To be or not to be a member of a grass-root institution.

A case study using a network analysis in rural areas in Ghana

Vera Chiodi
Paris School of Economics

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In collaboration with Francis Mulangu (ACET)
The role of the GRI’s: 10 cases in north rural Ghana

Source: qualitative survey addressed to the Grass-Root Institution (GRI) chief reveals the objectives are:

- Generate general mutual assistance in the farming
- Secure support from NGO’s and government
- Pool resources for crop production (and cattle)
- Develop agri-business
- Access (formal) credit, technical knowledge from Ministry
Motivation of the case study

1. Study the ways in which grass-root institutions (GRI) interact with links inside and outside the village
   - Links outside the village are considered as a proxy for market connections.
   - Each network is studied for links regarding credit, input, labor and land.

2. Literature shows that social networks help spread information, technologies and products

3. Also, economic indicators and membership, versus non-membership
Hypothesis

- The existence of links between GRI and HH’s in each village for each network
  - degree of complementarity or substitutability between internal and external links in order to inform how households and institutions behave
    - HH’s with external links are less likely to be involved in economic transactions within the village...?
- External links of the GRI (having a mother GRI)
Evidence on the role of Social Networks 1/2

1. Substituability between internal and external links
   - Individuals participating in the market are less likely to get involved in reciprocated transactions, (experimental results), (Henrich et al. 2004, 2010)
   - Demotivation to develop internal links as doing business gets within-community moral pressure to provide credit, discounts, etc. (Meagher, 2006; Whitehouse, 2011)

2. Dominant network by enterprise size and type
   - Networks affect enterprise performance in different ways depending on the network features -Ghana.
     - Large entrepreneurs maintain large innovation networks (information about technology and markets).
     - Smaller ones small networks (reduce information asymmetries and this supporting informal credit and risk-sharing arrangements) (Barr, 2002)
   - Informal entrepreneurs have to combine strong and wide social support ties with weaker business ties to be successful -Burkina Faso. (Berrou and Combarrous, 2012)
1. Incidence in the labor market

- Importance of kinship for starting a business. -Ouagadougou. (Nordmann, Pasquier-D., 2013)
- A larger network increases the probability of finding a wage employment -rather than self-employment (better access to information).
  - Weakness of siblings’ ties also has a positive effect (more effort to socialize).
- The social network does not necessarily help the unemployed find a job.
  - May exert a disincentive effect, through the provision of a safety net or a pressure to redistribute.
New dataset of social and economic networks collected in 9 rural communities in the Tolon and Kumbungu districts of Northern Ghana (August-September 2013)

Based on a list of GRI registered with the Ministry of Food and Agriculture

- randomly select 10 GRIs from 9 communities
- HH survey was conducted (15% of the total HH of these communities)
- Survey of the chief of the community
- 150 households were interviewed (50% non-GRI members)
Control of the quality of the data, supervision of surveyors and quality checks

Quantitative
- Socio-demographic characteristics and agricultural activities of the household members
- Individual events (work experience, migration history, etc.)
- Information on social and economic networks
  - networking matrices within and between communities, for HH, GRI and GI in four types of exchange networks

Qualitative:
- 10 structured interviews to 10 GRI. Emphasis on social network formation and on the resources they had acquired
Table 1: Summary statistics of GRI level

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of GRI members presently</td>
<td>44.7</td>
<td>10.625</td>
<td>10</td>
</tr>
<tr>
<td>Number of female members</td>
<td>24.6</td>
<td>18.512</td>
<td>10</td>
</tr>
<tr>
<td>What crop is at the center of your organization?</td>
<td>Maize Rice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of households in community</td>
<td>141.8</td>
<td>152.046</td>
<td>10</td>
</tr>
<tr>
<td>GRI contacted last year [4]</td>
<td>2.8</td>
<td>0.919</td>
<td>10</td>
</tr>
<tr>
<td>Has network other GRI in community</td>
<td>0.3</td>
<td>0.483</td>
<td>10</td>
</tr>
<tr>
<td>Average meetings by GRI network</td>
<td>3.658</td>
<td>1.478</td>
<td>10</td>
</tr>
<tr>
<td>GI contacted last year [4]</td>
<td>3.1</td>
<td>0.568</td>
<td>10</td>
</tr>
<tr>
<td>Average meetings by GI network</td>
<td>4.425</td>
<td>1.845</td>
<td>10</td>
</tr>
</tbody>
</table>

- All GRI have been in contact with other GRI in the last year, as well as with GI (except for 1). 6 over 10 declared they have no mother GRI.
Network lists

1. **Land** network
   - Of the land you cultivated last year: did you lend out or borrow in land from ...

2. **Inputs** network
   - Did you lend or borrow any production means (tools & fertilizer, etc.) for other ... in last year (2011-12)?

3. **Credit** network
   - Did you lend or borrow money from ... in last year (2011-12)?

4. **Labor** network
   - Did you work for other ... in last year (2011-12)?

- **Internal** link within the village (gift exchange (Kranton and Minehart, 2001), spill over effects) vs **External** link outside the village (as a proxy of market connection)
The methodology: comparison of means of two groups

Non-GRI members chosen randomly among the GRI members neighbors

2 scenarios
- with internal links
- with external links

Reference group
Empirical Strategy

- Analysis of comparisons on means of outcome variables $Y$ by GRI group membership $X$, for each household $i$: $Y_i = \beta X_i + Var_i$.

- Independent variable is being or not a GRI member. The $\beta$ coefficient is the difference of means (t-test). [Statistical significance is depicted as 1% (***)], 5% (**) et 10% (*)].
  - Model 1 without control variables
  - Model 2 with control variables $Var$ at the HH level (marriage and kinship links, as well as a dummy indicating if the GRI has a mother GRI)
  - Model 3 adds more demographic control variables -as HH size and HH head education

Vera Chiodi Paris School of Economics
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<table>
<thead>
<tr>
<th>Variable Names</th>
<th>GRI</th>
<th>Non-GRI</th>
<th>Diff</th>
<th>Effect M1</th>
<th>Diff</th>
<th>Effect M2</th>
<th>Diff</th>
<th>Effect M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has a land network</td>
<td>0.55</td>
<td>0.52</td>
<td>0.03</td>
<td></td>
<td>0.03</td>
<td></td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>Has a labor network</td>
<td>0.63</td>
<td>0.51</td>
<td>0.12</td>
<td></td>
<td>0.12</td>
<td></td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>Has an input network</td>
<td>0.71</td>
<td>0.55</td>
<td>0.16</td>
<td>**</td>
<td>0.16</td>
<td>*</td>
<td>0.15</td>
<td>*</td>
</tr>
<tr>
<td>Has a credit network</td>
<td>0.60</td>
<td>0.44</td>
<td>0.16</td>
<td>*</td>
<td>0.17</td>
<td>**</td>
<td>0.16</td>
<td>*</td>
</tr>
<tr>
<td>Has external link</td>
<td>0.55</td>
<td>0.47</td>
<td>0.08</td>
<td></td>
<td>0.06</td>
<td></td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Has internal link</td>
<td>0.69</td>
<td>0.69</td>
<td>0.00</td>
<td></td>
<td>0.01</td>
<td></td>
<td>0.00</td>
<td></td>
</tr>
<tr>
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<td>0.47</td>
<td>0.35</td>
<td>0.12</td>
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<td>0.12</td>
<td></td>
<td>0.12</td>
<td></td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>Has a internal input network</td>
<td>0.32</td>
<td>0.24</td>
<td>0.08</td>
<td></td>
<td>0.09</td>
<td></td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>Has a internal credit network</td>
<td>0.40</td>
<td>0.40</td>
<td>0.00</td>
<td></td>
<td>-0.01</td>
<td></td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td>Has a external land network</td>
<td>0.08</td>
<td>0.17</td>
<td>-0.09</td>
<td>*</td>
<td>-0.09</td>
<td></td>
<td>-0.10</td>
<td>*</td>
</tr>
<tr>
<td>Has a external labor network</td>
<td>0.11</td>
<td>0.11</td>
<td>-0.00</td>
<td></td>
<td>0.00</td>
<td></td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Has a external input network</td>
<td>0.39</td>
<td>0.31</td>
<td>0.08</td>
<td></td>
<td>0.06</td>
<td></td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Has a external credit network</td>
<td>0.20</td>
<td>0.04</td>
<td>0.16</td>
<td>***</td>
<td>0.17</td>
<td>***</td>
<td>0.17</td>
<td>***</td>
</tr>
</tbody>
</table>
### Economic variables regressions results

<table>
<thead>
<tr>
<th>Variable Names</th>
<th>GRI</th>
<th>NGR</th>
<th>Diff M1</th>
<th>Diff M2</th>
<th>Diff M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land size owned [Acres]</td>
<td>13.65</td>
<td>13.68</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.64</td>
</tr>
<tr>
<td>Income [1gh-,44]</td>
<td>264.36</td>
<td>599.29</td>
<td>-334.93 **</td>
<td>-325.29 **</td>
<td>-327.04 **</td>
</tr>
<tr>
<td>Agricultural income 11-12</td>
<td>1641.96</td>
<td>2006.97</td>
<td>-365.01</td>
<td>-342.11</td>
<td>-384.93</td>
</tr>
<tr>
<td>Sell cash crop to trader</td>
<td>0.81</td>
<td>0.81</td>
<td>0.00</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>HH member migrated</td>
<td>0.59</td>
<td>0.64</td>
<td>-0.05</td>
<td>-0.01</td>
<td>-0.02</td>
</tr>
<tr>
<td>Consider relatively wealthier</td>
<td>0.37</td>
<td>0.21</td>
<td>0.16    **</td>
<td>0.14    *</td>
<td>0.13    *</td>
</tr>
<tr>
<td>Satisfied with agriproduction</td>
<td>0.27</td>
<td>0.40</td>
<td>-0.13    *</td>
<td>-0.10</td>
<td>-0.09</td>
</tr>
<tr>
<td>Satisfied with post-harvest</td>
<td>0.35</td>
<td>0.44</td>
<td>-0.09</td>
<td>-0.06</td>
<td>-0.06</td>
</tr>
<tr>
<td>Satisfied with input costs</td>
<td>0.11</td>
<td>0.07</td>
<td>0.04</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Satisfied with market prices</td>
<td>0.20</td>
<td>0.15</td>
<td>0.05</td>
<td>0.09</td>
<td>0.09</td>
</tr>
<tr>
<td>Better position production</td>
<td>0.25</td>
<td>0.17</td>
<td>0.08</td>
<td>0.06</td>
<td>0.05</td>
</tr>
<tr>
<td>Better position postharvest</td>
<td>0.16</td>
<td>0.19</td>
<td>-0.03</td>
<td>-0.04</td>
<td>-0.04</td>
</tr>
<tr>
<td>Better position costs</td>
<td>0.04</td>
<td>0.11</td>
<td>-0.07</td>
<td>-0.06</td>
<td>-0.06</td>
</tr>
<tr>
<td>Better position prices</td>
<td>0.05</td>
<td>0.12</td>
<td>-0.07   *</td>
<td>-0.08    *</td>
<td>-0.08    *</td>
</tr>
<tr>
<td>% prod sold at the market</td>
<td>56.80</td>
<td>59.93</td>
<td>-3.13</td>
<td>-1.93</td>
<td>-1.98</td>
</tr>
<tr>
<td>% prod sold in village</td>
<td>16.63</td>
<td>15.48</td>
<td>1.15</td>
<td>1.46</td>
<td>1.31</td>
</tr>
<tr>
<td>% prod consumed</td>
<td>22.24</td>
<td>24.08</td>
<td>-1.84</td>
<td>-3.39</td>
<td>-3.22</td>
</tr>
<tr>
<td>Variable Names</td>
<td>GRI</td>
<td>Non-GRI</td>
<td>Diff</td>
<td>Effect M1</td>
<td>Diff</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----</td>
<td>---------</td>
<td>------</td>
<td>-----------</td>
<td>------</td>
</tr>
<tr>
<td>Input cost constraint to you</td>
<td>1.00</td>
<td>0.99</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Weather uncertainty constraint to you</td>
<td>0.72</td>
<td>0.60</td>
<td>0.12</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Credit constraint to you</td>
<td>0.69</td>
<td>0.57</td>
<td>0.12</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>Price uncertainty constraint to you</td>
<td>0.63</td>
<td>0.55</td>
<td>0.08</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Degraded soil constraint to you</td>
<td>0.73</td>
<td>0.71</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>Inadequate infrastructure constraint to you</td>
<td>0.67</td>
<td>0.61</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>High storage cost constraint to you</td>
<td>0.25</td>
<td>0.16</td>
<td>0.09</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Price volatility constraint to you</td>
<td>0.29</td>
<td>0.13</td>
<td>0.16</td>
<td>0.15 **</td>
<td>0.15 **</td>
</tr>
<tr>
<td>Risk of theft constraint to you</td>
<td>0.23</td>
<td>0.08</td>
<td>0.15</td>
<td>0.15 **</td>
<td>0.15 **</td>
</tr>
<tr>
<td>Pressing need of cash constraint to you</td>
<td>0.63</td>
<td>0.49</td>
<td>0.13</td>
<td>0.15 *</td>
<td>0.15 *</td>
</tr>
<tr>
<td>Transaction cost constraint to you</td>
<td>0.27</td>
<td>0.21</td>
<td>0.05</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Low bargaining power constraint to you</td>
<td>0.67</td>
<td>0.59</td>
<td>0.08</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Information asymmetry constraint to you</td>
<td>0.39</td>
<td>0.23</td>
<td>0.16</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>Low farm gate price constraint to you</td>
<td>0.09</td>
<td>0.03</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Low quality of product constraint to you</td>
<td>0.07</td>
<td>0.05</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
</tr>
</tbody>
</table>
Some results interpretations

- No systematic differences between both groups: GRI members & Non-GRI members

**Relaxing credit and input constraints:**
- Advantage of GRI members for: Input (borrow\(>\)lend) & Credit (borrow\(>\)lend) networks (both internal and external) → with respect to the non-GRI members
  - Credit (borrow\(>\)lend) networks for external link
- ...is it a consequence of intrinsic differences between both groups or a result of the GRI membership that creates a differential of access for these types of networks?

- Doesn’t seem that GRI members interact differently (more, less) with the rest of the community or with outside village HH’s than the non-GRI members.

- Non-GRI members compensating this lack of resources (credit and input) with marginal land external networks (lend or borrow a portion of land)
Some results interpretations

- Significant less income for GRI members (they pay GRI membership); however no significant difference for agricultural income.

- GRI members HH’s declared themselves as relatively wealthier than the rest of their community HH’s, but less satisfied with their level of production and they would prefer having better prices than the non-GRI members.
  - Also, regarding the few significant differences on the constraints variables, GRI members more prone to identify own constraints.
  - GRI membership doesn’t lead having less constraints than the non-GRI members.
  - GRI members may have acquired more knowledge about prices (i.e. volatility, farm gate price) and market structure (i.e. information asymmetry) than the non-GRI members.
Adding control variables as (1) marriages between HH’s & (2) kindred relationship between HH’s & (3) having a mother GRI, do not change results (and even total income).

No significant differences on public goods or public services access or interactions with authorities.

Taking into account these differences for rural development policies towards GRI’s as ‘inclusive’ development is crucial

Limitations: Small sample & cross section nature of the data
Location of the GRI’s

*To be or not to be a member of a grass-root institution.*

**KEY**
- Community
- Community where GRI is located

**TOLON DISTRICT**
- Tibogu nnayili
- Tali Botingli
- Gbambaya
- Katinga Market
- Woribogu
- Nyankpala Junction
- UDS Nyankpala Camp
- Daboya-Tolon Road

**KUMBUNGU DISTRICT**
- Tali
- Nlata Tali
- Tolon
- Woribu Kamonagili
- Yabzien
- Katinga
- Nlata
- Gbambaya
- Tali Botingli
- Woribogu
- Buntaga Irrigation Dam
- Buntaga junction
- Zangbaling
- Buntaga
- Saakuba
- Kumbungu
- Kumbungu Road

**ALSO NOTED**
- 4km
- 1.5km
- 1.3km
- 1.2km
- 3km
- 2.5km
- 1.3km
- 3km
- 1km
- 0.3km
- 1.2km
- 1.3km
- 4km
- 9km
- 10km
- 4km
- 3km
- 4km
- 9km