Agriculture and climate change

Molly E Brown, PhD
NASA Goddard Space Flight Center
Greenbelt, MD 20771
Molly.brown@nasa.gov
You can’t see vulnerability from space...

- In Africa, 95% of all food consumed is grown on the continent

- Variability in growing conditions results in widespread reduction in crop production

- Vulnerability to food insecurity results from:
  - Economic context in which reductions in production occur
  - Livelihood strategy and income level of farmers
  - Political and governmental effectiveness in providing market and economic stability

- Access to food is the primary cause of food security crises today, not food availability
Agriculture and Climate Change

- Population expansion is likely to peak in 2050
- ‘Business as usual’ CO2 emissions is likely to result in a 4°degree+ warming
- Global agriculture is likely to experience declining yields, even with technological advances
- Warming will result in large local production declines in tropical African arid and semi-arid agricultural regions (1 of every 2 yrs harvest failure in Southern Africa (Thornton et al 2011))
Markets may not deliver...

- Market solutions to redistribute excess food will not be reliable if yields decline globally - leading to greater access problems than exist today.

- Adaptive capacity of food systems in Africa is low -
  - Food aid as a long term strategy is not effective.
  - Response of national governments to protect markets can backfire.
  - ‘Farmers will not grow crops or raise livestock that they do know, are not able to sell and are not used to eating’.
Social Sources of Vulnerability

- Transforming global food system to respond to increasing demand
- Simultaneous climate change-reductions in yields and global population expansion
- Increases in commodity prices reduces the ability of the world’s poorest to access food from the global market
- Local food production will remain central to food security in Africa for decades – thus the local government’s ability to foster security, access to markets, and political effectiveness is critical