Weathering and halting the perfect storm: food system solutions

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Program Director
1. Mega food system challenges
2. Progress is significant
3. But, we need a food system transformation
The mega adaptation challenge

Change in length of growing period in a +4 °C world (2090)

- >20% loss
- 5-20% loss
- No change
- 5-20% gain
- >20% gain

Farming as we know it now, will not be feasible in many places
Many records are being broken

In many regions we have only 11 growing seasons to reach 500 M farming households

Number of record-breaking monthly temperature extremes now 5X times more

Coumou et al. (2013) Climatic Change

Dry record-breaking events in SSA have increased by up to 50%

Current agricultural technologies perhaps can only achieve 20-40% of what is needed by 2030.

Reductions in other sectors will not be enough to achieve targets.

19-29% global GHGs from food systems

Vermeulen et al., 2012

ERER

Wollenberg et al., 2017

Global Change Biology
## How are agric practices changing?

<table>
<thead>
<tr>
<th>Region</th>
<th>Stepping up (intensifying)</th>
<th>Stepping out (accumulating non-ag assets)</th>
<th>Hanging in (coping)</th>
<th>Scraping by (&gt; 5 food deficit months)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Africa</td>
<td>14</td>
<td>12</td>
<td>43</td>
<td>32</td>
<td>100%</td>
</tr>
<tr>
<td>West Africa</td>
<td>11</td>
<td>6</td>
<td>70</td>
<td>14</td>
<td>100%</td>
</tr>
<tr>
<td>South Asia</td>
<td>17</td>
<td>17</td>
<td>58</td>
<td>9</td>
<td>100%</td>
</tr>
<tr>
<td>South East Asia</td>
<td>12</td>
<td>15</td>
<td>63</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>Latin America</td>
<td>21</td>
<td>14</td>
<td>60</td>
<td>6</td>
<td>100%</td>
</tr>
</tbody>
</table>

Thornton et al. (2018)

**How do we scale up change?**
Climate risk drives poverty

Climate variability

- Uncertainty
- Extreme events

Climate risk management interventions

- Climate-informed advisories
  - Climate-informed advisories
  - Index insurance
- Early warning systems
  - Early warning systems
  - Productive safety nets

Increased investment, adoption

Protected productive assets

Stress-adapted technologies
Massive expansion of use of stress-tolerant varieties

Drought tolerant maize:
- >100 new varieties
- 2 million smallholders
- 13 countries

Lots of work on heat-tolerant wheat
650,000 insured in sub-Saharan Africa

10s of millions accessing extension through mobile phones
Within a few seasons of R&D 300,000 farmers paying for climate-informed advisory services
Solar powered irrigation as a “remunerative crop”

- Sell to the grid
- Sell water to other farmers
- More secure irrigation water
- Positive GHG implications
- Limited over-pumping if incentives right

- USD 21.5 billion investment in rolling out 2.75 M solar irrigation pumps in India

5% cropland in Africa irrigated – global average 20%
Can solar be an energy and water solution?
But, a significant challenge:

- Climate change intensifying
- Less than 20% of small-scale farmers are stepping up
- Must reach 500 million smallholders
What will it take to get food system transformation?

- Fostering enabling policy and institutions
- Digitally enabled climate-informed services
- Reshaping supply chains, food retail, marketing and procurement
- Innovative finance to leverage public & private sector investments
- Climate-resilient and low-emission practices and technologies

Empower farmer and consumer organizations, women and youth

Dinesh et al 2018 CCAFS Infonote
Campbell et al., 2018 Current Opinion
Thank you

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