Agroecological Intensification in Malawi: Evidence from Farmer Research Networks

Maize-Legume Best Bets project, September 2020
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Introduction

- Malawi Maize-Legume Best Bets Technologies project
  - Supporting Farmer Research Networks (FRNs) to
    - Strengthen farmer engagement in soil health innovation
    - Increase scaling of soil health innovations
      - At farm level
      - Community level

2015 BBIII introduces FRNs
2019 BBIV scale FRNs
2020 survey on FRNs
Survey inspired by FAO agroecology elements

Other sources of inspiration
- Biovision criterion tool
- Sustainable Intensification Assessment Framework

Elements related to Best Bets project
- Diversity
- Synergies
- Efficiency
- Co-creation
- Human and social values
Survey objectives

• **Main objective**
  - To analyse the effectiveness of FRNs in supporting soil health innovations for agroecological intensification in maize-legume farming systems

• **Specific objective**
  1. To analyse the diversity of farmers engaging in soil health innovation through FRNs
  2. To establish the contribution of FRNs to selected agroecological elements
     - *Diversity*
     - *Synergies*
     - *Efficiency*
     - *Co-creation*
     - *Human and social values*
Preliminary steps to the survey

1. Reviewing literature on agroecological tools
2. Adapting frameworks/tools to project context
3. Designing a questionnaire
4. Pretesting
Survey design

• Quasi-experimental design (Campbell and Stanley, 2015)
  • Post-test only
    • Comparison of farmers exposed to FRN and those not exposed
      • Possible shortfalls
        • Differences in characteristics of comparison groups
        • Spill over effect
        • Mortality problem

Treatment (farmers in FRN)

Compared to

Control (farmers not in FRN)
### Sampling

- **Multistage sampling**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Units selected</th>
<th>Selection technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>3 districts</td>
<td>Purposive</td>
</tr>
<tr>
<td>Two</td>
<td>7 EPAs</td>
<td>Purposive</td>
</tr>
<tr>
<td>Three</td>
<td>1-2 sections (treatment)</td>
<td>Cluster and simple random sampling</td>
</tr>
<tr>
<td></td>
<td>1 section (control)</td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td>686 farmers</td>
<td>Simple random sampling</td>
</tr>
</tbody>
</table>
### Sample size

<table>
<thead>
<tr>
<th></th>
<th>Kasungu</th>
<th>Mzimba</th>
<th>Ntcheu</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRN</td>
<td>128</td>
<td>116</td>
<td>125</td>
<td>369</td>
</tr>
<tr>
<td><strong>BBIII</strong></td>
<td>51</td>
<td>47</td>
<td>69</td>
<td>167</td>
</tr>
<tr>
<td><strong>BBIV (a)</strong></td>
<td>44</td>
<td>33</td>
<td>27</td>
<td>104</td>
</tr>
<tr>
<td><strong>BBIV (b)</strong></td>
<td>33</td>
<td>36</td>
<td>29</td>
<td>98</td>
</tr>
<tr>
<td>Control</td>
<td>90</td>
<td>99</td>
<td>97</td>
<td>286</td>
</tr>
<tr>
<td><strong>Total sample</strong></td>
<td><strong>218</strong></td>
<td><strong>215</strong></td>
<td><strong>222</strong></td>
<td><strong>655</strong></td>
</tr>
</tbody>
</table>

Almost 70% of the sample frame-list of FRN members

70% of the FRN sample

**BBIII** = Farmers who joined FRNs in 2015-2018  
**BBIV (a)** = Farmers who joined FRNs in 2019  
**BBIV (b)** = Farmers who joined FRNs in 2020
Summary of items in the questionnaire

• 1-Farmer and farm diversity
  • Demographic characteristics
  • Farm Characteristics (2018/19 rain Season)
  • Household food security and assets

• 2- Knowledge, Attitudes and Practices (KAP) on agroecology
  • Integration of crops, trees and livestock (synergies)
  • Farm inputs and productivity of maize and legume crops (efficiency)

• 3- Farmer empowerment and engagement in innovation
  • Participation in agroecological activities (co-creation)
  • Women empowerment index (human and social values)
Results: Diversity of farmers in FRNs

- Cluster analysis identifies three categories of farmers

### Variables loaded in cluster analysis

1. if hired labour
2. if house has iron sheet roof
3. if own cell phone
4. if own chairs
5. if use candle for lighting
6. if access tap water
7. if own cattle
8. education level
9. age of respondent
10. rainfed fields cultivated
11. months with inadequate food
12. dietary diversity score
Results: Diversity of farmers in FRNs

- The three farmer categories have different characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>p&lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>hired labour (%)</td>
<td>7</td>
<td>47</td>
<td>51</td>
<td>0.000</td>
</tr>
<tr>
<td>iron sheet roof (%)</td>
<td>53</td>
<td>6</td>
<td>86</td>
<td>0.000</td>
</tr>
<tr>
<td>own cell phone (%)</td>
<td>23</td>
<td>90</td>
<td>91</td>
<td>0.000</td>
</tr>
<tr>
<td>own chairs (%)</td>
<td>33</td>
<td>53</td>
<td>87</td>
<td>0.000</td>
</tr>
<tr>
<td>Use candles for lighting (%)</td>
<td>0</td>
<td>0</td>
<td>27</td>
<td>0.000</td>
</tr>
<tr>
<td>access tap water (%)</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>0.002</td>
</tr>
<tr>
<td>own cattle (%)</td>
<td>2</td>
<td>3</td>
<td>23</td>
<td>0.000</td>
</tr>
<tr>
<td>Education level-secondary (%)</td>
<td>16</td>
<td>31</td>
<td>36</td>
<td>0.000</td>
</tr>
<tr>
<td>mean age in years</td>
<td>44.4</td>
<td>40.3</td>
<td>45.9</td>
<td>0.0000</td>
</tr>
<tr>
<td>mean number of rainfed fields</td>
<td>1.8</td>
<td>2.0</td>
<td>2.1</td>
<td>0.0000</td>
</tr>
<tr>
<td>mean number of months without food</td>
<td>1.9</td>
<td>1.4</td>
<td>0.9</td>
<td>0.0000</td>
</tr>
<tr>
<td>mean dietary diversity score</td>
<td>3.6</td>
<td>4.1</td>
<td>4.1</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

C1: Very Poor  
C2: Poor        
C3: Better-off
Results: Diversity of farmers in FRNs

- All three farmer categories are represented in the FRNs

![Bar chart showing distribution of farmers in clusters by study groups (30% Very poor-C1, 32% Poor-C2, 38% Better-off-C3) and chi-square p-value of 0.318]
Results: Diversity in farms

• Evidence of crop diversification in all groups, but FRN farmers are more diversified

High crop diversification for all FRN categories and only better -off in control

P<0.001
Results: Diversity in farms

- FRN farmers integrating legumes in farms and shifting from monocropping (maize)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Treatment</th>
<th>Less than quarter field</th>
<th>Quarter field</th>
<th>Half field</th>
<th>Three quarter field</th>
<th>Full field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>Control (n=283)</td>
<td>1</td>
<td>5</td>
<td>16</td>
<td>27</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>FRN (n=356)</td>
<td>7</td>
<td>10</td>
<td>35</td>
<td>27</td>
<td>57</td>
</tr>
<tr>
<td>Beans</td>
<td>Control (n=111)</td>
<td>5</td>
<td>23</td>
<td>14</td>
<td>16</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>FRN (n=282)</td>
<td>17</td>
<td>31</td>
<td>15</td>
<td>9</td>
<td>37</td>
</tr>
<tr>
<td>Soya</td>
<td>Control (n=134)</td>
<td>12</td>
<td>37</td>
<td>15</td>
<td>8</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>FRN (n=266)</td>
<td>18</td>
<td>37</td>
<td>26</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>Control (n=113)</td>
<td>12</td>
<td>43</td>
<td>15</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>FRN (n=222)</td>
<td>21</td>
<td>41</td>
<td>23</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Pigeon peas</td>
<td>Control (n=12)</td>
<td>17</td>
<td>33</td>
<td>25</td>
<td>8</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>FRN (n=77)</td>
<td>47</td>
<td>35</td>
<td>4</td>
<td>4</td>
<td>14</td>
</tr>
</tbody>
</table>
Experiences with the questionnaire

- Interview lasted
  - 40 min (average)
- What was helpful (speed)
  - Structured and closed ended questions
  - Structured questions generated from qualitative information
  - Pretesting with farmers having similar characteristics

- Farmers struggled to answer this questions
  - “How maize crops are used to support the legume crops”
    - It took time for farmers to comprehend the question

- Farmers were not able to give details on pesticides and herbicides
  - A few farmers apply chemicals
    - Are farmers, without their knowledge, already practicing agroecology?
Next steps

• Analyse data
• Report writing (journal papers)
• Further investigations to
  • Fill in the gaps
  • Dig into issues identified from the study, for example,
    • How does the FRN model support scaling of innovations?
    • How do power imbalances affect the agroecology knowledge system?
    • Is actor collaboration viable for agroecological innovation?
Thank you for your attention