A monitoring system for agriculture, nature and human well-being

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- etc
BACKGROUND-WHY VITAL SIGNS?

- Agriculture is the most important sector in Africa accounting for 65% of Africa’s workforce and 32% of the continent’s GDP. In some countries more than 50% of GDP.

- Agricultural landscapes are the **single most important solution space** for achieving the SDGs.

- African agriculture is diverse and complex – needs **site specific solutions**.

- We need the **data at that site level** to get the solutions right.
• The Vital Signs monitoring system collects and integrates data using standardized protocols and methods including household surveys, vegetation plot measurements, and remote sensing.

• The data analyzed together aims to communicate the importance of ecosystem services for small holder agriculture and the complex trade-offs between agriculture, ecosystems and human wellbeing.

• The goal is to ensure that agricultural development does not undermine conservation and ecosystem services critical to human well-being.
QUESTIONS VITAL SIGNS AIMS TO ANSWER

• What is the value of nature to farmers?

• What interventions will increase the resilience of agricultural production to climate variability and shocks?

• Which ecosystems (and where) should we conserve to ensure that agricultural production can be sustained?

• Where should agriculture be intensified to maximize yields while sustaining healthy ecosystems?
VITAL SIGNS SAMPLING FRAMEWORK
UGANDA, TANZANIA, GHANA, RWANDA & KENYA
DATA COLLECTED TO DATE

- 830 household surveys covering 7,197 individuals
- 2,272 agricultural fields surveyed
- 212 verified yield samples
- 4,980 soil samples from biophysical plots
- 999 soil samples from farmer’s fields
- 49,661 trees measured and identified
- 6,810 subplots assessed for erosion
- 2,764 unique plant species identified
- 6733 georeferenced land cover points recorded for ground-truthing classifications
- 8 weather stations constantly collecting data and transmitting to database every half hour
NATURE PLAYS A KEY ROLE IN FOOD SECURITY

The graph shows the relationship between the percentage of the landscape with forest cover and the percentage of households reporting no food shortage in the past year. The countries included are Rwanda, Tanzania, and Uganda, represented by different colors.

The trend indicates that as the percentage of the landscape with forest cover increases, the percentage of households reporting no food shortage also increases.
UGANDA: FORESTS CAN BUFFER AGAINST MALNUTRITION WHERE AGRICULTURAL OUTPUT IS LOW
LOW RETURNS ON INVESTMENT IN AGRICULTURE DUE TO LAND DEGRADATION
RWANDA: LOW RETURNS ON INVESTMENT IN AGRICULTURE DUE TO LAND DEGRADATION

42% degraded: farmers get $4 for every $1 spent on Agriculture.

2.6% degraded: farmers get $34 for every $1 spent.
IMPROVED SEEDS AND EXTENSION SERVICES ARE CRITICAL FOR HIGHER YIELDS
WOMEN FARMERS CARRY THE BIGGEST BURDEN
FEMALE HEADED HOUSEHOLDS ...

- Buy less seed
- Use less pesticide
- Use less herbicide
- Farm smaller areas
- Have less diverse diets
- Eat fewer meals
- Are less likely to own a toilet
- Ensure safe drinking water
- Sell more ag. byproducts

- Female-headed households
- Male-headed households
Partnering with ISRIC, Vital Signs has scaled up on-the-ground soil samples using Machine Learning to map soil nutrients across the continent at high resolution.
VISUALISING THE VITAL SIGNS INDICATORS
INDICATORS.VITALSIGNS.ORG
Vital Signs & Technology

- Space Based Sensors
- Ground Sensors
- Social Surveys
- Scalable Data Integration and Insights Platform
PARTNERSHIPS

• LSMS – ISA
• National Statistics and Meteorological Agencies
• NASA & ESA
• Land PKS
• AGRA
• Lund University
OTHER EXCITING OPPORTUNITIES!

- University of Washington – Data Science for Social Good program – 16 students and 2 Data Scientists made available to work on our data for 10 weeks


- UNECA – Signed MOU to provide data for their various programmes

- SDG Interlinkages working group – support countries to better understand how the SDG targets and indicators link together for easier reporting

- Future Earth (futureearth.org) – opportunity to share the best science with the wider society in Africa
IN SUMMARY

• Natural resources are playing a key role in complementing food security and nutrition

• Limited returns on investment from agriculture especially due to land degradation

• High levels of malnutrition remain despite increase in intensification

• Female headed households still bear most of the burden
NEXT STEPS – RENEWING OUR PARTNERSHIP
NEXT STEPS- 5 TO 10 YEAR TIMEFRAME?

- **2nd Phase of Data Collection:** VS Established strong baseline but needs to continue data collection to better understand trends, causality and trade-offs (at various scales).
  - Focus on a smaller number of key indicators
  - Larger sample sizes in key hotspots
  - Incorporate National data – Household surveys, agricultural data, etc

- **Identify key entry points for Data to support Policy Making:** e.g
  - Tanzania: Village land use plans
  - Rwanda: Bonn Challenge-forest landscape restoration program;
  - Kenya-Integrated platform for planning and decision making
  - Uganda-Agricultural Zoning Policy
NEXT STEPS- 5 TO 10 YEAR TIMEFRAME?

- **Strengthen National Capacity** to analyze and use the results for better decision making at various scales (including extension workers)

- **Strengthen collaboration with key partners working in the same space**: The Regional Center for Mapping and Development, CIAT, ICRAF, European space agency, AFSIS, Land PKS, CGIAR Data Platform, etc

- **Respond to Emerging Requests for Data**: SDG 2 reporting, Planetary Health (Environment and Health/Climate change and Health)

- **Plan for Sustainability** – Integrate the data collection and monitoring system into either the Bureau of Statistics, or Planning Ministry – so that in 10 years countries have capacity to collect, analyze, interpret their own data and use it for better decisions
THANK YOU

Questions?