Assessing Climate Smart Agriculture in an uncertain future to reach development and mitigation goals in Zambia

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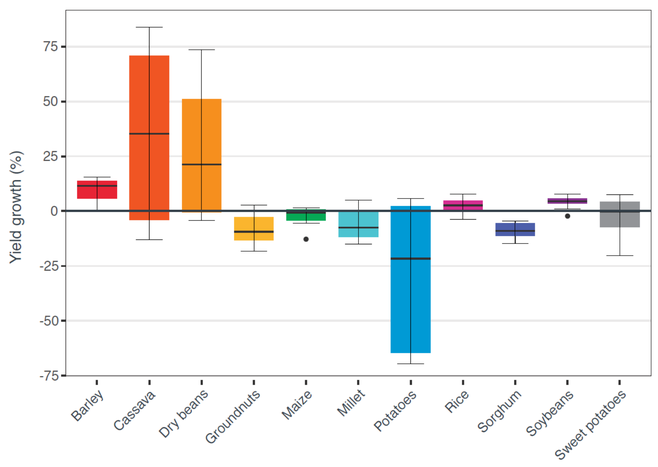
Background

- 60% of Zambia's population depend on agriculture for their livelihood and Zambia's climate is highly variable
- More than 90% of Zambia's carbon footprint come from LULUCF sources
- The Government of Zambia promotes CSA strategies to increase productivity, enhance resilience and reduce GHG emissions

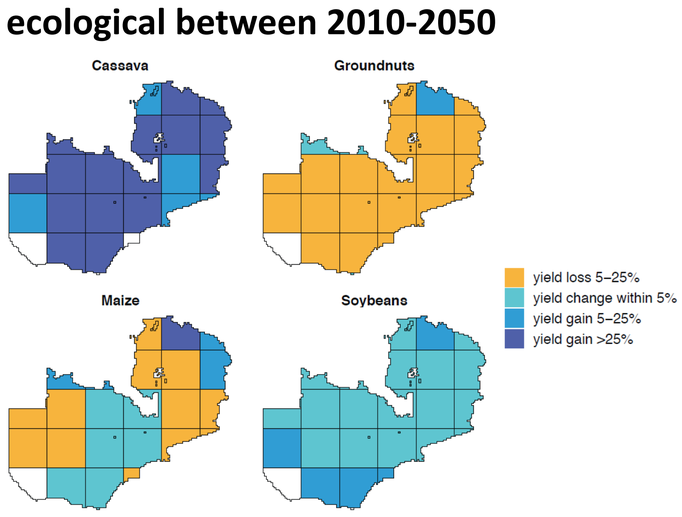
Research questions

- What are agriculture sector trends in 2050, under an uncertain future (climate change and socioeconomic development)?
- What are the impacts of CSA strategies on GHG emissions, land use change, food security and key agriculture sector indicators?
- Can CSA strategies help achieve the agriculture sector vision, compared to conventional practices?

Percent change in yields across main crops between 2010-2050



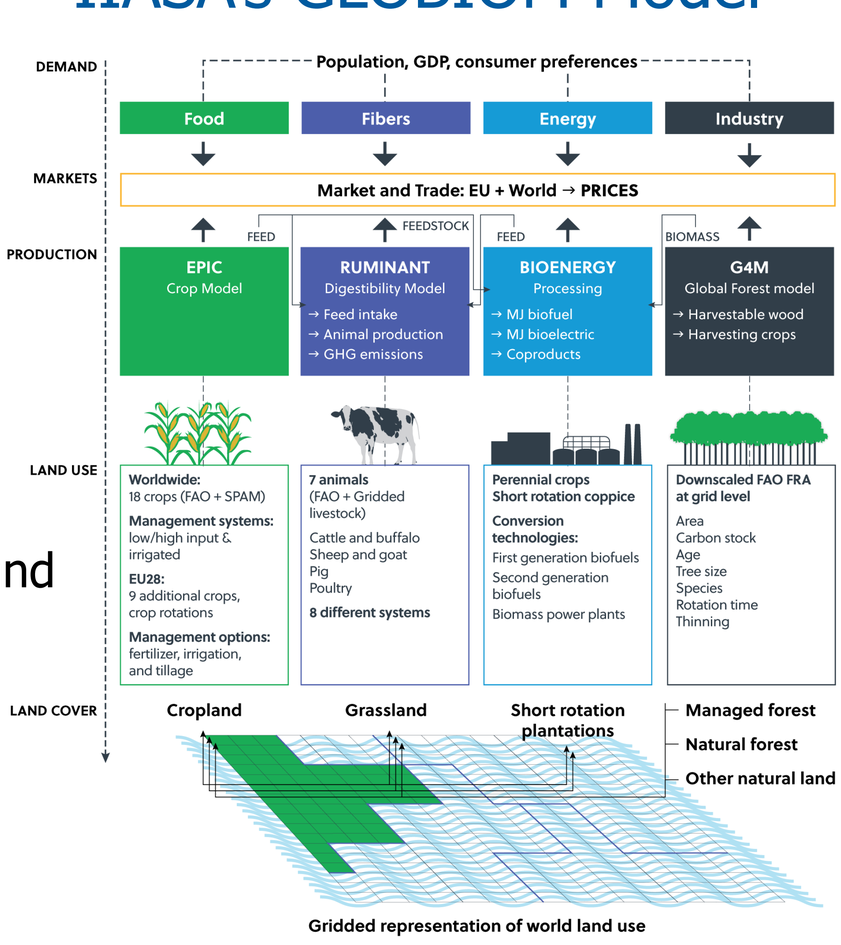
Percent change in yields across main crops across agro-ecological between 2010-2050



Targets to achieve the long-term vision for Zambia's agriculture sector

Policy	Target
National Agriculture Investment Plan (2014–2018)	Increase the share of agricultural exports as a percentage of nontraditional exports from 41% in 2011 to 55% by 2018
	Increase production of cereals from 3.2 million metric tons (MT) to 6.0 million MT by 2018
National Long Term Vision 2030	Increase land under cultivation by 900,000 hectares (ha) by 2030
National Policy on Environment (2007)	Sustainably intensify land use without converting additional land area into agricultural land
Nationally Determined Contribution (2015)	Reduce GHG emissions by 25% with limited international support or 47% conditional on the receipt of US$35 billion of international assistance
Stakeholder workshop	By 2050, double yields and profits by means of diversification (beyond maize), while ensuring household food and nutrition security

IIASA's GLOBIOM Model



Gridded representation of world land use

Conclusions

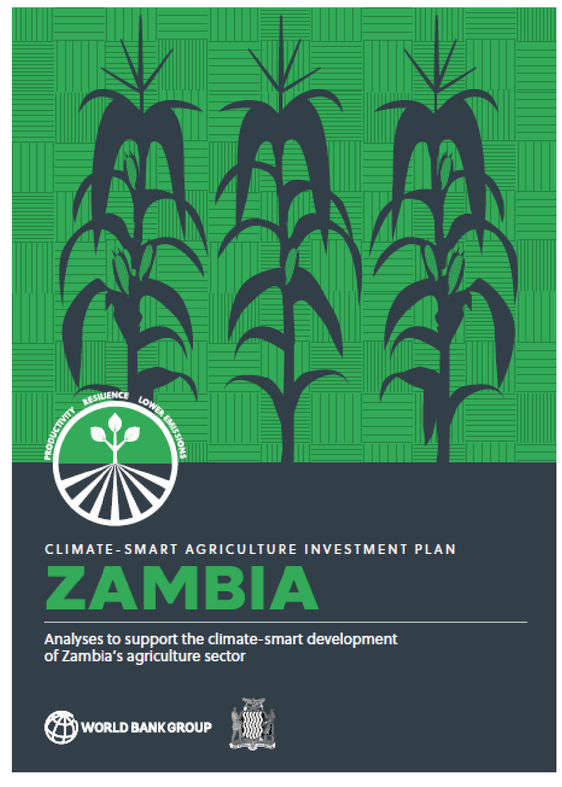
Globally gridded crop models show large variation in impacts across crops and large spatial variation in crop yields due to climate change by 2050

Under conventional practices:

- Agricultural production, food security and net exports will increase and reach the vision, but Zambia's vision for crop yields will not be met
- Cropland area will expand, reaching the National Long-Term vision but **contradicting** the Environmental Vision of no loss in forest area
- NDC for GHG emission reduction targets will not be met.

Compared to conventional practices, the adoption of CSA strategies:

- Has a largely positive effects on crop yield, agricultural production, food security and climate mitigation although impact differs across the various practices.
- Will contribute to reaching the Zambia Vision on agricultural development but cannot close the gaps completely.
- Have an impact on reducing fertilizer related GHG emissions, which is, however, only a small share of total GHG emissions in Zambia.
- Have a limited impact on reducing land use change and related GHG emissions but under carbon prices returns on investment in CSA practices are still positive.



Analysis contributes to:

World Bank. 2018. *Zambia - Climate Smart Investment Plan To Support A Climate-Smart Development of Zambia's Agriculture Sector (English)*. Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/775871546839275668/Zambia-Climate-Smart-Investment-Plan-To-Support-A-Climate-Smart-Development-of-Zambia-s-Agriculture-Sector