronomic practices conducted equally, disease and insect check regularly.
[Data collected]
Seedling height, number of leaves, fresh weight, and dry weight of shoots.

[Others]
Soil texture, pH, P, N, K and organic carbon were analyzed.

[Stakeholders]
DAs, and 3\(^{rd}\) year plant science students at WSU.

Results:
Significant influence on pre-sowing fungicides, especially on Metalaxil on improving the germination, seedling height, average leaf number, fresh and dry shooting weight of maize seedling was found. Farmers, based on their own criteria, also preferred Metalaxil, as the first choice during seedling stand evaluation.

Farmer participation:
In-depth awareness creation training on the Pre-sowing seed treatment methods, Handling of treated seeds, Field preparation, and Seed sowing and fertilizer application method and evaluate the seedling stand.

Research team:
Plant pathologist, Agronomist, and Soil scientist.

Contacts (Principle investigator):
Wondimeneh Taye Haile, Wolaita Sodo Univ.
Tel: 046-551-14-24, Mobile: 0911-53-76-67,
Fax: 0465515113
e-mail: wondimeneh2008@gmail.com
Participatory Evaluation of Different rates of Fungicides (Mancozeb and Apron plus 50%) for the Control of Groundnut Root Rot (*Sclerotium rolfsii* Sacc. [teleomorph]) in Eastern Hararghe

**Fedis ARC (Oromia region) / Discontinued 2012**

**Duration:** May 2011-June 2013  
**Budget:** 20,184 Birr

**Background:**  
Groundnut is produced widely by significant number of farmers and is a source of income for a large number of small-scale farmers. However, soil borne diseases such as root rot, and wilting are bottlenecks for its production, and yield losses reach more than 80% in heavily infested fields.

**Objective:**  
- To select the most effective, least costly chemical, and select the exact rate of chemical for the control of root rot disease of groundnut in coordination with farmers in the area.  
- To establish knowledge network among FRG, non-FRG farmers and other stakeholders.

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>3(RCB)</td>
<td>1</td>
</tr>
</tbody>
</table>

**Trial location:** East Hararghe Zone, FedisWoreda  
**[Treatment]**  
Mancozeb (Dithane M-45): 15, 20, 25gm per Kg of seed,  
Apron plus 50% (Apron XL): 5, 10, 15 gm per 4Kg of seed. (control: no treatment)

**[Plot design]**  
Plot size (3m x 3.6m), spacing (rows 60cm, plant 20cm), no fertilizer, equal timing of weeding and earthening up

**[Data collected]**  
Plant stand harvest (%), emergency date, plant height(cm), days to flower, number of flower, number of branch per plant, number of seed per pod, number of pod per plant, Tsw(g), grain yield(kgha⁻¹), Di(%), Disease severity (1-9 scale), Insect incidence(%), MD, HD, Farmers assessment, Cost of input-output

**[Others]**  
All data will be analyzed using IRRISTAT.  
Partial budget analysis will be performed.  
[Stakeholders]  
1 FRG (10-15 farmers), DAs, extension workers, NGOs, SMS

**Results:** To be notified.

**Farmers participation:**  
Select site, prepare seed, execute recommended practices, encourage visit by others

**Research team:**  
Crop protectionist, Agricultural economist, and Pulse and oil crops breeder

**Contacts**  
**Principle investigator:** Samuel Tegene, Fedis ARC,  
Tel: 025-666-75-49 Mobile: 0911996962  
Fax: 025-666-75-51 E-mail: sm2teg@yahoo.com
Participatory Evaluation of Seed Dressing Insecticides for the Management of Tef Shoot fly (*Delia armbourgi*) at Wag-Lasta Area

**Sekota DARC (Amhara region) / Discontinued 2012**

**Duration:** May 2011-March 2012  
**Budget:** 39,950 Birr (2011)

**Background:**  
Tef is covering 30% of the total acreage of the cereals and about 26% of the whole area cultivated with annual field crops in Ethiopia. However, the annual yields are often low and are subject to extreme fluctuations. Insect pest problems are factors of low yields, and problem becomes more serious with the lower rainfalls. Especially in dryland areas like Waghimira, shortage of rainfall causes the severe yield loss.

**Objective:**  
- To select the best seed dressing insecticide for the management of tef shoot fly  
- To evaluate economic feasibility of seed dressing insecticides for the management of tef shoot fly  
- To promote the best seed dressing insecticides for the management of tef shoot fly

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4 (RCBD)</td>
<td>2</td>
</tr>
</tbody>
</table>

**[Location]** Wag-Himera Zone, Sekota Woreda, Woleh Kebele, North Wollo Zone, Lasta Woreda, Shumeshiha Kebele  
**[Treatment]** ApronStar 42WS, Gaucho 70WS of 500ml/qt and 250ml/qt of seed respectively. (control: no treatment)  
**[Plot design]** Plot size (4m x 3m), spacing (plots 1m, replications 1.5m), fertilizer (Urea and DAP as recommended), weeding, and other agronomic practices as recommended.  
**[Data collected]** Stand count no. /100cm², number of dead heart plants/100cm², number of panicles at harvest /100cm², damage score, number of tillers and heads /100cm², grain yield /plot  
**[Others]**  
- Preliminary germination test for treated seeds and untreated seeds has been done in the laboratory.  
- Economic advantage of different shoot fly management insecticides will be evaluated.

**[Stakeholders]**  
2 FRGs (6 farmers each), DAs, Agricultural experts at Woreda levels.

**Results:** The result of the study indicated that, the chemicals that were tested are not effective for the target insect. Thus, further study is crucial by incorporating other systemic seed dressing chemicals for the management of tef shoot fly in the area.

**Farmers participation:**  
Providing land, evaluation at stages, execution and management of trials, and participating trainings.

**Research team:**  
IPM, Plant scientist, Agricultural extension researcher, and Resource economist

**Contacts**  
**Principle investigator:** Wubeshet Beshir, Sekota Dry land ARC,  
Tel: 0334-401104 Mobile: 0913-093946  
Fax: 0334-400409  
E-mail: wbglovestwm2001916@gmail.com
Effect of Seed Treatment on Seed Born Disease of Hot Pepper and Onion: in the Case of Central Rift Valley of Ethiopia

Adami Tulu ARC/ Ongoing
Duration: May 2011-July 2013
Budget: 20,000 Birr

Background:
Central rift valley area of east Shewa zone is well known producers and suppliers of tropical vegetables like tomato, onion, cabbage, hot pepper and green beans. However, the production and productivity has been decreasing due to the bacterial disease of vegetable crops. Over 90% of the Connecticut pepper plantings inspected over the last five years were infected with bacterial leaf spot which reduce profit and sometimes resulting in complete crop failure.

Objective:
-To evaluate different seed treatment option that can improve field survival rate of hot pepper and onion.
-To create awareness about seed treatment options among farmers.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

[Location] East Shoa Zone, Adami Tulu
JidoKombolchaWoreda, EdokonpolakKebele,
DugdaWoreda, Bekelegirisa Kebele.

[Treatment]
Apron star as recommended, Mancozeb 80WP as recommended, immerse with hot water at 50°C, immerse with hot water at 50°C with (1)Apron star of half of the recommended, (2)Mancozeb 80WP of half of the recommended.

[control: no treatment]

[Plot design]
Hot pepper (Marekofana variety), Onion (Bombey red variety)

[Data collected]
Date of germination, germination percentage, leaf number, stem thickness, root number, root length and root to shoot ratio, seedling vigor (scale), seedling height, disease and insect if any.

[Stakeholders]
2 FRGs (producing hot pepper and onion respectively), DAs,

Results: hot water with half apron star shows with the highest vigourousity, seedling height, leaf length, seedling thickness and leaf number while it was insignificant for root length, and shoot length, on the other hand, for the hot pepper treatments apron star as the recommendation and mancozeb as per the recommendation show highest significant difference for vigourousity, and seedling height while non-significant for seedling thickness and greenness furthermore, it is the fifth and six for leaf number

Farmers participation:
40 farmers in 3 FRGs

Research team:
Horticulture, Extension researcher, plant pathology

Contacts
Principle investigator: AbdiEtafa,
Adami Tulu ARC,
Tel: 046-441-90-03 Mobile: 0910-082-192
Fax: 046-441-91-08
E-mail: abdrom.etafa@gmail.com
ZerfeBula (DA), Edo KontolaKebele
Mobile: 0913876550
UrgessaTusure (Farmer), Edo KontolaKebele
Mobile: 0913957345
4 Farmer saved seed
Participatory Evaluation of Farmer-saved and Purified Seed for Agronomic Performance in Wheat

Mekele University (Tigray Region)/ ongoing
Duration: July 2011-June 2014
Budget: 40,000 Birr (2011)

Background:
One of the main problems that reduce the yield of wheat in Tigray region is the prevalence of weeds like wild oats, and that is related to the use of impure farmer saved seeds. Farm-saved seeds have also immature and broken seeds, foreign materials, among others which causes negative effects on the crop stand. However, the awareness of the farmers on the use of clean or certified seed is limited. Also, little or no attention is given on the amount of moisture content of the grains for storage.

Objective:
- Evaluate the agronomic performance of farmer-saved and purified (refreshed) wheat varieties on farmer’s fields
- Estimate cost-benefit of use of farmer-saved and purified seeds
- Introduce appropriate seed storage and cleaning technologies to FRG members.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

[Location] South Eastern Zone, Enderta Woreda, Didba Kebele
[Treatment]
Refreshed seed and farmer-saved seed
[Plot design]
Plot size (10m x 10m)
[Data collected]
Days to emergence, plant height (cm), number of tillers/plant, leaf number/plant, days to flowering, spike length, number of seeds per spike, grain yield, and straw yield.
[Others]
Germination test and purity analysis were carried out before sowing in the experimental plots.
[Stakeholders]
10 FRGs (18-20 households each), extension workers, local administrative bodies, ISSD project, CASCAPE project

Results: Similar to that of 2011, the results of the 2012 cropping season has shown better agronomic performance in wheat varieties planted to purified seeds than non-purified seeds. The combined mean grain yield obtained from the three varieties used was 4347 kg/ha compared to 3792 kg/ha which was obtained from the non-purified seeds of the same varieties. This is a 555 kg/ha (14.6%) mean yield increase of the purified seeds over the non-purified farm saved seeds. Similar trend was also observed on biomass yield.

Remarks:
Two hundred seeds from purified and farmer-saved have been taken for the germination tests before the field experiment.

Farmers’ participation:
Provides land for trials, cover cost of land preparation, weeding and harvesting, manage trials, discuss progress among FRG farmers, keep the activity record.

Research team:
Agronomist, Entomologist, Agricultural Extension researcher, and Animal scientist.

Contacts
Principle investigator: Alem Gebretsadik, Mekele University,
Mobile: 0914 20 24 59
E-mail: alemgr3@yahoo.com
DA: Abadi G/yesus (Didba Kebele)
Mobile: 0914115978
Farmer: Ato Kalayu Gebru (Didba Kebele)
Mobile: 0914 480909
Sustaining Bread Wheat Productivity through Evaluation and Promotion of Quality Seed Production

**Alamata ARC (Tigray Region) / Discontinued in 2012**

**Duration:** June 2011 - November 2013  
**Budget:** 40,000 Birr

**Background:** 
Bread wheat is one of the major staple crops in southern Tigray, but the average yield is lower than that of national average yield. This is due to insufficient availability of quality seed, absence of seed producers, and insufficient seed distribution system.

**Objective:**
- To identify the difference in quality between the conventional farmers saved seed and the seeds received complete cleaning and selection.
- To introduce and promote possible intervention methods for the production of quality bread wheat seed.
- To increase farmers participation in the production of quality bread wheat seed

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4(RCB)</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] 1 site each at Fala and HashengeinOflaworeda  
[Treatment]  
Farmer saved seed with/without applying seed cleaning/selection with salt solution/water.

[Plot design]  
Plot size (100m²), seed rates (150 kg ha⁻¹), fertilization amount, weeding, and roughing as recommended.

[Data collected]
- Weight of immature seeds and dusts
- germination test
- days to emergency
- dry matter weight per 1m² of 1 month plant
- stand count after emergency and at harvesting stage
- number of tillers, plant height, leaf number, and days to boating
- seed yield per unit area measured
- perception of farmers
- cost of production and revenue

[Stakeholders]  
2FRGs (10 farmers each), Woreda experts, DAs

**Results:**
To be notified.

**Remarks:**
Field days, farmers field school, experience sharing from FRG team from Tabia level to Woreda and regional level will be performed.

**Farmers participation:**
Land preparation, weeding, roughing, harvesting

**Research team:**  
Breeder (3), Horticulturist, Weed researcher, Protection researcher, and Extension researcher.

**Contacts**
**Principle investigator:** MuezMehari, Alamata ARC, Mobile: 0913 81 81 60  
E-mail: muez97@gmail.com
5 Irrigated vegetables
Participatory Onion Production and Technology Adaptation, Evaluation and Demonstration under Irrigated Condition of Sogido-Saraweyeba Irrigation Schemes

Melkassa ARC (Oromia region)/Discontinued in 2012

Duration: May 2012-December 2014
Budget: 80,017.97 Birr/Year

Background:
Under the existing knowledge, the farmers and agro-pastoralists have started to improve their livelihood of their families in the area. Thus, if they get improved technologies such as improved crop varieties, better management and crop production knowledge, they will more improve their livelihood by the income obtained from sales of high value crops (e.g. Onion) production by irrigation. Supplementing such developments by introducing improved agricultural technologies is believed to enhance the livelihood of the community and innovative capabilities of the farmers through Farmers Research Group approach. Therefore, filling the agricultural technology gap and realizing the purpose, irrigation development scheme requires scientific support through the intervention of research.

Objective:
- To identify adaptable and appropriate onion varieties for the target irrigation scheme
- To identify appropriate crop management practices, including water management, for onion production in the targeted irrigation scheme

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>3 (RCBD in factorial arrangement)</td>
<td>1</td>
</tr>
</tbody>
</table>

[Location] East Shewa Zone, Fantale Woreda, Sogido/Saraweyba
[Treatment] 3 varieties of onions with 2 different irrigation practices (farmer and improved irrigation practices)
[Plot design] RCBD with 3 replications
[Data collected] farmers assessment data on establishment (%), maturity, number of bolter plants, yield (marketable and total), splits and thick necked %, bulb size, bulb color, TSS%, disease and insect reactions, soil data and water measurement

Stakeholders:
Farmers (18 farmers in 1 FRG with 4 females), DAs, Woreda BoA, East Shewa Zone water resource office, Researchers

Results:
-to be notified

Farmers’ participation:
-18 farmers (13 male and 5 female)

Research team:
Agronomist, Pathologist, irrigation researcher, Econ./Extension researcher

Contacts
Principle investigator: Gebeyehu Wondimu, Melkassa ARC,
Tel: 022-225-0213 Mobile: 0913-116-424
E-mail: gebeyehuw@gmail.com
Participatory Evaluation, Selection and Demonstration of Tomato 
(Lycopersicon esculentum) Varieties Using Irrigation System

Fedis ARC (Oromia region)/Ongoing from 2012
Duration: February 2012-February 2014
Budget: 40,000 Birr/ year

Background:
Proper irrigation water management technologies and improved varieties of crop is a means for optimizing agricultural production, conserving water and water use efficiency. Irrigation is particularly necessary in the dry season, and supplementary irrigation is needed in the wet season. The primary objective of irrigation is to apply water at the right period and in the right amount since maintenance of adequate soil moisture throughout the growing season of a crop is necessary to expect optimum plant growth and yield with due consideration to the dwindling water resource availability.

Objective:
- To evaluate and select better yielding and disease resistant tomato varieties using irrigation techniques.
- To compare water use efficiency of controlled furrow and farmer practiced furrow irrigation techniques.
- To demonstrate best performing tomato varieties under controlled furrow irrigation system

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>(RCBD)2</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] West Hararghe Zone, HirnaWoreda, TiraaKufise and LubuDakabeKebele
[Treatment]
3 varieties (Melkashola, Bishola and 1 local check) and 2 different irrigation techniques (controlled furrow and farmer practiced furrow irrigation techniques)
[Plot design] RCBD with 2 replications
[Data collected] farmers’ assessment/ feedback on the technology, cost of input (land, labor, capital), yield and other social values, pest disease incidence (%), agronomic practices, water use efficiency, irrigation frequency.
[Stakeholders]
Farmers(30 farmers and 2 FRGs), 2 DAs, 2 Woreda BoA, 6 Researchers

Results: There was significant difference among varieties in fruit weight, total fruit weight per plant, marketable yield, unmarketable yield and yield parameters at 5% level. Among the three varieties: Melkashola gave highest yield (39.28ton/ha) and Local check (20.85 ton/ha) gave lowest yield as compared to other varieties.
Based on performance evaluation, disease reaction, farmer’s preference and other agronomic traits Melkashola variety was significantly out yielded and promised for further production.

The Controlled irrigation technique 7,095.50 m³/ha of water and for farmers practiced irrigation technique treatment 10,298.90 m³/ha of water was applied for total growing period of 120 days for each of varities.

Farmers’ participation:
20 farmers (female 4, male 16)

Research team:
Irrigation engineer, agro-economist, horticulture scientist, plant pathologist, soil scientist, food science and post harvest technology scientist

Contacts
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AliyiiMume (Farmer), TirakufiseKebele
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Mobile: 0921443372
6 Forage Improvement in Pastoral and Agro-pastoral Areas
Participatory Evaluation and Demonstration of Herbaceous Forage Species in the Agro-pastoral Areas of Aba’alaworeda Afar National Regional State

Mekelle Univ. (Tigray region) / Ongoing from 2012
Duration: May 2012-December 2014
Budget: 49,864 Birr/ year

Background:
Aba’alaworedain Afar as elsewhere in the marginal areas of the region has remained unexposed to any sort of development and research activity related to feed improvement and development for many years. This coupled with frequent drought has resulted to rangeland degradation, reduction in feed availability both in quality and quantity and reduction in livestock productivity. Therefore, there is a need to seek for the possible opportunities/technologies to alleviate feed shortages and to improve the productivity of the mainstay of the people in the area.
Hence, it is with intension (alleviation of livestock feed shortages) that this research proposal is designed and the research is planned.

Objective:
- To select appropriate forage production technology (species) fitting in to the research area
- To evaluate the performance of different forage species under arid and semi-arid environmental condition
- To improve livestock feed availability and improve livestock performances

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trialagro-pastoralist sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

[Location] Zone II, Aba’alaworeda, AdiharemaliKebele, WokrigubiKebele

[Treatment]
4 forage crops (Lablab, cow pea, Rhodes grass, alfalfa)

[Plot design] 5 replications

[Data collected] germination rate at lab, sowing date, germination date, vigor, resistance to moisture stress, flowering date, seed setting date, biomass yield, yield and disease and pest occurrence, agro-pastoralists’ perception and species preference, soil moisture, temperature, relative humidity

[Stakeholders]
Agro-pastoralists (20 agro-pastoralists in 1 PRGs), DAs, Researchers

Results:
-Rhodes grass germinated one week late from the other forage crops, Dodder weed observed in Alfalfa, Lablab & Rhodes are the most and least vigour respectively, Lablab & Alfalfa more drought tolerant than others, and Cow pea produce seeds earlier than the others. Taking all considerations Lablab (1st), Alfalfa (2nd), Cow pea (3rd) & Rhodes grass (4th) chosen.

Agro-pastoralists’ participation:
- 20 pastoralist (15 male, 5 female) in 1 PRG

Research team:
Range land management scientist, Agronomist, Pathologist, Extension researcher, animal feed scientist

Contacts
Principle investigator: Teshome Tefsamariat, Mekelle Univ.
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DA: WubshetWerkalemaw, WuhdetKebele
Tel: 0910564482
Agro-pastoralist: Tsegay Berhe, WuhdetKebele
Tel: He has no mobile
Participatory Demonstration of Quality Seed Production on Alfalfa and Panicum antidotale at Gursum Woreda, Somali Region, Ethiopia

**Fafen ILRDC (Somali region) / Discontinued in 2012**
**Duration:** May 2012-December 2014
**Budget:** 40,000 Birr/year

**Background:**
Due to a significant shrinkage of rangelands for grazing and browsing taken by every encroaching farmlands and rangeland degradation expressed in the form of the reduction or disappearance of these palatable grasses browses species, there is significant decline in the amount of fodder available for livestock. This coupled with frequent drought and expanding invasive species has caused a tremendous decline in the performance of livestock species negatively affecting the livelihood of the pastoral and agro-pastoral community.

Hence, this project targets this evident challenge and aims to address by multiplying seeds of improved forage species which has been previously tested by SoRPARI and found adaptable and disseminate then to the end users.

**Objective:**
- To demonstrate improved forage production targeted towards improved supply of high quality improved forage seeds for further scaling up/dissemination
- To facilitate dissemination of improved forage seed production techniques and knowledge among the FRG member farmers in the selected villages.
- To demonstrate and train local communities in the management and utilization of pastures and forages.

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

[Location] Jijiga Zone, Gursum Woreda, Aroaska Kebele, Golmarodi Kebele, and Kubijaro Kebele

[Treatment]
2 species of forage crops

[Plot design/ Plot size: 20mx20m=400m²] RCBD with 3 replication s

[Data collected] planting date, germination date (50%), flowering date (50%), harvesting date, biomass yield

[Stakeholders]
Agro-pastoralists (20 agro-pastoralists in 3 FRGs), DAs, Researchers

**Results:**
- To be notified

**Farmers’ participation:**
21 agro-pastoralists (15 male and 6 female)

**Research team:**
Animal science, Animal production and health scientist, range scientist, research extension and socio-economist

**Contacts**
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E-mail: abdiawga99@hotmail.com
Demonstration and Evaluation of Improved Forage Species in Benatsemay Woreda of South Omo Zone

**Jinka ARC (SNNP region)/Discontinued in 2012**

**Duration:** May 2012-December 2014

**Budget:** 40,000 Birr/ year

**Background:**
Due to land scarcity and crop-dominated farming there has been limited spontaneous introduction of improved pasture and forages (Alemayehu, 2002). Food security in the area is highly affected by poor livestock managements and crop production due to erratic rainfall and old traditional subsistence farming. The livelihood characterized by bimodal type of rainfall which begins mid of February and the area has a good potential for irrigated agricultural development. On the other hand, currently agro-pastoralists are producing some forage crops in their back yard, in conservation base and at bordering sites as fencing by pre-scaling up in JinkaARC collaboration with EIAR. However, agro-pastoralists prioritize food crop when planting time arrives. Besides, the agro-pastoralists in the area don’t give attention to collect and store.

**Objective:**
- To identify high yielding improved forage varieties at on-farm
- To alleviate feed shortage during dry season thereby increasing productivity and quality of forage species
- To establish recommended agronomic practices of the selected forage varieties for the areas’ selection criteria

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trialagro-pastoralist sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2 (RCBD)</td>
<td>12</td>
</tr>
</tbody>
</table>

[Location] South Omo Zone, Benatsemay Woreda, Chali Kebele, Kako Kebele

[Treatment]
african foxtail (*Cenchrus ciliaris*), rhodes grass (*Chloris gayana*), *Lablab purpureus*, *Vigna unguiculata*

[Plot design] four treatment, two kebeles, within each Kebele 6 trail pastoralists, having 2 PRG with total of 20 pastoralists, and each trail pastoralist receives two treatments randomly.

[Data collected] stand count, date of sowing, seed rate, date of germination, plant height, seed yield, DM yield, attitude of agro-pastoralist and cost of production

[Stakeholders]
Agro-pastoralists (20 agro-pastoralists in 2 PRGs), DAs, Experts

**Results:**
- To be notified

**Agro-pastoralists’ participation:**
- 2PRGs, 10 (6 male and 4 female) households for each FRG

**Research team:**
Range and forage management researcher, Animal nutritionist, Animal Breeder

**Contacts**
**Principal investigator:** Denbela Hidosa, Jinka ARC,
Tel: 046-775-0881 Mobile: 0913-007-332
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E-mail: denbelahidosa@gmail.com
Participatory Evaluation of Rangeland Forage Improvement in Lowland Areas of Borana Zone, Southern Ethiopia

Yabello PARC (Oromia region)/Suspended in 2013

Duration: May 2012-January 2015

Budget: 46,884 Birr/ year

Background:
Currently, the adverse effects of bush encroachment on the performance of the pastoral economy are being acknowledged. Local and international non-governmental organizations and some government departments are conducting range rehabilitation, involving hand clearing of woody species along highways and near settlements, on an experimental basis. So far, little is known about the effects of bush encroachment control in terms of the responses by the encroaching woody species. It is undeniable fact that Borana pastoral and agro-pastoral settings has been encroached by bush, shrubs and trees overtime, that has resulted in loss of potential grazing sites within the settings being the most pressing development challenge in the locality. This fact, indeed need appropriate intervention timely, on research evidence based and scientifically justifiable and sound technological approaches.

Objective:
- To improve rangeland productivity, utilization and conservation systems in Borana pastoral areas
- To understand the perceptions of the communities on the impacts of currently available bush thinning technologies
- To test the effectiveness of bush thinning with the combination of fire
- To enhance hay production as a reserve for drought periods

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>0% thinning</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>0% thinning with fire</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>50% thinning</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>50% thinning with fire</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>100% thinning</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>100% thinning with fire</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

[Location] Borana Zone, Yabello Woreda, Dire Woreda

[Treatment]
1. 0% thinning
2. 0% thinning with fire
3. 50% thinning
4. 50% thinning with fire
5. 100% thinning
6. 100% thinning with fire

[Plot design] 2 replications

[Data collected] Basal cover, litter cover, herbaceous layer composition, dry matter yield of grass and non-grass species, dead and re-sprouted bush after treatment application, economic parameters

[Stakeholders]
Pastoralists (20 pastoralists in 2 PRGs), PA leaders, DAs

Results:
to be notified

Pastoralists’ participation:
- 20pastoralists (12 male and 8 female)

Research team:
Animal, range and wildlife scientist, Natural resource economist, Rural Development and agricultural extension researcher

Contacts
Principle investigator:NizamHusen, YabelloPARC,
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7FRG based research activities at Farmer Training Centers (FTCs)
Participatory Evaluation and Determination of N and P fertilizer Application Rate on Yield and Yield Components of Upland Rice (NERICA-4) at Bambasi District in Benishangul – Gumuz Region

Assosa ARC (Benishangul Gumuz region) / ongoing
Duration: May 2012-December 2014
Budget: 40,000 Birr/year

Background:
Rice research activity has been conducted in the region for the past few years and some promising varieties have been adapted and under production in the area. Among the released NERICA varieties, NERICA-4 had better yield advantage over others under research and farmers’ field. Yet, improvement of its production has not been possible due to a number of soil-plant-management related factors. Apparently, low soil fertility and inadequate nutrient management are among the major factors determining its yield level. Continuous cropping, high proportions of cereals in the cropping system, and the application of suboptimal levels of mineral fertilizers by farmers aggravates the situation in the area.

Objective:
- To determine the optimum N and P fertilizer rates for upland rice (NERICA-4) in the area under Nitosol condition.
- To enhance farmers knowledge about using optimum rates of fertilizer for rice production.
- To capacitate the initiative of FTC for technology generation and dissemination to farmers.

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
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</thead>
<tbody>
<tr>
<td>16</td>
<td>3 (RCBD)</td>
<td>3 with FTC1</td>
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</tbody>
</table>

[Location] Mother trial: 1 FTC site in Sonka FTC, Assosa Zone, Bambasi Woreda
Baby trials: Assosa Zone, Bambasi Woreda, Sonka Kebele, Mender 46 Kebele, Mender 49 Kebele
[Treatment] Four levels of N (0, 46, 92, 138 kg/ha) and four levels of P (0, 10, 20, 30 kg/ha)
[Plot design] RCBD with 3 replications
[Data collected] Days to 50% heading, days to maturity, plant height at maturity, disease, number of filled and unfilled grain per panicle, number of fertile and unfertile tillers per plant, plants and capsules aspect (1-5 scale), number of panicle per plant, number of seed per panicle, thousand seed weight, grain yield (kg/plot), farmer observation, comments and suggestion during all meeting and discussion

Results:
- 92-20 kg N-P ha-1 fertilizer application rate was the best profitable and hence recommended rate for rice production at Bambasi district.

Farmers’ participation:
- Site selection, provide land, preparation, planting, field management, evaluation, and recording.
- 15 farmers (10 male and 5 female)

Research team:
Soil scientist, Agronomist, Rural Development researcher

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Contact Farmer: Hussen Yesuf, Mender 49 Kebele
Tel: 0917171860

Stakeholders
Assosa Research Center, Agricultural offices, world vision (NGO), both FRG and non-FRG members,
Evaluation & Promotion of Improved Tef Technologies in Two Selected Districts of East Wollega and HoroGuduruWollega Zones

Bako ARC (Oromia region) / Ongoing from 2012
Duration: June 2012-December 2014
Budget: 40,000 Birr/ year

Background:
It was observed under field evaluation in 2011 main cropping season at Bako, row planting of teff were found to be promising in field performance and hopefully expected to double crop productivity. Combination of variety evaluation with sowing method can hopefully quadruple teff productivity. To do so, FTC is the appropriate place to train, aware and convinces farmers for adoption of new agricultural technologies that can change their livelihood. Therefore, an extensive FRG based participatory evaluation and promotion of teff technologies on FTC of unaddressed districts will be pressing issues to be addressed by the current project.

Objective:
- To evaluate recently varieties under row planting and broad casting method
- To multiply and disseminate the selected variety(ies) along with its full package to the end users thereby increase household income.
- To build seed channel (Farmers to farmers’ seed diffusion mechanism) To identify farmers’ selection criteria
- To reinforce the capacity of farmers to multiply and diffuse seeds of varieties selected by them

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>8</td>
<td>0</td>
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</tbody>
</table>

[Location]
- 3 FTC site in East Wollega Zone, Jimma rare woreda, HaroGutaKebele, Gemedakebele, KekuKaluKebele
- 3 FTC sites in HorroGuduruWollega Zone, LekaDulechaWoreda, AlleKawisaKebele, HordaKewisakebele, BedhoKebele

[Treatment] Three improved varieties (Kuncho, Guduru, and Kena), one local variety with broadcasting and row planting

[Plot design] RCBD with 3 replications (FTCs considered as replication)

[Data collected]
Development agents and farmers collect data: Days to emergence, days to heading, plant vigor, and uniformity
Researchers collect data: Plant height, Panicle length, Grain yield per plot

[Stakeholders]
Farmers Training Center, District Agriculture office, Development Agents of FTC

- From the experiment result it was observed that different teff varieties and different teff planting methods showed variation on yield and preference by farmers. In order to confirm the last year data it is better to repeat the same experiment in this cropping season and recommend suitable teff production technologies to the farmers.

Farmers’ participation:
- 15 farmers (12 male and 3 female) in each FTC site

Research team:
Agronomist, Pathologist, Plant breeder, Socio-economist, agro-economist

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WegariDano (DA), HordaKewis, Leka Dulecha
Mobile: 0917839985
Diriba Tola (Farmer), HaroGuta, Wayu
Mobile: 0925970008
Tula Keno (Farmer), Bedo, Leka Dulecha
Tel: 092041058
On-farm Quantification and Demonstration of the Extent of Soil Erosion and Nutrient Loss from Slope Farmland under Millet Production in Kaffa Zone, Ethiopia

Bonga ARC (SNNP region) / Ongoing from 2012
Duration: Jun 2012-December 2014
Budget: 40,000 Birr/ year

Background:
Farmers are not willing to construct conservation structures on slope lands for reduction of soil loss while slope land for crop production is essential to feed their family and for income. Besides, millet production is very common in the study area. The importance of the study has significant response for direct value of soil, environment, society (reduced pollution of rivers, reduced sediment in canals and roads), reduction of fertilizer which all result in high economic benefit to farmers and other beneficiaries as a whole. Creating awareness about the impact of erosion on the production and productivity should therefore be crucial.

Objective:
- To demonstrate known facts to farmers that serious erosion is taking place
- To determine the nutrient loss due to soil erosion under millet production
- To estimate the economic value of nutrient loss due to erosion

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Total trial farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>3</td>
<td>6</td>
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</tbody>
</table>

[Location] 1 FTC site in Kafa Zone, GimboWoreda, ShombakichibKebele, 6 farmer field at their own farmlands with slope category of 10-15% and 16-20% in GimboworedaShombakichib kebele

[Treatment]
Factorial experiment with two main plots (10-15% slope and 16-20% slope) and three subplots (with control, with traditional, and with introduced) (control: no structure to prevent erosion)

[Plot design] 3 replications

[Stakeholders]
Farmers (32 farmers(M:24 F:8) in 1 FRGs), DAs,Woreda experts, kebele administration, Researchers

Results:
- To be notified

Farmers’ participation
32 farmers (24 male and 8 female)

Research team:
Soil and water conservation scientist, Agroforestry researcher, Breeder, Socio-economist

Contacts
Principle investigator: AbiyGebremichael, Bonga ARC
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E-mail: gebremichaelaby@gmail.com
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Tel: +251934548562
Farmer: MulualemEniyew, Shombasheka kebele
Tel: +251917232036
Participatory Evaluation and Selection of Improved Tomato Production Technologies at Erer Valley Areas of Harari Regional State.

Haramaya Univ. (Oromia region)/Discontinued in 2012

**Duration:** June 2012-December 2014

**Budget:** 40,000 Birr/ year

**Background:**
The region has great potential for tomato production in terms of physical environment and market opportunities, availability of irrigated water, altitudinal location (between 1300 to 2200 m.a.s.l), temperature (annual average 17 to 20°C), high tomato demand from the three nearby populated cities (Harar, Dire Dawa and Jijiga) and being located in the country important export outlet (Djibouti and Hargesa, of Somalia) push for the need to support small holding farmers solve their productivity problems. This project intended for the same through participatory evaluation and selection of improved production practices using improved verities.

**Objective:**
- To evaluate improved tomato varieties with its improved production management practices with FRG farmers and
- To develop farmers technical capacity in recommended tomato production management packages

**Methods:**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>3 and 1 at FTC</td>
</tr>
</tbody>
</table>

[Location] one FTC site in Erer Woreda Erer Woldeya Kebele, three farmers’ field at Sofi Woreda Erer Hawaye and Hrewe Kebeles

[Treatment]
Chali, Cocholo, and one local variety

[Plot design] RCBD at farmers’ field with 3 replications

[Data collected] soil type, dates of seeding, seedling transplanting, fertilizer application, onset flowering, 50% flowering, maturity, disease occurrence, tomato spoiled in %, cost of land preparation, planting including seeding, chemicals, harvesting, selling price/kg, total cost, total revenues, net benefit, agenda of meeting, date and list of attendants, list of the members participating in activities, their responsibilities, socio-demographic characteristics of participating members, list of non-members who attend demonstrations and field days, meteorological data

[Stakeholders]
Farmers, DAs, Woreda staffs

**Results:**
- to be informed

**Farmers’ participation:**
- 64 farmers (40 male and 24 female)

**Research team:**
Extension researcher, plant protection/agronomist

**Contacts**
**Principle investigator:** Tibebu Bezabih,
Haramaya Univ.,
Tel: 0915-750-295 Mobile: 0920-916-998
Fax: 0256-671-123 E-mail: tibebezabih991@gmail.com
8FRG based research activities on other technologies
Participatory evaluation & Comparison of Chickpea Row planting and broadcasting methods in Ada and Minjar wereda

Debre Zeit ARC(Oromia Region) / ongoing from 2013
Duration: May 2013-December 2014
Budget: 50,000 Birr

Background:
Chickpea is one of the major pulses grown in Ethiopia mainly by subsistence farmers usually under rain-fed conditions. It is one of the annual crops in terms of its share of the total pulse cropped area and its role in direct human consumption. Many improved chickpea varieties have been released for wider adoption in the country. Farmers are looking for chickpea row planting instead of broadcasting method. Therefore, it is high time to compare and evaluate chickpea row planting with broadcasting methods through FRG

Objective:
- Compare and evaluate row planting and broadcasting methods
- Identify farmers comparison criteria for future use
- Develop an extension package with extension material

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
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</thead>
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<tr>
<td>4</td>
<td>6</td>
<td>2</td>
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</tbody>
</table>

[Location] East Shewa Zone, Aba Woreda, UdeKebele, Minjar Woreda, Memihir Hager Kebele

[Treatment]
Broadcasting with hoeing, Broadcasting without hoeing, Row plowing with hoeing and row planting without hoeing

[Plot design]
4 treatments. Broadcasting with hoeing and without hoeing, Row planting with hoeing and without hoeing. Chickpea will be planted on three farmers' field per woreda. farmers will be used as replications

[Data collected]
farmers' selection criteria, crop phonological characteristics, disease, insect and weed incidence, cost of production, farmers' perception and water data

[Others]

[Stakeholders]
farmers, researchers, DAs, SMS and seed producers

Results: to be notified

Farmers participation:
20 farmers per FRG, 12 males and 8 females

Research team:
Socio-economist, Extensionist, Pathologist, Breeder, Agronomist and entomologist

Contacts
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DinkaChala (DA), Ude-Sirba Kebele
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AmhaAbrham (Farmer), Ude-Sirba Kebele
Tel: 0911 36 27 80

Kidanu (farmer), Memihir Hager Kebele
Tel: 0913 09 50 53
Participatory Management of Storage Insect Pests of Maize in Jimma Zone

Jimma ARC (Oromia Region) / ongoing from 2013
Duration: July 2013-Jun 2014
Budget: 48,920 Birr

Background:
The hybrid maize varieties are reported to be highly susceptible to insect pest attacks both in the field and storage (Girma et al., 2008). Hence, farmers are not benefitted from new varieties because of storage insect pests. To reduce such loss, farmers intensively used synthetic insecticides in storage. However, it is important to identify the efficacy of the insecticides by natural and non-toxic substances which are environmentally safe and economically appropriate for the users.

Objective:
- To study the available farmers practices to manage storage insect pests
- To identify the most appropriate options at farmers’ level
- To understand the comparative advantages of natural and non toxic substances compared to synthetic insecticides
- To investigate possible improvement to the farmers’ technologies

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>3</td>
<td>3</td>
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</table>

[Location] Jimma Zone, Dedo Woreda, Offile Dawa Kebele, Kersa Woreda (Kebele TBC), and Seka Woreda (Kebele TBC)

[Treatment]
1. Black polyethylene sheets (BPB), 2. Chenopodium ambrosioides (5% w/w) (ChA), 3. Croton macrostachyus (5% w/w) (CrM), 4. Teff mixture (50% w/w) (TM), 5. Ethylten 5% (ET), 6. Untreated check (UnT)

[Plot design]
A 50kg maize containing sack will be assumed as one plot. This means that six treatments will be assigned at each three FTCs

[Data collected]
Number of Dead and alive progeny (10 days interval), Grain weight losses due to the damage (3 and 6 months after storage), Germination % six months after storage (7 days interval), Economic data (cost for each treatment, Market Maize price/kg (Pure and infected maize) between February and April 2014, Pesticide cost)

[Laboratory work]
6 treatments including non-treated check will be applied on the maize grains in the sacks replicated three times (3 FTCs). 50 weevils (male and female mixed) will be released to each sack (if no natural infestation). 500g of grain sample will be taken from the top, middle and bottom of the sacks from each treatment. Mortality of introduced insects will be recorded at 10-day intervals, except for black polyethylene which will be inspected soon after applications.

[Stakeholders]
FRG Farmers, DAs, woreda Agriculture and rural development office

Results: to be notified

Farmers’ participation:
30 FRG farmers (15 Females and 15 Males) from the three FTC

Research team:
Entomologist, Socio economic researcher and crop breeder

Contacts
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Participatory Evaluation of Selected Fish Processing and Preservation Technologies: The Case of Lake Tana, Ethiopia

Bahir Dar Univ.(Amhara Region) / ongoing from 2013
Duration: May 2013-December 2014
Budget: 99,826Birr/ 2 seasons

Background:
Lake Tana, which is the largest lake in Ethiopia create job opportunity for 3514 fishers (ANRSLRDPA, 2011). In 2011, the Amhara National Regional State earned 65 million Birr from Lake Tana fish products (ANRSLRDPA, 2011). Out of the total 65 million Birr, 14, 338, 443 Birr was gained form exported fish products. Therefore, this shows how much fisheries in Lake Tana is very much important to the fishing community as well as to the region.

Objective:
- To determine the microbial load of the processed product using different fish processing techniques
- To evaluate the quality of processed fish produces organoleptically
- To determine the best post-harvest fish processing techniques in terms of hygiene, storability, and marketability

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Replications/site</th>
<th>Trial farmer sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>2</td>
<td>2</td>
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</tbody>
</table>

[Location] South Gonder Zone, Fogera Woreda, Nabega Kebele, North Gonder Zone, Dembia Woreda, Gorgora Kebele

[Treatment]
Four Post-harvest processing technologies will be implemented. These are:
1. Traditional drying method (control): Usually through hang over ropes and woods or putting on rocks
2. Sun/air drying: a bed like structure will be made and then the sample will be salting then drying
3. Solar tent drying: wooden frame structure will be prepared and covered by polyethelen sheet, then the sampling fish will saltied then dryed
4. Smoking: from locally available material a house like structure will be constructed and then the sample will salted and smoked using plant materials

[Plot design]
The treatments will be tested for 9 months on farm

[Data collected]
- Initial and final weight of the fishes
- Duration of time taken to dry the fish samples for different species and processing techniques
- Moisture content of fish samples processed by the three methods (by oven drying)
- The seven point hedonic scale data for sensory evaluation of the three fish species with respect to the processing techniques
- Microbial load count of the sample fish with respect to the processing techniques
- Prices of these sample fish species

[Stakeholders]
DAs, Kebele and woreda administrative staffs

Results: to be notified

Farmers participation:
in the two trial sites, 18 female and 12 male will be involved

Research team:
Fisheries and wetland management, Fisheries and Aquatic science, Disaster Risk Management and Sustainable Development, Agricultural economics

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Principle investigator: Shewit Gebremedhin,
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Farmers and DAs to be involved in the research activities will be confirmed after initiating the research activities.
FRG based evaluation of the effect of sorghum-legume intercropping system on soil fertility in Chena woreda, Kafa Zone

Bonga ARC[SNNP region] / ongoing from 2013
Duration: May 2013-December 2014
Budget: 49,131.00Birr

Background:
The farmers cultivate their land without soil and water conservation measures for continues long years resulting to highly degraded soil. They are also reluctant to apply artificial fertilizers due to its high cost which resulted to very less production of sorghum yield in the area. Therefore, it is very crucial to create awareness to farmers that they could use organic fertilizers from planting of nitrogen fixing multipurpose grasses/shrubs/trees on their land as intercropping for sustaining its productivity. As intercropping is an important aspect of smallholder-farmer crop production systems, a study was initiated to evaluate the performance of pigeon pea and cowpea forages as an intercropping legume with sorghum and to know also their residual effect for next cropping season.

Objective:
- To evaluate the change in soil fertility due to intercropping of legume-sorghum
- To know the economic importance of intercropping
- To identify the farmers’ perception and preference of best intercropping legume

Methods:

<table>
<thead>
<tr>
<th>Treatments</th>
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</thead>
<tbody>
<tr>
<td>Only Sorghum</td>
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<tr>
<td>Only Pigeon pea</td>
<td></td>
<td></td>
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<tr>
<td>Only Cow pea</td>
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<td></td>
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<tr>
<td>Sorghum and pigeon pea</td>
<td></td>
<td></td>
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<tr>
<td>Sorghum and Cow pea</td>
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</tbody>
</table>

[Location]Kafa Zone, Chena Woreda, BobabalaKebele
[Treatment]
1. Only Sorghum
2. Only Pigeon pea
3. Only Cow pea
4. Sorghum and pigeon pea
5. Sorghum and Cow pea
[Plot design]
RCBD
[Data collected]
1. Composite soil sample before trial
2. Agronomic data of sorghum (days of Emergence, days of germination, plant height, leaf area index, harvest index, mean days of physiological maturity, vigor index, mean days of tasseling, mean days of harvest maturity, Straw weight and 1000 seed weight).

Office of Agricultural Development, Kebele and Woreda administration

Results: to be notified

Farmers participation:
20 Male and 6 Female selected as FRG members

Research team:
Soil and water conservation, Forage, Agronomy, Soil fertility, Socio economics

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Improving Application Time and Use Proportion of Cattle Manure, *Erythrina bruchi* and *Croton macrostachyus* Leaves as a Source of Fertilizer through Farmers Participation in Wolaita, Southern Ethiopia

**Organization:** Wolaita Sodo University (SNR region) / ongoing  
**Duration:** May 2013-Dec. 2014  
**Budget:** 50,000 Birr

**Background:**  
Farmers around Wolaita (South Ethiopia) are using leaf litters of different tree species such as *Erythrina bruchi*, *Croton macrostachyus*, *Cordia Africana*, etc… as organic fertilizers. Despite the critical services that organic inputs provide, the use of organic materials by smallholder farmers is based primarily on trial and error (Palm *et al.*, 2001). That is farmers are applying identical type of organic materials to their field at different times. Furthermore, lack of access to single organic material made farmers to apply mixtures of organic materials. Hence optimizing application time and use proportion are very demanding to synchronize the nutrient release with crop demands, enhance soil fertility and use the resources optimally.

**Objective:**  
- To evaluate the use of easily accessible organic materials and their application time on soil fertility and yield of maize  
- To improve the use of locally available organic materials as a source of fertilizer by small scale farmers

**Methods:**  
**Experiment 3: Field Experiment**

<table>
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<tbody>
<tr>
<td>14</td>
<td>4(RCBD)</td>
<td>1</td>
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</tbody>
</table>

**[Location]** Wolaita Zone, Sodo Zoria Woreda, Kokate-Marachere Kebele  
**[Treatment]**  
The treatments will be made from a combination of three mixed proportions of organic materials and four application times. The mixed proportion will include 1:1 and 1:2 ratio of green leavesof *E. bruchi* and *C. macrostachyus*, respectively; and 1:1:1 green leavesof *E. bruchi*, *C. macrostachyus*, and cattle manure, respectively. The application time will include two, four, six and eight weeks before sowing. In addition, a treatment having no organic matter and inorganic fertilizer will be added for comparison.

**[Plot design]**  
Wheat variety (Degalo), Plot size (2m x 2m), spacing (rows 25cm, plots 0.75m, blocks 0.75m), fertilizer (DAP 100kg ha⁻¹)  
**[Data collected]**  
Plant height, spike length, straw and biomass weight, number of seeds/spike, number of tillers (fertile and infertile) per plant, and 1000 seed weight  
**[Others]**  
- Weather data such as temperature and rainfall will be collected.  
- Farmers preference and partial budget analysis will be performed  

**[Stakeholders]**  
1FRG (10 farmers (7 male and 3 female), extension workers, DAs

**Results:** to be notified

**Farmers’ participation:**  
- Participate in sample collection, site selection, land preparation, sowing, regular evaluation and final stand evaluation  
- Sharing their experience to non-participant farmers during field day

**Research team:**  
Agronomist, Soil expert and agricultural economist

**Contacts (Principal investigator):**  
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Mr. YurfeTunkalo (Farmer)Marachere Kebele, Mobile:0926000236
Participatory evaluation of Push-pull technology for maize production through FRG approach in Tselemti Woreda, North Western Zone of Tigray, Ethiopia

Organization:MayTsebri ARC (Tigray) / ongoing from 2013
Duration: May 2013-December 2014
Budget: 58,490Birr

Background:
The average maize yield in north western zone of Tigray is 2.25tons per hectare while the potential yield is 6 tons per hectare. Several constraints were indicated as the cause of the low yields among them stem borers which are the most important pests causing significant yield loss ranging from 20-80%. Farmers in north western Zone of Tigray have been using crop rotation, removal crop residue from the field, and a few using pesticides like endosulfane solution, but no more effective and environmentally sound solution.

Objective:
- To investigate adaptability of the push-pull technology for maize under farmers condition
- To sensitize and train farmers on the application of the push-pull technology

Methods:
<table>
<thead>
<tr>
<th>Treatments</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MAIZE+Desmodium+bana grass</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>[Location] North western Zone, TselemtiWoreda, Seraco and MayaniKebele</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Treatment]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAIZE+Desmodium+bana grass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Plot design]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial plot is planted 15m apart from control plot with dummy plot in between</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Data collected]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of 50% emergence, Date of 50% flowering, Date of 50% Maturity, Plant height(cm), Grain yield/plot, Biomass yield for maize plot, Biomass yield for Desmodium plot, Biomass yield for Bana grass, Stem borer infestation, number of dead heart plants, percentage of damaged cobs, number of lodged stems, Striga count, density of stem borer at 85% ear filling, Density of stem borer at harvest, Disease score and costs required to establish</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results: to be notified

Researchers:
Ministry of Agriculture and Rural Development officers, DAs

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Mr. Alaye Mekonnen (farmer)
Tel: 0914 79 31 40

Farmers participation: