Perennial Grains:
Transformative agriculture or pipedream?
"Sorghum or Kaffir corn is grown chiefly on the river, and in some places in Zomba sorghum has the advantage of being biennial: it may even be used for three years .. will yield a fair return in thin shingly soil that would not support maize. The roots of sorghum are of a stronger character, and go farther in search of food."

Buchanan (1885)
Annualizing project?
ICRISAT 2015 Pigeonpea priorities: “New plant type concept on improvement of erect varieties; Expansion and promotion of super-early pigeonpea genotypes in new niches.”
Legumes: Annuals, Perennials and ??

Annual pulses
- Bean, peanut & soybean

Perennial agroforestry
- Gliricidia & tephrosia
A third way
A third type of legume

- Lablab
- Runner bean
- Lima bean
- Pigeonpea
- Cowpea
Ratooned pigeonpea (Cajanus cajan)
Why/why not ratoon pigeonpea in Malawi

Why NOT ratoon:
- No benefit
- Increased disease
- Competition with maize

Roge et al. ms. submitted
Why grow perennial pigeonpea?
Choice experiments in Malawi

![Graph showing the demand for soil fertility, perenniability, biomass, and yield across different percentages of demand. The graph indicates the trade-offs between these factors.]
Pigeonpea case study

‘Always the bridesmaid, never the bride’

◆ ICRISAT: Early 1990s almost **shut down pigeonpea** research program
◆ BMGF: 2008 funded ‘N2 for Africa’ Prof Ken Giller
  ▪ **Pigeonpea removed** from project
  ▪ Tropical Legumes III 2015: **Pigeonpea removed**
◆ USAID-Malawi: 2010 funded ‘Integrated Nutrient Value Chain’
  DAI (Malawi Government, MSU, AR), project goal: increase by 15% yields of pulses
  ▪ **Pigeonpea removed** from project
◆ Irish Aid in 2011 funded promotion of *Tephrosia vogelli*
  agroforestry maize in Malawi, **pigeonpea overlooked**
## Pigeonpea case study

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>1</strong></td>
<td>All farmers value annuals, <strong>some</strong> ratoon, and value perennial traits</td>
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<tr>
<td><strong>2</strong></td>
<td>Research vision is <strong>all</strong> annual (almost no breeding no agronomy)</td>
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<td><strong>3</strong></td>
<td>Perennial grains were grown historically and persist in some locations</td>
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<td><strong>4</strong></td>
<td>Yet, intensification is an annual (maize!) project in Malawi</td>
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Perennial wheatgrass

Annual wheat

Photo by Jim Richardson
Perennial wheat lines yield vs. annual

Grain Yield % of Annual

- First Year
- Second Year

Jaikumar et al., 2013
Perennial grain biblio. topic modeling
Which vision, agronomy = annuals?

Are perennials key to SUSTAINABLE intensification?

Why have perennial grains been overlooked?